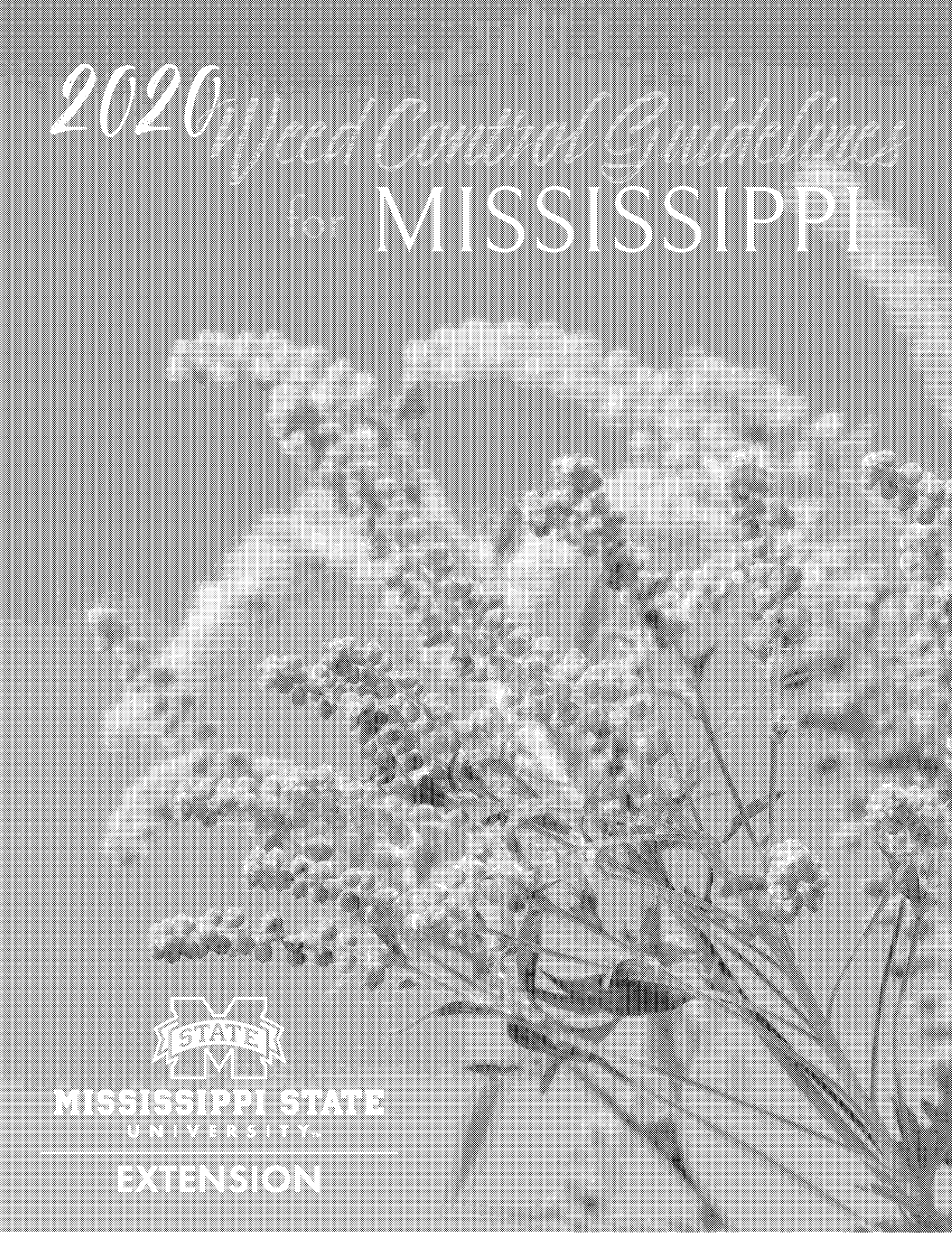
2020 Weed Control Guidelines for MISSISSIPPI



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EXTENSION

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If you wish to receive copies of the 2021 *Weed Control Guidelines for Mississippi,* complete and return the form below to

2021 *Weed Control Guidelines for Mississippi*
c/o John D. Byrd, Jr., Weed Specialist
Dept. of Plant and Soil Sciences
Box 9555
Mississippi State, MS 39762-9555

Copies may not be available if not ordered in advance.

Please send me ____ copies (at $10.00 each) of the publication, 2021 Weed Control Guidelines for Mississippi. Enclose check with order payable to Mississippi State University Extension Service and designate it 2021 Weed Control Guidelines.

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CONTRIBUTING GROUPS

This publication is the result of cooperative work by members of the Mississippi Weed Science Committee. This committee is composed of personnel from the following agencies:

1. Agricultural Research Service, U.S. Department of Agriculture
2. Bureau of Plant Industry, Mississippi Department of Agriculture and Commerce
3. Mississippi Agricultural and Forestry Experiment Station
4. Mississippi State University Extension Service
5. Mississippi State University Forest and Wildlife Research Center

This publication is for the direction and guidance of agricultural workers. Specific and less technical information for various crops may be obtained at county offices of the Mississippi State University Extension Service.

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Particular attention has been taken to ascertain that all herbicide treatments in this report are registered with the EPA for use in the manner described. Registrations for specific practices are frequently modified or deleted, often making it impossible for practices suggested in this report to remain current throughout the calendar year. Therefore, the manufacturer's label should be read and observed to prevent misuse of a herbicide. Some herbicide treatments or practices included herein are provided for through Special Local Need Registrations, Section 24(c). Use directions may be in the form of supplemental labeling, which must be in possession of the user at the time of use. Supplemental labeling for these special uses may be obtained from the dealer or registrant. It is not intended or proposed that any practice suggested in this guide be in violation of existing registration or manufacturer's label.

Precautions

All agricultural chemicals should be handled with care. The manufacturer's label on the container includes precautions for safe handling, which should always be observed. When material is spilled on the body, it should be washed off immediately. In no case, should spray tips be placed to the lips to blow out trash. Many of the materials are flammable and should be handled accordingly.

Aerial application of dicamba, picloram, 2,4-D, and other phenoxy or hormone-type herbicides is regulated by law in Mississippi. 2,4-D, dicamba, and/or MCPA may not be applied by fixed-wing aircraft between April 1 and September 30. 2,4-D and/or MCPA shall not be applied in any form to rice by helicopter between April 1 and September 30, except with special spray equipment and under certain conditions. Before aerial applications of such materials are made, operators should contact the Bureau of Plant Industry, Mississippi Department of Agriculture and Commerce, Mississippi State, Mississippi, relative to compliance with this law and the regulations promulgated thereunder.

Clean spray tanks after the final application of a pesticide and before the application of another pesticide. Failure to clean the spray tank can result in severe crop injury or illegal residues in the harvested commodity. Most pesticide residues can be cleaned from the spray tank using household ammonia. Use clean water to rinse the inside of the spray tank. Use enough water to flush the spray boom hoses and spray tips.

Fill the spray tank with clean water; add enough ammonia to make a 1 percent solution (1 gallon ammonia per 100 gallons water). The ammonia used for cleaning should contain 3 percent active ingredient. Agitate the ammonia solution through the spray equipment and flush the hoses, booms, and nozzles for at least 15 minutes. When possible, allow sprayer to sit with this solution overnight before draining. Fill the tanks with clean water, agitate the water, and flush the boom with clean water for 5 minutes. Whenever possible, locate mix-load sites and equipment clean-up sites at least 100 feet from any surface water or from direct links to groundwater.

It is best not to use the same spraying equipment for applying both phenoxy-type herbicides, (2,4-D, etc.) and other pesticides unless the crop has good tolerance. Herbicides such as 2,4-D can be satisfactorily cleaned out of sprayers, but some risk still exists when spraying sensitive broadleaf crops.

Injury to fish, birds, honey bees, and mammals may be avoided in these ways:

1. Prevent drift of herbicides to wooded areas occupied by wildlife, drift to land areas not intended for treatments, and drift to bodies of water.
2. Prevent runoff or washoff by rain from treated areas to bodies of water through judicious timing of application.
3. Do not make applications too often or in excessive dosages.
4. Do not apply highly toxic herbicides.
5. Prevent carelessness.
6. Avoid treating extensive areas of water with approved aquatic herbicides in one operation, since the decaying vegetation that would result might deplete oxygen content of the water to the point of causing fish kills.
7. Comply with all restrictions specified on the pesticide label in the Endangered Species Act.

Herbicide Safety

Herbicides should always be handled in such a way that the possibility of harm to nontarget organisms (including man), either through contamination of food and water or by contact, is kept to a minimum. All users should be trained in the proper handling of herbicides and in following the precautions below:

1. Know the material being applied; READ THE CONTAINER LABEL AND UNDERSTAND THE DIRECTIONS for preparing and applying the herbicide, and FOLLOW THE DIRECTIONS.
2. Wear protective clothing specified on the pesticide label and avoid prolonged exposure to herbicides. Special care should be exercised to prevent inhalation and contamination of the skin when handling concentrates (use respirators, goggles, impermeable aprons, and gloves as specified on the label).
3. Avoid contamination of foods or drinking water of man and animals.
4. When herbicide contamination of the body occurs, wash the affected area quickly and thoroughly with soap and water. Wash with soap routinely after each day of spraying.
5. Keep spray equipment clean and in good condition.
6. STORE HERBICIDES IN PROPERLY LABELED CONTAINERS OUT OF REACH OF CHILDREN AND ANIMALS.
7. Dispose of empty containers safely (See Container Dis- posal Section).
8. **KNOW THE EMERGENCY MEASURES FOR TREATING ACCIDENTAL POISONING.** When illness arises due to a possible overexposure to a herbicide, contact your local physician. **Physicians and other medical authorities may obtain information on the toxicity of herbicides from the Poison Control Center, University Medical Center, Jackson, MS, telephone 1-800-222-1222.**
9. If herbicides get into the eyes, flush the eyes with plenty of water for 15 minutes and call a physician.
10. If a herbicide is swallowed, apply the first-aid treatment printed on the label of the container and call a physician.

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Mixing and Handling Herbicides

1. Mix and prepare herbicides in the open or in a well-ventilated place. When handled in close quarters, highly toxic herbicides may cause poisoning through inhalation. Certain volatile herbicides may cause fires or explosions.
2. Open herbicide containers carefully to prevent billowing of dusts or splashing of liquids.
3. Pour herbicides carefully to avoid spills. Triple or pressure rinse empty containers and use the rinse water to fill the spray tank.
4. Use special containers — drums or pails — for mixing herbicides; never use food or beverage containers.
5. Never use your mouth to siphon a herbicide from a container.
6. Do not mix herbicides in concentrations higher than those recommended and measure accurately. This will help ensure application of correct and safe dosages.
7. Avoid spilling concentrates on the skin or clothes, and keep them away from the eyes, mouth, and nose. If a herbicide is spilled, wash it off with soap and water and change contaminated clothing immediately. Launder contaminated clothing before wearing it again. Launder contaminated clothing separately. Do not launder with family wash.
8. Always wear rubber gloves when handling concentrates. Rinse the gloves with water before removing them; do not turn gloves inside out when removing.
9. To safely mix and prepare some herbicides, it is necessary to wear a respiratory device and protective clothing. The container label will indicate if these precautions are needed.
10. Do not smoke, eat, or drink when handling herbicides.

Applying Herbicides

1. Wear the protective clothing prescribed on the container label when applying a herbicide.
2. Do not apply dosages greater than those recommended on the container label.
3. Time your applications to prevent illegal herbicide residues on food, feed, or forage crops; allow the prescribed number of days' interval between the last herbicide application and harvest or grazing.
4. Guard against drift of herbicides onto nearby crops, pastures, or grazing livestock, or onto streams, ponds, lakes, other fish-bearing waters, or other sensitive areas. Do not spray when environmental conditions favor drift. Use of the correct nozzle size, which maximizes the largest droplet size, will aid in minimizing spray drift.
5. Guard against runoff of herbicides into water supply sources. Do not mix or/apply herbicides near dug wells, cisterns, or any other water sources into which they may run or be washed by rain. Do not clean application equipment, dump unwanted herbicides, or dispose of empty containers near these places.
6. When applying spray or dust, work into the breeze or at a right-angle to it; thus, the herbicide will be blown away from instead of onto you.
7. Do not smoke, eat, or drink while applying herbicides.
8. Be careful not to rub eyes or mouth with your hands during applications.
9. If you should feel ill while applying herbicides, stop work at once and get medical attention.
10. At the end of a day's work, bathe and change all clothing. Launder the clothing before wearing it again. Launder contaminated clothing separately, not with family wash.
11. Rubber shoes may be cleaned with soap and water.
    It is impossible to efficiently decontaminate leather shoes. If your shoes have become heavily contaminated with herbicide, do not wear them again. Dispose of contaminated footwear properly.

Worker Protection Standard

1. Agricultural, forestry, nursery, and greenhouse users are affected by the Worker Protection Standard.
2. Requirements for Worker Protection Standard must be followed when they appear on the pesticide label. This includes providing personal protective equipment, observing restricted-entry intervals (REI), and notifying workers about areas where applications are taking place or where REI's are in effect. Notification may be oral or with signs posted at field entrances or both if required by the label.
3. Generic provisions of providing a decontamination facility, worker training, monitoring of handlers, cleaning, inspection, and maintenance of personal protective equipment, and notification of applications are required.
4. Training for noncertified pesticide handlers and applicators can be provided by: (1) a currently certified restricted-use pesticide applicator, (2) a person currently designated as a trainer of certified applicators or handlers by State, Federal, or Tribal agency having jurisdiction, or (3) a person having completed a "Pesticide Safety Train-The-Trainer" program approved by the State, Federal, or Tribal agency having jurisdiction. Reinforcement training about the specific pesticide being used should be conducted at the time the pesticide is to be handled or applied.
5. The employer must display at a central location infor- mation about each application, the name, telephone number, and address of the nearest emergency medical facility, and a WPS pesticide safety poster developed by EPA or an equivalent poster. He must also provide transportation to an emergency medical facility for the employee thought to have been poisoned or injured and supply the treating medical personnel any requested information from the product label. A description of the way the pesticide was used and the circumstances of the worker's exposure to the pesticide must also be given.

ATTENTION: Certification and Training Requirements for the Purchase and Application of Auxin Herbicides

Any person intending to **PURCHASE** any dicamba or 2,4-D product that is labeled and intended for in-crop use on 2,4-D- or dicamba-tolerant crop systems and classified as a state restricted-use pesticide must first complete and pass an educational training course offered by Mississippi State University and approved by the Mississippi Department of Agriculture and Commerce. This free course can be found at ***http://www.auxintraining.com***. In addition to passing this training course, the person must **ALSO** be certified in the state of Mississippi as an applicator of restricted-use pesticides.

Any person involved in the **APPLICATION** of any dicamba product that is labeled and intended for in-crop use on dicamba-tolerant crop systems must first complete dicamba-specific training offered by Mississippi State University. This free course can be found at http://www.auxintraining.com.

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ATTENTION: Mississippi Required Recordkeeping Form for the Application of Auxin Herbicides

Applicators must use Mississippi's mandatory recordkeeping form for Engenia, FeXapan, and XtendiMax applications. The form can be found at https://extension.msstate.edu/sites/default/ files/ publications/forms/F1173_web.pdf. The form reflects federal label changes implemented in 2019, including:

- pesticide certification for all applicators,
- 72-hour window for completing the applicacation
- additional buffer requirements for endangered species protection.

A separate form must be filled out for each application. Application records must be retained for 2 years. For each applicator, confirmation of completion of Dicamba Applicator Training must also be kept for 2 years.

ATTENTION: Status of State Restricted-Use Pesticide Products

Any 2,4-D or dicamba products labeled and intended for in-crop use on 2,4-D- or dicamba-tolerant crops shall be classified and registered as "state-restricted use."

Any dicamba product packaged in containers of 1 gallon or larger size and labeled for use in agricultural production shall be classified and registered as "state-restricted use."

Any person attempting to purchase "state-restricted use" pesticides must have a Mississippi pesticide applicator certification.

ATTENTION: Mandatory Paraquat Safety Training

Paraquat-specific training is required by new paraquat labels and must be completed prior to using products with the new labeling. All paraquat labels are expected to include a link to the training by fall 2019. Paraquat products bearing the new labeling can be handled by certified applicators only (i.e., paraquat can no longer be handled by those working under the supervision of a certified applicator). There is no recall of product, so current inventory can be used up.

The free online training can be found at https://campus.extension.org/enrol/index.php?id=1660. Individuals must retake the training every 3 years in order to mix, load, apply, or handle paraquat.

ATTENTION: 2015 Revised Worker Protection Standard for Agricultural Pesticides

The 2015 Revised Worker Protection Standard for Agricultural Pesticides became fully enforceable on January 2, 2018. The following table summarizes key provisions in the EPA's current WPS regulation and the 2015 revisions. The table does not cover all of the details in the rule, nor does it include all of the information needed to comply with the regulation. For more information on how to comply, along with other WPS resources, please refer to the Pesticide Applicator Certification page at **http://extension.msstate.edu/content/revised-worker-protection-standard**.

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QUICK REFERENCE GUIDE TO THE WORKER PROTECTION STANDARD (WPS) AS REVISED IN 2015

The WPS is a federal regulation designed to protect agricultural workers (people employed in the production of agricultural plants) and pesticide handlers (people mixing, loading, or applying pesticides or doing certain tasks involving direct contact with pesticides). Each section links to the Code of Federal Regulations (40 CFR Part 170) for more information on the revised WPS. (www.adf.gov)

The guide summarizes the maximum requirements under the revised WPS. It does not include exemptions and exceptions that may allow you to do less. See the referenced sections below.

Exemptions (general) 170.303 (b) and 170.601

Exceptions for **workers** 170.401 (b) and 170.409 (a)(2)

Exceptions for early-entry **workers** during a restricted-entry interval 170.603

Exceptions for **handlers** 170.501 (b)

Exceptions to PPE required on pesticide labels 170.607

Employer Responsibilities for Supervisors and Labor Contractors

Employers must provide sufficient information to supervisors and/or labor contractors to ensure compliance with the revised WPS. Specify:

- The tasks supervisors/labor contractors must do, and
- The information they must provide to workers/handlers.

Employers are liable for a penalty under FIFRA if a supervisor or labor contractor acting for them fails to comply with the revised WPS requirements. 170.309 (d), 170.313 (d), 170.317 (c)

Duties for ALL Employers

These requirements apply to agricultural employers and commercial pesticide handler employers except the pesticide safety, application and hazard information requirements apply only to agricultural employers.

Anti-Retaliation

Employers must not retaliate against a worker or handler who attempts to comply with the WPS, files a complaint, or provides information in an investigation of alleged WPS noncompliance. 170.315

Minimum Age Requirements

1. Ensure that early-entry workers and all handlers are at least 18 years old. 170.309 (c) and 170.313 (c)

Pesticide Safety, Application and Hazard Information

An agricultural employer must display or make certain information available on the establishment. Commercial pesticide handler employers do not have to comply with information display requirements.

1. Display or make available all of the information listed in #2 together in an easily accessible ("central") location on the agricultural establishment. 170.311 (a)(5) and 170.311 (b)(2)
2. The information includes:
   - EPA WPS safety poster or equivalent information, which must include some additional information by January 2, 2018, and must be kept current. 170.311 (a)
   - Application information that includes:
     - Product name, EPA registration number, and active ingredient
     - Crop or site treated, location and description of the treated area
     - Date, start and end times of the application, and duration of restricted-entry interval (REI). 170.311 (b)(1)
   - A copy of the safety data sheet (SDS) for the formulated product for each WPS-labeled pesticide applied. 170.309 and 170.311
3. In addition, display the EPA WPS safety poster (or equivalent) where decontamination supplies are located at permanent sites and where decontamination supplies are provided for 11 or more workers. 170.311 (a)(5)
4. Allow workers and handlers unrestricted access to all of the information and keep all of the displayed information current and legible. 170.311 (a)(6)-(7) and 170.311 (b)(3)-(4)
5. Display the EPA WPS safety poster or equivalent information before an application takes place and for 30 days after the REI expires. 170.309 (h)
6. Display the SDS and application information within 24 hours of the application and before workers enter treated areas. This information must be displayed for 30 days after the REI expires and kept in records on the agricultural establishment until 2 years after the REI expires. 170.309 (h)&(i) and 170.311 (b)(5)-(6)
7. Provide the SDS and application information upon request of a worker, handler, designated representative or medical personnel, within 15 days. 170.311 (b)(7)-(9)

Pesticide Safety Training

Ensure that **workers** are trained before performing tasks in a pesticide treated area (REI in effect within the last 30 days). 170.401 (a) Ensure that **handlers** are trained before performing any handler activity. 170.501 (a) There is no grace period for worker or handler training.

1. Train workers and handlers annually. 170.401 (a) and 170.501 (a)
2. Present training using EPA-approved materials either orally from written materials or audio-visually. After January 2, 2018, the training must cover additional topics. 170.401 (c) and 170.501 (c)
3. Trainers must be certified applicators or have completed an EPA-approved train-the-trainer program or be designated by the State or Tribal pesticide enforcement agency. 170.401 (c)(4) and 170.501 (c)(4)
4. Training must be delivered in a manner the employees can understand, and the trainer must be present and respond to questions. 170.401 (c)(1) and 170.501 (c)(1)
5. Maintain training records on the establishment for two years from the training date for each worker and handler required to be trained on the agricultural establishment. 170.401 (g) and 170.501 (g)

Continued on next column

Separate from the pesticide safety training, employers must tell workers and handlers where to find the following on the worksite: EPA WPS safety poster (or equivalent), application information, SDSs and decontamination supplies. 170.403 and 170.503 (b)

Decontamination Supplies

1. Establish accessible decontamination supplies located together within 1/4 mile of all **workers** (when required 170.411 (c)) and **handlers**. 170.411 and 170.509
   - 1 gallon of water per worker and 3 gallons of water per handler at the beginning of each work period for routine and emergency decontamination,
   - Plenty of soap and single-use towels, Note: hand sanitizers and wet towelettes are insufficient. 170.411 (b)(2) and 170.509 (b)(2)
   - A clean coverall (or other clean change of clothes) for handlers
2. Provide water that is safe and cool enough for washing, eye-flushing, and drinking. Do not use water that is also used for mixing pesticides unless steps are taken to ensure safety. 170.411 (b)(1)
3. Provide **handlers** with decontamination supplies where personal protective equipment (PPE) is removed at the end of a task. 170.509 (a)
4. Provide **handlers** with decontamination supplies at each mixing and loading site. 170.509 (c)(1)
5. When a product requires protective eyewear for **handlers**, and/or when using a closed system under pressure, provide the following in mixing and loading areas: a system that can deliver gently running water at 0.4 gallons per minute for at least 15 minutes or 6 gallons of water in containers suitable for providing a gentle eye-flush for about 15 minutes. 170.509 (d)(1)
6. When applying a product that requires protective eyewear, provide 1 pint of water per **handler** in portable containers that are immediately available to each handler. 170.509 (d)(2)
7. Do not put **worker** decontamination supplies in areas being treated or under an REI. 170.411 (d)
8. For **handlers**, decontamination supplies must be kept outside the treated area, or any area under an REI, unless they are protected from contamination in closed containers. 170.509 (c)(1)&(3)

Employer Information Exchange

1. Before any application, commercial pesticide handler employers must make sure the owner/operator of an agricultural establishment where a pesticide will be applied, is aware of:
   - Location and description of area to be treated,
   - Date of application, estimated start time and estimated end time of the application,
   - Product name, EPA registration number, active ingredient(s), and REI,
   - Whether the product label requires both oral warnings and treated area posting,
   - All other safety requirements on labeling for workers or other people. 170.313 (i)
2. Owners/operators of agricultural establishments must make sure any commercial pesticide handler employer they hire is aware of:
   - Specific location and description of any treated areas where an REI is in effect that the commercial handler may be in or walk within 1/4 mile of, and,
   - Restrictions on entering those areas. 170.309 (k)

The commercial pesticide employer must pass this information along to the handler doing the work. 170.313 (h)

Emergency Assistance

If there is reason to believe a worker or handler has been exposed to pesticides, during or within 72 hours of employment, and needs emergency medical treatment, employers must do the following:

1. Promptly make transportation available to an appropriate emergency medical facility.
2. Promptly provide to the treating medical personnel, information related to each pesticide product to which the person may have been exposed:
   - Safety Data Sheet
   - Product name, EPA registration number, and active ingredient(s).
   - Description of how the pesticide was used on the agricultural establishment.
   - Circumstances that could have resulted in exposure to the pesticide. 170.309 (l)

This is a summary of the requirements. It does not contain all the information to comply with the revised WPS. Refer to the regulations where indicated for complete details.

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Additional Duties for Worker Employers

These requirements apply to agricultural employers who employ workers.

Restrictions During Applications 170.405 (a)-(b)

During pesticide applications, keep workers and everyone other than appropriately trained and equipped handlers out of the treated area (for all types of applications) and out of:

- The application exclusion zone (AEZ) for outdoor production, or
- A specified area that varies by the type of application until the ventilation criteria are met for enclosed space production.

Restricted-Entry Intervals (REIs) 170.309 (l) and 170.407

Do not direct or allow any worker to enter or remain in the treated area until the REI has expired and all posted warning signs are removed or covered. Read the exceptions in 170.603.

Notice About Applications 170.409 (a)

1. Orally warn workers **and** post treated areas if required by the pesticide labeling.
2. If not, post warning signs if the REI is **greater than**:
   - 48 hours for outdoor production or
   - 4 hours for enclosed space production.
3. For all other applications, **either** orally warn workers or post warning signs.

Posted Warning Signs 170.409 (b)

1. Post legible 14" x 16" WPS-design warning signs no more than 24 hours prior to an application; keep posted during REI; remove or cover before workers enter and within 3 days after the end of the REI. 170.409 (b)(1)-(2)
2. Post signs so they can be seen at all reasonably expected entrances to treated areas. 170.409 (b)(3)(ii)
3. Warning signs can be smaller than 14" x 16" under certain conditions. All warning signs must meet specific requirements. 170.409 (b)

Oral Warnings 170.409 (c)

1. Before each application, tell workers who are on the establishment (in a manner they can understand):
   - Location and description of treated area,
   - Date and times entry is restricted
   - AEZ, REI, and not to enter during REI.
2. Workers who enter the establishment after application starts must receive the same warning at the start of their work period.

Additional Agricultural Employer Duties

Before allowing persons not directly employed by the establishment to clean, repair, or adjust pesticide application equipment, provide the following information:

- The equipment may be contaminated with pesticides.
- The potentially harmful effects of pesticide exposure.
- How to handle equipment to limit exposure to pesticides.
- How to wash themselves and/or their clothes to remove and prevent exposure to pesticide residues. 170.309 (g) and 170.313 (j)

Additional Duties for Handler Employers

These requirements apply to commercial pesticide handler employers and agricultural employers who employ handlers.

Application Restrictions and Monitoring 170.505

1. Do not allow handlers to apply a pesticide so that it contacts, directly or through drift, anyone other than appropriately trained and equipped handlers.
2. Handlers must suspend applications when anyone other than appropriately trained and equipped handlers enter the application exclusion zone (AEZ). This goes into effect on January 2, 2018. 170.505 (b)
3. When anyone is handling a highly toxic pesticide with a skull and crossbones, maintain sight or voice contact every two hours.
4. Make sure a trained handler equipped with labeling-specific PPE maintains constant voice or visual contact with any handler in an enclosed-space production site (e.g., greenhouses, high tunnels, indoor grow houses) while applying a fumigant.

Specific Instructions for Handlers

1. Before handlers do any handling task, inform them, in a manner they can understand, of all pesticide labeling instructions for safe use. 170.503 (a)(1)
2. Ensure that the handler has access to product labeling during the entire handling task. 170.503 (a)(2)

Equipment Safety

1. Inspect pesticide handling equipment before each day of use, and repair or replace as needed. 170.309 (j) and 170.313 (g)
2. Allow only appropriately trained and equipped handlers to repair, clean, or adjust pesticide equipment that contains pesticides or residues, unless they are not employed on the establishment. 170.309 (g) and 170.507 (a) See Additional Agricultural Employer Duties for information regarding non-employed persons.

Personal Protective Equipment (PPE) Handlers Must Use

1. Provide handlers with the PPE required by the pesticide labeling, and be sure it is: 170.507 (b)
   - Clean and in operating condition, 170.507 (b)
   - Worn and used according to the manufacturer's instructions, 170.507 (c)
   - Inspected before each day of use, 170.507 (c)(2)
   - Repaired or replaced as needed. 170.507 (c)(2)
2. When a respirator is required by product labeling, provide handlers with:
   - A medical evaluation to ensure the handler is physically able to safely wear the respirator,
   - Training in respirator use, and
   - A fit test to ensure the respirator fits correctly.
   - Keep records on the establishment of these items for two years. 170.507 (b)(10)
3. Take steps to avoid heat-related illness when labeling requires the use of PPE for a handler activity. 170.507 (e)
4. Provide handlers a pesticide-free area for:
   - Storing personal clothing not in use,
   - Putting on PPE at start of task,
   - Taking off PPE at end of task. 170.507 (d)(9)
5. Do not allow used PPE to be taken home. 170.507 (d)(10)

Care of PPE

1. Store and wash used PPE separately from other clothing and laundry 170.507 (d)(3)
2. If PPE will be reused, clean it before each day of reuse, according to the instructions from the PPE manufacturer unless the pesticide labeling specifies other requirements. If there are no other instructions, wash in detergent and hot water. 170.507 (d)(1)
3. Dry the clean PPE before storing. 170.507 (d)(4)
4. Store clean PPE away from personal clothing and apart from pesticide-contaminated areas. 170.507 (d)(5)

Replacing Respirator Purifying Elements

1. Replace particulate filters or filtering facepiece respirators when any following condition is met:
   - When breathing becomes difficult,
   - When the filter is damaged or torn,
   - When the respirator label or pesticide label requires it,
   - After 8 total hours of use, in the absence of any other instructions or indications of service life. 170.507 (d)(6)
2. Replace vapor-removing cartridges/canisters when any following condition is met:
   - When odor/taste/irritation is noticed,
   - When the respirator label or pesticide label requires it (whichever is shorter),
   - When breathing resistance becomes excessive,
   - After 8 total hours of use, in the absence of any other instructions or indications of service life. 170.507 (d)(7)

Disposal of PPE

1. Discard, do not clean, coveralls and other absorbent materials that are heavily contaminated with pesticide having a signal word "DANGER" or "WARNING." When discarding PPE, ensure that it is unusable as apparel or made unavailable for further use.
2. Follow federal, state, and local laws when disposing of PPE that cannot be cleaned correctly. 170.507 (d)(2)

Instructions for People Who Clean PPE

170.507 (d)(8)

The handler employer must inform people who clean or launder PPE:

- That PPE may be contaminated with pesticides,
- Of the potential for harmful effects of exposure to pesticides,
- How to protect themselves when handling PPE,
- How to clean PPE correctly, and
- Decontamination procedures to follow after handling contaminated PPE.

EPA United States Environmental Protection Agency — epa.gov

PERC Pesticide Educational Resources Collaborative — pesticideresources.org

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Suggestions for Disposal of Excess Pesticides and Pesticide Containers

Owners of excess pesticides should first exhaust the two following avenues before undertaking final disposal:

1. Use the pesticide for the purposes originally intended at the prescribed rate, providing these uses are currently legal.
2. Return pesticide to the manufacturer or distributor.

Recommended Procedures for Disposal of Excess Pesticides
The best way to dispose of excess pesticides is to apply the pesticide according to the label. Cancelled or suspended pesticides are classified as hazardous waste and must be disposed of at a hazardous waste facility. For information on disposal, contact:

Mississippi Department of Environmental Quality
Bureau of Pollution Control
Division of Hazardous Waste Management
P. O. Box 10385, Jackson, MS 39289
Telephone (601) 961-5171

Recommended Procedures for Disposal of Pesticide Containers and Residues

Containers
Dispose of pesticide containers according to instructions on the pesticide label. As a general rule, (1) containers which held liquid pesticides should be triple or pressure rinsed and either offered for recycling or reconditioning, or disposed of in a permitted solid waste facility. (2) Containers which held dry materials should be completely emptied, triple or pressure rinsed if appropriate, and then either offered for recycling, reconditioning, or disposed of in a permitted solid waste facility.

U.S. Ag Recycling of Waller, Texas, offers recycling services for used agricultural chemical containers in a number of locations throughout Mississippi on a quarterly basis. There is no charge for this service, but all containers must be triple rinsed and free of lids and foil, and they must have supplemental information (all but adhesive label) removed. Contact 1-800-654-3145 for more information about drop-off locations and quarterly schedules for pick-up. For additional information visit www.usagrecycling.com.

In addition, the MSU Extension Service typically conducts one or more waste pesticide disposal days each year, depending on the availability of funds. These events are anonymous and free to Mississippi producers. Contact your local County Extension Office for more information on waste pesticide disposal events.

Pesticide Residues
Rinsate from pesticide containers and spray equipment should be added to the spray or mix-tank as diluent and sprayed back on the field.

Open burning of pesticide containers is not permissible under Mississippi law.

Recommended Procedures and Criteria for Storage of Pesticides and Pesticide Containers
Temporary storage of highly toxic or moderately toxic pesticides for the period immediately prior to, and of the quantity required for a single application, may be undertaken by the user at isolated sites and facilities where flooding is unlikely, where provisions are made to prevent unauthorized entry, and where separation from water systems and buildings is sufficient to prevent contamination by runoff, percolation, or wind-blown particles or vapors.

Recordkeeping by Pesticide Applicators

Mississippi does not have a standard form for private or commercial pesticide recordkeeping, but the following sample form includes the items required by EPA, USDA, Worker Protection Standard (WPS), and state law. A similar document or format that captures this data is acceptable for use by pesticide applicators. While not every entry on the form is required for each situation, they are all elements of smart recordkeeping. Following are additional details that may help defend a proper pesticide application: (1) stage of the crop or insect, (2) crop variety, (3) reasons for delaying or halting an application, (4) sensitive areas downwind from the treatment area, (5) required spray droplet size and how it was achieved, (6) sprayer operating pressure, and (7) surfactants and other adjuvants used.

How to Complete the Pesticide Application Record Form

1. Write the location of the application (not the farm or business). The location may be identified on a farm map, by USDA map and number, by global positioning system (GPS), by a common field name (for example, 52-48 Old Creek Field), or by a legal description. If the site treated is a greenhouse or storage facility, give it a unique name or number. Here are some options for using GPS coordinates to record location: (1) create a map of the treated area with GPS coordinates, (2) list the GPS coordinates to delineate the field perimeter, or (3) record GPS coordinates that accurately identify one point pertaining to the field. The coordinates should be followed by a statement indicating the relationship of the point to the field. For more information on GPS go to www.ams.usda.gov/pesticiderecords.
   1a. Record the customer of a custom applicator/PCO, or the business that employs the applicator who is applying to publicly or privately owned nonagricultural ground.
2. Record the applicator's name and certification number.
3. Fill in the month, day, and year of application. WPS also requires you to post the start and end time of application.
4. The EPA Registration Number is located below the ingredients statement on most labels (for example, EPA Reg. No. 241-337). It is not the same as the EPA establishment number.
5. Copy the active ingredients from the label for all products used in the application.
6. Write the brand or product name of the pesticide. Use multiple lines to record tank mixes. Information on all products used in a tank mix is required.
7. The pesticide label lists the restricted entry interval (REI). The application information for workers must remain posted until 30 days after the end of the REI. When there is no REI, the notice must remain for 30 days after the application date. If you apply pesticides in a tank mix with different REIs, write down the longer REI.
8. Fill in the crop, commodity, or site. If the location is a green house, record crop and site location. If you are treating live stock, record the type of animals treated (hogs, cattle, etc.).
9. The pesticide label will usually give you a minimum to maximum of the application rate per unit (for example, 1.5 pints per acre). Record the rate you actually use.

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FIELD ID/LOCATION: **1.** 52-48 Old Creek Field

(COMMERCIAL) NAME/ADDRESS OF PERSON/BUSINESS FOR WHOM PESTICIDE APPLIED:
1a. John Brown, 1234 Jackson Rd., Your Town, MS

Applicator Name and Certification Number	Mo/Day/Year Start/End Time	EPA Reg. Number	Active Ingredients	Brand/ Product Name	Restricted Entry Interval (REI)	Crop, Commodity, or Site
Bob B. Smith	*5/3/02 10 am*	*241-337*	*Pendimethalin*	*Prowl 3.3EC*	*24 hrs*	*cotton*
200028265	*5/3/02 10 am*	*100-642*	*Fluometuron*	*Cotoran 4L*		
2.	**3.**	**4.**	**5**	**6.**	**7.**	**8.**

10. Record the number of units treated. Units may be acres, linear feet, bushels, cubic feet, square feet, or number of animals, etc. For special applications (for example, alternate middles, weed wicks, band applications), record the total area covered. A 20-acre field treated using an alternate middle approach would still be recorded as 20 acres. See the following note on spot treatments.
11. The total amount applied refers to the total quantity of product used—not the quantity after water or carrier is added. Amount does not refer to percent of actual ingredient.
12. When you are filling out the application record, you may find it helpful to record information about the sprayer equipment, the pests, the weather (particularly wind speed and direction, but also temperature and humidity), and the crop status. This information will help you know whether an application was effective and improve future pest- management decisions. It will also be helpful in problem solving if the pesticide fails to control the target pest or moves off target.

Note: "Spot Treatments" are applications made to less than one-tenth of an acre. Application of a RUP herbicide along a fencerow or an insecticide applied to a fire ant mound would be examples of spot treatments. Greenhouse and nursery treatments do not qualify as spot treatments. For spot treatments, describe the location of the area treated (for example, poison ivy along fencerow of Baker Farm), indicate "spot treatment," and record the following:

- Brand name;
- EPA registration number;
- Month, day, and year;
- Total amount applied; and
- "Spot treatment," describe location.

Commercial applicators: EPA regulations require disposal information (as listed on the form) for any excess pesticide that must be disposed of.

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FIELD LOCATION/DESCRIPTION:

(COMMERCIAL) NAME/ADDRESS OF PERSON/BUSINESS FOR WHOM PESTICIDE APPLIED:

Applicator Name and Certification Number	Mo/Day/Year Start/End Time	EPA Reg. Number	Active Ingredients	Brand/ Product Name	Restricted Entry Interval (REI)	Crop, Commodity, or Site

Keep this record for at least 2 years

Note: For application of auxin herbicides to transgenic crops, refer to the label for product-specific recordkeeping information.

Rate	Size of Area Treated	Total Amount Applied	Field Notes: target pest(s); sprayer nozzles, speed, pressure, gallonage; wind and weather; crop status. COMMERCIAL: type of service performed; disposal information (amount, method, date(s), location of disposal site)

Keep this record for at least 2 years

Modified from USDA Recordkeeping Manual for Private Pesticide Applicators (rev. Aug. 2010).

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General Instructions for Use of Abbreviated Guides

1. Preplant and preemergence herbicide rates are generally related to soil texture and organic matter content. Some herbicides are suggested in these guidelines for a wide range of soil types (sandy to clays); whereas, others are suggested for only a few soil types. The soil organic matter content further defines use rates. Some times low contents prevent use, but generally, rates increase with increasing organic matter content.
2. If a single rate is recommended for a herbicide, use the recommended rate for all soil types and weed conditions described.
3. If a range of rates (2 to 4 lb for example) is recommended, select a rate from within the range in accordance with the size and condition of crop and weeds. For example, the lowest recommended rate of diuron plus surfactant should be used to control a very scattered infestation of newly emerged crabgrass in 6-inch cotton. In cotton more than 10 inches tall, the highest rate should be used if the problem consists mainly of crabgrass 2-3 inches tall and thickly spaced in the row.
4. If a range of rates (2 to 3 to 4 lb for example) is recommended for soil-applied herbicides, the specific rate should be chosen in accordance with soil texture and organic matter content of the soil. First, use the lower range for soils in the sandy textural class and the higher range for loams, clay loams, or, where recommended, for clays. Second, within either the low or high range select the specific rate in accordance with the organic matter content of the soil. Use the lower side of the range where organic matter is low and the higher side of the range where organic matter is high. Although exact knowledge concerning the organic matter content of soils is generally not available, there are several rough guides that can be used. Soils high in organic matter tend to darker and more easily cultivated than similar soils low in organic matter. Plants grown in high organic soils suffer less from drought than plants grown in similar soils with low organic matter. Soils of the Midsouth with less than one percent organic matter should be considered low in organic matter while those with 1.5 percent should be considered high in organic matter for purposes of herbicide use.

FACTORS TO CONVERT BROADCAST RATE/A TO A BAND RATE AT VARIOUS BAND AND ROW WIDTHS.

Band width inches	Row Spacing — Inches							
	20	24	28	30	32	36	38	40
6	0.3	0.25	0.21	0.20	0.19	0.17	0.16	0.15
8	0.4	0.33	0.29	0.27	0.25	0.22	0.21	0.20
10	0.5	0.42	0.36	0.33	0.31	0.28	0.26	0.25
12	0.6	0.50	0.43	0.40	0.37	0.33	0.31	0.30
14	0.7	0.58	0.50	0.47	0.44	0.39	0.37	0.35
16	0.8	0.67	0.57	0.53	0.50	0.44	0.42	0.40
18	0.9	0.75	0.64	0.60	0.56	0.50	0.47	0.45
20	1.0	0.93	0.71	0.67	0.62	0.56	0.53	0.50

How to Convert: Find the factor for row spacing and band width and multiply this by the broadcast rate.
For Example: The broadcast rate is 1.0 lb/acre, row spacing is 30 inches and band width is 10 inches—multiply .33 by 1.0 to get 0.33 lb/acre on a 10-inch band.

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Caution - Noxious Weeds

The Mississippi Department of Agriculture and Commerce has the authority (under Section 69-25-1 through 69-25-47, Laws of Mississippi 1974) to regulate noxious weeds. A noxious weed is a plant species or classified group of plants declared by the Bureau of Plant Industry to be a public nuisance or to be especially injurious to the environment, to agricultural and horticultural production, or to wildlife, and which should be controlled and the dissemination of which prevented. The Mississippi Noxious Weed List and Quarantine information can be found in the regulation "Plant Diseases, Insects and Weeds" on the Bureau of Plant Industry Web site (www.mdac.ms.gov → "Agency Info" → "Laws & Regulations" → "Bureau of Plant Industry").

MISSISSIPPI NOXIOUS WEEDS

Common Name	Scientific Name	Habitat
Benghal Dayflower	*Commelina benghalensis*	terrestrial
Brazilian Santintail	*Imperata braziliensis*	terrestrial
Chinese Tallow Tree	*Sapium sebiferum(Triadica sebifera)*	terrestrial
Cogongrass	*Imperata cylindrica*	terrestrial
Giant Salvinia	*Salvinia molesta*	aquatic
Hydrilla	*Hydrilla verticillata*	aquatic
Itchgrass	*Rottboellia cochinchinensis*	terrestrial
Kudzu	*Pueraria montana var. lobata*	terrestrial
Torpedograss	*Panicum repens*	aquatic/terrestrial
Tropical Soda Apple	*Solanum viarum*	terrestrial

Also, the Mississippi Department of Agriculture and Commerce has the authority under the Mississippi Aquaculture Act of 1998 (Section 79-22-9, Laws of Mississippi 1974) to regulate the cultivation and marketing of certain aquatic products. In the "Guidelines for Aquaculture Activities" regulation, the department further defined permitting requirements for the importation, selling, possessing, or transporting of species that are detrimental to the state's native resources. The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) and the Department of Marine Resources may advise MDAC in issuing cultivation and marketing permits (Section 49-7-80, Laws of Mississippi 1974). MDWFP determined the following species to be detrimental to the state's native resources. **Sales and distribution of the following species are prohibited in Mississippi**. The list of prohibited aquatic plants for sale and distribution can be found in the regulation "Guidelines for Aquaculture Activities" on the Bureau of Regulatory Services Web site (www.mdac.ms.gov → "Agency Info" → "Laws & Regulations" → "Bureau of Regulatory Services").

AQUATIC PLANTS PROHIBITED FOR SALE AND DISTRIBUTION IN MISSISSIPPI

Common Name	Scientific Name	Habitat
Hydrilla (Florida Elodea)	*Hydrilla verticillata*	aquatic
Egeria (African Elodea)	*Egeria densa*	aquatic
Water Hyacinth	*Eichhornia crassipes*	aquatic
Rooted Hyacinth	*Eichhornia azurea*	aquatic
Eurasian Watermilfoil	*Myriophyllum spicatum*	aquatic
Water Lettuce	*Pistia stratiotes*	aquatic
Paperbark (Melaleuca)	*Melaleuca quinquenervia*	aquatic or wetland

A list of federal noxious weeds is available on the USDA APHIS Web site (www.aphis.usda.gov). This list includes species or species groups that are not currently in the United States and present a real threat to agricultural, forest, urban, and natural areas. The list also includes species that are major weed problems elsewhere in the world and which currently have limited distributions in the United States. **Movement of any federal noxious weed, including seed and other propagules, into the United States and across state lines is prohibited**. See the Computer Aids section in this publication for additional Web sites about non-native invasive weeds.

FEDERAL NOXIOUS WEEDS OCCURRING IN ADJACENT STATES

Common Name	Scientific Name	Habitat	States
Duck-lettuce	*Ottelia alismoides*	aquatic	Louisiana
Cattail Grass	*Setaria pallide*	terrestrial	Louisiana
Fringed Dodder	*Cuscuta suaveolens*	terrestrial	Alabama
Kodomillet	*Paspalum scrobiculatum*	terrestrial	Alabama
Turkey Berry	*Solanum torvum*	terrestrial	Alabama

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GLYPHOSATE PRODUCTS, FORMULATIONS, AND RATE CONVERSIONS

Product[1,2]	Manufacturer or distributor	Active ingredient Concentration (lb)[3] Acid (a.e.)	Salt (a.i.)	Surfactant recommended[4]	Amount (oz/A) of product to apply according to rate required and glyphosate formulation: lb ae/A =	0.375	0.56	0.75	1.125	1.5
					lb ai/A (3 lb ae/4 lb ai) =	0.5	0.75	1.0	1.5	2.0
					lb ai/A (4 lb ae/5.4 lb ai) =	0.5	0.75	1.0	1.5	2.0
Accord Concentrate[5]	Dow AgroSciences	4	5.4	Yes*		12	18	24	36	48
Accord SP[5]	Dow AgroSciences	3	4	No		16	24	32	48	64
Aqua Star[5]	Albaugh (Agri Star)	4	5.4	Yes		12	18	24	36	48
Aqua Neat[5]	Cerexagi (Riverdale)	4	5.4	Yes		12	18	24	36	48
Aquamaster[5]	Monsanto	4	5.4	Yes		12	18	24	36	48
Buccaneer	Tenkoz	3	4	Yes*		16	24	32	48	64
Buccaneer Plus*	Tenkoz	3	4	Yes*		16	24	32	48	64
ClearOut 41	Chemical Prod. Tech.	3	4	Yes		16	24	32	48	64
ClearOut 41 Plus*	Chemical Prod. Tech.	3	4	Yes*		16	24	32	48	64
ClearOut Pro Plus	Chemical Prod. Tech.	3	4	No		16	24	32	48	64
Cornerstone*	Agriliance	3	4	Yes*		16	24	32	48	64
Cornerstone Plus*	Agriliance	3	4	Yes*		16	24	32	48	64
Credit*	Nufarm	3	4	Yes*		16	24	32	48	64
Credit Extra*	Nufarm	3	4	No		16	24	32	48	64
Credit Duo*	Nufarm	3	3.97	Yes*		16	24	32	48	64
Credit Duo Extra*	Nufarm	3	3.97	No		16	24	32	48	64
Eagre[5]	Griffin	4	5.4	Yes		12	18	24	36	48
Foresters[5]	Riverdale	4	5.4	Yes*		12	18	24	36	48
Gly Star Plus*	Albaugh (Agri Star)	3	4	No		16	24	32	48	64
Gly Star Pro*	Albaugh (Agri Star)	3	4	No		16	24	32	48	64
Gly Star 5*	Albaugh (Agri Star)	4	5.4	Yes		12	18	24	36	48
Gly Star Original*	Albaugh (Agri Star)	3	4	Yes*		16	24	32	48	64
Gly-Flo	Micro-Flo	3	4	Yes*		16	24	32	48	64
Glyfos*	Cheminova	3	4	Yes*		16	24	32	48	64
Glyphos X-tra*	Cheminova	3	4	No		16	24	32	48	64
Glyfos Aquatic[5]	Cheminova	4	5.4	Yes		12	18	24	36	48
Glyfos Pro[5]	Cheminova	3	4	No		16	24	32	48	64
Glyphomax*	Dow AgroSciences	3	4	Yes*		16	24	32	48	64
Glyphomax Plus*	Dow AgroSciences	3	4	No		16	24	32	48	64
Glyphosate*	DuPont	3	4	Yes*		16	24	32	48	64
Glyphosate original*	Griffin	3	4	Yes*		16	24	32	48	64
Glyphosate VMF[5]	DuPont	4	5.4	Yes		12	18	24	36	48
Glyphosate 4*	Farmsaver.com	3	4	Yes		16	24	32	48	64
Glypro[5]	Dow AgroSciences	4	5.4	Yes		12	18	24	36	48
Glypro Plus[5]	Dow AgroSciences	3	4	No		16	24	32	48	64

(continued)

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GLYPHOSATE PRODUCTS, FORMULATIONS, AND RATE CONVERSIONS *(continued)*

Product[1,2]	Manufacturer or distributor	Active ingredient Concentration (lb)[3] Acid (a.e.)	Salt (a.i.)	Surfactant recommended[4]	Amount (oz/A) of product to apply according to rate required and glyphosate formulation: lb ae/A =	0.375	0.56	0.75	1.125	1.5
					lb ai/A (3 lb ae/4 lb ai) =	0.5	0.75	1.0	1.5	2.0
					lb ai/A (4 lb ae/5.4 lb ai) =	0.5	0.75	1.0	1.5	2.0
Honcho	Monsanto	3	4	Yes*		16	24	32	48	64
Honcho Plus*	Monsanto	3	4	Yes*		16	24	32	48	64
Kleenup Pro$	United Hort. Supply	3	4	Yes*		16	24	32	48	64
Mad Dog*	AGSCO	3	4	Yes*		16	24	32	48	64
Mirage	Platte	3	4	Yes*		16	24	32	48	64
Mirage Plus*	Platte	3	4	Yes*		16	24	32	48	64
Polado L	Monsanto	4	5.4	Yes		12	18	24	36	48
Rattler	Helena	3	4	Yes*		16	24	32	48	64
Rattler Plus	Helena	3	4	Yes*		16	24	32	48	64
Razor$	Riverdale	3	4	Yes*		16	24	32	48	64
Razor Pro$	Riverdale	3	4	No		16	24	32	48	64
Rodeo$	Dow AgroSciences	4	5.4	Yes		12	18	24	36	48
Roundup Original RT	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original II*	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Original II CA*	Monsanto	3	4	Yes*		16	24	32	48	64
Roundup Custom*	Monsanto	4	5.4	Yes		12	18	24	36	48
Roundup Ultra Max*	Monsanto	3.7	5	No		13	19	26	40	52
Roundup Pro$	Monsanto	3	4	No		16	24	32	48	64
Roundup Pro Concentrate$	Monsanto	3.7	5	No		13	19	26	40	52
Roundup UltraDry*	Monsanto	64.9%	71.4%	No		10	14	19	29	38
Roundup ProDry$	Monsanto	64.9%	71.4%	No		10	14	19	29	38
Roundup WeatherMax*	Monsanto	4.5	5.5	No		11	16	21	32	42
Silhouette	Agriliance	3	4	Yes*		16	24	32	48	64
Touchdown CF	Syngenta	3	3.6	No		16	24	32	48	64
Touchdown Pro$	Syngenta	3	3.6	No		16	24	32	48	64
Touchdown 5	Syngenta	3.4	5	No		14	21	28	42	56
Touchdown*	Syngenta	3	3.6	No		16	24	32	48	64

[1] Glyphosate products marked with "*" can be applied over-the-top of "Roundup Ready" crops. Please refer to glyphosate product label for specific restrictions.

[2] Glyphosate products marked with "$" are labeled for noncrop (aquatic, forestry, industrial, pasture, and/or turf) use only.

[3] Like many other herbicides, the glyphosate molecule is formulated as a salt. The weight of the active ingredient (a.i.) varies, depending on the chemical elements used to form that salt. The salt portion of the active ingredient does not contribute to actual weed control. Because the weight of the salt used in the different glyphosate formulations varies, a better measure among glyphosate products is the comparison of the actual amount of glyphosate, i.e. acid equivalent (a.e.). The a.e. rate measurement allows one to compare the actual glyphosate rate among the different salt formulations. The a.e. measurement is the only true method to compare glyphosate rates among the different salt formulations.

[4] Some formulations of glyphosate "*" contain some surfactant; however, additional surfactant is required with certain spray volumes. See product label for specific surfactant rates and uses.

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PREPLANT WEED CONTROL OF WINTER ANNUAL WEEDS

Successful conservation tillage systems begin with good preplant weed-control programs. The steps for achieving a successful weed-control program are problem diagnosis, method evaluation, program selection, and program implementation. The diagnosis phase is probably the most important step when using these tillage systems. Without proper identification, unsuccessful weed control programs may be implemented, and, in some cases, complete crop loss could occur. Producers have few options to correct ineffective weed-control programs after planting and crop emergence.

More new and different weeds will occur in stale seedbed or no-till cropping systems than in conventional tillage systems. Many of these winter and early emerging spring and summer annuals are difficult to identify in early growth stages, and they become difficult to control by the time they are easily identifiable. Ideally, producers should know what species are present before using a herbicide, although a herbicide such as paraquat or glyphosate can control many plants that are not identified correctly. However, some species require special attention because they are not easily controlled by glyphosate or paraquat.

Producers using conventional tillage systems must become aware of key species that require specialized herbicide programs to avoid unsatisfactory or catastrophic results. Although not a complete list, the most commonly encountered species in the mid-South are shown in the table on the following page. The most difficult to control species in our geographic area are annual ryegrass, cutleaf eveningprimrose, curly dock, horseweed, Pennsylvania smartweed, and swinecress. The following table also shows the expected response of these and other species to commonly used herbicides and herbicide combinations. Weed responses in the table on the following page were compiled from a variety of sources and offer a relative comparison of control provided by different herbicides and combination. Some data should be considered preliminary data and were recorded as field observations without replicated field trials to verify their accuracy. In addition, the ratings provided may be lower than those expected with rates labeled for specific weeds. Overall, they reflect observations made over a wide variety of growing conditions, weed growth stages, and soil types. All of these are factors that affect herbicide performance. Therefore, use these expected responses as guidelines only and always refer to the herbicide label.

Few accurate generalizations can be made with regard to preplant weed control; however, the following may provide some insight to the data contained on the following page: (1) glyphosate and 2,4-D are most effective on small, actively growing weeds; (2) paraquat is most active on weeds that are either very young or have reached reproductive stages; (3) the addition of tank-mixture partners to glyphosate, with perhaps the exceptions of Goal, Harmony extra, and 2,4-D, tends to substantially antagonize (reduce) glyphosate's activity on grasses; (4) the addition of tank-mixture partners, particularly photosynthetic inhibitors, greatly enhances paraquat's performance.

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ESTIMATED LEVELS OF PREPLANT FOLIAR WEED CONTROL NORMALLY EXPECTED

Herbicides	Annual bluegrass	Bittercress	Buttercup	Carolina geranium	Chickweed	Eveningprimrose	Henbit	Prostrate knotweed	Shephardspurse	Wildlettuce	Virginia pepperweed	Vetch	Little Barley	Horseweed	Curly dock (seedling)	Curly dock (mature)	Ryegrass	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass	Seedling Johnsongrass	Cocklebur	Entireleaf morningglory	Pitted morningglory	Smallflower morningglory	P. smartweed	Hemp sesbania	Prickly sida	Spurred anoda	Pigweed	Sicklepod	Cutleaf groundcherry	Common ragweed	Red rice	Upright spurge	Cheat	Groundsel	Fall panicum	Rhizome Johnsongrass	Annual sedge	Purple nutsedge	Lambsquarters	Soil activity
Preplant – PPF*																																												
Sencor	9	10	9	7	10	6	8	6	9	8	6	6	10	5	5	-	6	7	8	7	7	8	7	7	7	7	8	9	8	8	8	7	7	8	4	4	-	-	-	-	-	-	-	yes
Scepter	3	8	9	5	9	5	7	5	9	7	-	4	3	4	3	-	2	2	3	3	3	6	10	5	6	7	7	0	3	2	10	5	3	8	2	2	-	-	-	-	-	-	-	yes
Goal 2XL/Delta Goal	9	10	9	8	8	4	9	9	9	9	8	7	-	6	9	-	5	-	-	-	-	-	8	8	9	9	8	9	9	8	9	-	-	-	-	9	7	7	-	-	-	-	-	yes
2,4-D	0	8	9	7	8	10	5	8	8	9	9	9	0	8	8	7	0	0	0	0	0	0	8	10	10	9	8	8	8	9	9	8	9	-	0	-	0	10	0	0	0	0	-	no
Clarity	0	9	9	8	9	8	9	8	9	9	9	9	0	8	9	7	0	0	1	1	1	0	10	9	9	9	9	9	8	9	8	8	9	9	0	9	0	8	0	0	0	0	8	no
Harmony Extra	0	9	9	8	8	8	7	-	9	9	9	9	0	6	10	9	0	0	0	0	0	0	8	7	8	8	-	6	4	-	8	4	-	-	0	-	0	-	0	0	-	-	9	no
Caparol/Cotton Pro	-	9	9	7	10	7	8	6	8	9	7	6	6	7	8	-	-	-	-	-	-	-	7	7	9	9	7	8	7	7	9	-	-	-	-	-	-	-	-	-	-	-	-	yes
Paraquat	10	10	10	7	10	7	9	6	9	7	7	8	8	8	7	4	8	9	9	9	8	9	6	5	5	7	6	6	6	8	9	9	7	8	7	8	9	9	-	-	-	-	-	no
Paraquat + Sencor	10	10	10	8	10	8	9	6	9	8	8	8	10	8	6	-	9	9	9	9	8	9	7	7	7	7	8	9	8	8	9	9	7	8	7	8	-	-	-	-	-	-	-	yes
Paraquat + Harmony Extra	9	10	10	10	10	8	9	-	10	-	5	9	10	7	9	7	5	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	no
Paraquat + Delta Goal/ Goal 2XL	10	10	10	10	10	7	9	-	10	-	5	9	10	8	7	5	6	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	9	-	9	-	-	-	-	-	yes
Paraquat + Clarity	10	10	10	9	10	9	8	-	9	-	7	10	9	9	9	7	6	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	no
Paraquat + 2,4-D	10	10	10	9	10	10	9	-	9	-	8	10	9	9	9	8	6	-	-	-	-	-	-	-	-	-	10	-	8	-	-	-	-	-	-	-	-	10	-	-	-	-	-	no
Glufosinate	6	-	-	8	10	7	6	-	-	-	9	8	7	9	-	6	8	8	8	8	8	9	10	10	10	9	8	8	7	-	8	7	-	-	-	-	-	-	-	-	-	-	-	no
Glyphosate	10	10	9	7	10	6	7	7	10	8	8	5	10	8	8	6	8	10	10	10	9	10	8	7	8	8	7	6	7	6	10	8	9	9	8	10	10	9	9	9	10	5	-	no
Glyphosate + 2,4-D	10	10	10	9	10	10	8	-	10	10	9	10	10	9	10	8	7	-	-	-	-	-	9	9	9	9	8	8	8	8	10	8	9	-	-	10	-	10	-	-	-	-	-	no
Glyphosate + Goal 2XL/ Delta Goal	10	10	10	8	10	7	9	-	10	-	10	7	10	8	8	7	8	9	9	9	8	9	8	9	9	9	8	10	9	9	10	8	9	9	-	10		9	8	8	-	-	-	yes
Glyphosate + Clarity	10	10	10	9	10	9	10	-	10	-	9	9	10	9	10	8	8	-	-	-	-	-	-	-	-	-	10	9	8	-	-	-	-	-	-	-	-	10	-	-	-	-	-	no
Glyphosate + Canopy XL	10	10	10	8	10	9	9	-	9	-	-	-	10	8	10	9	8	10	10	10	9	10	9	9	9	9	9	7	8	-	10	8	-	-	9	-	10	9	9	9	-	-	-	yes
Glyphosate + Harmony Extra	10	10	10	8	10	7	9	-	10	9	10	9	10	8	10	9	7	10	10	10	9	10	8	8	9	9	10	7	-	-	10	8	-	-	-	-	10	10	9	9	-	-	9	no
Glyphosate + Harmony GT	10	10	10	8	10	7	9	-	9	8	8	-	10	8	10	9	8	10	10	10	9	10	8	8	8	8	8	6	7	-	10	8	9	9	9	9	10	9	9	9	-	-	9	no
Glyphosate + LeadOff	10	7	9	9	9	6	7	-	9	-	-	-	10	6	10	9	8	10	10	10	9	10	8	8	8	8	7	7	7	-	10	8	-	-	8	-	10	9	9	9	-	-	-	yes
Glyphosate + Valor	10	10	10	8	10	9	9	-	9	-	-	-	10	8	-		9	10	10	10	9	10	8	8	8	8	9	-	-	-	10	8	9	9	9	10	10	9	9	9	-	-	-	yes

*Plus adjuvant if required according to label instructions.

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Herbicide-Resistant Weed Management

Herbicide-Resistant Weeds

Repeated applications of the same herbicide or a different herbicide with similar mode of action on the same field growing season after growing season has contributed to the widespread occurrence of resistance to herbicides in several weed species around the world, in the U.S., and in Mississippi (see list below). Weed management programs must not depend solely on herbicides to be economically sustainable in the long term. In general, a combination of the following strategies is recommended:

1. Use residual herbicides
2. Practice crop rotation
3. Rotate herbicides with different modes of action
4. Tank-mix herbicides with different modes of action at full recommended rates
5. Avoid sequential applications of the same herbicide continually
6. Utilize tillage, cultivation, and other cultural practices wherever and whenever feasible
7. Clean equipment thoroughly before and after each use
8. Control weeds postharvest to reduce soil seedbank

Herbicide-Resistant Weeds in Mississippi

Species	WSSA group	Herbicide active ingredient
Annual bluegrass	5	simazine
Barnyardgrass/junglerice	1	cyhalofop, fenoxaprop,
	2	bispyribac, imazamox, imazethapyr, penoxsulam
	4	quinclorac
	7	propanil
Common cocklebur	2	imazaquin, imazethapyr
	17	MSMA, DSMA,
Common ragweed	9	glyphosate
Goosegrass	3	pendimethalin, trifluralin
	9	glyphosate
	17	DSMA, MSMA
Horseweed (marestail)	9	glyphosate
	22	paraquat
Italian ryegrass	1	diclofop, clethodim
	2	imazapic, imazapyr, mesosulfuron, metsulfuron, pyroxsulam, sulfometuron
	9	glyphosate
Johnsongrass	1	fenoxaprop, fluazifop, quizalofop
	3	pendimethalin, trifluralin
	9	glyphosate
Palmer amaranth	2	pyrithiobac
	9	glyphosate
	14	acifluorfen, carfentrazone, fomesafen, lactofen
Pigweed species	2	sulfometuron
Rice flatsedge	2	Halosulfuron, imazethapyr
Spiny amaranth	9	glyphosate
Tall waterhemp	9	glyphosate

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Herbicide-Resistant Weed Management

Management Options for Herbicide-Resistant Weeds

These are suggested options for managing herbicide-resistant weeds in the major agronomic crops of Mississippi. These are not the only options, but they have proven effective at managing herbicide-resistant weeds in Mississippi. See overall herbicide resistance summary in this section for details on existing herbicide-resistant weeds in Mississippi.

NOTE: Consult individual crop sections in this publication or product labels for specific information on application rates, timings of application, preplant intervals, and crop rotation restrictions.

Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Barnyardgrass (ALS-resistant)				
Rice	pendimethalin + Bolero	0.75 to 1 lb ai/A + 4 pt/A	Delayed preemergence	Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.
Rice	propanil	3–6 lb ai/A, depending on barnyardgrass size	Postemergence to barnyardgrass with less than four leaves	Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Sequential applications may be needed for complete control. Add clomazone, pendimethalin, or quinclorac for residual control after application.
Rice	quinclorac	0.25–0.5 lb ai/A, depending on barnyardgrass size	Preemergence or postemergence until 40 days before harvest	Add crop oil concentrate at 1 quart per acre for postemergence applications. Apply with clomazone or pendimethalin for additional residual control. Apply with propanil, Ricestar HT, or Clincher SF for additional postemergence control. May be applied postflood, but this would be an emergency salvage treatment.
Rice	RiceBeaux	4 qt/A	Postemergence to barnyardgrass with one to three leaves	Soil should be moist at time of application and not allowed to crack after application. RiceBeaux works best as a component of a barnyardgrass program including preemergence and postemergence applications of other herbicides.
Barnyardgrass (ALS-, propanil-, and quinclorac-resistant)				
Rice	Clincher SF	15 oz/A	Postemergence from one-leaf rice to early tillering stage to barnyardgrass with fewer than four leaves	Soil moisture is critical for good activity. Weed foliage must not be covered with water at application. Add clomazone or pendimethalin for residual control. Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. May be applied postflood, but this would be an emergency salvage treatment.
Rice	clomazone	0.8–2.1 pt/A, depending on soil texture	Preemergence after planting but before rice emergence; postemergence to rice with up to five leaves	Use the higher rate on heavier-textured soils. Clomazone provides no postemergence control. Apply with glyphosate if barnyardgrass is emerged at preemergence application. Apply with Clincher SF or Ricestar HT if barnyardgrass is emerged at postemergence application.
Rice	pendimethalin	Formulation and soil texture dependent	Delayed preemergence after rice seed have imbibed water for germination	Use higher rate on heavier-textured soils. Provides no postemergence control. Include Clincher SF or Ricestar HT to control emerged barnyardgrass.
Rice	pendimethalin + Bolero	0.75–1 lb ai/A + 4 pt/A	Delayed preemergence	Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.
Rice	Ricestar HT	24 oz/A	Postemergence from two-leaf rice to early tillering stage and to barnyardgrass with fewer than four leaves	Soil moisture is critical for good activity. Flush the field before application if soil is dry. Weed foliage must not be covered with water at time of application. Add clomazone or pendimethalin for residual control after application.
Barnyardgrass (propanil- and quinclorac-resistant)				
Rice	Beyond	5–6 oz/A	Postemergence from four-leaf rice until 14 days after panicle initiation on varieties; from four- leaf rice to panicle initiation on hybrids	Use on Clearfield rice varieties and hybrids only. Add crop oil concentrate at 1 quart per acre. Beyond may be substituted for the second application of Newpath, but two applications are required before flooding. This treatment may be applied postflood, but this would be an emergency salvage treatment.
Rice	Clearpath	0.5 lb/A	Preplant incorporated, preemergence, or postemergence until one-leaf rice	Use on Clearfield rice varieties and hybrids only. Add crop oil concentrate at 1 quart per acre. Clearpath must be followed by an application of Newpath or Beyond before flooding.

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Herbicide-Resistant Weed Management

Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Rice	Grasp	2–2.8 oz/A, depending on application timing	Postemergence until 60 days before harvest	Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. Add clomazone or pendimethalin for residual control after application. This treatment may be applied postflood, but this would be an emergency salvage treatment.
Rice	pendimethalin + Bolero	0.75–1 lb ai/A + 4 pt/A	Delayed preemergence	Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.
Rice	Newpath	4–6 oz/A	Preplant incorporated, preemergence, or postemergence until flooding	Use on Clearfield rice varieties and hybrids only. Add crop oil concentrate at 1 quart per acre. Applications made preplant incorporated, preemergence, or to one- to two-leaf rice should be followed by a second application of Newpath or Beyond before flooding.
Rice	Regiment	0.4–0.67 oz/A, depending on barnyardgrass size	Postemergence from three-leaf rice to 0.5-inch internode elongation	See the Regiment label for a list of adjuvants approved by Valent. Add clomazone or pendimethalin for residual control after application. This treatment may be applied postflood, but this would be an emergency salvage treatment.
Goosegrass (glyphosate-resistant)				
Cotton, soybean	clethodim	0.07–0.125 lb ai/A	Postemergence to goosegrass with 2–6 inches of lateral growth	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Cotton, soybean	Fusilade DX	8 oz/A	Postemergence to goosegrass less than 5 inches with fewer than six leaves	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Cotton, soybean	quizalofop	0.048–0.055 lb ai/A	Postemergence to goosegrass with 2–6 inches of lateral growth	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Cotton, soybean	sethoxydim	0.188 lb ai/A	Postemergence to goosegrass less than 6 inches	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Horseweed (glyphosate- and paraquat-resistant)				
Corn, cotton, rice, soybean	2,4-D	Formulation dependent	Postemergence during fall to spring burndown	Apply alone or with residual herbicide listed in this section. 2,4-D provides no residual control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
Corn	2,4-D	Formulation dependent	Postemergence to corn only less than 8 inches	Postemergence applications of 2,4-D may cause injury such as lodging, bending, and brittle stalks.
Corn	atrazine	1.5–2.5 lb ai/A	Preplant, preemergence, or post- emergence from 14 days before planting until corn reaches 12 inches	Atrazine may be applied with glyphosate, paraquat, or glufosinate to improve grass and broadleaf weed control before corn emergence. Add crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Soybean	Canopy	4–6 oz/A	Preemergence during fall to spring burndown up to planting	Apply before horseweed emerges. Add 2,4-D or dicamba to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Soybean	Canopy EX	2 oz/A	Preemergence during fall to spring burndown up to 7 days before planting	Apply before horseweed emerges. Add 2,4-D or dicamba to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Corn, cotton, soybean	dicamba	Formulation dependent	Postemergence during fall to spring burndown	Apply alone or with residual product listed in this section. Dicamba provides no residual horseweed control. It is often applied with glyphosate or glyphosate plus residual herbicide in a spring burndown program.
Corn	dicamba	Formulation dependent	Postemergence to corn only less than 36 inches	**Do not** add crop oil concentrate to dicamba applied after corn emergence to avoid injury.
Cotton	diuron	0.5–1.6 lb ai/A, depending on soil texture	Preemergence during fall to spring burndown	Apply before horseweed emerges. Add 2,4-D, dicamba, or glufosinate to control emerged horseweed. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba. A postemergence application will likely be required for spring-emerged horseweed.

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Herbicide-Resistant Weed Management

Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Soybean	Envive	3 oz/A	Preemergence during fall to spring burndown up to planting	Apply before horseweed emerges. Add 2,4-D or dicamba to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Cotton	Envoke	0.15 oz/A	Preemergence during fall to spring burndown but 3 months before planting	Apply before horseweed emerges. Add 2,4-D, dicamba, or glufosinate to control emerged horseweed. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Corn, soybean	Fierce	3–3.75 oz/A	Preemergence during fall to spring burndown	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Soybean	Fierce XLT	3.75–5.25 oz/A	Preemergence during fall to spring burndown	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Soybean	FirstRate	0.75 oz/A	Preemergence during fall to spring burndown but before soybean emergence	Apply before horseweed emerges. Add 2,4-D, dicamba, or glufosinate to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Soybean	FirstRate	0.3–0.6 oz/A	Preemergence or postemergence up to 50% flowering soybean	FirstRate may be applied postemergence to soybean and horseweed at 0.3 ounce per acre. A second application of 0.3 ounce may be applied 10 to 14 days later to control regrowth and provide longer residual activity. A single application of 0.6 ounce per acre may be applied under high weed pressure.
Soybean	FirstRate + glyphosate	0.3–0.6 oz/A + formulation dependent	Preemergence or postemergence up to 50% flowering soybean	If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required. However, improved control has been observed when an additional adjuvant is used in the preloaded glyphosate formulation.
Corn, cotton, rice, soybean	flumioxazin	0.064 lb ai/A	Preemergence during fall to spring burndown	Apply before horseweed emerges. If horseweed has emerged, add 2,4-D or dicamba. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v when tank-mixing with 2,4-D or dicamba.
Corn, cotton, rice, soybean	glufosinate	0.4–0.66 lb ai/A	Postemergence during fall to spring burndown but before crop emergence	Glufosinate is often applied at planting as a salvage treatment. Control is dependent on size and age of horseweed, spray coverage, and air temperature. Daytime temperatures should be at least 70°F at application and for 3 to 4 days after application.
Corn, cotton, soybean	glufosinate	0.4–0.79 lb ai/A, depending on crop	Postemergence; see individual crop sections for specific application timings	Use only on LibertyLink crops. Sequential applications should be made 10 to 14 days apart.
Rice	Grasp	2.3 oz/A	Postemergence to horseweed less than 6 inches	Add crop oil concentrate or methylated seed oil (MSO) at 1 quart per acre. Grasp will not completely control horseweed until after flooding.
Corn	Halex GT + atrazine	3.6–4 pt/A + 1.5 lb ai/A	Postemergence until corn reaches 12 inches	Add nonionic surfactant at 0.25% v/v.
Corn	Lexar EZ	2.25–3 qt/A, depending on soil texture	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Add glyphosate, paraquat, or glufosinate to improve grass and broadleaf weed control before corn emergence. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Rice	propanil + quinclorac	4 lb ai/A + 0.375 lb ai/A	Postemergence to horseweed less than 6 inches	Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Propanil plus quinclorac will not completely control horseweed until after flooding.

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Herbicide-Resistant Weed Management

Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Soybean	Python	1–1.33 oz/A	Preemergence up to 30 days before planting but before soybean emergence	Apply before horseweed emerges. Add 2,4-D, dicamba, or glufosinate to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Corn, cotton, rice, soybean	Sharpen	1–3 oz/A, depending on crop and soil texture	Preemergence or postemergence during fall to spring burndown	Horseweed should be less than 4 to 6 inches in height or diameter, depending on rate. Add glyphosate, paraquat, or glufosinate to improve grass and broadleaf weed control. Add methylated seed oil (MSO) at 1% v/v and ammonium sulfate at 1% to 2% v/v.
Soybean	Synchrony XP	1.125 oz/A	Preemergence to early postemergence	This treatment is for use on STS soybean varieties only when applying 1.125 ounces per acre postemergence. Control with Synchrony XP may be incomplete or inconsistent.
Soybean	Synchrony XP + glyphosate	1.125 oz/A + formulation dependent	Preemergence to early postemergence	This treatment is for use on STS soybean varieties only when applying 1.125 ounces per acre postemergence. Improved control has been observed when additional adjuvant is used with preloaded glyphosate formulation.
Soybean	Valor XLT	3 oz/A	Preemergence during fall to spring burndown but before soybean emergence	Apply before horseweed emerges. Add 2,4-D or dicamba to control emerged horseweed. If applied with 2,4-D or dicamba, add 1% crop oil or 0.25% nonionic surfactant.
Italian ryegrass (glyphosate- and ALS-resistant)				
Corn, soybean	Authority Supreme	6.5–12 oz/A; depending on soil texture	Preemergence from mid-October to mid-November	Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Corn, soybean	Anthem Maxx	3.25–6.5 oz/A, depending on soil texture	Preemergence from mid-October to mid-November	Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Corn, soybean	Boundary	2 pt/A	Preemergence from mid-October to mid-November	Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Corn, cotton, soybean, rice	clethodim	0.094–0.125 lb ai/A	Postemergence from late January to early February to Italian ryegrass less than 6 inches	Multiple applications of clethodim are not recommended. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. Sequential application of paraquat will be required if no fall residual was applied.
Rice	clomazone	0.75 lb ai/A	Preemergence from mid-October to mid-November	Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Corn, soybean	Fierce	3–3.75 oz/A	Preemergence during fall to spring burndown	Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Corn, cotton, soybean	metolachlor or *S*-metolachlor	1.27–1.58 lb ai/A, depending on soil texture	Preemergence from mid-October to mid- November	Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Corn, cotton, soybean, rice	paraquat	0.75–1 lb ai/A	Postemergence from mid-February to early-March to Italian ryegrass less than 12–14 inches	Paraquat should be applied in at least 15 gallons of water and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Avoid air induction nozzles. Apply with PSII herbicide to improve postemergence control. Paraquat should be applied 2 to 4 weeks after clethodim if no fall residual was applied.
Cotton, soybean	trifluralin	0.75–1 lb ai/A	Preemergence from mid-October to mid-November	Use the higher rate on heavier-textured soils. Incorporate 1 to 2 inches deep immediately after application for best results. A 30% loss can occur if incorporation is delayed 24 hours.

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Herbicide-Resistant Weed Management

Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Corn, cotton, soybean	Zidua	0.11–0.21 lb ai/A, depending on soil texture	Preemergence from mid-October to mid- November	Use the higher rate on heavier-textured soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Italian ryegrass is emerged at application. Paraquat should be applied in at least 15 gallons of water by ground and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.
Wheat	Axial XL	16.4 oz/A	Postemergence to wheat from two-leaf to preboot and to Italian ryegrass from one-leaf to two-tiller	Only one application is allowed per growing season. **Do not** mix with other postemergence herbicides, such as Harmony Extra or 2,4-D.
Wheat	Axiom	5–10 oz/A	Early postemergence from wheat germination up to two-leaf stage but before weed emergence	This product contains metribuzin. Some wheat varieties are sensitive to metribuzin.
Wheat	metribuzin	0.094–0.125 lb ai/A	Postemergence after wheat has reached two-leaf stage until jointing	Some wheat varieties are sensitive to metribuzin. Metribuzin rate depends on wheat growth stage. Multiple applications are allowed per season, but a minimum of 21 days between applications is required.
Palmer amaranth (glyphosate- and ALS-resistant)				
Corn	2,4-D	Formulation dependent	Postemergence to corn less than 8 inches	Postemergence applications of 2,4-D may cause some injury, such as lodging, bending, and brittleness. Stalks remain brittle for 5 to 7 days after application, during which time they are susceptible to breaking.
Corn, soybean	Anthem Maxx	2.5–6.5 oz/A	Preplant, preemergence, or postemergence from 14 days before planting up to V4 corn and V3 soybean stages	Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Corn	Armezon or Impact + atrazine	0.75 oz/A + 0.5–1 lb ai/A	Postemergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add ammonium sulfate and 1% methylated seed oil. Add glyphosate or glufosinate to improve postemergence control in tolerant hybrids.
Corn	atrazine + acetochlor	Formulation dependent	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Add glyphosate or glufosinate to improve postemergence control in tolerant hybrids.
Corn	atrazine + metolachlor or *S*-metolachlor	Formulation dependent	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Add glyphosate or glufosinate to improve postemergence control in tolerant hybrids.
Soybean	Authority Elite	19–32 oz/A, depending on soil texture	Preplant 14 to 21 days before planting and after final bed preparation	Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Authority MTZ + Group 15 herbicide	8–18 oz/A + appropriate rate for Group 15 herbicide	Preemergence up to 7 days before planting	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce Warrant activity. Injury may occur if rain falls soon after crop emergence. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Authority Supreme	6–11.5 oz/A, depending on soil texture	Preemergence up to 7 days before planting	Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Boundary	1.2–2.5 pt/A, depending on soil texture	Preemergence up to 7 days before planting	Injury may occur if rain falls soon after crop emergence, especially on sand or silt-loam soils. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Canopy + Group 15 herbicide	4–6 oz/A + appropriate rate for Group 15 herbicide	Preemergence up to 7 days before planting	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce Warrant activity. Injury may occur if rain falls soon after crop emergence. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.

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Herbicide-Resistant Weed Management

Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Corn	Capreno + atrazine	3 oz/A + 0.5–1 lb ai/A	Postemergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add glyphosate or glufosinate to improve postemergence control in tolerant hybrids. Add crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Corn	Corvus + atrazine	5.6 oz/A + 0.5–1 lb ai/A	Preplant, preemergence, or early postemergence from 14 days before planting until V2 corn stage	Add glyphosate, paraquat, or glufosinate to improve grass and broadleaf weed control before corn emergence. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Corn	dicamba	Formulation dependent	Postemergence to corn less than 36 inches and to Palmer amaranth less than 4 inches	**Do not** add crop oil concentrate to dicamba applied after crop emergence as crop injury may result. Dicamba may be applied with glyphosate to improve grass and broadleaf weed control.
Cotton	diuron	0.8 lb ai/A	Post-directed when cotton is at least 12 inches tall and after last cultivation	Apply with glyphosate and MSMA (1 pound of active ingredient per acre) to improve control of emerged Palmer amaranth and other weeds. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate and/or MSMA formulations not preloaded with an adjuvant.
Soybean	Envive + Group 15 herbicide	3 oz/A + appropriate rate for Group 15 herbicide	Preplant 14 to 21 days before planting and after final bed preparation	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Warrant should be applied when the weather is warm; lower temperatures may reduce activity. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Fierce	3–3.75 oz/A	Preplant 14 to 21 days before planting and after final bed preparation	Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Fierce XLT	3.75–5.25 oz/A	Preplant 14 to 21 days before planting and after final bed preparation	Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Flexstar GT + Group 15 herbicide	3.5–5 pt/A + appropriate rate for Group 15 herbicide	Postemergence until 45 days before soybean harvest	Group 15 herbicides recommended for use in Mississippi soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce Warrant activity. Injury may occur if rain falls soon after crop emergence. Spray coverage is critical; apply in at least 15 gallons of water per acre.
Cotton	fluometuron	1–2 lb ai/A, depending on soil texture	Preplant or preemergence but before cotton emergence	Use the higher rate on heavier-textured soils. Fluometuron provides only residual control, and control is dependent on herbicide activation and level of infestation. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Cotton	fomesafen	0.25 lb ai/A	Preplant after at least 0.5 inch of rain on medium- or fine-textured soils; preemergence on coarse-textured soils	Apply with paraquat at 0.5 pound of active ingredient per acre if Palmer amaranth is emerged at application. An at-planting application of residual herbicide will be required for in-season Palmer amaranth control if beds are disturbed before planting.
Cotton	fomesafen	0.25 lb ai/A	Post-directed when cotton has at least 4 inches of bark and after last cultivation	Application should be directed at the bottom 2 inches of cotton. Apply with glyphosate and MSMA to improve postemergence control. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate and/or MSMA formulations not preloaded with an adjuvant.
Cotton	flumioxazin	0.064 lb ai/A	See individual crop sections for specific application timings	Flumioxazin provides only residual control, and control is dependent on herbicide activation and level of infestation.
Corn, cotton	glufosinate	0.4–0.79 lb ai/A, depending on crop	Postemergence; see individual crop sections for specific application timings	Use only on LibertyLink crops. Sequential applications should be made 10 to 14 days apart. Apply in at least 10 gallons of water. Avoid application with air induction nozzles. Add residual herbicide in first application for residual control.
Soybean	glufosinate + fomesafen + Group 15 herbicide	0.53 lb ai/A + 0.375 lb ai/A + appropriate rate for Group 15 herbicide	Postemergence 7 to 21 days after soybean planting	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Use only on LibertyLink crops. Sequential applications should be made 10 to 14 days apart. Apply in at least 10 gallons of water.

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Herbicide-Resistant Weed Management

Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Cotton	Gramoxone SL	2 pt/A	Postemergence as late-season salvage application under hooded sprayer	Apply by directing spray between rows using a hooded sprayer. Gramoxone SL should be applied in at least 15 gallons of water and with nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v. Apply with diuron to improve postemergence Palmer amaranth activity and provide residual control.
Corn	Halex GT + atrazine	3.6–4 pt/A + 1.5 lb ai/A	Postemergence until corn reaches 12 inches and to Palmer amaranth less than 4 inches	Add nonionic surfactant at 0.25% v/v.
Corn	Lexar EZ	2.25–3 qt/A, depending on soil texture	Preplant, preemergence, or postemergence from 14 days before planting until corn reaches 12 inches	Add glyphosate or glufosinate to improve postemergence control in tolerant hybrids. Add methylated seed oil at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Corn, cotton, soybean	metolachlor or *S*-metolachlor	Formulation dependent	Preemergence or postemergence; see individual crop sections for specific application timings	This herbicide only provides residual control and does not control emerged weeds. Residual control is dependent on activation of herbicide and level of weed infestation. Apply with glyphosate or Sequence (premixture of glyphosate and *S*-metolachlor) alone.
Soybean	metribuzin + Group 15 herbicide	5.33–10.67 oz/A, depending on soil texture + appropriate rate of Group 15 herbicide	Preemergence up to 7 days before planting	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce Warrant activity. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Corn, cotton, soybean	pendimethalin	Formulation and soil texture dependent	Preemergence or postemergence; see individual crop sections for specific application timings	This herbicide only provides residual control and does not control emerged weeds. Residual control is dependent on activation of herbicide and level of weed infestation. Apply with paraquat at 0.5–0.75 pound of active ingredient per acre during preemergence application if Palmer amaranth is emerged at application.
Soybean	Prefix + glyphosate	2 pt/A + formulation dependent	Postemergence when soybean has one to two trifoliate leaves	Prefix provides partial control of emerged Palmer amaranth, with level of control dependent on weed size (no more than four leaves).
Cotton	prometryn	0.5 lb ai/A	Post-directed once or twice after cotton is 3 inches tall	Avoid contact with cotton foliage. Prometryn provides some residual control in addition to controlling emerged weeds. Apply with MSMA at 1 pound of active ingredient per acre to improve control of emerged Palmer amaranth.
Soybean	Sharpen + Group 15 herbicide	1–1.5 oz/A + appropriate rate for Group 15 herbicide	Preplant 14 to 21 days before planting and after final bed preparation	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce Warrant activity. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Sonic or Authority First + Group 15 herbicide	6.45–8 oz/A + appropriate rate for Group 15 herbicide	Preplant 14 to 21 days before planting and after final bed preparation	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce Warrant activity. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Soybean	Surveil + Group 15 herbicide	3.5–4.2 oz/A + appropriate rate for Group 15 herbicide	Preplant 14 to 21 days before planting and after final bed preparation	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce Warrant activity. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Cotton, soybean	trifluralin	0.5–0.75 lb ai/A	Preplant incorporated; in-season control optimized with applications immediately before planting	Control is dependent on activation of herbicide and level of weed infestation. Use the higher rate on heavier-textured soils. Incorporate 1 to 2 inches deep immediately after application for best results. A 30% loss can occur if incorporation is delayed 24 hours.
Soybean	Valor XLT + Group 15 herbicide	3 oz/A + appropriate rate for Group 15 herbicide	Preplant 14 to 21 days before planting and after final bed preparation	Group 15 herbicides recommended for use in Mississippi soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce Warrant activity. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.

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Herbicide-Resistant Weed Management

Crop	Herbicide(s)	Rate	Timing of application	Special instructions
Soybean	Verdict + Group 15 herbicide	5–7.5 oz/A + appropriate rate for Group 15 herbicide	Preplant 14 to 21 days before planting and after final bed preparation	Group 15 herbicides for soybeans include metolachlor or *S*-metolachlor, Warrant, and Zidua. Lower temperatures may reduce activity Warrant. Apply with paraquat at 0.75 pound of active ingredient per acre if Palmer amaranth is emerged at application.
Rhizome johnsongrass (glyphosate-resistant)				
Cotton, soybean	clethodim	0.094–0.25 lb ai/A or 0.07–0.188 lb ai/A	Postemergence to emerged johnsongrass	Apply to johnsongrass before it reaches 25 inches. Reduced level of control can be expected on larger johnsongrass. Apply a sequential application if needed, but apply to johnsongrass no larger than 18 inches. Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Cotton, soybean	Fusilade DX	12 oz/A followed by 8 oz/A to control regrowth	Postemergence to johnsongrass less than 18 inches with 12 oz/A and less than 12 inches for sequential application	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Corn	nicosulfuron	Dependent on formulation and johnsongrass size at application	Postemergence to johnsongrass from 12 to 18 inches	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant. If applied with glyphosate formulation preloaded with an adjuvant, no additional adjuvant is required.
Cotton, soybean	quizalofop	0.0688 lb ai/A for single application followed by 0.048 lb ai/A to control regrowth	Postemergence to johnsongrass from 10–24 inches and from 6–10 inches for sequential application	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Cotton, soybean	sethoxydim	0.188 lb ai/A followed by 0.188 lb ai/A to control regrowth	Postemergence to johnsongrass less than 20 inches with 24 oz/A rate and less than 10 inches with sequential application	Add nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v if applying alone or with a glyphosate formulation not preloaded with an adjuvant.
Rice flatsedge (ALS-resistant)				
Rice	bentazon	1.5–2 pt/A, depending on rice flatsedge size	Postemergence to emerged rice flatsedge and at least 24 hours before flooding	Add crop oil concentrate at 1% v/v. **Do not** apply to submerged weeds. The addition of propanil may improve rice flatsedge control. A sequential application may be utilized, but the total bentazon rate should not exceed 4 pints per acre in a single season.
Rice	propanil	3–6 lb ai/A, depending on rice flatsedge size	Postemergence to emerged rice flatsedge	Add crop oil concentrate at 1% v/v if using an SC propanil formulation. Sequential applications may be needed for complete control. The addition of bentazon may improve rice flatsedge control.
Rice	RiceBeaux	4 qt/A	Postemergence to emerged rice flatsedge	Soil should be moist at the time of application and not allowed to crack after application. Sequential applications with bentazon and/or propanil may be needed for complete control.

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Herbicide Modes of Action

	HRAC site group of action	Chemical family	Active ingredient	WSSA group
A	Inhibition of acetyl CoA carboxylase (ACCase)	Aryloxyphenoxy-propionate "FOPs"	clodinafop-propargyl cyhalofop-butyl diclofop-methyl fluazifop-P-butyl	1
		Cyclohexanedione "DIMs"	clethodim sethoxydim tralkoxydim	
		Phenylpyrazoline "DEN"	pinoxaden	
B	Inhibition of acetolactate synthase ALS (acetohydroxy acid synthase AHAS)	Sulfonylurea	chlorimuron-ethyl chlorsulfuron foramsulfuron halosulfuron-methyl iodosulfuron mesosulfuron metsulfuron-methyl nicosulfuron orthosulfamuron primisulfuron-methyl prosulfuron rimsulfuron sulfosulfuron thifensulfuron-methyl tribenuron-methyl trifloxysulfuron	2
		Imidazolinone	imazapic imazamox imazapyr imazaquin imazethapyr	
		Triazolopyrimidine	cloransulam-methyl diclosulam florasulam flumetsulam penoxsulam pyroxsulam	
		Pyrimidinyl(thio)benzoate	bispyribac-Na pyrithiobac-Na	

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Herbicide Modes of Action

HRAC site group of action		Chemical family	Active ingredient	WSSA group
C1	Inhibition of photosynthesis at photosystem II	Triazine	atrazine prometon propazine simazine	5
		Triazinone	hexazinone metribuzin	
		Uracil	bromacil terbacil	
C2	Inhibition of photosynthesis at photosystem II	Urea	diuron fluometuron (see F3) linuron siduron tebuthiuron	7
		Amide	propanil	
C3	Inhibition of photosynthesis at photosystem II	Nitrile Benzothiadiazinone	bromoxynil bentazon	6
D	Photosystem-I-electron diversion	Bipyridylium	diquat paraquat	22
E	Inhibition of protoporphyrinogen oxidase (PPO)	Diphenylether	acifluorfen-Na fomesafen lactofen oxyfluorfen	14
		N-phenylphthalimide	flumioxazin flumiclorac-pentyl	
		Thiadiazole	fluthiacet-methyl	
		Oxadiazole	oxadiazon	
		Triazolinone	carfentrazone-ethyl sulfentrazone	
F1	Bleaching: Inhibition of carotenoid biosynthesis at the phytoene desaturase step (PDS)	Pyridazinone Other	norflurazon fluridone	12
F2	Bleaching: Inhibition of 4-hydroxyphenyl-pyruvate-dioxygenase (4-HPPD)	Triketone Isoxazole	mesotrione isoxaflutole	27
F4	Bleaching: Inhibition of carotenoid biosynthesis (unknown target)	Isoxazolidinone	clomazone	13
		Urea	fluometuron (see C2)	

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Herbicide Modes of Action

HRAC site group of action		Chemical family	Active ingredient	WSSA group
G	Inhibition of EPSP synthase	Glycine	glyphosate	9
H	Inhibition of glutamine synthetase	Phosphinic acid	glufosinate-ammonium	10
I	Inhibition of DHP (dihydropteroate) synthase	Carbamate	asulam	18
K1	Microtubule assembly inhibition	Dinitroaniline	benefin ethalfluralin oryzalin pendimethalin trifluralin	3
		Pyridine	dithiopyr thiazopyr	
		Benzamide	propyzamide = pronamide	
		Benzoic acid	DCPA = chlorthal-dimethyl	
K3	Inhibition of VLCFAs (see Remarks) (Inhibition of cell division)	Chloroacetamide	acetochlor alachlor butachlor dimethanamid metolachlor	15
		Isoxazoline	pyroxasulfone	
		Acetamide	napropamide	
		Oxyacetamide	flufenacet	
L	Inhibition of cell wall (cellulose) synthesis	Nitrile Benzamide	dichlobenil isoxaben	20 21
N	Inhibition of lipid synthesis (not ACCase inhibition)	Thiocarbamate	EPTC thiobencarb	8
		Phosphorodithioate	bensulide	
		Benzofuran	ethofumesate	
O	Action like indole acetic acid (synthetic auxins)	Phenoxy-carboxylic-acid	2,4-D 2,4-DB MCPA	4
		Benzoic acid	dicamba	
		Pyridine carboxylic acid	clopyralid fluroxypyr picloram triclopyr	
		Quinoline carboxylic acid	quinclorac	

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Herbicide Modes of Action

HRAC site group of action		Chemical family	Active ingredient	WSSA group
P	Inhibition of auxin transport	Phthalamate Semicarbazone	naptalam diflufenzopyr	19
Z	Unknown herbicide mode of action	Organoarsenical Other	DSMA MSMA dazomet fosamine metam oleic acid pelargonic acid	17

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Rainfast Intervals and Rotational Crop Restrictions

Many herbicides used in various crops have planting restrictions. When considering a rotational crop, the following table will help you choose the proper herbicide for the current year. If a rotational crop is planted within the interval stated, or before the interval has expired, unacceptable injury to the rotational crop can occur. Consult individual product labels for more specific information regarding rotational crop restrictions.

		Rotation Interval[1]							
Herbicide	Rainfast Interval	Corn	Cotton	Grain sorghum	Peanut	Rice	Soybeans	Wheat	Other grains
2,4-D	6 h	14 d	30 d	29 d	n/a	30 d	15 d	7d	1 m
2,4-DB		n/a	n/a	n/a	none	n/a	none	n/a	n/a
Acifluorfen	4 h	100 d	100 d	100 d	none	none	none	40 d	40 d
Acuron[2]	—	none	10 m	10 m	10 m	10 m	10 m	4 m	4 m
Aim	6-8 h	none	none	none	none	none	none	none	none
Alachlor	—	none	ns	none[3]-spring	ns	spring	spring	4 m	spring
Anthem Flex[4]	1 h	none	1-4 m	6-10 m	4 m	10 m-2 y	0-4 m	1-6 m	11 m-1.5 y
Anthem Maxx[4]	1 h	none	1-4 m	6-10 m	4 m	10 m-2 y	0-4 m	1-6 m	11 m-1.5 y
Armezon Pro	1 h	none	9 m	9 m	9 m	9 m	9 m	4 m	4 m
Armezon/Impact	1 h	none	9 m	9 m	1.5 y	3 m	9 m	1.5 y	1.5 y
Atrazine[5]	—	none	ns	none	1 y	2 y	ns	1 y	1 y
Authority Elite	—	10 m	1-1.5 y	10 m	4 m	10 m	none	4.5 m	1 y
Authority First	—	10 m	1-1.5 y	1 y	1 y	10 m	none	4 m	1 y
Authority MTZ	—	10 m	1.5 y	1.5 y	1 y	10 m	none	4 m	4 m
Authority Supreme		4 m	12 m[5]	10-12 m[5]	4 m	10 m - 2 y[5]	0-4 m[5]	4-6 m[5]	10-18 m[5]
Authority XL—pH ≤ 7	—	10 m	1 y	10 m	3 y	10 m	none	4 m	4 m
Authority XL—pH ≥ 7	—	1.5 y	1 y	1.5 y	3 y	1.5 y	none	4 m	4 m
Axial XL	30 min	3 m	3 m	3 m	3 m	3 m	3 m	none	3 m
Axiom		none	8 m	1 y	1.5 y	1 y	none	7 d	1 y
Bentazon	4 h	none	none	none	none	none	none	none	none
Beyond	1 h	8.5 m	9 m	9 m	9 m	9 m	9 m	3 m	9 m
Bolero	—	6 m	6 m	6 m	6 m	none	6 m	6 m	6 m
Boundary	—	4 m	1 y	1 y	1 y	8 m	none	4.5 m	1 y
Broadhead	6-8 h	1 y	1 y	1 y	1 y	none	1 y	1 y	1 y
Cadre	3 h	9 m	1.5 y	1.5 y	none	26 m	9 m	4 m	18-26 m
Callisto	—	none	10 m	none	10 m	10 m	10 m	4 m	4 m
Canopy—pH ≤ 7	1 h	10 m[7]	10 m	10 m	8 m	10 m	none	4 m	4 m
Canopy—pH ≥ 7	1 h	1.5 y	1.5 y	1.5 y	1.5 y	1.5 y	none	4 m	4 m
Canopy EX	2 h	n/a	10 m	12 m	8-13 m[7]	10 m	none	4 m	4 m
Capreno	1 h	none	none	10 m8	11 m	1.5 y	1.5 y	4 m	1.5 y
Classic	1 h	7 m	8 m	9 m	6 m	9 m	none	3 m	3 m
Clearpath	1 h	10 m	1.5 y	1.5 y	10 m	1.5 y	10 m	10 m	10 m
Clethodim	1 h	1 m	none	1 m	none	1 m	none	1 m	1 m
Clincher SF	2 h	3 m	3 m	none	3 m	3 m	3 m	3 m	3 m
Clomazone		9 m	none[5]	9 m	9 m	9 m	none	1 y	1 y
Cobra	30 min	none	none	none	none	none	none	none	none
Corvus	—	none	10 m	17 m[10]	11 m	10 m	9 m	4 m	17 m[10]
Dicamba[11]	4 h	none	21 d	15 d	n/a	15 d	15-28 d	15 d	15 d

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Rainfast Intervals and Rotational Crop Restrictions

Herbicide	Rainfast Interval	Rotation Interval[1]							
		Corn	Cotton	Grain sorghum	Peanut	Rice	Soybeans	Wheat	Other grains
Duron (Based on crops that may follow treated cotton)	—								
PRE, banded	—	4 m	4 m	4 m	4 m	4 m	4 m	4 m	4 m
PRE, broadcast	—	next spring	next spring	next spring	within 1 y after last application	within 1 y after last application	next spring	within 1 y after last application	within 1 y after last application
POST	—	next spring	next spring	next spring	within 1 y after last application	within 1 y after last application	next spring	within 1 y after last application	within 1 y after last application
Duet	6-8 h	3 m	3 m	3 m	3 m	3 m	3 m	3 m	3 m
Envive—pH ≤ 7	1 h	10 m	10 m	1 y	8 m	10 m	none	4 m	4 m
Envive—pH ≥ 7	1 h	1.5 y	2.5 y	1.5 y	8 m	10 m-1.5 y	none	4 m	4 m
Envoke	3 h	7 m	7 m	7 m	7 m	7 m	7 m	3 m	1.5 y
Ethalfluralin		1 y	n/a	1 y	none	n/a	none	n/a	8 m
Fierce	1 h	1 m[12]	2 m	1 y	4 m	1 y	none	2 m	1 y
Fierce XLT—pH ≤ 7	1 h	1.5 y	1.5 y	1.5 y	1.5 y	1.5 y	none	10 m	1.5 y
Fierce XLT—pH ≥ 7	1 h	1.5 y	2.5 y	1.5 y	2.5 y	1.5 y	none	1.5 y	1.5 y
Finesse Cereal & Fallow	6 h	1.5 y	1.5 y	4 m	n/a	1.5 y	1.5 y	4 m	10-16 m
FirstRate	2 h	9 m	9 m	9 m	9 m	9 m	none	4 m	9 m-1 y
FirstShot	—	14 d	14 d	14 d	30 d[13]	none	7 d	none	none
Flexstar GT	4 h	10 m	none	1.5 y	10 m	10 m	10 m	4 m	1 y
Flumioxazin[14]	1 h	30 d	30 d	30 d	none	30 d	none	1 m	3-8 m
Fluometuron	—	8 m	none	9 m	8 m	9 m	9 m	3 m	9 m
Fomesafen	1 h	10 m	none[15]	1.5 y	10 m	10 m	none	1.5 y	4 m
Fusilade DX	1 h	2 m	none	2 m	none	2 m	none	2 m	2 m
Glufosinate	4 h	none	none	6 m	6 m	none	none	2 m	2 m
Glyphosate	n/a	none	none	none	none	none	none	none	none
Goal 2XL	—	10 m	none	10 m	none	10 m	none	10 m	10 m
Grandstand R	—	4 m	4 m	4 m	4 m	none	4 m	4 m	4 m
Grasp	1 h	3 m	3 m	3 m	3 m	none	3 m	3 m	3 m
Grasp XTRA	1 h	3 m	3 m	3 m	3 m	none	3 m	3 m	3 m
Halex GT		none	10 m	none[1]	10 m	18 m	10 m	4.5 m	4.5 m
Halosulfuron	4 h	1 m	4 m	2 m	6 m	none	9 m	2 m	2 m
Harmony Extra	—	14 d	14 d	14 d	1.5 m	none	7 d	none	2 m
Huskie	1 h	4 m	n/a	7 d	n/a	n/a	4 m	7 d	9 m
Imazethapyr	1 h	none[1]	1.5 y	1.5 y	none	n/a	none	4 m	9 m
Intimidator	—	10 m	1 y	1.5 y	1.5 y	10 m	none	4.5 m	8 m-1.5 y
Latigo	4 h	n/a	n/a	n/a	1 y	1 y	n/a	n/a	n/a
Laudis	1 h	none	10 m	10 m	11 m	4 m	8 m	4 m	4 m
Layby Pro	—	8 m	1 y	4 m	8 m	1 y	1 y	4 m	4 m
LeadOff—1.5 oz/A	—	none	1 m	10 m	1.5 m	10 m	none[16]-1 m[17]	3 m	1.5 y
LeadOff—1.5 - 2.7 oz/A	—	none	10 m	1.5 y	1.5 y	1.5 y	none[16]-1 m[17]	4 m	1.5 y
League	6 h	1 y	8 m	1 y	2 y	none	1 y	1 y	2 y
Lexar EZ5		none	spring	spring	spring	1.5 y	spring	spring	spring
Linuron (DF formulation)	—	none	4 m	none	n/a	1 y	none	4 m	4 m

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Rainfast Intervals and Rotational Crop Restrictions

Herbicide	Rainfast Interval	Rotation Interval[1]							
		Corn	Cotton	Grain sorghum	Peanut	Rice	Soybeans	Wheat	Other grains
Londax	4 h	4 m	4 m	4 m	4 m	none	4 m	4 m	4 m
Loyant	2 h	3 m	3 m	3 m	3 m	none	3 m	3 m	3 m
Metolachlor/S-metolachlor[5]	—	1 y	1 y	1 y[7]	1 y	1 y	1 y	4.5 m	4.5 m
Metribuzin	6 h	4 m	1.5 y	1.5 y	11 m	1 y	4 m	4 m	1.5 y
MSMA		none	none	none	none	none	none	none	none18
Newpath[19]	1 h	8.5 m	1.5 y	1.5 y	none	1.5 y	none	4 m	1.5 y
Nicosulfuron	4 h	none	10 m	10 m-1.5 y[9]	1.5 y	1.5 y[10]	15 d	4 m	4 m
Obey	—	10 m	10 m	10 m	10 m	none	10 m	10 m	10 m
Osprey	4 h	3 m	3 m	3 m	3 m	3 m	3 m	7 d	7-30 d
Outlook	----	none	4 m	4 m	6-9 m	6-9 m	none	4 m	4 m
Paraquat	30 min	none	none	none	none	none	none	none	none
Peak[21]	4 h	1 m	1.5 y	1 m	10 m	none	10 m	1 m	1 m
Pendimethalin	—	none	none	10 m-1 y	none	none	none	4 m	ns
Permit Plus	4 h	1 m	4 m	2 m	6 m	none	2 m	2 m	2 m
Poast	1 h	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
PowerFlex	4 h	10 m	10 m	10 m	10 m	1 y	1 y	1 m	10 m-1 y
Prefix	—	10 m	1 m	10 m	4 m	10 m	none	4.5 m	4.5 m
Prometryn	----	5 m	5 m	1 y	1 y	1 y	1 y	1 y	1 y
Propanil	8 h	2 m	2 m	2 m	2 m	none	2 m	2 m	2 m
Provisia	1 h	4 m	none	4 m	4 m	4 m	none	4 m	4 m
Pyrithobac	4 h	10 m[3]	none	ns	10 m	9 m	10 m	4 m	10 m
Python	6 h	none	1.5 y	1 y	4 m	6 m	none	4 m	4 m
Quinclorac (L formulation)	6 h	10 m	10 m	none	10 m	none	10 m	none	10 m
Quizalofop	1 h	4 m	none	4 m	4 m	4 m	none	4 m	4 m
Realm Q	4 h	none	10 m	10 m	10 m	1.5 y	10 m	9 m	9 m
Regiment	8 h	ns	ns	ns	ns	none	ns	ns	none
Resicore		none	12 m	10.5 m	1.5 y	10.5 m	10.5 m	4 m	10.5 m-1.5 y
RiceBeaux	6 h	2 m	2 m	2 m	n/a	none	2 m	2 m	n/a
Roundup HT	1 h	n/a	n/a	n/a	n/a	none	9 m	n/a	n/a
Scepter	—	9.5 m	1.5 y	11 m	11 m	ns	none	4 m	11 m
Sequence		none	none	none	none	9 m	none	4.5 m	4.5 m
Sharpen[4]	1 h	none	1.5-9 m	0-1 m	4-9 m	0-4 m	0-6 m	0-3 m	0-3 m
Simazine	—	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Solicam	—	2 y	30 d	2 y	30 d	2 y	1.5 m	2 y	2 y
Solstice	1 h	none	10 m	none	10 m	10 m	10 m	4 m	4 m
Sonic	----	10 m	1-1.5 y	1 y	1 y	10 m	none	4 m	1 y
Spartan Charge	—	4 m	8-1 y	10 m-1.5 y	4 m	10 m	none	4 m	4 m-1 y
Status	4 h	7 d	30 d	30 d	3 m	3 m	30 d	30 d	30 d
Steadfast Q	4 h	none	10 m	10 m - 1.5 y[7]	1.5 y	15 d	15 d	4 m	4 m
Storm	4 h	100 d	100 d	100 d	none	none	none	40 d	40 d
Strada	6 h	3 m	6 m	1 y	1 y	none	6 m	3 m	3 m

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Rainfast Intervals and Rotational Crop Restrictions

Herbicide	Rainfast Interval	Rotation Interval[1]							
		Corn	Cotton	Grain sorghum	Peanut	Rice	Soybeans	Wheat	Other grains
Strada PRO	6 h	3 m	6 m	3 y	3 y	none	9 m	3 m	3 m
Strada XT2	6 h	11 m	11 m	11 m	11 m	none	11 m	11 m	11 m
Strongarm	—	1.5 y	10 m	1.5 y	none	1.5 y	none	4 m	6 m
Suprend	3 h	7 m	7 m	7 m	7 m	7 m	7 m	3 m	1.5 y
SureStart II	—	none	26 m	1 y	26 m	26 m	spring	4 m	26 m
Syochony XP	1 h	8-9 m	8-9 m	9 m-1 y	8-15 m	10-15 m	none	3-4 m	3-4 m
Trifluralin	—	1 y	none	1 y	none	1 y	none	1 y	1 y
Truvence	1 h	10 m	1.5 y	1.5 y	8 m	1 y	none[7]	4 m	1.5 y
Valor XLT—pH ≤ 7	1 h	10 m	10 m	10 m	1.5 y	9 m	none	4 m	4 m
Valor XLT—pH ≥ 7	1 h	1.5 y	30 m	1.5 y	30 m	1.5 y	none	4 m	4 m
Verdict	1 h	none	6 m	0-1 m	7-9 m	4 m	4-6 m	4 m	4 m
Warrant	—	ns	ns	ns		ns	none	4 m	ns
Yukon	4 h	1 m	4 m	2 m	6 m	2 m	9 m	2 m	2-9 m[8]
Zidua or Zidua SC[9]	—	none	1-4 m	6 m-1 y	1-4 m	10 m-1.5 y	0-4 m	1-6 m	11 m-1.5 y

[1]Abbreviations: n/a or (—) = consult the label for specific instructions; h = hour; min = minute; d = days after application; m = months after application; y = years after application; spring = spring following application; ns = next season; PRE = preemergence application; POST = postemergence application.
[2]If applied after June 1, rotating to crops other than corn (all types) may result in crop injury.
[3]Replant only with Concept-treated or Screen-treated seed.
[4]Rotational crop restrictions are dependent on the rate of herbicide applied. Consult the product label for specific information.
[5]If applied after June 10, injury may occur if any crop other than corn or grain sorghum is planted the year after application.
[6]Cotton may be planted 12 months following Authority Supreme with the following conditions: medium and fine soils, pH < 7.2, and rainfall or irrigation exceeding 15 inches after application.
[7]Field corn may be planted after 9 months if Canopy rate does not exceed 6 ounces per acre.
[8]Rotation interval should be increased to 18 months for grain sorghum if pH is 7.5 or greater or if Capreno rate exceeded 3 ounces per acre.
[9]Do not plant cotton unless disulfoton or phorate organophosphate insecticide is applied in-furrow with the seed at a minimum of 0.75 pounds of active ingredient per acre.
[10]Rotation interval should be increased to 24 months if pH is 7.5 or greater.
[11]Rotational crop restrictions are for the use rate of 8 ounces per acre. At least 1 inch of rainfall or overheard irrigation is required before waiting interval begins.
[12]Rotation interval may be decreased to 7 days for minimum and no-till corn if the Fierce rate does not exceed 3 ounces per acre.
[13]Rotation interval applies for peanuts grown in Alabama and Georgia only; no specification for Mississippi.
[14]Rotational crop restrictions apply to applications of 0.064 pounds active ingredient per acre or less; additionally, 1 inch of rainfall or irrigation must occur between application and planting.
[15]At least 0.5 inch of rainfall or overhead irrigation must occur before planting cotton.
[16]Rotation interval applies to soybean with Bolt technology.
[17]Rotation interval applies to soybean without Bolt technology.
[18]Barley, oats, and rye may be replanted after 4 months.
[19]For Newpath use rates greater than 8 ounces per acre per season up to 12 ounces per acre per season, only soybean may be planted the following year.
[20]Grain sorghum or rice may be planted 10 months after nicosulfuron application on soils with pH of no more than 7.5 or 6.5, respectively. If soil pH is greater than 7.5 or 6.5, **do not** plant grain sorghum or rice, respectively, for 18 months.
[21]Rotational crop restrictions apply to applications where soil pH is < 7.8.
[22]Corn may be planted 10 months after pyrithiobac application in cotton if the total amount of pyrithiobac from all applications does not exceed 3.8 fluid ounces per acre.
[23]Rotation interval is dependent on soil pH. Consult the product label for specific information.
[24]Rotation interval is 4 months when no additional application of metribuzin-containing product is applied.

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Burndown Weed Management

Weed Response Ratings for Herbicides Applied in Burndown Prior to Planting[1]

				Winter weeds														Summer weeds														
	Herbicide group number	Crop[2, 3]	Soil Activity	Annual bluegrass	Italian ryegrass	Bittercress	Buttercup	Carolina geranium	Chickweed	Curly dock (seedling)	Cutleaf evening-primrose	Henbit	Horseweed	Prickly lettuce	Shepherds-purse	Vetch	Virginia pepperweed	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Goosegrass	Red rice	Seedling johnsongrass	Common ragweed	Hemp sesbania	Morningglory—entireleaf	Morningglory—pitted	Morningglory—smallflower	Palmer amaranth	Pennsylvania smartweed	Prickly sida	Sicklepod	Spurred anoda
2,4-D	4	C, CT, R, S	yes	0	0	8	9	7	8	7	9	5	8	9	8	6	9	0	0	0	0	0	0	-	8	9	9	9	8	8	8	8	9
Dicamba	4	C, CT, GS, SG, S	yes	0	0	8	9	8	8	9	9	7	9	9	8	9	9	0	0	0	0	0	0	9	9	9	9	9	8	8	6	9	9
Fomesafen	14	CT, S	yes	0	0	-	-	-	-	-	-	-	3	-	-	-	-	4	3	4	4	2	4	7	4	5	7	6	9	7	8	7	1
Glufosinate	10	C, CT, S	no	6	7	-	-	8	9	6	7	6	9	-	-	8	9	8	8	8	5	-	9	-	8	9	9	9	8	8	7	7	-
Glyphosate	9	C, CT, GS, P, R, SG, S	no	9	5	9	9	7	9	6	6	7	5	8	9	5	8	9	9	9	8	8	9	9	6	7	8	8	5	7	7	8	5
Glyphosate + 2,4-D	9, 4	C, CT, R, S	yes	9	5	9	9	9	9	8	9	8	9	9	9	6	9	9	9	9	8	8	9	9	8	9	8	8	9	8	9	9	8
Glyphosate + Aim	9, 14	C, CT, GS, P, R, SG, S	no	9	5	9	9	8	9	8	7	7	5	8	9	5	9	9	9	9	8	8	9	9	9	9	9	8	8	9	7	8	8
Glyphosate + Canopy EX	9, 2, 2	S	yes	9	5	9	8	7	8	8	7	8	7	-	8	8	-	9	9	9	8	8	9	9	8	8	9	9	5	7	8	8	8
Glyphosate + clomazone	9, 13	R, S	yes	9	5	9	9	7	9	6	6	7	5	8	9	5	8	9	9	9	8	8	9	9	6	7	8	8	5	7	7	8	5
Glyphosate + clomazone + Sharpen	9, 13, 14	R, S	yes	9	5	9	9	7	9	9	7	7	8	9	9	5	8	9	9	9	8	8	9	9	9	8	9	9	9	8	7	8	6
Glyphosate + dicamba	9, 4	C, CT, GS, SG, S	yes	9	5	9	9	9	9	9	8	8	9	9	9	9	9	9	9	9	8	8	9	9	8	9	8	8	9	8	9	9	9
Glyphosate + dicamba + 2,4-D	9, 4, 4	C, CT, S	yes	9	5	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	9	9	8	9	8	8	9	8	9	9	9
Glyphosate + Envive	9, 2, 2, 14	S	yes	9	6	9	9	8	9	-	8	9	9	-	9	-	-	9	9	9	8	8	9	9	-	8	8	8	9	9	-	8	-
Glyphosate + Fierce	9, 14, 15	C, S	yes	9	6	9	9	8	9	-	8	9	8	-	9	-	-	9	9	9	8	8	9	9	-	8	8	8	9	9	-	8	-
Glyphosate + Firstshot SG	9, 2, 2	C, CT, GS, R, SG, S	yes	9	5	9	9	8	9	9	7	8	5	9	9	9	9	9	9	9	9	8	9	6	7	8	9	9	5	9	7	8	6
Glyphosate + flumioxazin	9, 14	C, CT, GS, P, R, S	yes	9	5	9	9	8	9	-	8	9	8	-	9	-	-	9	9	9	8	8	9	9	7	8	8	8	9	9	-	8	-
Glyphosate + Goal 2XL	9, 14	CT, S	yes	9	5	9	9	8	9	7	7	9	8	-	9	7	9	9	9	9	8	-	9	-	7	8	8	8	9	7	7	8	-
Glyphosate + LeadOff	9, 2, 2	C, CT, P, S	yes	9	6	7	9	9	9	9	6	7	7	-	9	-	-	9	9	9	8	-	9	-	7	8	8	8	9	7	7	8	-
Glyphosate + metolachlor/S-metolachlor	9, 15	C, CT, GS, P, S	yes	9	5	9	9	7	9	6	6	7	5	8	9	5	8	9	9	9	8	8	9	9	6	7	8	8	5	7	7	8	5
Glyphosate + Sharpen	9, 14	C, CT, GS, R, SG, S	yes	9	6	9	9	7	9	9	7	7	8	9	9	5	8	9	9	9	8	8	9	9	9	8	9	9	9	8	7	8	6
Glyphosate + Synchrony XP	9, 2, 2	S	yes	9	5	9	9	7	9	8	7	7	7	9	9	5	8	9	9	9	8	8	9	9	7	8	8	8	5	9	7	7	-
Glyphosate + Verdict	9, 14, 15	C, GS, S	yes	9	6	9	9	7	9	9	7	7	8	9	9	5	8	9	7	9	8	8	9	9	9	8	9	9	9	8	7	-	6
Metribuzin	5	S	yes	9	6	9	9	7	9	-	6	8	5	8	9	6	6	6	6	6	6	3	6	8	9	7	7	7	8	8	8	7	8
Paraquat	22	C, CT, GS, P, R, SG, S	no	9	8	9	9	7	9	4	7	9	6	7	9	8	7	8	8	8	8	7	8	8	8	8	8	7	9	6	6	9	8
Paraquat + 2,4-D	22, 4	C, CT, R, S	yes	9	8	9	9	7	9	7	8	9	8	-	9	8	8	8	8	8	8	7	8	8	8	8	8	8	9	8	8	9	8
Paraquat + atrazine	22, 5	C, GS	yes	9	8	9	9	8	9	-	8	9	9	8	9	8	8	8	8	8	8	7	8	8	8	8	8	8	9	8	8	9	8
Paraquat + diuron	22, 5	CT	yes	9	8	9	9	8	9	-	8	9	9	8	9	8	8	8	8	8	8	7	8	8	8	8	8	8	9	8	8	9	8
Paraquat + Goal 2XL	22, 14	CT, S	yes	9	8	9	9	9	9	5	7	9	6	-	9	8	7	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-
Paraquat + metribuzin	22, 5	S	yes	9	8	9	9	8	9	-	8	9	9	8	9	8	8	8	8	8	8	7	8	8	8	8	8	8	9	8	8	9	8
Paraquat + prometryn	22, 5	CT	yes	9	8	9	9	7	9	-	7	9	9	8	9	8	7	8	8	8	8	7	8	8	8	8	8	8	9	8	8	9	8

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

[2]Abbreviations: C, corn; CT, cotton, GS, grain sorghum; P, peanut; R, rice; SG, small grains; S, soybean.

[3]See Rotational Crop Restrictions for additional information about labeling for each crop.

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Burndown Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
2,4-D amine – 0.5 to 1 lb/A	Various formulations (See product label for specific rates)	Varies by crop, rate, and/or product (See product label for specific information)	Annual, biennial, and perennial broadleaf weeds	Mix with glyphosate, glufosinate, or paraquat to improve weed control spectrum. Ester formulations are usually more effective than amine formulations in controlling curly dock and wild garlic. Apply esters when temperatures are less than 60° and amines when more than 60°. **Do not** apply by air after March 31.
dicamba – 0.25 lb/A	dicamba (4 lb/gal formulation) — 8 oz/A	Varies by crop and/or rate (See product label for specific information)	Horseweed, clovers; other annual, biennial, and perennial broadleaf weeds	Mix with glyphosate to improve weed control spectrum. Add a nonionic surfactant at 0.25% v/v. **Do not** apply this product near emerged soybean. Apply in 10 to 20 gallons water by ground or 5 gallons water by air.
fomesafen – 0.25 to 0.38 lb/A	fomesafen (2 or 1.88 lb/gal formulations) — 1 to 1.5 pt/A	Varies by crop and/or rate (See product label for specific information)	Small-seeded broadleaf weeds, especially pigweeds and prickly sida	Mix with glyphosate, glufosinate, or paraquat to broaden weed control spectrum. Rainfall within 7 days of application is necessary for activation. Some cotton injury can occur if rainfall occurs during or soon after cotton emergence. See label for crop specific instructions.
glufosinate – 0.53 to 0.66 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 36 oz/A	Preplant or preemergence	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	Apply when temperatures are warm, as colder weather may reduce activity. **Do not** use nozzles and pressure that result in coarse spray droplets. Glufosinate may be mixed with soil-applied herbicides for residual activity.
glyphosate – 1 to 1.5 lb/A	Various formulations (See product label for specific rates)	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	Apply to actively growing weeds < 6 inches tall. Use higher rate for weeds > 6 inches tall. If tillage is intended after treatment, wait at least 3 days (7 days for perennial weeds) after application. Avoid drift to nontarget areas. Glyphosate may be mixed with soil-applied herbicides for residual activity.
glyphosate + 2,4-D – 1 to 1.5 lb/A + 0.5 to 1.0 lb/A	Various formulations (See product labels for specific rates)	Varies by crop, rate, and/or product (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate and 2,4-D. Use the full rate of glyphosate.
glyphosate + Aim – 1 to 1.5 lb/A + 0.0195 to 0.05 lb/A	Various formulations (See product label for specific rates) + Aim 2 EC — 1.25 to 3.2 oz/A	Varies by crop, rate, and/or product (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate. Use the full rate of glyphosate. Application rate for Aim varies with crop. Coverage is essential for good control.
glyphosaste + chlorimuron + tribenuron – 1 to 1.5 lb/A + 0.02 to 0.04 lb/A	Various formulations (See product label for specific rates) + Canopy EX 29.5 WDG — 1.1 to 2.2 oz/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate. **Do not** apply to Black Belt soils with a pH greater than 7 or a history of nutrient deficiency. Higher rates can be used to control larger weeds or to extend residual control. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v if applied with a glyphosate formulation not preloaded with a surfactant.
glyphosate + clomazone – 1 to 1.5 lb/A + 0.3 to 0.6 lb/A	Various formulations (See product label for specific rates) + clomazone (3 lb/gal formulation) — 0.8 to 1.6 pt/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See *Special Instructions and Remarks* for glyphosate. Antagonism may occur in some situations. Use the full rate of glyphosate. Sequential postemergence grass herbicide application will be needed. **Do not** apply to recently land-formed fields. If grasses emerge after application, rainfall or flushing may be needed for activation or reactivation. See table at beginning of rice section for specific clomazone rates by soil texture.
glyphosate + clomazone + saflufenacil – 1 to 1.5 lb/A + 0.3 to 0.6 lb/A + 0.022 to 0.044 lb/A	Various formulations (See product label for specific rates) + clomazone (3 lb/gal formulation) — 0.8 to 1.6 pt/A + Sharpen 2.85 SC — 1 to 2 oz/A	Varies by crop and/or rate (See product label for specific information)	Annual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See *Special Instructions and Remarks* for glyphosate, glyphosate + clomazone, and glyphosate + Sharpen.

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Burndown Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
glyphosate + dicamba – 1 to 1.5 lb/A + 0.25 lb/A	Various formulations (See product labels for specific rates) + dicamba (4 lb/gal formulation) — 8 oz/A	Varies by crop and/or rate (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate and dicamba. Use the full rate of glyphosate.
glyphosate + dicamba + 2,4-D – 1 to 1.5 lb/A + 0.25 lb/A + 0.5 to 1 lb/A	Various formulations (See product labels for specific rates) + dicamba (4 lb/gal formulation) — 8 oz/A	Varies by crop, rate, and/or product (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate, 2,4-D, and dicamba. Use the full rate of glyphosate.
glyphosate + flumioxazin + chlorimuron + thifensulfuron – 1 to 1.5 lb/A + 0.065 to 0.1 lb/A	Various formulations (See product label for specific rates) + Envive 41.3 WDG — 2.5 to 4 oz/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate. **Do not** apply preemergence to coarse soils or to Black Belt soils with a pH greater than 7. **Do not** apply more than 4 ounces per season.
glyphosate + flumioxazin + pyroxasulfone – 1 to 1.5 lb/A + 0.14 to 0.18 lb/A	Various formulations (See product label for specific rates) + Fierce 76 WDG — 3 to 3.75 oz/A	Varies by crop and/or rate (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate and glyphosate + flumioxazin. See label for crop specific instructions. Soybean injury may occur if Fierce is used in the same field where flufenacet, alachlor, metolachlor/*S*-metolachlor, or dimethenamid-P will be used preemergence.
glyphosate + thifensulfuron + tribenuron – 1 to 1.5 lb/A + 0.016 to 0.025 lb/A	Various formulations (See product label for specific rates) + FirstShot 50 SG — 0.5 to 0.8 oz/A	Varies by crop (See product label for specific information)	Winter annual and some perennial broadleaf weeds, including curly dock and Pennsylvania smartweed	See *Special Instructions and Remarks* for glyphosate. Sequential applications allowed as long as total applied during a single season does not exceed 1 ounce per acre. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v if applied with a glyphosate formulation not preloaded with a surfactant.
glyphosate + flumioxazin – 1 to 1.5 lb/A + 0.032 to 0.096 lb/A	Various formulations (See product label for specific rates) + flumioxazin 51% formulation — 1 to 3 oz/A or 4 lb/gal formulation — 1 to 3 oz/A	Varies by crop and/or rate (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate. Application rate for flumioxazin varies with crop. Soybean injury may occur if flumioxazin is used in the same field where flufenacet, alachlor, metolachlor/*S*-metolachlor, or dimethenamid-P will be used preemergence. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v if applied with a glyphosate formulation not preloaded with a surfactant.
glyphosate + oxyfluorfen – 1 to 1.5 lb/A + 0.25 to 0.5 lb/A	Various formulations (See product label for specific rates) + Goal 2XL 2 EC — 1 to 2 pt/A	Varies by crop and/or rate (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks*for glyphosate. Use the lower rate for short residual (late winter, early spring) application. Use the higher rate for long residual (fall, early winter) applications. See label for crop specific instructions. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v if applied with a glyphosate formulation not preloaded with a surfactant.
glyphosate + rimsulfuron + thifensulfuron – 1 to 1.5 lb/A + 0.031 + 0.056 lb/A	Various formulations (See product label for specific rates) + LeadOff 33.4 WDG — 1.5 to 2.7 oz/A	Varies by crop and/or rate (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate. Labeling recommends 1.5 ounces per acre for most applications. See label for crop specific instructions. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v if applied with a glyphosate formulation not preloaded with a surfactant.
glyphosate + metolachlor – 1 to 1.5 lb/A + 1.5 to 2.5 lb/A or *S*-metolachlor – 0.95 to 1.6 lb/A	Various formulations (See product labels for specific rates)	Preplant or preemergence	Annual grasses and some small-seeded broadleaf weeds	See *Special Instructions and Remarks* for glyphosate. Sufficient weed control depends on adequate rainfall for incorporation. See label for crop specific instructions. See table at beginning of soybean section for specific rates of metolachlor and *S*-metolachlor by soil texture.
glyphosate + chlorimuron + thifensulfuron – 1 to 1.5 lb/A + 0.0176 to 0.053 lb/A	Various formulations (See product label for specific rates) + Synchrony XP 28.4 DG — 1 to 3 oz/A	From 45 days before planting until just before soybean emergence	Hemp sesbania, morningglory, yellow nutsedge, sicklepod	See *Special Instructions and Remarks* for glyphosate. Application rate is dependent on soil pH. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v if applied with a glyphosate formulation not preloaded with a surfactant.

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Burndown Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
glyphosate + dimethenamid-P + saflufenacil – 1 to 1.5 lb/A + 0.22 to 0.44 lb/A	Various formulations (See product label for specific rates) + Verdict 5.67 EC — 5 to 10 oz/A	Varies by crop and/or rate (See product label for specific information)	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate. Application rate for Verdict varies with crop. Add methylated seed oil at 1% v/v plus ammonium sulfate.
metribuzin – 0.25 to 0.63 lb/A	metribuzin (75% formulation — 5.33 to 13.4 oz/A or 4 lb/gal formulation — 8 to 20 oz/A	Preplant or preemergence	Hemp sesbania, prickly sida, early sicklepod; annual grasses and small-seeded broadleaf weeds	See table at beginning of soybean section for specific rates by soil texture. Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Soybean injury may occur (1) on soils with calcareous surface or pH 7.5 and above, (2) to certain soybean varieties, (3) on soil with < 0.5% organic matter, (4) when soybeans are planted < 1.5 inches deep, and (5) when heavy rains follow application.
paraquat – 0.5 to 1 lb/A	paraquat (2 lb/gal formulation) — 2 to 4 pt/A or 3 lb/gal formulation — 1.33 to 2.67 pt/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	Avoid off-site movement to emerged vegetation. May be mixed with most preemergence herbicides. Apply in a minimum of 10 gallons of water by ground or 5 gallons by air. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
paraquat + 2,4-D – 0.5 to 1 lb/A + 0.5 to 1 lb/A	paraquat (2 lb/gal formulation) — 2 to 4 pt/A or 3 lb/gal formulation — 1.33 to 2.67 pt/A + Various formulations (See product labels for specific rates)	Varies by crop, rate, and/or product (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for paraquat and 2,4-D.
paraquat + atrazine – 0.5 to 1 lb/A + 1.5 lb/A	paraquat (2 lb/gal formulation) — 2 to 4 pt/A or 3 lb/gal formulation — 1.33 to 2.67 pt/A + atrazine (4 lb/gal formulation) — 1.5 qt/A or 90% formulation — 1.67 lb/A	Preplant or preemergence	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for paraquat. **Do not** use on sand, loamy sand, or sandy loam or any soil with less than 1% organic matter. **Do not** plant crops other than corn or sorghum until the year after treatment. If treatment is made after June 10 crops other than corn or sorghum should not be planted the following year.
paraquat + diuron – 0.5 to 1 lb/A + 0.5 to 1 to 1.6 lb/A	paraquat (2 lb/gal formulation) — 2 to 4 pt/A or 3 lb/gal formulation — 1.33 to 2.67 pt/A + diuron 4 (lb/gal formulation) — 1 to 2 to 3.2 pt/A or 80% formulation — 0.63 to 1.25 to 2 lb/A	Preplant or preemergence	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for paraquat. If stand failure occurs, cotton may be replanted with minimum disturbance of the treated soil. In a single season, **do not** exceed 0.8 pound of active ingredient on loamy sand, 1.2 pounds on sandy loam, 1.6 pounds on clay loam, or 2.2 pounds on clay. Rebed only after thorough tillage.
paraquat + oxyfluorfen – 0.5 to 1 lb/A + 0.25 to 0.5 lb/A	paraquat (2 lb/gal formulation) — 2 to 4 pt/A or 3 lb/gal formulation — 1.33 to 2.67 pt/A + Goal 2XL 2 EC — 1 to 2 pt/A	Varies by crop and/or rate (See product label for specific information)	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for glyphosate + Goal 2XL.
paraquat + metribuzin – 0.5 to 1 lb/A + 0.25 to 0.63 lb/A	paraquat (2 lb/gal formulation) — 2 to 4 pt/A or 3 lb/gal formulation — 1.33 to 2.67 pt/A + metribuzin (75% formulation — 5.33 to 13.4 oz/A or 4 lb/gal formulation — 8 to 20 oz/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	See table at beginning of soybean section for metribuzin rates by soil texture. *Special Instructions and Remarks* and Remarks for metribuzin and paraquat.

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Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
paraquat + prometryn – 0.5 to 1 lb/A + 0.75 to 1 lb/A	paraquat (2 lb/gal formulation) — 2 to 4 pt/A or 3 lb/gal formulation — 1.33 to 2.67 pt/A + prometryn (4 lb/gal formulation) — 1.5 to 2 pt/A	November 1 up to 14 before cotton planting	Annual broadleaf weeds	See *Special Instructions and Remarks* for paraquat. Use the high rate for early applications and low rate for applications closer to planting.

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Cotton Weed Management

Weed Response Ratings for Cotton Herbicides Applied Preemergence[1]

	Herbicide group numbers	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Goosegrass[3]	Johnsongrass—rhizome	Johnsongrass—seedling	Annual sedge	Nutsedge—purple	Nutsedge—yellow	Annual morningglory	Cocklebur	Hemp sesbania	Honeyvine milkweed	Nodding spurge	Palmer, spiny amaranth, waterhemp	Pennsylvania smartweed	Prickly sida	Purslane	Sicklepod	Smooth, redroot pigweed	Spurred anoda	Velvetleaf	Crop tolerance (G = good, F = Fair)
Preplant[2]																										
Fomesafen	14	4	0	3	4	-	4	0	4	7	3	7	4	7	3	0	2	9	-	7	7	4	9	1	1	G
Pendimethalin	3	9	0	9	9	9	9	5	9	0	0	0	3	0	0	0	1	7	2	0	9	1	8	0	0	G
Trifluralin	3	9	0	9	9	9	9	6	9	0	0	0	3	0	0	0	1	8	2	0	9	1	8	0	0	G
Preemergence																										
Clomazone	13	9	-	9	9	8	9	3	9	-	-	-	2	6	4	-	8	2	8	9	9	0	2	9	10	F
Diuron	7	7	0	8	8	8	8	0	6	9	0	0	7	4	4	0	6	9	7	6	9	5	9	2	7	F
Fluometuron	7	7	0	8	9	7	8	0	6	9	0	0	7	8	6	0	3	8	7	9	9	6	8	3	6	G
Pyrithobac	2	5	-	5	5	-	5	2	5	-	-	-	8	4	4	-	9	6	6	9	-	6	8	9	8	G
Solicam DF	12	8	2	8	9	7	8	2	7	9	4	4	5	3	3	0	7	7	7	9	9	4	7	8	7	G
Warrant	15	8	0	8	8	-	8	0	8	7	5	7	0	2	0	0	6	8	-	2	-	2	8	0	2	-

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

[2]An overlay treatment with the preemergence herbicides will control a broader spectrum of weeds, but the control of a given species may be no better than that for the best herbicide in the specific combination selected.

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Cotton Weed Management

Weed Response Ratings for Cotton Herbicides Applied Postemergence[1]

	Herbicide group numbers	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Goosegrass[3]	Johnsongrass—rhizome	Johnsongrass—seedling	Annual sedge	Nutsedge—purple	Nutsedge—yellow	Annual morningglory	Cocklebur	Hemp sesbania	Honeyvine milkweed	Nodding spurge	Palmer, spiny amaranth, waterhemp	Pennsylvania smartweed	Prickly sida	Purslane	Sicklepod	Smooth, redroot pigweed	Spurred anoda	Velvetleaf	Crop tolerance (G = good, F = Fair)
Postemergence directed																										
Aim	14	0	0	0	0	0	0	0	0	0	0	0	8	7	6	0	7	6	-	6	-	4	6	-	10	G
MSMA	17	7	0	8	8	7	4	5	8	6	6	6	3	9	2	1	0	5	1	2	3	3	6	0	0	G
Cobra	14	3	0	3	3	3	3	2	3	2	-	2	6	8	-	5	8	8	7	8	8	-	8	7	8	G
MSMA	17	8	0	8	8	7	8	5	9	6	6	6	9	9	7	5	8	9	7	8	9	5	9	7	8	F
Fluometuron	7	6	-	6	6	6	6	-	6	-	1	1	7	5	4	-	-	6	-	5	-	-	6	-	-	G
MSMA	17	8	0	9	9	8	8	5	8	8	6	6	8	9	5	2	4	9	4	7	6	8	9	3	6	F
Goal 2XL	14	4	0	4	4	4	4	2	4	2	2	2	9	8	-	2	7	7	9	8	9	-	7	-	8	G
MSMA	17	8	0	8	8	7	8	5	9	6	6	6	9	9	7	2	7	9	9	8	9	8	9	5	8	F
Prometryn	5	7	-	7	7	7	7	-	7	-	1	1	8	6	6	-	-	7	-	7	-	-	7	-	-	G
MSMA	17	8	0	9	9	8	8	5	9	8	6	6	8	9	6	2	5	9	4	8	8	8	9	5	7	F
Suprend	2, 5	8	-	8	8	7	7	0	7	-	1	1	9	9	9	-	7	7	7	8	8	9	8	7	7	G
Postemergence over-the-top																										
Clethodim	1	9	9	9	9	8	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	E
Envoke	2	2	0	2	2	-	2	5	7	9	7	8	9	9	9	-	-	7	-	2	-	9	8	-	9	F
Fusilade DX	1	9	9	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
Glufosinate	10	8	-	8	8	-	5	2	8	-	4	4	9	8	9	-	-	8	8	7	-	8	8	9	7	F
Glyphosate	9	8	5	9	9	8	8	7	9	9	7	6	6	8	6	3	-	9	9	8	6	7	9	8	7	G
Outlook[2]	15	8	0	7	8	8	8	0	8	7	3	5	2	2	2	0	7	8	-	2	8	2	8	0	2	G
Pyrithiobac	2	0	0	0	0	0	0	3	6	-	5	5	9	7	9	-	7	6	9	7	6	5	7	9	9	G
Sequence	15, 9	9	6	9	9	9	8	8	9	10	8	7	8	8	6	4	9	9	7	7	9	8	9	9	7	G
S-metolachlor/metolachlor[2]	15	8	0	8	8	-	8	0	8	7	5	7	0	2	0	-	6	8	-	2	-	2	9	0	0	G
Warrant[2]	15	8	0	8	8	-	8	0	8	7	5	7	0	2	0	0	6	8	-	2	-	2	8	0	2	-
Layby – preemergence only																										
Anthem Flex	14, 15	9	-	9	9	8	8	4	7	-	-	4	6	3	6	-	9	9	-	8	9	7	9	-	7	G
Diuron	7	5	0	5	6	5	5	2	5	4	0	0	7	4	4	1	4	9	3	4	5	8	9	3	3	G
+ MSMA	17	8	0	9	9	8	8	5	9	8	6	6	8	9	5	2	4	9	4	7	7	8	9	4	4	F
Flumioxazin	14	8	0	4	4	4	4	2	4	4	4	4	8	9	-	-	8	8	8	10	8	9	8	8	8	F
Layby Pro	17, 7	6	0	6	6	6	6	1	6	0	0	0	7	5	5	0	5	7	5	6	7	8	8	4	5	G
Linuron	17	6	0	6	6	6	6	1	5	0	0	0	6	4	4	0	6	7	6	6	8	4	7	2	5	G
Zidua or Zidua SC	15	9	-	9	9	8	8	4	7	-	-	4	6	3	6	-	9	9	-	8	9	7	9	-	7	G

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

[2]Outlook, *S*-metolachlor/metolachlor, and Warrant will not control emerged weed species. Control ratings given are for residual control of species listed.

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Cotton Weed Management

Herbicide Rates for Controlling Grasses with Postemergence Herbicide Applications

	Fusilade DX		Quizalofop		Poast	
Grass species	**Grass size**	**Rate**	**Grass size**	**Rate**	**Grass size**	**Rate**
Barnyardgrass	1 to 2	12	2 to 6	8	1 to 8	24
Bermudagrass Second application	4 to 8 4 to 8	12 8	3 3	10 7	1 to 6 1 to 4	36 24
Broadleaf signalgrass	2 to 4	12	2 to 6	8	1 to 8	24
Crabgrass	1 to 2	12	2 to 6	8	1 to 6	24
Goosegrass	2 to 4	8	2 to 6	8	1 to 6	24
Red rice	1	16	1 to 4	9	1 to 4	48
Rhizome johnsongrass Second application	8 to 18 6 to 12	12 8	10 to 24 6 to 10	10 7	15 to 20 6 to 10	24 24
Seedling johnsongrass	2 to 8	6	2 to 8	5	1 to 8	24
Volunteer corn	12 to 24	6	8 to 18	5	12 to 20	24 to 36

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Preplant Incorporated				
norflurazon – 1 to 2 lb/A	Solicam 80 DF — 1.25 to 2.5 lb/A	Within 30 days of planting	Annual grasses and small-seeded broadleaf weeds	Incorporate no deeper than 2 to 3 inches after beds have been reduced for planting. **Do not** use where johnsongrass or morningglory are a major problem. The application also may be split with half the rate preplant incorporated and the other half applied on the surface after planting. Provides good to excellent control of prickly sida and good control of spurred anoda.
pendimethalin – 0.48 to 1.9 lb/A	pendimethalin (3.8 lb/gal formulation) — 1 to 4 pt/A or 3.3 lb/gal formulation — 1.2 to 4.6 pt/A	Preplant incorporated — up to 60 days before planting; Preplant surface — up to 15 days before planting	Annual grasses and some small-seeded broadleaf weeds such as pigweeds and purslane	Use 1 to 2 pints per acre on coarse-textured soils (conventional or reduced tillage systems) and 2 pints per acre on coarse-textured soils under no till systems. Use 2 pints per acre on medium-textured soils for conventional or reduced tillage and 3 pints per acre in no-till. Use 3 pints per acre on fine-textured soils in conventional or reduced tillage and 4 pints per acre in no-till. Incorporate 1 to 2 inches deep immediately after application for best results.
trifluralin – 0.5 to 0.75 to 1 lb/A	trifluralin (4 lb/gal formulation) — 1 to 1.5 to 2 pt/A	Any time after Jan. 1 to immediately before planting	Annual grasses and some small-seeded broadleaf weeds such as pigweeds and purslane	Immediately incorporate 1 to 2 inches deep. Loss of 30% can be expected if incorporation is delayed 24 hours. **Do not** apply to wet soils or soils subject to prolonged flooding.
Preemergence: Preemergence applications should be made after planting but before weed or crop emergence. Avoid planting cotton less than 0.5 inch deep to avoid excessive injury during periods of heavy rainfall. Substituted-urea herbicides such as fluometuron or diuron may interact when used in combination with organophosphate insecticides at planting, resulting in cotton injury.				
acetochlor – 0.94 to 1.5 lb/A	Warrant 3 CS — 1.25 to 2 qt/A	Preemergence	Annual grasses and small-seeded broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Sufficient weed control depends on adequate rainfall for incorporation.
clomazone – 0.5 to 1 lb/A	clomazone (3 lb/gal formulation) — 1.33 to 2.67 pt/A	Preemergence	Annual grasses, purslane, spotted spurge, velvetleaf, wild poinsettia	**Use of organophosphate insecticide in-furrow is required to prevent cotton injury.** These insecticides may cause injury when used with fluometuron or diuron. **Do not** apply during periods of high winds in excess of 10 mph and/or expected heavy rainfall. Provides no control of pigweed. Addition of fluometuron improves morningglory and cocklebur control.

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Cotton Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
diuron – 0.5 to 1.0 to 1.6 lb/A	diuron (4 lb/gal formulation) — 0.5 to 1 to 1.6 qt/A or 80% formulation — 0.63 to 1.25 to 2 lb/A	Preemergence	Annual grasses and small-seeded broadleaf weeds	If stand failure occurs, cotton may be replanted with minimum disturbance of the treated soil. In a single season, **do not** exceed 0.8 pound of active ingredient on loamy sand, 1.2 pounds on sandy loam, 1.6 pounds on clay loam, or 2.2 pounds on clay. Rebed only after thorough tillage.
fluometuron – 0.75 to 1.5 to 2 lb/A	fluometuron (4 lb/gal formulation) — 0.75 to 1.5 to 2 qt/A	Preemergence	Annual grasses and small-seeded broadleaf weeds	If stand failure occurs, cotton may be replanted with minimum disturbance of the treated soil. Rebed only after thorough tillage.
norflurazon – 1 to 1.5 to 2 lb/A	Solicam 80 DF — 1.25 to 1.9 to 2.5 lb/A	Preemergence	Annual grasses and small-seeded broadleaf weeds	See *Special Instructions and Remarks* for Solicam. If stand failure occurs, cotton, soybeans, or peanuts may be with minimum disturbance of the treated soil, or the area may be reworked. Rebed only after thorough tillage.
pendimethalin – 0.5 to 0.75 to 1 lb/A	pendimethalin (3.8 lb/gal formulation) — 1 to 1.5 to 2 pt/A or 3.3 lb/gal formulation — 1.2 to 1.8 to 2.4 pt/A	Preemergence	Annual grasses and some small-seeded broadleaf weeds	See *Special Instructions and Remarks* for pendimethalin. Seedling diseases, cold weather, excessive moisture, shallow or deep planting, low or high soil pH, high soil salt concentration, or drought can weaken seedlings and increase the possibility of crop damage.
pyrithiobac – 0.033 to 0.053 lb/A	pyrithiobac (3.2 lb/gal formulation) — 1.3 to 2.1 oz/A	Preemergence	Spurge, prickly sida, broadleaf weeds	**Do not** use on coarse soils such as sands or loamy sands.
Postemergence – Directed: Cotton at least 3 inches tall				
MSMA – 2 lb/A	Various formulations (see product label for specific rates)	After smallest cotton is at least 3 inches tall	Annual grasses, susceptible cocklebur, nutsedge, small johnsongrass	**Do not** apply after first bloom. Addition of fluometuron or prometryn will broaden spectrum of weeds controlled. This treatment is more effective during hot, dry periods than in cool, wet periods. Limit to two applications. Add a nonionic surfactant at 0.25% v/v if formulation does not contain adjuvant.
fluometuron – 0.8 lb/A	fluometuron (4 lb/gal formulation) — 0.8 qt/A	After smallest cotton is at least 3 to 6 inches tall	Annual grasses and broadleaf weeds	Mix with MSMA to broaden weed control spectrum. See *Special Instructions and Remarks* for MSMA. This treatment is relatively safe on young cotton and also provides residual preemergence weed control.
prometryn – 0.5 lb/A (or plus MSMA)	prometryn (4 lb/gal formulation) — 1 pt/A	After smallest cotton is at least 3 inches tall	Annual grasses and broadleaf weeds	Mix with MSMA to broaden weed control spectrum. See *Special Instructions and Remarks* for MSMA. **Do not** apply at the 3-inch stage if cotton is stressed. Provides some residual control in addition to killing emerged weeds.
Postemergence – Directed: Cotton at least 6 inches tall (in addition to herbicides listed for smaller cotton)				
carfentrazone – 0.012 to 0.024 lb/A	Aim 2 EC — 0.8 to 1.6 oz/A	After smallest cotton is at least 6 inches tall with 5 to 6 nodes	Morningglory, pigweed, velvetleaf	Applications to cotton < 6 inches must be made with hooded or shielded sprayer. Coverage is essential for good control. For control of additional broadleaf weeds and grasses, mix with other herbicides registered for use in cotton. **Do not** apply more than 3.2 ounces per season in post-directed and layby applications. Add a crop oil concentrate at 1% v/v.
diuron – 0.2 to 0.5 lb/A	Diuron (4 lb/gal formulation) — 0.4 to 1 pt/A or 80% formulation — 0.25 to 0.63 lb/A	After smallest cotton is at least 6 inches tall	Annual grasses and broadleaf weeds	Apply as directed spray. Diuron plus MSMA provides better weed control under a wide range of growing conditions than either herbicide alone. See *Special Instructions and Remarks* for MSMA. Add a nonionic surfactant at 0.25% v/v if MSMA formulation does not contain adjuvant.

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Cotton Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
fomesafen – 0.25 to 0.38 lb/A	fomesafen (2 or 1.88 lb/gal formulation) — 1 to 1.5 pt/A	After smallest cotton is at least 6 inches tall	Hemp sesbania, morningglory, Pennsylvania smartweed, pigweed	Apply as a directed spray. Use shielded or hooded applications on 6- to 12-inch cotton. Contact with cotton foliage can cause significant injury. **Do not** apply with liquid nitrogen. **Do not** apply within 70 days of cotton harvest. **Do not** apply more than 1.5 pints per acre per season. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
lactofen – 0.2 lb/A	Cobra 2 EC — 0.8 pt/A	After smallest cotton is at least 6 inches tall	Hemp sesbania, morningglory, prickly sida, common ragweed, pigweed	Height differential between cotton and weeds is important since good spray coverage on the weeds is necessary for control. Mix with MSMA to broaden weed control spectrum. See *Special Instructions and Remarks* for MSMA. Add crop oil concentrate at 0.5 to 1 pint per acre for cotton 6 to 8 inches tall or 1 to 2 pints per acre for cotton taller than 12 inches.
linuron – 0.5 to 0.75 lb/A	linuron (4 lb/gal formulation) — 1 to 1.5 pt/A or 50% formulation — 1 to 1.5 lb/A	After smallest cotton is at least 8 inches tall	Annual grasses and broadleaf weeds	Apply as a directed spray. If a second application is needed, use same rate and apply 1 week or more after first treatment. Mix with MSMA to broaden weed control spectrum. See *Special Instructions and Remarks* for MSMA. Add a nonionic surfactant at 0.25% v/v if MSMA formulation does not contain spray adjuvant.
linuron + diuron – 0.5 to 0.75 lb/A	Layby Pro 4 L — 1 to 1.5 pt/A	After smallest cotton is at least 6 to 8 inches tall	Annual grass and broadleaf weeds	Apply as a directed spray. Use the lower rate on 6-inch cotton and the higher rate on 8-inch cotton or taller. For control of emerged weeds, Add a nonionic surfactant at 0.5% v/v or a crop oil concentrate at 1% v/v. **Do not** use a crop oil concentrate on cotton less than 12 inches tall.
pyroxasulfone – 0.04 to 0.11 lb/A	Zidua 85 WG — 0.75 to 2.1 oz/A or 4 SC — 1.25 to 3.5 oz/A	Between the 5-leaf to bloom stages	Annual grasses and pigweed	Apply as a directed spray. Mix with glyphosate or glufosinate to improve weed control spectrum or control emerged vegetation.
oxyfluorfen – 0.25 or 0.5 lb/A	Goal 2 XL 2 EC — 1 or 2 pt/A	After smallest cotton is at least 6 inches tall	Prickly sida, morningglory, hemp sesbania	Mix with MSMA to broaden weed control spectrum. See *Special Instructions and Remarks* for MSMA. Good spray coverage is essential for control. Goal 2 XL is most effective under optimum growing conditions. Use the higher rate on larger weeds or under drought conditions. Add a nonionic surfactant at 0.25% v/v if MSMA formulation does not contain spray adjuvant.
prometryn + trifloxysulfuron – 0.8 to 1.2 lb/A	Suprend 80 DF — 1 to 1.5 lb/A	After smallest cotton is at least 6 inches tall	Morningglory, velvetleaf, pigweeds, sicklepod, cocklebur, hemp sesbania	Apply to weeds less than 6 inches tall. **Do not** apply within 60 days of harvest. **Do not** exceed total of 2.7 pounds per season. Injury may occur if mixed with malathion, profenofos (Curacron) or emamectin-benzoate-containing insecticides (Denim), acephate, Bidrin, Capture, or Karate. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
Postemergence – Over the Top (Any Technology)				
acetochlor – 0.94 to 1.5 lb/A	Warrant 3 CS — 1.25 to 2 qt/A	Between cotton emergence and first bloom	Annual grasses and pigweed	Warrant will not control emerged weeds. Apply postemergence to cotton but before weed seedling emergence. Mix with glyphosate in Roundup Ready system.
clethodim – 0.063 to 0.13 lb/A	clethodim (1 lb/gal formulation) — 12 to 16 oz/A or 2 lb/gal formulation — 6 to 8 oz/A — 6 to 8 oz/A	Small, actively growing weeds	Annual grasses, johnsongrass, bermudagrass	Adjust spray volume and pressure to ensure thorough coverage of grass. **Do not** apply within 1 hour of anticipated rainfall. **Do not** apply to stressed grasses. **Do not** cultivate within 7 days of application. Add a nonphytotoxic crop oil concentrate at 1% v/v.
dimethenamid-P – 0.6 to 0.75 lb/A	Outlook 6 EC — 12.8 to 16 oz/A	From 1-true-leaf cotton up to mid-bloom stage	Annual grasses and small-seeded broadleaf weeds	Outlook will not control emerged weeds. Apply postemergence to cotton but before weed seedling emergence. Mix with glyphosate in Roundup Ready system. **Do not** apply preplant incorporated, preplant surface, or preemergence. Split applications are labeled but **do not** apply more than 21 ounces per acre per season.
MSMA – 0.75 to 1 lb/A	Various formulations (see product label for specific rates)	When cotton is 3 to 6 inches tall	Annual grasses, susceptible cocklebur, nutsedge, small johnsongrass	Use as a salvage treatment only. Possible burning and reddish color of foliage may appear. May delay cotton maturity. **Do not** tank mix with other herbicides. Apply only to healthy cotton under favorable growing conditions. **Do not** apply after first square or when cotton is more than 6 inches tall. Add nonionic surfactant at 0.25% v/v unless formulation contains surfactant.

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Cotton Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
fluometuron – 0.5 to 1 lb/A	fluometuron (4 lb/gal formulation) — 1 to 2 pt/A	After smallest cotton is at least 6 inches tall	Annual grass and broadleaf weeds	**Use as a salvage treatment only.** Crop injury may occur. Apply only to healthy cotton under favorable growing conditions. Use the higher rate on vigorously growing cotton and bigger weeds. Controls or suppresses wide spectrum of annual weed seedlings to allow more effective directed sprays later. Add nonionic surfactant at 0.25% v/v.
fluazifop – 0.094 to 0.19 lb/A	Fusilade DX 2 EC — 6 to 16 oz/A **(see table at beginning of section for specific rates by species)**	Small, actively growing weeds	Annual grasses, rhizome johnsongrass, bermudagrass	For annual grasses, re-treat if needed for late emerging grasses. **Do not** apply more than 48 ounces per acre per season. **Do not** apply after boll set or within 90 days of harvest. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
metolachlor – 0.75 to 1.33 lb/A or *S*-metolachlor – 0.48 to 1.27 lb/A	Various formulations (see product label for specific rates)	When cotton is 3 to 12 inches tall	Annual grasses and pigweeds	Metolachlor/*S*-metolachlor will not control emerged weeds. Apply postemergence to cotton but before weed seedling emergence. Mix with glyphosate in Roundup Ready system. **Do not** apply within 100 days of harvest.
pendimethalin – 0.26 to 0.53 lb/A	Prowl H_2O 3.8 CS — 1.1 to 3.2 pt/A or 3.3 EC — 1.2 to 3.6 pt/A	Between the 5- and 8-leaf stages	Annual grasses and small-seeded broadleaf weeds	This treatment will not control emerged weeds. When mixed with Roundup PowerMax or Roundup WeatherMax, AMS is required.
pyrithiobac – 0.065 to 0.095 lb/A	pyrithiobac (3.2 lb/gal formulation) — 2.6 to 3.8 oz/A	From 1-true-leaf cotton up to 60 days before harvest	Broadleaf weeds	Optimum control depends upon proper timing, thorough coverage of weed foliage, and a well-designed preemergence program. **Do not** mix with insecticides containing malathion. **Do not** mix with metolachlor/*S*-metolachlor as a postemergence treatment. **Do not** exceed 3.8 ounces per acre in a single application or 5.1 ounces per acre per season. Add nonionic surfactant at 0.25% v/v.
quizalofop – at 0.031 to 0.063 lb/A	quizalofop (0.88 lb/gal formulation) — 4.5 to 9.16 oz/A **(see table at beginning of section for specific rates by species)**	Small, actively growing weeds up to 80 days before harvest	Annual grasses, seedling and rhizome johnsongrass, bermudagrass, volunteer grain sorghum, red rice	**Do not** apply using crop-origin (vegetable) oils as an adjuvant or carrier. **Do not** apply more than 18 fluid per ounces per season. **Do not** apply within 24 hours of a postemergence broadleaf herbicide. **Do not** cultivate within 7 days of application. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
sethoxydim – 0.19 to 0.28 lb/A	Poast 1 EC — 24 to 36 oz/A **(see table at beginning of section for specific rates by species)**	Small, actively growing weeds	Annual grasses, seedling and rhizome johnsongrass, bermudagrass, red rice	A second application can be made to control new emergence or regrowth of johnsongrass and bermudagrass. **Do not** apply within 40 days of harvest. Add a crop oil concentrate at 1% v/v.
trifloxysulfuron – 0.08 to 0.11 lb/A	Envoke 75 DG — 0.1 to 0.15 oz/A	When cotton has at least 5 true leaves	Morningglory, sicklepod, pigweed, and nutsedge	Envoke may cause temporary yellowing or stunting of cotton plants. Envoke may be mixed with other products when applied as a post-directed spray (See label for specifics). **Do not** mix with insecticides containing malathion, profenofos, or emamectin-benzoate or unacceptable injury may occur. Add a nonionic surfactant at 0.25% v/v.
Cultivation—Utilize so that soil moved will not interfere with subsequent use of postemergence herbicides. Deep cultivation (> 2 inches) usually is not necessary and may damage the crop.				
Glytol + LibertyLink/Widestrike/XtendFlex/Enlist Varieties Only				
glufosinate – 0.53 to 0.78 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 43 oz/A	Between cotton emergence to early-bloom	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	Ground application should be applied in a minimum of 15 gallons of spray mix. **Do not** apply more than 72 to 87 fluid ounces per acre in a single growing season. Single application rate can be as high as 43 ounces per acre. Maximum total application rate is dependent upon whether glufosinate was applied at burndown and application rate at that time. **Do not** apply within 70 days of harvest. Avoid use of air induction spray tips.

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Cotton Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
glufosinate + metolachlor or *S*-metolachlor – 0.53 to 0.78 lb/A + 0.75 to 1.33 lb/A or 0.48 to 1.27 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 43 oz/A + Various formulations (see product label for specific rates)	When cotton is 3 to 12 inches tall	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	See *Special Instructions and Remarks* for glufosinate and metolachlor/*S*-metolachlor.
glyphosate – 1 to 1.5 lb/A	Various formulations (see product label for specific rates)	Small, actively growing weeds until 7 days prior to harvest	Annual and perennial grass and broadleaf weeds	Sequential applications should be made 10 to 14 days apart to improve control of larger weeds. See individual product label for specific information on mixtures and rates. Glyphosate-resistant weeds are prevalent throughout Mississippi. See Herbicide Resistant Weed section for additional control options.
glyphosate + *S*-metolachlor 1.6 to 2.3 lb/A	Sequence — 2.5 to 3.5 pt/A	When cotton is 3 to 12 inches tall	Annual grasses and pigweeds	**Do not** exceed 2.5 pints of Sequence per acre in a single application. **Do not** exceed 3.5 pints per acre in a season. **Do not** apply within 100 days of harvest.
glyphosate + pyrithiobac – 1 lb/A + 0.033 to 0.095 lb/A	Various formulations (see product label for specific rates) + pyrithiobac (3.2 lb/gal formulation) — 1.3 to 3.8 oz/A +	Postemergence up to 60 days before harvest	Annual grasses, broadleaf weeds, sedges	See *Special Instructions and Remarks* for pyrithiobac and glyphosate.
XtendFlex Varieties Only				
dicamba – 0.5 lb/A	XtendiMax with VaporGrip 2.91 SL or FeXapan with VaporGrip 2.91 SL — 22 oz/A	Preemergence or postemergence up 7 days before harvest	Broadleaf weeds	See www.xtendimaxapplicationrequirements.com and the product label for instructions related to XtendiMax. See http://www.dupont.com/products-and-services/crop-protection/soybean-protection/articles/fexapan-application.html and the product label for instructions related to FeXapan.
dicamba – 0.5 lb/A	Engenia 5 SL — 12.8 oz/A	Preemergence or postemergence up 7 days before harvest	Broadleaf weeds	See www.engeniatankmix.com and the product label for instructions related to Engenia.
Enlist Varieties Only				
glyphosate + 2,4-D – 1.46 to 1.98 lb/A	Enlist Duo 3.33 SL — 3.5 to 4.75 pt/A	Preemergence or postemergence up mid bloom	Annual grasses and broadleaf weeds	See www.enlisttankmix.com and the product label for instructions related to Enlist Duo.
2,4-D – 0.71 to 0.95 lb/A	Enlist One 3.8 SL — 1.5 to 2 pt/A	Preemergence or postemergence up mid bloom	Annual grasses and broadleaf weeds	See www.enlisttankmix.com and the product label for instructions related to Enlist Duo.
Layby				
carfentrazone – 0.012 to 0.024 lb/A	Aim 2 EC — 0.8 to 1.6 oz/A	When cotton is at least 12 inches tall with sufficient bark development	Morningglory, pigweeds, velvetleaf	Coverage is essential for good control. For control of additional broadleaf weeds and grasses, mix with other herbicides registered for use in cotton. **Do not** apply more than 3.2 ounces per season by post-directed and layby applications. Add a crop oil concentrate at 1% v/v.
diuron – 0.5 to 1.0 to 1.2 lb/A	diuron (4 lb/gal formulation) — 1 to 2 to 2.4 pt/A or 80% formulation — 0.63 to 1.25 to 1.5 lb/A	When cotton is at least 12 inches tall	Annual grasses and broadleaf weeds	Diuron plus MSMA provides better weed control under a wide range of growing conditions than either herbicide alone. See *Special Instructions and Remarks* for MSMA. Add a nonionic surfactant at 0.25% v/v if MSMA formulation does not contain spray adjuvant.

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Cotton Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
flumioxazin – 0.064 lb/A	flumioxazin (51% formulation) — 2 oz/A or 4 lb/gal formulation — 2 oz/A	When cotton is at least 16 inches tall	Annual broadleaf weeds	Severe crop injury may result if application is made to green or unbarked stem. Use a nonionic surfactant at 0.25% v/v. **Do not** use crop oil concentrate, methylated seed oils, organosilicon surfactants, or products containing these ingredients as severe crop injury may occur.
fomesafen – 0.25 to 0.38 lb/A	fomesafen (2 or 1.88 lb/gal formulation) — 1 to 1.5 pt/A	When cotton has at least 4 inches of brown bark	Small-seeded broadleaf weeds, especially pigweeds and prickly sida	Avoid contact with any nonbarked portions of plants. Adjust nozzles to provide complete coverage of weeds. **Do not** apply with liquid nitrogen. **Do not** apply within 70 days of cotton harvest. **Do not** apply more than 1.5 pints per acre per season. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
linuron – 1 to 1.5 lb/A	linuron (4 lb/gal formulation) — 2 to 3 pt/A or 50% formulation — 2 to 3 lb/A	When cotton is at least 20 inches tall	Annual grasses and small-seeded broadleaf weeds	Apply as a directed spray with nozzles adjusted to minimize contact to cotton. Omit surfactant if no emerged weeds are present at time of treatment..
linuron + diuron – 0.8 1.2 lb/A	Layby Pro 4 L — 1.6 to 2.4 pt/A	When cotton is at least 15 inches tall	Annual grasses and broadleaf weeds	For control of emerged weeds, add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
pendimethalin – 0.5 to 1.5 lb/A	Prowl H_2O 3.8 CS — 1.1 to 3.2 pt/A or 3.3 EC formulation — 1.2 to 3.6 pt/A	After last cultivation	Annual grasses and small-seeded broadleaf weeds	Apply to the soil between rows as a directed spray following last cultivation. Destroy existing weeds prior to application. Avoid spray contact with nonbarked portion of cotton stems and foliage or serious crop injury may occur. Apply at least 60 days before harvest.
pyroxasulfone – 0.04 to 0.11 lb/A	Zidua 85 WG — 0.75 to 2.1 oz/A or 4 SC — 1.25 to 3.5 oz/A	Between the 5-leaf to bloom stages	Annual grasses and pigweed	See *Special Instructions and Remarks* for Zidua.
pyroxasulfone + carfentrazone – 0.043 to 0.119 lb/A	Anthem Flex 4 SE — 1.4 to 3.8 oz/A	When cotton is at least 6 inches tall	Annual grasses and small-seeded broadleaf weeds	Applications to cotton with less than 5 to 6 nodes must be applied with hooded or shielded sprayer.
pyroxasulfone + flumioxazin – 0.14 lb/A	Fierce 76 WDG — 3 oz/A	When cotton is at least 16 inches tal	Prickly sida, morningglory, pigweed, crabgrass, barnyardgrass; other annual grass and broadleaf weeds	*See Special Instructions and Remarks* for flumioxazin and Zidua
Hooded sprayers: Use of nonselective herbicides applied with hooded sprayers to avoid contact with the crop may be desirable for weed control in row middles, especially in no-till or conservation tillage systems. Addition of a residual herbicide will extend weed control and may negate the need for a layby application made to 12-inch tall or greater cotton.				
flumioxazin – 0.064 lb/A	flumioxazin (51% formulation) — 2 oz/A or 4 lb/gal formulation — 2 oz/A	After cotton is at least 6 inches tall	Annual broadleaf weeds	**Use only hooded sprayer equipment** designed to minimize exposure of the spray to cotton foliage. Hoods must be operated on the ground or skidding along the ground to minimize spray contact with desirable vegetation. See *Special Instructions and Remarks* for flumioxazin in Layby section. Provides some post emergence activity on emerged weeds. Provides excellent residual control of most broadleaf weeds and suppression of annual grass weeds.

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Cotton Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
glufosinate – 0.53 to 0.78 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 43 oz/A	Between cotton emergence and early-bloom	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	See *Special Instructions and Remarks* for glufosinate. **Use only hooded sprayer equipment** designed to minimize exposure of the spray to cotton foliage when applying to cotton varieties not tolerant to glufosinate. Hoods must be operated on the ground or skidding along the ground to minimize spray contact with desirable vegetation.
paraquat – 0.31 to 0.63 lb/A	Gramoxone SL 2 SL — 1.25 to 2.5 pt/A	After cotton is at least 6 inches tall	Annual grasses and broadleaf weeds	**Use a hooded sprayer ONLY.** Keep the bottom edge of the hood in contact with the soil surface. Avoid crop contact with spray solution. Avoid use of spray tips that produce fine spray droplets. (State Label). **Other formulations of paraquat are NOT labeled for hooded sprayer applications.** Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.

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Soybean Weed Management

Weed Response Ratings for Soybean Herbicides Applied Preemergence[1]

	Herbicide group numbers	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Goosegrass	Johnsongrass—rhizome	Johnsongrass—seedling	Volunteer glyphosate-resistant corn	Yellow nutsedge	Balloonvine	Cocklebur	Common ragweed	Cutleaf groundcherry	Hemp sesbania	Hophornbeam copperleaf	Jimsonweed	Morningglory—entireleaf	Morningglory—palmleaf	Morningglory—pitted	Morningglory—small-flower	Palmer, spiny amaranth, waterhemp	Pennsylvania smartweed	Prickly sida	Purple moonflower	Purslane	Showy crotolaria	Sicklepod	Smooth, redroot pigweed	Spurge	Spured anoda	Velvetleaf	Wild poinsettia	Crop tolerance *(G = good, F = Fair)*
PPI-Preplant-Incorporated[2]																																		
Pendimethalin or Trifluralin	3, 3	9	9	9	9	9	9	3	-	8	1	0	-	-	0	-	5	2	2	2	2	7	2	0	1	9	3	4	8	-	0	4	-	G
Preplant or Preemergence																																		
Anthem Maxx	14, 15	9	9	9	8	8	0	8	0	4	-	-	5	-	-	-	7	6	-	6	-	9	-	8	-	9	-	-	9	-	-	7	-	G
Authority Elite	14, 15	9	9	9	9	8	0	8	0	7	-	-	7	8	4	8	7	8	8	8	8	9	9	8	8	9	-	4	9	6	-	7	-	F
Authority MTZ	5, 14	6	6	6	6	5	4	0	-	7	-	7	8	-	8	9	8	9	9	9	9	9	9	8	-	8	-	7	9	8	-	8	9	F
Authority Supreme	14, 15	9	9	9	8	8	4	8	0	5	-	4	7	8	6	8	8	8	8	8	8	9	8	8	8	9	-	4	9	6	-	7	-	F
Authority XL	2, 14	6	6	6	6	5	5	2	-	9	-	9	8	-	5	9	8	9	9	9	9	9	9	4	-	8	-	6	9	8	-	9	9	F
Boundary	5, 15	8	8	8	8	8	6	0	-	7	9	5	9	9	9	9	8	3	7	7	8	8	9	9	5	9	6	7	9	9	9	8	6	F
Canopy DF	2, 5	7	6	7	7	7	7	3	-	5	8	9	9	9	9	8	8	8	8	8	9	8	9	9	6	10	-	7	9	9	9	9	8	F
Canopy EX	2	8	8	7	7	7	6	2	-	8	-	8	8	-	9	-	5	8	8	8	8	8	9	7	-	8	8	-	8	8	-	7	0	G
Clomazone	13	9	9	9	8	9	9	3	-	-	5	6	5	0	4	8	8	4	6	7	6	0	8	9	3	9	3	0	4	8	9	10	9	G
Envive	2, 2, 14	6	5	6	6	5	5	0	-	7	7	9	9	5	8	9	8	9	9	9	6	9	8	8	9	9	9	7	9	8	9	5	-	F
Fierce	14, 15	7	7	7	7	6	3	5	2	5	7	3	7	7	8	8	8	7	5	7	7	8	8	9	7	8	-	7	9	9	8	8	9	F
Fierce XLT	2, 14, 15	7	7	7	7	6	3	5	2	5	7	3	7	7	8	8	8	7	5	7	7	8	8	9	7	8	-	7	9	9	8	8	9	F
Flumioxazin	14	5	5	5	6	5	5	0	-	7	7	0	9	5	9	9	8	8	8	8	6	8	9	8	9	6	9	7	8	8	8	5	-	F
Fomesafen	14	4	3	4	-	4	4	0	-	7	-	7	7	8	4	-	4	5	6	8	5	8	7	8	4	7	-	7	8	-	1	-	6	G
Intimidator	5, 14, 15	8	8	8	8	8	6	0	-	7	9	5	9	9	9	9	8	3	7	7	8	9	9	9	5	9	6	7	9	9	9	8	6	F
Metolachlor/S-metolachlor	15	8	8	9	9	9	6	0	-	9	1	0	6	6	0	2	8	0	0	0	0	7	4	4	0	9	3	2	9	5	0	4	-	G
Metribuzin	5	8	6	8	7	7	5	0	-	2	9	6	9	9	9	9	8	2	2	7	8	7	9	9	6	9	7	8	9	9	9	8	7	F
Outlook	15	8	8	9	9	9	6	0	-	5	1	0	9	4	0	3	3	0	0	0	0	6	4	4	0	9	5	3	9	8	0	4	-	G
Pendimethalin	3	9	9	9	9	9	9	3	-	0	0	0	3	0	0	0	3	2	2	2	2	6	2	4	1	9	0	2	8	2	0	2	0	G
Prefix	14, 15	9	8	9	3	9	7	0	-	9	-	5	9	9	7	6	8	5	5	5	4	9	4	4	9	6	4	5	8	9	9	6	-	G
Python	2	0	0	0	0	0	0	0	-	-	3	8	8	9	0	7	-	5	7	7	8	6	9	9	-	9	3	7	9	9	9	9	6	G
Scepter	2	7	7	7	5	5	7	2	-	4	5	9	7	-	0	7	8	6	8	8	8	6	9	9	5	9	-	5	10	6	7	6	7	G
Solicam DF	12	8	8	9	7	8	7	2	-	4	-	4	-	-	4	-	-	4	5	5	4	7	5	8	4	9	-	5	8	8	7	7	-	F
Sonic or Authority First	2, 14	5	5	5	5	5	5	0	6	7	-	7	8	8	-	8	8	8	8	9	7	7	9	7	7	9	-	-	9	8	8	8	7	G
Valor XLT	2, 14	6	5	6	6	5	5	0	-	8	7	9	9	5	8	9	9	9	9	9	6	9	8	8	9	9	9	7	9	6	9	5	-	F
Warrant	15	8	8	7	9	7	5	3	-	7	-	0	5	9	0	-	4	0	0	0	0	6	4	5	0	9	3	3	8	3	2	3	3	G
Zidua or Zidua SC	15	9	9	9	8	8	4	7	0	4	-	3	5	-	6	8	7	6	6	6	6	9	7	8	-	9	-	7	9	9	-	7	-	G

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

[2]An overlay treatment with the preemergence herbicides will control a broader spectrum of weeds, but the control of a given species may be no better than that for the best herbicide in the specific combination selected.

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Soybean Weed Management

Weed Response Ratings for Soybean Herbicides Applied Postemergence[1]

	Herbicide group numbers	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Goosegrass	Johnsongrass—rhizome	Johnsongrass—seedling	Yellow nutsedge	Balloonevine	Cocklebur	Common ragweed	Cutleaf groundcherry	Hemp sesbania	Hophornbeam copperleaf	Jimsonweed	Morningglory—entireleaf	Morningglory—palmleaf	Morningglory—pitted	Morningglory—small-flower	Palmer, spiny amaranth, waterhemp	Pennsylvania smartweed	Prickly sida	Purple moonflower	Purslane	Showy crotolaria	Sicklepod	Smooth, redroot pigweed	Spurge	Spured anoda	Velvetleaf	Volunteer glyphosate-resistant corn	Wild poinsettia	Crop tolerance (G = good, F = Fair)
Acifluorfen	14	3	4	3	2	3	3	2	3	8	5	8	9	9	8	8	8	9	9	8	7	7	1	9	8	9	3	8	7	2	-	-	7	G
Acifluorfen + 2,4-DB	14, 4	3	4	3	2	3	3	2	-	8	7	8	9	9	8	8	8	9	9	8	7	7	1	9	8	9	3	8	7	-	-	-	8	F
Assure II	1	9	9	9	9	8	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	G
Bentazon	6	0	0	0	0	0	0	0	6	8	9	9	6	4	0	8	2	7	6	9	4	9	8	3	7	0	0	5	0	8	9	-	7	G
Bentazon + 2,4-DB	6, 4	0	0	0	0	0	0	0	6	8	9	9	6	5	0	8	5	9	8	9	4	9	8	5	7	0	0	5	0	8	9	-	6	F
Classic	2	0	0	0	0	0	0	0	6	5	10	8	-	8	4	9	9	9	8	8	6	9	2	9	5	-	7	10	0	4	8	-	8	G
Clethodim	1	9	9	9	8	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	G
Cobra	14	4	4	4	3	4	3	2	3	9	8	8	9	9	8	9	8	8	9	8	8	6	8	9	9	9	5	9	8	6	8	-	8	F
FirstRate	2	0	0	0	0	0	0	0	6	-	9	8	-	3	4	-	8	8	9	9	2	-	2	-	-	-	7	2	4	-	7	-	-	G
Fomesafen	14	3	3	3	2	3	3	3	6	8	8	8	9	9	8	9	8	8	9	8	8	7	2	9	8	9	3	9	5	2	-	-	8	G
Fusilade DX	1	8	8	8	8	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	G
Glufosinate[2]	10	7	7	7	7	5	7	6	4	9	9	9	6	8	8	8	9	9	9	8	7	9	7	-	6	-	8	8	8	7	7	9	-	G
Glyphosate[3]	9	9	9	9	9	8	10	9	7	8	10	9	9	7	8	8	7	8	8	9	8	8	7	8	8	8	8	9	8	7	7	-	9	G
Permit Plus[4]	2	0	0	0	0	0	0	0	9	-	8	8	-	9	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	8	0	-	G
Poast	1	8	9	9	9	9	9	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	G
Prefix	14, 15	3	3	3	2	3	3	3	7	8	8	6	8	9	9	0	8	8	9	8	8	7	2	9	8	8	9	9	8	2	9	-	6	G
Scepter	2	2	2	3	5	3	6	5	5	0	10	6	-	2	3	0	5	6	6	7	6	7	3	5	9	0	3	10	3	2	3	-	7	G
Storm	6, 14	3	4	3	2	3	3	0	6	8	9	9	9	9	7	8	8	9	9	9	7	8	7	7	8	9	2	8	6	7	8	-	6	G
Sequence	9, 15	9	9	9	9	8	10	9	7	8	10	9	9	7	8	8	7	8	8	9	9	8	7	8	8	8	8	9	8	7	7	-	9	G
Synchrony XP[4]	2	8	8	8	9	7	6	0	7	-	9	-	0	8	7	7	9	9	9	9	8	8	6	7	8	-	-	8	8	-	8	-	0	G
Postemergence-Directed																																		
2,4-DB	4	0	0	0	0	0	0	0	0	1	9	1	0	3	2	4	9	9	9	9	2	0	3	9	3	-	0	2	0	2	3	-	3	G
Linuron	7	7	7	8	7	7	7	0	-	8	7	8	8	8	7	7	8	8	8	8	8	7	8	7	8	-	7	8	7	8	6	-	7	G
Linuron + 2,4-DB	7, 4	7	7	8	7	7	7	0	2	9	9	9	10	8	9	8	10	9	9	10	9	7	8	9	9	-	9	9	7	8	7	-	8	G
Metribuzin	5	7	7	8	-	7	7	0	0	8	8	7	7	7	-	-	7	7	7	7	8	7	8	7	-	-	8	8	4	8	8	-	5	G
Metribuzin + 2,4-DB	5, 4	7	7	8	-	7	7	0	0	9	9	8	8	7	8	7	9	9	9	9	8	7	8	8	3	-	9	8	4	8	8	-	7	G
Paraquat (2 applications)	22	9	9	9	8	8	8	0	3	2	4	8	7	1	7	7	5	6	4	7	8	5	4	4	8	-	8	8	5	3	6	-	8	G

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

[2]LibertyLink soybean cultivars only.

[3]Roundup Ready soybean cultivars only.

[4]STS soybean cultivars only.

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Soybean Weed Management

Herbicide Rates for Preemergence Application in Soybean

Herbicide	Formulation	Sand, sandy loam	Loam, silt, silt loam, sandy clay, sandy clay loam	Silty clay, clay loam, silty clay loam, clay
Metolachlor	8 EC	1.5 to 2 pt/A	2 to 2.5 pt/A	2 to 2.5 pt/A
S-metolachlor	7.62 EC	1 to 1.33 pt/A	1.33 to 1.67 pt/A	1.33 to 1.67 pt/A
Metribuzin	75 DF	0.33 to 0.5 lb/A	0.5 to 0.67 lb/A	0.67 to 0.83 lb/A
	4 L	0.5 to 0.75 pt/A	0.75 to 1 pt/A	1 to 1.25 pt/A

Herbicide Rates for Controlling Grasses with Postemergence Herbicide Applications

	Fusilade DX		Quizalofop		Poast	
Grass species	Grass size	Rate	Grass size	Rate	Grass size	Rate
Barnyardgrass	1 to 2	12	2 to 6	8	1 to 8	24
Bermudagrass	4 to 8	12	3	10	1 to 6	36
Second application	4 to 8	8	3	7	1 to 4	24
Broadleaf signalgrass	2 to 4	12	2 to 6	8	1 to8	24
Crabgrass	1 to 2	12	2 to 6	8	1 to 6	24
Goosegrass	2 to 4	8	2 to 6	8	1 to 6	24
Red rice	1	16	1 to 4	9	1 to 4	48
Rhizome johnsongrass	8 to 18	12	10 to 24	10	15 to 20	24
Second application	6 to 12	8	6 to 10	7	6 to 10	24
Seedling johnsongrass	2 to 8	6	2 to 8	5	1 to 8	24
Volunteer corn	12 to 24	6	8 to 18	5	12 to 20	24 to 36

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Preplant-incorporated				
pendimethalin – 0.5 to 0.75 to 1.0 lb/A	pendimethalin (3.8 lb/gal formulation) — 1 to 1.5 to 2 pt/A or 3.3 lb/gal formulation — 1.2 to 1.8 to 2.4 pt/A	Preplant or preemergence	Annual grasses and some small-seeded broadleaf weeds such as pigweeds and purslane	Immediately incorporate 1 to 2 inches deep. Loss of 15% can be expected if incorporation is delayed 24 hours. If stand failure occurs, replant soybeans, but **do not** re-treat. Increase rate by 0.5 pint on medium-textured soils and 1 pint on fine-textured soils if heavy weed populations are anticipated.
trifluralin – 0.5 to 0.75 to 1 lb/A	trifluralin (4 lb/gal formulation) — 1 to 1.5 to 2 pt/A	Preplant or preemergence	Annual grasses and some small-seeded broadleaf weeds such as pigweeds and purslane	Immediate incorporate 1 to 2 inches deep. Loss of 30% can be expected if incorporation is delayed 24 hours. If stand failure occurs, replant soybeans, but **do not** re-treat.
Preplant or preemergence				
clomazone – 1.0 to 1.25 lb/A	clomazone (3 lb/gal formulation) — 2.6 to 3.3 pt/A	Preemergence	Annual grasses, purslane, spotted spurge, velvetleaf, wild poinsettia	**Do not** (1) apply within 1,500 feet of towns, subdivisions, commercial vegetables, greenhouses, or nurseries; (2) graze or feed forage, hay, or straw from treated fields to livestock; (3) apply with aerial equipment. **Avoid off-site movement.** Select rates according to soil texture and weed pressure.
cloransulam – 0.032 to 0.039 lb/A	FirstRate 84 DG — 0.6 to 0.75 oz/A	Within 2 weeks of planting for preplant applications or within 2 days after planting for PRE applications	Horseweed, morningglory, prickly sida, common ragweed, giant ragweed, smartweed, velvetleaf	At least 0.5 inch rainfall needed for incorporation. Mix with glyphosate or other nonselective herbicides to improve control of emerged vegetation. Mix with soil-applied herbicides to improve residual weed control.
dimethenamid-P – 0.47 to 0.98 lb/A	Outlook 6 EC — 10 to 21 oz/A	Preplant or preemergence	Annual grasses and some small-seeded broadleaf weeds	Provides poor control of most large-seeded broadleaf weeds. May cause temporary growth suppression of soybeans with high rainfall and water-saturated soil. **Do not** use more than 21 ounces of Outlook per season.
fomesafen – 0.25 to 0.38 lb/A	fomesafen (2 or 1.88 lb/gal formulation) — 1 to 1.5 pt/A	Preemergence	Small-seeded broadleaf weeds, especially pigweeds and prickly sida	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. **Do not** exceed a cumulative total of 0.375 pound of fomesafen per acre per year. Sufficient weed control depends on adequate rainfall for incorporation. Temporary injury to soybean can result if rainfall occurs soon after crop emergence; new soybean growth emerging after rainfall will be normal.
flumetsulam – 0.05 to 0.067 oz/A	Python 80 WDG — 1.0 to 1.33 oz/A	Preemergence	Annual broadleaf weeds	**Do not** (1) apply more than 1.4 ounces of Python in a year; (2) exceed 0.07 lb flumetsulam per year; (3) apply to soils with a pH of 7.8 or higher; (4) aerially apply.
flumioxazin – 0.063 to 0.096 lb/A	flumioxazin (51% formulation) — 1 to 2.5 oz/A or 4 lb/gal formulation — 1 to 2.6 oz/A	Preplant or preemergence	Prickly sida, morningglory, pigweeds, horseweed; other annual broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Soybean injury is possible under cool and wet conditions following planting or when incorporating rainfall occurs as seedlings are cracking. To reduce likelihood of injury, use flumioxazin as a preplant herbicide and allow rainfall to occur before planting. Injury may occur if flumioxazin is used in the same field where flufenacet, alachlor, metolachlor/*S*-metolachlor, or dimethenamid-P will be used.
flumioxazin + chlorimuron – 0.076 lb/A	Valor XLT 40.3 WDG — 3 oz/A	Preplant or preemergence	Prickly sida, morningglory, pigweed, horseweed; other annual broadleaf weeds	See *Special Instructions and Remarks* for flumioxazin. Valor XLT has increased morningglory, annual grass, cocklebur, and sicklepod control and longer residual control of glyphosate-resistant horseweed (marestail).
flumioxazin + chlorimuron + thifensulfuron – 0.065 to 0.1 lb/A	Envive 41.3 WDG — 2.5 to 4 oz/A	Preplant or preemergence	Prickly sida, morningglory, pigweed, horseweed; other annual broadleaf weeds	See *Special Instructions and Remarks* for Valor XLT and flumioxazin. **Do not** apply more than 4 ounces per season.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
flumioxazin + chlorimuron + metribuzin – 0.23 to 0.34 lb/A	Trivence 61.3 WDG — 6 to 9 oz/A	Preplant or preemergence	Prickly sida, morningglory, pigweed, horseweed; other annual broadleaf weeds	See *Special Instructions and Remarks* for Valor XLT, flumioxazin, and metribuzin. **Do not** apply more than 4 ounces per season. **Do not** apply to Black Belt soils with a pH > 7.0 or history of nutrient deficiency such as iron chlorosis.
flumioxazin + pyroxasulfone – 0.14 to 0.18 lb/A	Fierce 76 WDG — 3 to 3.75 oz/A	Preplant or preemergence	Prickly sida, morningglory, pigweed, crabgrass, barnyardgrass; other annual grass and broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. See *Special Instructions and Remarks* for flumioxazin. **Do not** apply more than 3.75 ounces of Fierce per season.
lumioxazin + pyroxasulfone + chlorimuron – 0.15 to 0.2 lb/A	Fierce XLT 62.4 WDG — 3.75 to 5.25 oz/A	Preplant or preemergence	Prickly sida, morningglory, pigweed, crabgrass, barnyardgrass; other annual grass and broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. See *Special Instructions and Remarks* for flumioxazin and Valor XLT. **Do not** apply more than 3.75 ounces per acre on soils with pH greater than 6.8.
imazaquin – 0.125 lb/A	Scepter 70 DG — 2.86 oz/A	Preemergence	Cocklebur, morningglory, prickly sida, smartweed, and common ragweed	Sufficient weed control depends on adequate rainfall for incorporation. May be mixed with a grass or broadleaf herbicide registered for preemergence application. In no-till or double-crop following wheat, use at least 20 gallons water. Add a nonionic surfactant at 0.25% v/v.
metolachlor – 1.5 to 2.5 lb/A or *S*-metolachlor – 0.95 to 1.6 lb/A	Various formulations **(see table at beginning of section for specific rates by soil texture)**	Preemergence	Annual grasses and some small-seeded broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Sufficient weed control depends on adequate rainfall for incorporation. If stand failure occurs, **do not** re-treat unless replanting is in the middles.
S-metolachlor + fomesafen – 1.32 lb/A	Prefix 5.29 EC — 2 pt/A	Preplant or preemergence	Annual grasses and broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. A maximum of 3 pints per acre can be applied within a single cropping season (includes preemergence and postemergence timings). Injury can occur if Prefix is applied at soybean cracking or after soybean emergence if rainfall occurs after soybean emergence.
S-metolachlor + metribuzin – 0.98 to 2 lb/A	Boundary 6.5 EC — 1.2 to 2.5 pt/A	Preplant or preemergence	Barnyardgrass, crabgrass, pigweed, prickly sida, hemp sesbania; other grass and broadleaf weeds	See *Special Instructions and Remarks* for metolachlor/*S*-metolachlor and metribuzin. **Do not** use rates > 1.5 pints per acre on soils above pH 7.0. **Do not** use on sands with less than 0.5% organic matter.
S-metolachlor + metribuzin + fomesafen – 1.2 to 2.69 lb/A	Intimidator 4.8 EC — 2 to 4.48 pt/A	Preplant or preemergence	Barnyardgrass, crabgrass, pigweed, prickly sida, hemp sesbania; other grass and broadleaf weeds	**Do not** exceed 4.48 pints per acre per season. This product contains fomesafen, which is a component of Reflex, Rhythm, Flexstar, and Prefix. **Do not** exceed a cumulative total of 0.375 pound of fomesafen per acre per year.
metribuzin – 0.25 to 0.63 lb/A	metribuzin (75% formulation) — 5.33 to 13.4 oz/A or 4 lb/gal formulation — 8 to 20 oz/A **(see table at beginning of section for specific rates by soil texture)**	Preplant or preemergence	Hemp sesbania, prickly sida, early sicklepod; annual grasses and small-seeded broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Injury may occur (1) on soils with calcareous surface or pH 7.5 and above, (2) to certain soybean varieties (see label for list), (3) on soil with < 0.5% organic matter, (4) when soybeans are planted < 1.5 inches deep, and (5) when heavy rains follow application, especially in poorly drained areas where water may stand several days.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
metribuzin + chlorimuron – 0.19 to 0.28 lb/A	Canopy 75 DF — 4 to 6 oz/A	Preplant or preemergence	Cocklebur, hemp sesbania, prickly sida, morningglory, sicklepod, smartweed, ragweed, spotted spurge	See *Special Instructions and Remarks* for metribuzin. Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. **Do not** apply more than 3 ounces per acre on soil with pH >7.0. **Do not** apply to Black Belt soils with pH >7.0 or history of nutrient deficiency. **Do not** apply to field planted to metribuzin-sensitive soybean cultivars (See label). **Do not** apply on soils with a calcareous surface layer or pH >7.5.
pendimethalin – 0.5 to 0.75 to 1.0 lb/A	Prowl H_2O 3.8 CS — 1 to 1.5 to 2 pt/A or 3.3 EC — 1.2 to 1.8 to 2.4 pt/A	Preplant or preemergence	Annual grasses and some small-seeded broadleaf weeds such as pigweed and purslane	See *Special Instructions and Remarks* for pendimethalin. Rainfall or overhead irrigation is needed within 7 days for activity. Seedling diseases, cold weather, excessive moisture, shallow or deep planting, low or high soil pH, high soil salt concentration or drought can weaken seedlings and increase the possibility of crop damage.
pyroxasulfone – 0.08 to 0.18 lb/A	Zidua 85 WDG — 1.5 to 3.5 oz/A or 4 SC — 2.5 to 5.75 oz/A	Preplant or preemergence	Pigweed, crabgrass, barnyardgrass, prickly sida, velvetleaf; other grass and broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. **Do not** apply more than 2.1 ounces on coarse soils or more than 3.5 ounces on all other soils per cropping season.
pyroxasulfone + fluthiacet-methyl – 0.067 to 0.185 lb/A	Anthem Maxx 4.3 SC — 2 to 5.5 oz/A	Preplant or preemergence	Pigweed, crabgrass, barnyardgrass, prickly sida, velvetleaf; other grass and broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Do not apply more than 3.4 ounces on coarse soils or more than 5.7 ounces on all other soils per cropping season.
sulfentrazone + cloransulam-methyl – 0.18 to 0.28 lb/A	Sonic or Authority First 70 WDG — 4 to 6.45 oz/A	Preplant or preemergence	Yellow nutsedge, pigweed, prickly sida, morningglory, common ragweed, horseweed	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. **Do not** apply more than 8 ounces per season.
sulfentrazone + carfentrazone-ethyl – 0.15 to 0.23 lb/A	Spartan Charge 3.45 SL — 5.75 to 8.5 oz/A	Preplant or preemergence	Pigweed, morningglory; other broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. **Do not** apply more than 8.5 fluid ounces per acre per 12-month period. Soybean chlorosis and stunting may occur at pH 7.5 and above, as well as under cold and wet growing conditions. **Do not** use on soils classified as sand, which have less than 1% organic matter.
sulfentrazone + *S*-metolachlor – 1.04 to 2.11 lb/A	Authority Elite 7 SC — 19 to 38.7 oz/A	Preplant or preemergence	Annual grasses and small-seeded broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Do not apply after crop emerges. **Do not** apply more than 38.7 ounces per cropping season.
sulfentrazone + metribuzin – 0.23 to 0.51 lb/A	Authority MTZ 45 DG — 8 to 18 oz/A	Preplant or preemergence	Pigweed, morningglory, prickly sida; other annual broadleaf weeds	See *Special Instructions and Remarks* for metribuzin. Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. **Do not** apply more than 33 ounces per year. **Do not** apply after soybean emergence or severe injury may occur. **Do not** apply to soils classified as coarse or having less than 1% organic matter.
sulfentrazone + chlorimuron ethyl – 0.13 to 0.35 lb/A	Authority XL 70 DG — 3 to 8 oz/A	Preplant or preemergence	Pigweed, morningglory, prickly sida; other annual broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. **Do not** apply more than 9.6 ounces per year. **Do not** apply after soybean emergence or severe injury may occur. **Do not** apply to Black Belt soils with a pH of more than 6.8 or history of nutrient deficiency.
Postemergence Cultivation: Use so that the soil moved will not interfere with subsequent use of postemergence treatment. Cultivation within 7 days before or after a postemergence herbicide application may reduce control from that treatment. Deep cultivation (more than 2 inches) is usually not necessary and may damage the crop.				
Early Postemergence				
acetochlor – 0.94 to 1.5 lb/A	Warrant 3 CS — 1.25 to 2 qt/A	Soybean emergence to R2; optimum at V2-V3	Annual grasses and pigweed	Warrant will not control emerged weeds. Apply postemergence to soybean but before weed seedling emergence. Mix with glyphosate in Roundup Ready soybean. **Do not** apply more than 4 quarts per season.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
acifluorfen – 0.38 to 0.50 lb/A	acifluorfen (2 lb/gal formulation) — 1.5 to 2 pt/A	Small, actively growing weeds	Hemp sesbania, morning-glory, pigweeds (less than 2 inches)	**Do not** apply to soybeans and weeds under stressed conditions, within 50 days of harvest, or more than 4 pints per acre per growing season. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
acifluorfen + 2,4-DB – 0.38 to 0.50 + 0.03 lb/A	acifluorfen (2 lb/gal formulation) — 1.5 to 2 pt/A + 2,4-DB (1.75 lb/gal formulation) — 2.2 oz/A or 2 lb/gal formulation — 1.9 oz/A	Small, actively growing weeds	Hemp sesbania, morningglory, groundcherry, pigweeds (less than 2 inches)	See *Special Instructions and Remarks* for acifluorfen.. **Do not** apply within 60 days of harvest. The 2,4-DB tank mixture will cause soybean foliage damage and may reduce yields. **Do not** use crop oil concentrate.
acifluorfen + bentazon – 0.75 lb/A	Storm 4 L — 1.5 pt/A	Small, actively growing weeds	Broadleaf weeds	**Do not** (1) apply more than 1.5 pints per application; (2) exceed 3 pints per season; (3) apply by air if sensitive crops, such as cotton or ornamentals are less than 200 feet down wind; (4) apply sequential treatments of Storm or acifluorfen less than 15 days after the initial treatments; (5) apply within 50 days before harvest. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
bentazon – 0.75 to 1 lb/A	bentazon (4 lb/gal formulation) — 1.5 to 2 pt/A or 5 lb/gal formulation — 1.2 to 1.6 pt/A + 2,4-DB (1.75 lb/gal formulation) — 2.2 oz/A or 2 lb/gal formulation — 1.9 oz/A	Small, actively growing weeds	Cocklebur, prickly sida (2 to 3 inches), smartweed	**Do not** apply more than 4 pints per acre per season, within 65 days of harvest, or under stressed conditions. For added control of pigweed and morningglory, 1 pint of acifluorfen plus surfactant may be added to bentazon.. For added control of hemp sesbania, 0.5 to 1 pint of acifluorfen plus surfactant may be added to bentazon.. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
bentazon + 2,4-DB – 0.75 to 1 + 0.03 lb/A	bentazon (4 lb/gal formulation) — 1.5 to 2 pt/A or 5 lb/gal formulation — 1.2 to 1.6 pt/A + 2,4-DB (1.75 lb/gal formulation) — 2.2 oz/A or 2 lb/gal formulation — 1.9 oz/A	Small, actively growing weeds	Cocklebur; prickly sida (2 to 3 inches), smartweed, morningglory	See *Special Instructions and Remarks* for bentazon. The 2,4-DB mix will cause soybean foliage injury and may reduce yields. **Do not** add surfactant to the 2,4-DB mixture.
chlorimuron – 0.0078 to 0.0104 to 0.0117 lb/A	Classic 25 DF — 0.5 to 0.67 to 0.75 oz/A	After soybeans have 1 trifoliate leaf until 60 days before maturity	Entireleaf and ivyleaf morningglory, giant ragweed, sicklepod (two applications 14 days apart)	**Do not** use on soybeans grown on Black Belt soils having a pH greater than 7.0 or a history of iron chlorosis. A sequential application may be applied 14 to 21 days after first application, but **do not** exceed a total of 1.5 ounces of per season. Soybeans may be stunted, particularly from sequential applications. Avoid off-target movement to non-target species. Add a nonionic surfactant at 0.25% v/v.
clethodim – 0.063 to 0.13 lb/A	clethodim (1 lb/gal formulation — 12 to 16 oz/A or 2 lb/gal formulation — 6 to 8 oz/A	Small, actively growing weeds	Annual grasses, johnsongrass, bermudagrass	Apply over-the-top or as a semi-directed spray to cover grasses. **Do not** apply (1) more than 32 ounces per acre per season (1 EC), (2) if rainfall is expected within 1 hour, or (3) to stressed plants. See label for sequential and mixture instructions for broadleaf herbicides. Add a nonphytotoxic crop oil concentrate at 1% v/v.
cloransulam – 0.25 oz/A	FirstRate 84 WG — 0.3 oz/A	Small, actively growing weeds	Common cocklebur, morningglory, ragweed, sicklepod	**Do not** (1) apply through irrigation system; (2) make more than two applications per season. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at1.2% v/v.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
flumetsulam – 0.0063 lb/A	Python 80 WDG — 0.125 oz/A	When soybean is in 1–5 trifoliate growth stage	Prickly sida (less than 2 inches tall)	**Do not** apply to soybean with more than five trifoliates. **Do not** apply more than two postemergence applications, and applications must be separated by at least 14 days. If Python is applied preemergence and postemergence, the cumulative rate cannot exceed 0.138 ounces per season. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
fomesafen – 0.25 to 0.38 or 0.24 to 0.35 lb/A	fomesafen (2 or 1.88 lb/gal formulation) — 1 to 1.5 pt/A	Small, actively growing weeds	Hemp sesbania, morningglory, Pennsylvania smartweed, pigweed	May cause temporary soybean leaf bronzing, crinkling, and/or spotting. Rainfall within 4 hours of application may reduce control. **Do not** (1) apply more than 1.5 pints per season; (2) apply to stressed plants; or (3) graze treated areas or harvest for forage or hay. **Avoid off-target movement to non-target plants.** Add a nonionic surfactant at 0.25% v/v.
fluazifop-P – 0.094 to 0.25 lb/A	Fusilade DX 2 EC — 6 to 16 oz/A **(see table at beginning of section for specific rates by species)**	Small, actively growing weeds	Annual grasses, seedling and rhizome johnsongrass, bermudagrass, volunteer grain sorghum, red rice	Apply over-the-top or as a semi-directed spray to cover the grasses. **Do not** apply (1) more than 32 ounces per acre per season, (2) after first bloom, or (3) if rainfall is expected within 1 hour after application. See Fusilade DX label for sequential and tank mix applications. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at1% v/v.
imazaquin – 0.063 or 0.13 lb/A	Scepter 70 DG — 1.43 to 2.86 oz/A	Small, actively growing weeds	Cocklebur (up to 12 inches tall), wild poinsettia, sicklepod.	For effective sicklepod control, use sequential preemergence and postemergence treatments. Apply at least 90 days before soybean harvest. **Do not** apply more than 0.25 pound of active ingredient per season or mix Scepter with postemergence grass herbicides. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
lactofen – 0.2 lb/A	Cobra 2 EC — 12.5 oz/A	Before soybeans exceed three trifoliate leaves	Hemp sesbania, morningglory, prickly sida, common ragweed, pigweed	Apply over-the-top or as a directed spray. Temporary speckling, burn, and/or crinkling of soybean leaves will occur. **Do not** (1) cultivate 5 days prior to application or while spraying; (2) apply more than once per growing season; (3) not later than 90 days before harvest. Add a nonionic surfactant at 0.125% v/v or a nonphytotoxic crop oil concentrate at 1 to 2 pt/A.
metolachlor – 1.5 to 2 lb/A or *S*-metolachlor – 0.95 to 1.27 lb/A	Various formulations **(see table at beginning of section for specific rates by soil texture)**	Soybean emergence to V3	Annual grasses and pigweed	Metolachlor/*S*-metolachlor should be applied postemergence to soybean but before weed seedling emergence. Mix with glyphosate in Roundup Ready soybean or with glufosinate in LibertyLink soybean.
S-metolachlor + fomesafen – 1.32 lb/A	Prefix 5.29 EC — 2 pt/A	When soybean is in V1 to V3 growth stage	Morningglory, pigweed, hemp sesbania, Pennsylvania smartweed	See *Special Instructions and Remarks* for fomesafen and metolachlor/*S*-metolachlor. Application should be made to weeds no larger than 3- to 4-leaf growth stage. Prefix can be mixed with glyphosate that contains an adjuvant. If it is mixed with glyphosate not containing an adjuvant, add nonionic surfactant at 0.25% v/v. **Do not** add crop oil concentrate, as severe soybean injury can occur.
pyroxasulfone – 0.053 to 0.12 lb/A	Zidua 85 WDG — 1 to 2 oz/A or 4 SC — 1.7 to 3.8 oz/A	Soybean emergence to V3	Annual grasses and pigweed	Zidua should be applied postemergence to soybean but before weed seedling emergence. Mix with glyphosate in Roundup Ready soybean or with glufosinate in LibertyLink soybean.
pyroxasulfone + fluthiacet-methyl – 0.055 to 0.11 lb/A	Anthem Maxx 4.3 SC — 1.65 to 3.25 oz/A	Soybean emergence to V3	Soybean emergence to V3	Anthem Maxx should be applied postemergence to soybean but before weed seedling emergence. Mix with glyphosate in Roundup Ready soybean or with glufosinate in LibertyLink soybean.
quizalofop-P – 0.034 to 0.069 lb/A	quizalofop-P (0.88 lb/gal formulation) — 5 to 10 oz/A **(see table at beginning of section for specific rates by species)**	Small, actively growing weeds before soybean pod set, and/or 80 days before soybean harvest	Annual grasses, seedling and rhizome johnsongrass, bermudagrass, volunteer grain sorghum, red rice	**Do not** apply (1) with crop oil concentrates; (2) > 20 ounces per season; (3) to drought-stressed grasses; or (4) if rain is expected within 1 hour after application. **Do not** cultivate 7 days before or after application or mix with bentazon or chlorimuron except as specified on the label. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
sethoxydim – 0.19 to 0.38 lb/A	Poast 1 EC — 24 to 48 oz/A **(see table at beginning of section for specific rates by species)**	Small, actively growing weeds	Annual grasses, seedling and rhizome johnsongrass, bermudagrass, red rice	**Do not** apply (1) to grasses under drought stress or herbicide injury; (2) if rainfall is expected within one hour after application; (3) within 90 days of harvest; (4) more than a total of 7.5 pints in one season. bentazon at labeled rate according to weed growth stage may be added, but Poast rates must be increased 50%. Add a nonphytotoxic crop oil concentrate at 1 qt/A.
LibertyLink Varieties Only				
glufosinate – 0.53 to 0.66 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 36 oz/A	Small, actively growing weeds from crop emergence to just before bloom	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	**For use only in LibertyLink soybean varieties. Do not** apply more than 65 fluid ounces per season. Sequential applications should be made 10 to 14 days apart to improve control of larger weeds. A single application use rate can be as high as 36 fluid ounces per acre. Apply when temperatures are warm, as colder weather may reduce activity. **Do not** use nozzles and pressure that result in coarse spray droplets.
glufosinate + acetochlor – 0.53 to 0.66 lb/A + 0.94 to 1.5 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 36 oz/A + Warrant 3 CS — 1.25 to 2 qt/A	Soybean emergence to V3	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	**For use only in LibertyLink soybean varieties.** See *Special Instructions and Remarks* for glufosinate and Warrant.
glufosinate + fomesafen – 0.53 to 0.66 lb/A + 0.27 to 0.33 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 36 oz/A + fomesafen (2 lb/gal formulation) — 17 to 21 oz/A or Cheetah Max 3 SL — 34 to 42 oz/A	Small, actively growing weeds from crop emergence to just before bloom	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	**For use only in LibertyLink soybean varieties.** See *Special Instructions and Remarks* for glufosinate and fomesafen.
glufosinate + metolachlor or *S*-metolachlor – 0.53 to 0.66 lb/A + 1.5 to 2 or 0.95 to 1.27 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 36 oz/A + Various formulations **(see table at beginning of section for specific rates by soil texture)**	Soybean emergence to V3	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	**For use only in LibertyLink soybean varieties.** See *Special Instructions and Remarks* for glufosinate and metolachlor/*S*-metolachlor.
glufosinate + pyroxasulfone – 0.53 to 0.66 lb/A + 0.053 to 0.12 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 36 oz/A + Zidua 85 WDG — 1 to 2 oz/A or Anthem Maxx 4.3 SC — 1.65 to 3.25 oz/A	Soybean emergence to V3	Annual grasses and broadleaf weeds; horseweed, morningglory, pigweed (less than 4 inches)	**For use only in LibertyLink soybean varieties.** See *Special Instructions and Remarks* for glufosinate and Zidua.
glufosinate + pyroxasulfone + fluthiacet-methyl – 0.53 to 0.66 lb/A + 0.055 to 0.11 lb/A	glufosinate (2.34 lb/gal formulation) — 29 to 36 oz/A + Anthem Maxx 4 SC — 1.7 to 3.8 oz/A	Soybean emergence to V3	Annual grasses and pigweed	**For use only in LibertyLink soybean varieties.** See *Special Instructions and Remarks* for glufosinate and Anthem Maxx.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Roundup-Ready/Roundup Ready 2 Xtend Varieties Only				
glyphosate – 1 to 1.5 lb/A	Various formulations (see product label for specific rates)	From soybean emergence through R2 growth stage	Annual and perennial grass and broadleaf weeds	**For use only in Roundup Ready soybean varieties. Do not** apply more than 2.25 pounds (ae) in a single growing season. Sequential applications should be made 10 to 14 days apart to improve control of larger weeds. Glyphosate-resistant weeds are prevalent throughout Mississippi. See Herbicide Resistant Weed section for additional control options.
glyphosate + acetochlor – 1 to 1.5 lb/A + 0.94 to 1.5 lb/A	Various formulations (see product label for specific rates) + Warrant 3 CS — 1.25 to 2 qt/A	Soybean emergence to V3	Annual and perennial grass and broadleaf weeds	**For use only in Roundup Ready soybean varieties.** See *Special Instructions and Remarks* for glyphosate and Warrant.
glyphosate + fomesafen – 1.23 lb/A	Flexstar GT 3.5 2.82 SL — 3.5 pt/A	Small, actively growing weeds after first trifoliate	Annual grasses and broadleaf weeds; horse-weed, morningglory, pigweed (less than 4 inches)	**For use only in Roundup Ready soybean varieties.** See *Special Instructions and Remarks* for glyphosate and fomesafen.
glyphosate + *S*-metolachlor – 1.6 to 2.3 lb/A	Sequence — 2.5 to 3.5 pt/A	Soybean emergence to V3	Annual and perennial grass and broadleaf weeds	**For use only in Roundup Ready soybean varieties.** See *Special Instructions and Remarks* for glyphosate and metolachlor/*S*-metolachlor. Provides residual control of small-seeded grasses and broadleaf weeds. Rainfall is required for residual control. **Do not** apply > 3.5 pints per acre. Expect poor control of large-seeded grasses like browntop millet and Texas panicum.
glyphosate + *S*-metolachlor + fomesafen – 1 to 1.5 lb/A + 1.32 lb/A	Various formulations (see product label for specific rates) + Prefix 5.29 EC — 2 pt/A	When soybean is in V1 to V3 growth stage	Annual grasses and broadleaf weeds; horse-weed, morningglory, pigweed (less than 4 inches)	**For use only in Roundup Ready soybean varieties.** See *Special Instructions and Remarks* for glyphosate and Prefix.
glyphosate + pyroxasulfone – 1 to 1.5 lb/A + 0.053 to 0.12 lb/A	Various formulations (see product label for specific rates) + Zidua 85 WDG — 1 to 2 oz/A or 4 SC — 1.7 to 3.8 oz/A	Soybean emergence to V3	Annual and perennial grass and broadleaf weeds	**For use only in Roundup Ready soybean varieties.** See *Special Instructions and Remarks* for glyphosate and Zidua.
glyphosate + pyroxasulfone + fluthiacet-methyl – 1 to 1.5 lb/A + 0.055 to 0.11 lb/A	Various formulations (see product label for specific rates) + Anthem Maxx 4.3 SC — 1.65 to 3.25 oz/A	Soybean emergence to V3	Annual grasses and pigweed	**For use only inRoundup Ready soybean varieties.** See *Special Instructions and Remarks* for glyphosate and Anthem Maxx.
Roundup Ready 2 Xtend Varieties Only				
dicamba – 0.5 lb/A	Engenia 5 SL — 12.8 oz/A	Preemergence or postemergence up to R1 growth stage	Broadleaf weeds	See www.engeniatankmix.com and the product label for instructions related to Engenia.
dicamba – 0.5 lb/A	XtendiMax with Vapor-Grip 2.91 SL or FeXa-pan with VaporGrip 2.91 SL — 22 oz/A	Preemergence or postemergence up to R1 growth stage	Broadleaf weeds	See www.xtendimaxapplicationrequirements.com and the product label for instructions related to XtendiMax. See http://www.dupont.com/products-and-services/crop-protection/soybean-protection/articles/fexapan-application.html and the product label for instructions related to FeXapan.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Sulfonylurea-Tolerant Soybean (STS) or BOLT Varieties Only				
chlorimuron + thifensulfuron – 0.0066 to 0.02 lb/A	Synchrony XP 28.4 DG — 0.38 to 1.13 oz/A	Small, actively growing weeds from before soybean emergence to 60 days before harvest	Hemp sesbania, morningglory, yellow nutsedge, sicklepod	**For use only in STS and BOLT soybean varieties.** The 1- to 1.125-ounce rates provide some residual control of certain small-seeded broadleaf weeds. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v if applied with a glyphosate formulation not preloaded with a surfactant.
halosufuron + thifensulfuron – 0.031 + 0.0036 lb/A	Permit Plus 75 WDG — 0.75 oz/A	Small, actively growing weeds from between the V1 and R2 soybean growth stages	Yellow nutsedge, purple nutsedge, hemp sesbania, common ragweed, velvetleaf	**For use only in STS and BOLT soybean varieties.** Only one application of Permit Plus is allowed per season. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v if applied with a glyphosate formulation not preloaded with a surfactant. Ammonium sulfate at 8.5 to 17 pounds per 100 gallons of water is recommended.
Directed Sprays/Hooded Sprayers				
2,4-DB – 0.20 lb/A	2,4-DB (1.75 lb/gal formulation) — 0.9 pt/A or 2 lb/gal formulation — 0.8 pt/A	After soybean are 8 inches tall	Cocklebur; partial control or of small pigweed and morningglory	Apply once or twice as a semi-directed spray when soybeans are 8 to 12 inches tall with sprays directed to contact no more than lower one-third of stems. Precise application is essential to prevent soybean injury. **Do not** apply if soybeans are under drought stress. Avoid spray pressures in excess of 40 psi. **Do not** add surfactant to spray mixtures.
linuron – 0.5 to 1.0 lb/A	linuron (4 lb/gal formulation) — 1 to 2 pt/A or 50% formulation — 1 to 2 lb/A	After soybean are 12 inches tall	Annual grasses and broadleaf weeds	Apply only single application as directed spray at base of crop plants striking the soybean plants no higher than 2 to 3 inches above the ground. **Do not** exceed 25 psi nozzle pressure or apply under windy conditions. Add a nonionic surfactant at 0.25% v/v.
linuron + 2,4-DB – 0.5 + 0.20 lb/A	linuron (4 lb/gal formulation) — 1 pt/A or 50% formulation — 1 lb/A + 2,4-DB (1.75 lb/gal formulation) — 0.9 pt/A or 2 lb/gal formulation — 0.9 pt/A	After soybean are 12 inches tall	Most annual grasses, cocklebur, morningglory, hemp sesbania, sicklepod prickly sida	See *Special Instructions and Remarks* for linuron and 2,4-DB.
metribuzin – 0.25 to 0.50 lb/A	metribuzin (75% formulation) — 5.33 to 10.67 oz/A or 4 lb/gal formulation — 8 to 16 oz/A **(see table at beginning of section for specific rates by soil texture)**	After soybean are 8 inches tall	Annual grasses and broadleaf weeds	Apply as a directed spray at the base of the soybean plants spraying no more than the lower 1/4 to 1/3 of the soybean plants. Soybean leaves contacted by the spray will be killed. **Do not** exceed 30 psi nozzle pressure or apply to sensitive varieties. Controls most broadleaf weeds < 3 inches tall except morningglory, most annual grasses < 1 inch tall. For hemp sesbania and prickly sida control, use 0.375 to 0.5 pounds active ingredient per acre.
metribuzin + 2,4-DB – 0.25 to 0.5 lb/A + 0.2 lb/A	metribuzin (75% formulation) — 5.33 to 10.67 oz/A or 4 lb/gal formulation — 8 to 16 oz/A + 2,4-DB (1.75 lb/gal formulation) — 0.8 pt/A	After soybean are 8 inches tall	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for metribuzin and 2,4-DB.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
S-metolachlor + metribuzin – 01.06 to 1.63 lb/A	Boundary 6.5 EC — 1.3 to 2 pt/A	After soybean are 8 inches tall	Annual grasses and broadleaf weeds	Boundary may be mixed with other herbicides labeled for directed or hooded applications to improve control of emerged weeds. **Do not** exceed 3.9 pints of Boundary per acre per season. **Do not** allow spray to contact more than the lower 1/4 to 1/3 of soybean plants.
paraquat – 0.07 to 0.13 lb/A	paraquat (2 lb/gal formulation) — 0.28 to 0.52 pt/A or 3 lb/gal formulation — 0.19 to 0.35 pt/A	After soybean are 8 inches tall	Annual grasses and broadleaf weeds, pigweeds, purslane	Use low rate for weeds less than 2 inches in height and the higher rate for weeds greater than 2 inches. Soybeans less than 8 inches will be injured or killed. Adjust nozzles to spray the lower 3 inches of the soybean plants. **Do not** exceed 30 psi to avoid drift. **Do not** apply more than twice. The second application should follow the first by 7 to 14 days.
Midseason Cocklebur Control				
2,4-DB – 0.20 lb/A	2,4-DB (1.75 lb/gal formulation) — 0.9 pt/A or 2 lb/gal formulation — 0.8 pt/A	7 to 10 days before soybean bloom until mid-bloom	Cocklebur	See *Special Instructions and Remarks* for 2,4-DB. Apply as broadcast spray after cocklebur plants have elongated and are as tall as soybean plants. 2,4-DB usually causes soybean injury but symptoms generally disappear within one week after treatment. **Do not** add surfactant.
Spot Spraying				
clethodim	clethodim (1 or 2 lb/gal formulation) — 0.25% + 1% crop oil concentrate by volume	Actively growing weeds	Johnsongrass, bermudagrass, annual grasses	Spray to wet foliage but not to point of runoff. Mixing example would be clethodim at 1 pint plus crop oil concentrate at 4 pints in 50 gallons of water.
fluazifop-P	Fusilade DX 2 EC — 0.5% + 0.25% nonionic surfactant or 1% crop oil concentrate by volume	Actively growing weeds	Johnsongrass (12 to 18 inches), bermudagrass, annual grasses	Spray to wet foliage but not to point of runoff. Make last application before soybean bloom. If a surfactant is used in lieu of crop oil concentrate, use only nonionic surfactants that contain at least 75% surface active agent. Mixing example would be Fusilade DX at 1 quart plus nonionic surfactant at 1 pint or crop oil concentrate at 4 pints in 50 gallons of water.
quizalofop-P	quizalofop-P (0.88 lb/gal formulation) — 0.375% + 0.25% nonionic surfactant or 1% crop oil concentrate by volume	Actively growing weeds before soybean pod set and/or within 80 days of soybean harvest	Johnsongrass (10 to 16 inches), bermudagrass (6 inches), annual grasses	Spray to wet foliage but not to point of runoff. Mixing example would be quizalofop at 1.5 pints plus nonionic surfactant at 1 pint or crop oil concentrate at 4 pints in 50 gallons of water.
sethoxydim	Poast 1 EC — 1.5% + 1.0% crop oil concentrate by volume	Actively growing weeds	Johnsongrass (15 inches), bermudagrass, annual grasses	Spray to wet foliage but not to point of runoff. **Do not** apply within 90 days of harvest. Mixing example would be Poast at 6 pints plus crop oil concentrate at 4 pints in 50 gallons of water.
glyphosate	Various formulations — 1% by volume for annual weeds or 2% by volume for perennial weeds	After johnsongrass reaches 12 inches in height but before soybean pod set	Johnsongrass, bermudagrass, annual and perennial weeds	Use high rate mix for bermudagrass. Spray to wet foliage of johnsongrass stems or other undesirable vegetation. Non-Roundup Ready soybeans in the treated area will be killed. Keep drift to a minimum. **Do not** apply if soybeans are setting pods.
Preharvest				
carfentrazone – 0.016 to 0.023 lb	Aim 2 EC — 1 to 1.5 oz/A	Mature, fully developed soybean with 50% natural defoliation and remaining leaves yellow	Morningglory desiccation	**Do not** apply more than 1.5 ounces per acre per season. **Do not** apply within 3 days of harvest. Aim may be mixed with glyphosate to improve control of grasses and other weeds. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.

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Soybean Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
glyphosate – 0.75 to 3.5 lb/A	Various formulations (see product label for specific rates)	Preharvest but after soybean pods have lost all green color	Annual grasses, johnsongrass, some broadleaf weeds	**Do not** apply more than 3.5 pounds (ae) per acre for preharvest applications. **Do not** apply more than 1.5 pounds (ae) of glyphosate per acre by air. Allow a minimum of 7 days between application and harvest. Use rates greater than 1.5 pounds ae would be beneficial for perennial weed control.
paraquat – 0.13 to 0.25 lb/A	paraquat (2 lb/gal formulation) — 0.52 to 1 pt/A or 3 lb/gal formulation — 0.35 to 0.67 pt/A	Mature, fully developed soybean with at least 50% of leaves dropped and remaining leaves yellow	Annual and perennial grasses and broadleaf weeds	Drought-stressed weeds will not be desiccated. Immature soybeans will be injured and yields reduced. **Interval between application and soybean harvest is a minimum of 15 days.** Add a nonphytotoxic crop oil concentrate at 1% v/v.
paraquat + sodium chlorate – 0.25 lb/A + 3 lb/A	paraquat (2 lb/gal formulation) — 0.52 to 1 pt/A or 3 lb/gal formulation — 0.35 to 0.67 pt/A + Various formulations (see product label for specific rates)	Mature, fully developed soybean with at least 50% of leaves dropped and remaining leaves yellow	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for paraquat and sodium chlorate.
saflufenacil – 0.022 to 0.044 lb/A	Sharpen 2.85 SC — 1 to 2 oz/A	Soybeans that have reached physiological maturity	Broadleaf weeds	Apply to indeterminate varieties with at least 65% brown pods and 70% defoliation or when seed moisture is 30% or less. Apply to determinant varieties when seed are fully developed with greater than 50% defoliation and remaining leaves are yellowing. **Do not** apply more than 2 fluid ounces per acre as a harvest aid per cropping season. **Do not** apply within 3 days of harvest. Add methylated seed oil at 1% v/v plus ammonium sulfate.
sodium chlorate – 6 lb/A	Various formulations (see product label for specific rates)	7 to 10 days before soybean harvest	Desiccation of most annual grasses and broadleaf weeds	Drought-stressed weeds will not be desiccated. Immature soybeans will be injured and yields reduced. **Do not** graze treated fields or feed treated bean foliage and fodder.

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Corn Weed Management

Weed Response Ratings for Corn Herbicides Applied Preemergence[1]

	Herbicide group numbers	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Goosegrass	Italian ryegrass	Johnsongrass—rhizome	Johnsongrass—seedling	Annual sedge	Purple nutsedge	Annual morningglory	Cocklebur	Common lambsquarters	Hemp sesbania	Horseweed	Palmer, spiny amaranth, waterhemp	Prickly sida (teaweed)	Sicklepod	Smooth, redroot pigweed
Preemergence																				
Anthem Maxx or Flex	14, 15	9	8	9	8	9	9	4	7	-	0	7	2	4	3	6	9	7	-	9
Atrazine	5	6	5	7	4	6	-	0	4	4	2	8	9	9	7	-	9	8	8	9
Bicep II Magnum, Harness Xtra, or Keystone NXT	5, 15	8	8	9	9	9	8	0	7	7	3	8	8	9	6	-	9	8	6	9
Corvus	2, 27	9	8	9	8	9	6	7	-	-	-	7	5	8	9	-	7	8	-	9
Lexar EZ	5, 15, 27	9	8	9	9	9	7	2	8	8	7	9	10	9	8	8	9	9	8	9
Pendimethalin	3	8	6	8	8	8	5	4	7	0	0	6	8	*	0	0	7	0	0	8
Sharpen	14	1	1	1	1	1	1	-	1	-	-	6	6	7	6	8	9	7	5	9
Simazine	5	6	5	8	6	7	-	0	4	2	0	7	9	9	-	3	9	9	8	9
Verdict	14, 15	8	6	8	7	8	-	0	-	-	-	6	6	7	6	8	9	7	5	9
Zidua or Zidua SC	15	9	8	9	8	9	9	4	6	-	-	7	-	4	3	6	9	7	-	9

Rating Scale: 0–3 = none to slight; 4–6 = fair; 7–8 = good; 9–10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

ED_005172C_00002010-00064

Corn Weed Management

Weed Response Ratings for Corn Herbicides Applied Postemergence[1]

	Herbicide group numbers	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Goosegrass	Italian ryegrass	Johnsongrass—rhizome	Johnsongrass—seedling	Annual sedge	Purple nutsedge	Annual morningglory	Cocklebur	Common lambsquarters	Hemp sesbania	Horseweed	Palmer, spiny amaranth, water-hemp	Prickly sida (teaweed)	Sicklepod	Smooth, redroot pigweed
2,4-D	4	1	0	0	2	1	0	0	0	4	2	9	8	9	8	8	8	8	8	8
Armezon or Impact	27	7	6	8	6	7	0	4	7	0	0	7	9	9	7	-	8	9	6	9
Atrazine + oil	5	6	7	8	5	6	-	0	3	6	2	8	9	9	7	-	9	9	8	9
Atrazine + metolachlor/*S*-metolachlor + safener	5, 15	6	5	6	4	6	-	0	4	5	2	8	8	8	6	-	8	7	8	8
Bentazon	6	0	0	0	0	1	0	0	0	6	2	3	9	0	4	-	3	8	1	3
Callisto	27	7	7	9	7	-	-	0	0	-	-	9	8	9	-	-	9	9	5	9
Capreno	2, 27	8	8	8	-	-	-	5	7	-	-	8	8	9	-	-	9	7	7	9
Dicamba	4	1	1	1	1	1	0	0	0	3	1	9	9	9	9	8	8	8	8	8
Dicamba + 2,4-D	4, 4	1	1	1	0	1	0	0	0	3	1	8	9	8	8	8	8	7	7	8
Glufosinate (LLink only)	10	8	8	9	9	5	6	7	8	8	4	9	9	-	9	8	8	9	9	8
Glyphosate (RR only)	9	9	9	9	9	9	6	7	9	9	7	7	8	9	6	9	9	7	8	9
Halex GT (RR only)	27, 15, 9	9	9	9	9	9	6	9	9	8	8	8	10	8	8	7	9	9	9	9
Halosulfuron	2	2	2	2	2	2	-	1	2	9	8	6	9	5	8	5	6	7	5	8
Laudis	27	7	8	8	-	7	-	5	6	-	-	8	8	9	-	-	9	7	7	9
Lexar EZ	27, 15, 5	7	9	9	8	9	7	2	8	8	7	9	10	9	8	8	9	9	8	9
Nicosulfuron	2	8	8	5	7	-	6	8	9	3	-	6	5	5	7	-	6	4	5	8
Realm Q	2, 27	8	7	8	8	8	4	7	9	8	6	8	9	8	-	-	8	9	7	8
Status	4, 19	3	4	3	4	3	0	0	5	0	0	9	9	9	9	8	9	9	9	9
Postemergence - Directed																				
Linuron	7	9	8	8	8	7	-	0	6	5	2	8	7	9	8	-	8	8	8	8
Paraquat	22	8	8	8	8	8	7	3	8	9	0	6	7	9	6	5	9	6	8	9
Preharvest																				
2,4-D	4	0	0	0	2	1	0	0	0	4	2	9	9	9	9	-	9	8	8	9
Aim	14	1	0	0	0	0	0	0	0	0	0	8	6	7	8	-	8	-	0	8
Glyphosate	9	8	9	9	9	8	9	8	9	9	7	8	9	9	6	8	9	8	9	9

Rating Scale: 0–3 = none to slight; 4–6 = fair; 7–8 = good; 9–10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

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Corn Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Removal of Partial Corn Stands for Replanting				
clethodim – 0.045 lb/A	Select Max 1 EC — 6 oz/A	Failed stands up to 12 inches tall	Roundup Ready, LibertyLink, Herculex corn hybrids	**Do not replant within 6 days of application. Avoid off-site movement** to emerged, non-target corn. Add a nonphytotoxic crop oil concentrate at 1% v/v plus ammonium sulfate.
paraquat + atrazine – 0.63 to 0.75 lb/A + 0.5 lb/A	paraquat (2 lb/gal formulation) — 2.5 to 3 pt/A or 3 lb/gal formulation — 1.68 to 2 pt/A + atrazine (4 lb/gal formulation) — 0.5 qt/A or 90% formulation — 0.55 lb/A	When corn is small enough to achieve adequate coverage	Roundup Ready, LibertyLink, Herculex corn hybrids	**Corn may be replanted immediately. Avoid off-site movement** to emerged vegetation. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
paraquat + diuron – 0.63 to 0.75 lb/A + 0.5 lb/A	paraquat (2 lb/gal formulation) — 2.5 to 3 pt/A or 3 lb/gal formulation — 1.68 to 2 pt/A + diuron (4 lb/gal formulation) — 0.5 qt/A or 80% formulation — 0.63 lb/A	When corn is small enough to achieve adequate coverage	Roundup Ready, LibertyLink, Herculex corn hybrids	**Corn may be replanted immediately. Avoid off-site movement** to emerged vegetation. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
Preemergence				
acetochlor – 0.8 to 2.4 lb/A	acetochlor (7 lb/gal formulation) — 1 to 2.75 pt/A	Preplant up to 30 days before planting, preplant incorporated, or preemergence	Annual grasses and small-seeded broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Sufficient weed control depends on adequate rainfall for incorporation. Use higher rates on reduced tillage systems. **Do not** use on sweet corn. If stand failure occurs, replant corn but **do not** make second application of acetochlor.
acetochlor + atrazine – 1.1 to 2 + 1 to 1.5 lb/A	Various formulations (see product label for specific rates)	Preplant or preemergence	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for acetochlor and atrazine. **Do not** use on sweet corn.
acetochlor + flumetsulam + clopyralid – 0.8 to 1.33 lb/A	SureStart II 4.25 EC — 1.5 to 2.5 pt/A	Preplant or preemergence	Annual grasses and broadleaf weeds	Weed control optimized when applications are as close as possible to planting but before weeds emerge. Applications may be made from 30 days prior to planting until 11-inch corn.
atrazine – 2 lb/A	atrazine (4 lb/gal formulation) — 2 qt/A or 90% formulation — 2.22 lb/A	Preplant or preemergence	Annual grasses and broadleaf weeds	**Atrazine is a restricted-use pesticide. Do not** plant fall cover crops. **Do not** exceed 2.5 pounds of active ingredient per year. See label for additional restrictions. Broadleaf signalgrass control poor.
atrazine + *S*-metolachlor + safener – 1 to 1.3 to 1.6 + 0.8 to 1 to 1.6 lb/A	Various formulations (see product label for specific rates)	Preplant or preemergence	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine and metolachlor/*S*-metolachlor.
dicamba – 0.25 lb/A	dicamba (4 lb/gal formulation) — 8 oz/A	Preplant or preemergence	Horseweed, clovers; other annual, biennial, and perennial broadleaf weeds	Apply only to medium- or fine-textured soils that contain 2% or greater organic matter. **Do not** apply to coarse-textured soils after crop emergence.

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Corn Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
dimethenamid-P – 1.5 to 0.8 lb/A	Outlook 6 EC — 12 to 18 oz/A	Preplant or preemergence	Annual grasses and broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Sufficient weed control depends on adequate rainfall for incorporation. This treatment provides poor control of most large-seeded broadleaf weeds. See label for mixtures.
dimethenamid-P + saflufenacil – 0.44 to 0.8 lb/A	Verdict 5.67 EC — 10 to 18 oz/A	Preplant, preplant incorporated, or preemergence	Annual grasses and broadleaf weeds	Use lower rates on coarse soils. **Do not** apply after corn emerges or severe crop injury will occur. **Do not** apply where at-planting application of an organophosphate or carbamate insecticide is planned. **Do not** apply more than 25 ounces per acre per year.
isoxaflutole + thiencarbazone-methyl – 0.115 lb/A	Corvus 2.63 SC — 5.6 oz/A	Preplant, preplant incorporated, or preemergence	Annual grasses and broadleaf weeds	Decrease the rate to 3.33 ounces per acre on coarse-textured soils with less than 2% organic matter. To avoid reduced crop stand or injury, plant corn seed at least 1.5 inches deep and completely cover it with soil and furrow firm. **Do not** apply more than one application per 365 days. May be applied early postemergence from spiking to V2 corn stage.
mesotrione + atrazine + *S*-metolachlor – 2.08 to 2.78 lb/A	Lexar EZ 3.7 SC — 2.25 to 3 qt/A	Preemergence	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. **Do not** apply postemergence within 7 days of any organophosphate or carbamate insecticide application. Research indicates that split applications with 2 quarts per acre applied preemergence and 1 quart per acre applied postemergence with glyphosate or glufosinate is effective for control of glyphosate-resistant Palmer amaranth.
S-metolachlor + atrazine + mesotrione + bicyclopyrone – 1.9 to 2.6 lb/A	Acuron 3.44 SC — 2.5 to 3 qt/A	Preemergence	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. The use rate of Acuron is based more on organic matter than soil texture.
S-metolachlor or metolachlor + safener – 0.8 to 1.6 lb/A	Various formulations (See product label for specific rates)	Preplant or preemergence	Annual grasses and small-seeded broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Sufficient weed control depends on adequate rainfall for incorporation. For soils with 3% or more organic matter, increase rate by 0.5 pint per acre. This treatment provides poor control of most large-seeded broadleaf weeds.
pendimethalin – 0.75 to 1.5 lb/A	pendimethalin (3.8 lb/gal formulation) — 1.6 to 3.2 pt/A or 3.3 lb/gal formulation — 1.8 to 3.6 pt/A	Preemergence	Annual grasses and small-seeded broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation Sufficient weed control depends on adequate rainfall for incorporation. See label for mixtures. This treatment provides poor control of broadleaf signalgrass and most large-seeded broadleaf weeds.
pyroxasulfone – 0.08 to 0.21 lb/A	Zidua 85 WDG — 1.5 to 4 oz/A or 4 SC — 2.5 to 6.5 oz/A	Preplant, preplant incorporated, or preemergence	Annual grasses and small-seeded broadleaf weeds	Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Sufficient weed control depends on adequate rainfall for incorporation. **Do not** apply more than 2.75 ounces per acre per year on coarse soils. **Do not** apply more than 5 ounces per acre per year on medium or fine soils. Weed control optimized when applications are made to seedbeds free of residue.
pyroxasulfone + fluthiacet-methyl – 0.12 to 0.19 lb/A	Anthem Maxx 4.3 SC — 3 to 6.5 oz/A	Preplant up to 45 days before planting, preplant incorporated, or pre emergence	Annual grasses and small-seeded broadleaf weeds	Use the lower rate on coarse-textured soils. Mix with glyphosate, paraquat, or glufosinate to control emerged vegetation. Sufficient weed control depends on adequate rainfall for incorporation. Weed control optimized when applications are made to seedbeds free of residue.
pyroxasulfone + carfentrazone – 0.109 to 0.227 lb/A	Anthem Flex 4 SE — 3.5 to 7.28 oz/A	Preplant up to 45 days before planting, preplant incorporated, or preemergence	Annual grasses and small-seeded broadleaf weeds	See *Special Instructions and Remarks* for Anthem MAXX.

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Corn Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
saflufenacil – 0.045 to 0.067 lb/A	Sharpen 2.85 SC — 2 to 3 oz/A	Preplant, preplant incorporated, or preemergence	Broadleaf weeds	Use lower rates on coarse soils. May be mixed with other preplant herbicides to broaden weed spectrum or residual control of annual grasses. **Do not** apply after corn emerges or severe crop injury will occur. **Do not** apply where at planting application of an organophosphate or carbamate insecticide is planned. **Do not** apply more than 6 ounces per acre per year.
simazine – 2 to 3 lb/A	Simazine 4 L — 4 to 8 pt/A or 90 DF — 2.2 to 4.4 lb/A	Preplant or preemergence	Annual grasses and small-seeded broadleaf weeds	Till soil in fall to minimize carryover potential to rotational crops. See label for additional restrictions.
Postemergence				
2,4-D amine – 0.24 to 0.72 lb/A	Various formulations (see product label for specific rates)	See special instructions	Broadleaf weeds	Direct spray below whorl of corn plants taller than 8 inches. Mix with glyphosate or glufosinate to improve weed control spectrum.
acetochlor + mesotrione + clopyralid – 0.93 to 1.13 lb/A	Resicore 3.29 SC — 2.25 to 2.75 pt/A	Small, actively growing weeds less than 3 inches tall	Henbit, morningglory, pigweed, other broadleaf weeds	Mix with glyphosate or glufosinate (depending on hybrid) and atrazine to improve weed control spectrum. **Do not** apply carbamate or organophosphate insecticide within 7 days before or 7 days after application. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
atrazine – 2 lb/A	atrazine (4 lb/gal formulation) — 2 qt/A or 90% formulation — 2.22 lb/A	Small, actively growing weeds before corn reaches 12 inches	Annual grasses and broadleaf weeds	**Atrazine is a restricted-use pesticide. Do not** exceed 2.5 pounds of active ingredient per acre per year. **Do not** apply when corn is stressed from cold or excess rain. Application with insecticides, liquid fertilizers, or other materials is not recommended due to compatibility problems or crop injury. Add nonphytotoxic crop oil concentrate at 1quart per acre when applied alone.
atrazine + *S*-metolachlor – 1 to 1.3 to 1.6 + 0.8 to 1 to 1.6 lb/A	Various formulations (see product label for specific rates)	Small, actively growing weeds before corn reaches 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum.
bentazon – 0.75 to 1 lb/A	bentazon (4 lb/gal formulation) — 1.5 to 2 pt/A or 5 lb/gal formulation — 1.2 to 1.6 pt/A	Small, actively growing weeds	Cocklebur, prickly sida (2 to 3 inches), smartweed	Use the low rate for small cocklebur and the high rate for 6- to 10-leaf cocklebur. Control may be poor if applied under drought conditions. Rainfall within 8 hours may reduce efficacy. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
carfentrazone – 0.008 lb/A	Aim 2 EC — 0.5 oz/A	Small, actively growing weeds up to V8 corn stage	Morningglory, pigweed (less than 2 inches)	For seed production fields, apply post-directed only using drop nozzles. **Do not** apply more than 1.9 ounces per acre per season. Weeds should be less than 4 inches at application. Add a nonionic surfactant at 0.25% v/v. Under dry conditions, a crop oil concentrate may improve weed control. The use of COC may increase crop injury.
dicamba – 0.25 to 0.5 lb/A	dicamba (4 lb/gal formulation) — 0.5 to 1 pt/A	Before corn is 36 inches tall or until 15 days before tassels emerge	Broadleaf weeds	**Avoid off-site movement to soybean. Do not** apply to sweet corn or popcorn. **Do not** make more than one application per season. Use the high rate before corn reaches 8 inches tall or exceeds the 5-leaf stage. Use the low rate if corn is greater than 8 inches tall.
dicamba + diflufenzopyr – 0.175 to 0.35 lb/A	Status 56 WG — 5 to 10 oz/A	Postemergence to corn from 4 to 36 inches tall or until 15 days before tassels emerge	Broadleaf weeds	**Avoid off-site movement to soybean. Do not** exceed 12.5 ounces per acre per season. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum. Mixtures with growth regulator herbicides such as 2,4-D or emulsifiable concentrate formulations of chloroacetamide herbicides are not recommended.
dicamba + 2,4-D – 0.1 to 0.25 + 0.25 to 0.50 lb/A	dicamba (4 lb/gal formulation) — 0.25 to 0.5 pt/A + Various formulations (see product label for specific rates)	See special instructions	Broadleaf weeds	See *Special Instructions and Remarks* for dicamba and 2,4-D. May be applied overhead before corn is 8 inches high. Use drop nozzles to direct spray to lower parts of the corn plant if taller than 8 inches.

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Corn Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Fluthiacet-methyl + mesotrione + atrazine – 0.098 lb/A + 1 to 2 lb/A lb/A	Solstice 4 SC — 3.15 oz/A + atrazine (4 lb/gal formulation) — 1 to 2 qt/A or 90% formulation — 1.11 to 2.22 lb/A	Small, actively growing weeds before corn reaches 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. Sequential applications should be at least 14 days apart. **Do not** exceed 3.15 ounces in a single application. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
LibertyLink Hybrids				
glufosinate – 0.4 lb/A	glufosinate (2.34 lb/gal formulation) 22 oz/A	From corn emergence until V7 growth stage	Annual grasses and broadleaf weeds	**Avoid off-site movement** to desirable vegetation. **Do not** apply more than two applications per year. Sequential applications should be at least 10–14 days apart. **Do not** exceed 44 ounces per growing season. **Do not** apply within 70 days of harvest. **Do not** add surfactant. **Do not** use nitrogen solutions as spray carriers. See label for approved mixtures.
Roundup Ready 2 Hybrids				
glyphosate – 0.75 to 1 lb/A	Various formulations (See product label for specific rates)	Postemergence until corn reaches V8 growth stage or 30 inches	Annual grasses and broadleaf weeds	Mix with a residual herbicide for optimum control. Single applications must not exceed 0.77 pounds acid equivalent per acre. Allow minimum of 10 days between applications. May be mixed with atrazine (up to 12-inch-tall corn) for residual control. See label for other mixtures. Avoid off-site movement to desirable vegetation.
halosulfuron – 0.032 to 0.063 lb/A	halosulfuron (75% formulation) — 0.67 to 1.33 oz/A	Postemergence between spike and layby, but at least 30 days before harvest	Nutsedge, cocklebur, hemp sesbania	This treatment may be applied with liquid fertilizer, but fertilizer should not be total carrier. **Do not** make more than two applications per season or exceed 2.67 ounces per acre per season. Add nonionic surfactant at 0.25% v/v or nonphytotoxic crop oil concentrate at 1% v/v.
halosulfuron + dicamba – 0.25 lb/A	Yukon 67.5 WG — 6 oz/A	Postemergence until corn reaches 30 inches	Horseweed, nutsedge, ragweed, broadleaf weeds	See *Special Instructions and Remarks* for dicamba and halosulfuron.
mesotrione + atrazine – 0.094 + 1 to 2 lb/A	Callisto 4 L — 3 oz/A + atrazine (4 lb/gal formulation) — 1 to 2 qt/A or 90% formulation — 1.11 to 2.22 lb/A	Small, actively growing weeds before corn reaches 12 inches	Morningglory, cocklebur, pigweed, other broadleaf weeds	See *Special Instructions and Remarks* for atrazine. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum. Severe corn injury may occur if any organophosphate or carbamate insecticide is applied within 7 days before or after Callisto. **Do not** use methylated seed oil or methylated seed oil blends. Without atrazine, Callisto may be applied to corn up to 30 inches tall.
mesotrione + atrazine + *S*-metolachlor – 2.08 to 2.78 lb/A	Lexar EZ 3.7 SC — 2.25 to 3 qt/A	Small, actively growing weeds before corn reaches 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum. **Do not** apply postemergence within 7 days of any organophosphate or carbamate insecticide application. Add a nonionic surfactant at 0.25% v/v.
mesotrione + glyphosate + *S*-metolachlor + atrazine – 1.98 to 2.22 lb/A + 1 to 2 lb/A	Halex GT 4.4 L — 3.6 to 4 pt/A + atrazine (4 lb/gal formulation) — 1 to 2 qt/A or 90% formulation — 1.11 to 2.22 lb/A	Small, actively growing weeds before corn reaches 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. **Do not** apply postemergence within 7 days of any organophosphate or carbamate insecticide application. Add a nonionic surfactant at 0.25% v/v.
S-metolachlor + atrazine + mesotrione + bicyclopyrone – 1.9 to 2.6 lb/A	Acuron 3.44 SC — 2.5 to 3 qt/A	Small, actively growing weeds before corn reaches 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. **Do not** make postemergence applications in mixture with organophosphate or carbamate insecticide, or severe corn injury may occur. The use rate of Acuron is based more on organic matter than soil texture. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum.

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Corn Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
nicosulfuron – 0.03 lb/A	Various formulations (See product label for specific rates)	Postemergence from V2 to V6 corn stage	Johnsongrass and other annual weeds	Applications at later stages should be made with drop nozzles. **Do not** apply when corn or weeds are drought-stressed. **Do not** apply to corn treated with Counter or soil- or foliar- applied organophosphate insecticides. Consult label for other restrictions and precautions. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
nicosulfuron + rimsulfuron – 0.036 lb/A	Steadfast Q 38 WG — 1.5 oz/A	Postemergence to corn up to 20 inches tall and with up to 6 leaf collars	Annual grass and broad-leaf weeds	**Do not** make more than one application of Steadfast Q per cropping season. **Do not** apply to field corn grown for seed, to popcorn, or to sweet corn. **Do not** use Steadfast Q in the same year as Counter 15G, Counter 20CR, Dyfonate, Lorsban, and Thimet. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
pyroxasulfone + fluthiac-et-methyl – 0.101 to 0.202 lb/A	Anthem Maxx 4.3 SC — 3 to 6.5 oz/A	Postemergence until the V4 corn stage	Annual grasses and small-seeded broadleaf weeds	Use the lower rate on coarse-textured soils. For heavy weed densities and longer residual, use the higher labeled rate. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
rimsulfuron + mesotrione + atrazine – 0.098 lb/A + 1 to 2 lb/A lb/A	Realm Q 39 SG — 4 oz/A + atrazine (4 lb/gal formulation) — 1 to 2 qt/A or 90% formulation — 1.11 to 2.22 lb/A	Small, actively growing weeds before corn reach-es 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. **Do not** apply to corn treated with Counter or soil- or foliar-applied organophosphate insecticides. Crop injury may occur if there is a prolonged period of cold weather and/or in conjunction with wet soils. Mix with glyphosate, or glufosinate (depending on hybrid) to improve weed control spectrum. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
tembotrione + atrazine – 0.082 lb/A + to 2 lb/A	Laudis 3.5 SC — 3 oz/A + atrazine (4 lb/gal formulation) — 1 to 2 qt/A or 90% formulation — 1.11 to 2.22 lb/A	Small, actively growing weeds before corn reach-es 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. Without atrazine, Laudis may be applied up to the eight-leaf collar stage. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum. Add methylated seed oil at 1% v/v and ammonium sulfate at 1.5 pounds per acre.
tembotrione + thiencarba-zone-methyl + atrazine – 0.081 lb/A + 1 to 2 lb/A	Capreno 3.45 SC — 3 oz/A + atrazine (4 lb/gal formulation) — 1 to 2 qt/A or 90% formulation — 1.11 to 2.22 lb/A	Small, actively growing weeds before corn reach-es 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. **Do not** exceed 6 ounces per acre per growing season. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spec-trum. Add crop oil concentrate at 1% v/v and ammonium sulfate at 1.5 pounds per acre.
topramezone + atrazine – 0.164 lb/A + 1 to 2 lb/A	Armezon 2.8 SL or Impact 2.8 SC — 0.75 oz/A + atrazine (4 lb/gal formulation) — 1 to 2 qt/A or 90% formulation — 1.11 to 2.22 lb/A	Small, actively growing weeds before corn reach-es 12 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. Without atrazine, Armezon or Impact may be applied after corn reaches 12 inches. Addition of acetochlor or *S*-metolachlor can extend residual weed control. Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum. Add methylated seed oil at 1% v/v and ammonium sulfate.
topramezone + dimethenam-id-P – 0.98 lb/A	Armezon PRO 6.25 SL — 20 oz/A	Postemergence until corn reaches V8 growth stage or 30 inches	Annual grasses and broadleaf weeds	Mix with glyphosate or glufosinate (depending on hybrid) to improve weed control spectrum. Add methylated seed oil at 1% v/v.

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Corn Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Directed Sprays/Hooded Sprayers				
linuron – 0.63 to 1.5 lb/A	linuron (4 lb/gal formulation) — 1.25 to 3 pt/A or 50% formulation — 1.25 to 3 lb/A	After corn is at least 15 inches tall and before weeds are 5 inches tall	Annual broadleaf weeds and grasses	Apply as a directed spray to cover weeds. **Do not** use on loamy sand or sand. May be applied in N solutions. Use the low rate when weeds are less than 2 inches tall and on light soils. Use the high rates on weeds up to 5 inches or on heavy soils. Add a nonionic surfactant at 0.5% v/v.
paraquat – 0.25 to 0.47 lb/A	paraquat (2 lb/gal formulation) — 1 to 1.88 pt/A or 3 lb/gal formulation — 0.67 to 1.25 pt/A	After corn is 6 inches tall	Annual grasses and broadleaf weeds less than 6 inches tall	**Application only with hooded sprayer.** Keep the bottom of the hood in contact with soil surface. Avoid crop contact with spray solution. Avoid use of spray tips that produce fine spray droplets. Best results are achieved when mixed with residual broadleaf herbicides. Consult label for specific mixtures. Add nonionic surfactant at 0.25% v/v.
Preharvest				
2,4-D amine – 0.48 to 0.95 lb/A	Various formulations (see product label for specific rates)	After corn is in dent or hard dough stage	Broadleaf weeds	Apply to broadleaf weeds such as morningglory, cocklebur, and sicklepod to facilitate harvest. Wait 5 to 7 days before harvesting.
carfentrazone – 0.031 lb/A	Aim 2 EC — 2 oz/A	After corn grain is physiologically mature and at least 3 days before grain harvest	Morningglory, pigweed, hemp sesbania	Spray volume must be sufficient to provide complete coverage of undesired foliage. A minimum of 10 gallons per acre is suggested for ground application and 5 gallons per acre for aerial application. Add a crop oil concentrate at 1% v/v.
paraquat – 0.3 to 0.5 lb/A	paraquat (2 lb/gal formulation) — 1.2 to 2 pt/A or 3 lb/gal formulation — 0.8 to 1.33 pt/A	After black layer has formed at the base of the kernels	Annual and perennial grasses and broadleaf weeds	Make one application at least 7 days before harvest. Drought-stressed weeds will not be desiccated. Add nonionic surfactant at 0.25% v.v.
paraquat + sodium chlorate – 0.3 to 0.5 lb/A + 3 lb/A	Various formulations for each (see product labels for specific rates)	After corn grain is physiologically mature and at least 14 days before harvest	Annual and perennial grasses and broadleaf weeds	See *Special Instructions and Remarks* for paraquat and sodium chlorate.
sodium chlorate – 6 lb/A	Various formulations (see product label for specific rates)	After corn grain is physiologically mature and at least 14 days before harvest	Desiccation of most annual grasses and broadleaf weeds	Apply where grasses such as johnsongrass make harvesting difficult. Apply at least 14 days before anticipated harvest date on clear days when temperatures are expected to go above 70 ° F. **Do not** graze treated fields or feed fodder, forage, or residual seeds within 14 days of application.

ED_005172C_00002010-00071

Rice Weed Management

Weed Response Ratings for Rice Herbicides Applied Preemergence or Delayed Preemergence[1]

	Herbicide group numbers	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Red rice	Sprangletop—Ami-azon	Sprangletop—bearded	Rice flatsedge	Yellow nutsedge	Annual morningglory	Ducksalad	Eclipta	Glyphosate-resistant horseweed	Gooseweed	Hemp sesbania (coffeebean)	Northern jointvetch	Palmer amaranth	Pennsylvania smartweed	Purple ammannia (redstem)	Spikerush	Spreading dayflower	Texasweed	Volunteer glyphosate resistant soybean[2]
Bolero delayed pre	8	8	4	7	7	0	9	9	7	4	4	7	8	-	6	4	5	-	5	7	7	8	5	-
Clomazone	13	9	9	9	9	0	8	8	0	0	3	0	0	-	0	2	3	0	2	0	0	0	0	0
Clomazone + pendimethalin delayed pre	13, 3	9	9	9	9	0	8	8	0	0	2	4	0	-	0	1	2	7	2	1	0	0	0	0
League	2	0	0	0	0	0	0	0	9	8	6	8	8	-	-	8	7	5	-	7	-	7	8	0
Obey	13, 4	9	9	9	9	0	8	8	5	0	7	2	8	-	3	6	7	0	2	0	0	5	0	-
Pendimethalin delayed pre	3	9	8	8	8	0	8	7	0	0	0	4	0	-	0	0	0	7	2	1	0	0	0	0
Quinclorac	4	9	9	9	8	0	0	0	5	0	7	2	8	-	3	6	7	0	0	0	-	5	-	-
Quinclorac + Bolero delayed pre	4, 8	9	9	9	9	0	8	8	8	0	8	7	9	-	5	8	8	-	5	7	7	7	-	-
Quinclorac + pendimethalin delayed pre	4, 3	9	9	9	9	0	8	8	5	0	8	0	8	-	3	6	7	7	2	3	-	3	-	-
Sharpen	14	0	0	0	0	0	0	0	0	0	8	-	-	8	-	7	-	9	8	-	-	-	7	4

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

[2]Control ratings do not apply to sulfonylurea-tolerant soybean (STS).

ED_005172C_00002010-00072

Rice Weed Management

Weed Response Ratings for Rice Herbicides Applied Preemergence or Delayed Postemergence[1]

	Herbicide group numbers	Barnyardgrass[2]	Broadleaf signalgrass	Crabgrass	Fall panicum	Red rice	Sprangletop—Am-azon	Sprangletop—bearded	Rice flatsedge	Yellow nutsedge	Annual morningglory	Ducksalad	Eclipta	Glyphosate-resistant horseweed	Gooseweed	Hemp sesbania (coffeebean)	Northern jointvetch	Palmer amaranth	Pennsylvania smartweed	Purple ammannia (redstem)	Spikerush	Spreading dayflower	Texasweed	Volunteer glyphosate resistant soybean[2]
Clearfield Rice System																								
Beyond	2	8	9	-	7	9	5	5	8	-	8	2	6	-	-	3	3	6	5	8	-	6	5	0
Clearpath	2, 4	9	9	9	6	8	6	6	9	8	8	6	8	-	0	7	7	5	6	8	-	6	7	-
Newpath (2 applications)	2	9	9	9	9	9	6	8	9	8	7	7	0	-	5	0	0	6	7	8	9	5	5	0
Provisia Rice System																								
Provisia (2 applications)	1	9	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0
Postemergence (Before Flood)																								
Aim	14	0	0	0	0	0	0	0	0	0	9	5	7	-	-	9	7	7	9	6	0	7	6	2
Clincher SF	1	8	9	6	9	0	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grandstand	4	0	0	0	0	0	0	0	6	0	9	4	9	6	5	9	8	8	6	8	6	6	8	9
Grasp	2	8	0	0	2	0	0	0	9	3	5	9	8	8	-	8	8	6	7	7	9	8	6	9
Grasp Xtra	2, 4	8	0	0	2	0	0	0	9	3	8	9	9	8	-	9	9	8	7	7	9	9	8	9
Halosulfuron	2	0	0	0	0	0	0	0	8	9	4	4	5	6	-	8	7	6	4	0	8	8	6	8
League	2	0	0	0	0	0	0	0	8	8	8	7	8	-	-	9	8	5	7	8	8	8	8	8
Loyant	4	8	9	2	-	0	6	4	9	9	6	9	9	8	-	9	9	9	7	9	-	9	3	9
Permit Plus	2	0	0	0	0	0	0	0	8	8	7	7	9	6	-	9	7	6	8	9	8	8	7	8
Propanil	7	9	9	7	8	0	5	4	9	4	5	7	8	1	5	9	5	8	6	6	9	5	6	8
Propanil + bentazon	7, 6	9	9	7	9	0	5	4	9	6	5	7	9	1	7	9	9	8	8	9	9	9	6	8
Propanil + Bolero (or RiceBeaux)	7, 8	9	9	7	9	0	9	9	9	5	6	8	9	2	6	9	5	8	6	8	9	8	7	8
Propanil + Londax (or Duet)	7, 2	9	9	7	9	0	5	4	9	8	9	7	9	-	9	9	9	8	8	9	9	8	7	8
Propanil + quinclorac	7, 4	9	9	7	9	0	5	4	9	5	8	6	8	8	5	9	9	8	5	6	9	5	6	8
Quinclorac	4	9	9	7	6	0	0	0	5	0	8	3	9	6	-	8	8	3	0	3	5	3	3	2
Quinclorac + Aim (or Broadhead)	4, 14	9	9	7	6	0	0	0	5	0	9	5	9	6	-	9	8	8	8	7	5	7	6	2
Regiment	2	9	3	0	0	0	2	2	8	0	6	9	7	5	0	8	7	6	9	6	8	8	8	9
Ricestar HT	1	9	9	8	7	0	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharpen	14	0	0	0	0	0	0	0	0	0	9	4	5	8	-	9	8	9	8	6	0	5	8	6
Storm	6, 14	3	3	3	2	0	2	2	8	7	8	8	7	-	-	9	6	7	8	9	8	7	8	0
Strada	2	0	0	0	0	0	0	0	9	7	7	6	8	5	-	9	9		6	8	9	7	6	8
Strada PRO	2	0	0	0	0	0	0	0	9	9	7	7	8	6	-	9	9	6	6	8	9	8	6	8
Strada XT2	2, 4	9	9	7	6	0	0	0	9	7	8	6	9	6	-	9	9	5	6	8	9	7	6	8
Postemergence (After Flood)																								
Acifluorfen	14	0	0	0	0	0	0	0	0	0	8	0	0	-	0	9	6	6	0	0	0	0	4	0
Propanil	7	4	4	4	4	0	0	0	5	3	0	3	4	-	0	8	0	7	5	4	5	0	4	-
Propanil + Grandstand	7, 4	2	2	2	2	0	0	0	6	2	8	5	6	-	7	9	8	6	4	9	6	4	4	-

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

[2]Control ratings do not apply to sulfonylurea-tolerant soybean (STS).

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Rice Weed Management

Herbicide Rates for Preemergence Application in Drill-Seeded Rice

Herbicide	Formulation	Sand, loamy sand	Sandy loam	Loam, silt, silt loam, sandy clay, sandy clay loam	Silty clay, clay loam, silty clay loam, clay
Clomazone	3 ME	**Do not** use	**Do not** use	0.8 to 1.125 pt/A	1.33 to 1.6 pt/A
Quinclorac	75 DF	**Do not** use	0.33 to 0.44 lb/A	0.44 to 0.5 lb/A	0.5 to 0.67 lb/A
	4 L	**Do not** use	0.5 to 0.67 pt/A	0.67 to 0.75 pt/A	0.75 to 1 pt/A
	1.5 L	**Do not** use	21 to 28 oz/A	28 to 32 oz/A	32 to 42 oz/A

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Clearfield Rice System				
imazethapyr – 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	Preplant-incorporated; **sequential application to 3- to 5-leaf rice required**	Red rice, annual grasses, yellow nutsedge	**Use on Clearfield rice varieties and hybrids only.** Flush for activation if rainfall does not occur within a few days of planting. This application must be followed by one postemergence application of Newpath or Beyond. **Avoid off-site movement** of Newpath onto conventional rice varieties.
imazethapyr – 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	Preemergence; **sequential application to 3- to 5-leaf rice required**	Red rice, annual grasses, yellow nutsedge	See *Special Instructions and Remarks* for Newpath.
imazethapyr – 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A	Postemergence to 3-leaf through 5-leaf rice before flooding	Red rice, annual grasses, yellow nutsedge	See *Special Instructions and Remarks* for Newpath. Mixing with other herbicides will be required for control of broadleaf weeds. This application must be preceded by one preplant-incorporated or preemergence application of Newpath. Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.
imazethapyr – 0.063 to 0.094 lb/A followed by imazethapyr – 0.063 to 0.094 lb/A	Newpath 2 AS — 4 to 6 oz/A followed by Newpath 2 AS — 4 to 6 oz/A	First postemergence application at spike to 1-leaf rice followed by second postemergence application approximately 14 days later	Red rice, annual grasses, yellow nutsedge	See *Special Instructions and Remarks* for Newpath. A soil-applied herbicide should be included in first application to aid in residual control of annual grasses. Mixing with other herbicides will be required for control of broadleaf weeds. Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.
imazethapyr + quinclorac – 0.063 + 0.312 lb/A followed by imazethapyr – 0.063 to 0.094 lb/A	Clearpath 75 DF — 0.5 lb/A followed by Newpath 2 AS — 4 to 6 oz/A	Preplant-incorporated, preemergence, or postemergence from spike to 1-leaf rice followed by application of Newpath approximately 14 days later	Red rice, annual grasses; improved control of some grasses and broadleaf weeds over Newpath alone	See *Special Instructions and Remarks* for Newpath. Mixing with other herbicides will be required for control of broadleaf weeds. Clearpath at 0.5 pound per acre provides 4 ounces of Newpath and 0.3 pounds active ingredient of quinclorac. Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.
imazamox – 0.039 to 0.047 lb/A	Beyond 1 AS — 5 to 6 oz/A	**After at least one application of Newpath or Clearpath.** Apply from 4-leaf rice until 14 days after panicle initiation on varieties and 4-leaf rice to panicle initiation on hybrids	Barnyardgrass, broadleaf signalgrass, fall panicum, morningglory, red rice	**Use on Clearfield rice varieties and hybrids only.** May be substituted for second application of Newpath, but two applications are required before flooding. Some Clearfield hybrids are less tolerant to Beyond than others. An emergency salvage application may be applied for late-season suppression of red rice. **Avoid off-site movement** of Beyond onto conventional rice varieties. Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.

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Rice Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Provisia Rice System				
quizalofop – 0.089 to 0.11 lb/A followed by quizalofop – 0.089 to 0.11 lb/A	Provisia 0.88 EC — 13 to 16 oz/A followed by Provisia 0.88 EC — 13 to 16 oz/A	First postemergence application at 1-leaf rice followed by second postemergence application approximately 14 days later	Red rice, annual grasses, volunteer rice	**Use on Provisia rice varieties only.** A soil-applied herbicide should be included in first application to aid in residual control of annual grasses. **Do not** apply more than 31 fluid ounces per acre per season or 16 fluid ounces per acre in a single application. Mixing with broadleaf or sedge herbicides can result in loss of grass control. See label for approved mixtures. Add a nonphytotoxic crop oil concentrate at 1% v/v.
Preemergence/Delayed Pre				
clomazone – 0.3 to 0.8 lb/A	clomazone (3 lb/gal formulation) — 0.8 to 2.1 pt/A	Preemergence	Annual grasses	Clomazone may be applied from planting to rice emergence but before weed emergence. **Do not** apply to recently land-formed fields. If grasses emerge after application, rainfall or flushing may be needed for activation or reactivation. Follow label when tank-mixing. See table at beginning of section for specific clomazone rates by soil texture.
clomazone + quinclorac – 0.3 to 0.5 lb/A + 0.3 to 0.5 lb/A	clomazone (3 lb/gal formulation) — 0.8 to 1.33 pt/A + Various formulations (see product label for specific rates)	Preemergence or delayed preemergence	Annual grasses, eclipta	See *Special Instructions and Remarks* for clomazone and quinclorac. If grasses emerge after application, rainfall or flushing will be required for activation or reactivation of the herbicide. **See table at beginning of section for specific clomazone and quinclorac rates by soil texture.**
glyphosate plus clomazone -- 1 to 1.5 lb/A + 0.3 to 0.6 lb/A	Various formulations (See product label for specific rates) + clomazone (3 lb/gal formulation) – 0.8 to 1.6 pt/A	Prior to rice emergence; **Do not apply if rice is beginning to emerge**	Annual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See *Special Instructions and Remarks* for glyphosate and clomazone. The field must be free of standing water at application. Antagonism may occur in some situations. Use the full rate of glyphosate. Sequential postemergence grass herbicide application will be needed. **See table at beginning of section for specific clomazone rates by soil texture.**
glyphosate + pendimethalin – 1 to 1.5 lb/A + 0.75 to 1 lb/A	Various formulations (see product label for specific rates) + pendimethalin (3.8 lb/gal formulation) — 1.6 to 2.1 pt/A or 3.3 lb/gal formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Annual and perennial grasses and broadleaf weeds plus residual control of annual grasses	See *Special Instructions and Remarks* for glyphosate alone and for pendimethalin.
halosulfuron + prosulfuron – 0.049 to 0.099 lb/A	Gambit 79 WG — 1 to 2 oz/A	Preplant or preemergence	Pennsylvania smartweed, yellow nutsedge, annual weeds	**Do not** apply within 48 days of harvest. Avoid off-site movement to soybean. **Do not** exceed 2 ounces per acre per year. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate or methylated seed oil at 1% v/v.
imazosulfuron – 0.19 to 0.3 lb/A	League 75 WG — 4 to 6 oz/A	Preemergence	Annual grasses except sprangletop; eclipta, hemp sesbania, jointvetch, morningglory	Rice injury may occur if League is applied at more than 3.2 ounces per acre on clay soil with a pH greater than 8. Yield reductions have not been observed. Soybean may not be planted for 12 months after League application. A half-mile buffer to emerged non-STS soybean is required for aerial applications.
orthosulfamuron + quinclorac – 0.28 to 0.44 lb/A	Strada XT2 70 WG — 6.5 to 10 oz/A	Preemergence or delayed preemergence	Hemp sesbania, Texasweed, rice flatsedge, yellow nutsedge	See *Special Instructions and Remarks* for quinclorac. **Do not** use on sand or loamy sand soils.

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Rice Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
pendimethalin – 0.75 to 1 lb/A	pendimethalin (3.8 lb/gal formulation) — 1.6 to 2.1 pt/A or 3.3 lb/gal formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Annual grasses	Apply after rice seed has imbibed water and germinated and after soil has been sealed by at least 1 inch of rainfall or irrigation (flush). If soil has not been sealed, apply when 80% of germinated seeds have the radicle at least 0.5 inch long. Under some conditions, use of gibberellic-acid-treated seed, heavy rainfall, or flushing after application may result in herbicide injury.
quinclorac – 0.25 to 0.5 lb/A	Various formulations (see product label for specific rates, **see table at beginning of section for specific rates by soil texture**)	Preemergence or delayed preemergence	Annual grasses except sprangletop; eclipta	**Do not** use on sand or loamy sand soils. **Do not** allow quinclorac to drift onto sensitive crops such as cotton, soybeans, corn, or vegetables. **Do not** use on precision-cut fields until the second rice crop. Rice seed exposed to the spray may be severely injured. **See product labels for yearly maximum use rates. See table at beginning of section for specific rates by soil texture.**
quinclorac + pendimethalin – 0.25 to 0.5 lb/A + 0.75 to 1 lb/A	Various formulations (see product label for specific rates) + pendimethalin (3.8 lb/gal formulation) — 1.6 to 2.1 pt/A or 3.3 lb/gal formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Annual grasses, including sprangletop; eclipta	See *Special Instructions and Remarks* for quinclorac and pendimethalin. Rice seed exposed to the spray may be severely injured. **See table at beginning of section for specific quinclorac rates by soil texture.**
quinclorac + thiobencarb – 0.25 to 0.5 lb/A + 3 to 4 lb/A	Various formulations (see product label for specific rates) + Bolero 8 EC — 3 to 4 pt/A	Preemergence or delayed preemergence	Annual grasses, including sprangletop; eclipta	See *Special Instructions and Remarks* for quinclorac and thiobencarb. Rice seed exposed to the spray may be severely injured. **See table at beginning of section for specific quinclorac rates by soil texture.**
thiobencarb – 4 lb/A	Bolero 8 EC — 4 pt/A	Delayed preemergence	Barnyardgrass, sprangletop, aquatic weeds	Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application. Application to rice stressed by high salt and/or high pH soil may cause excessive rice injury.
thiobencarb + pendimethalin – 4 lb/A + 0.75 to 1lb/A	Bolero 8 EC — 4 pt/A + pendimethalin (3.8 lb/gal formulation) — 1.6 to 2.1 pt/A or 3.3 lb/gal formulation — 1.8 to 2.4 pt/A	Delayed preemergence	Barnyardgrass, broadleaf signalgrass, sprangletop, aquatic weeds	See *Special Instructions and Remarks* for pendimethalin and thiobencarb. Seedbed should be sealed by rain or flushing. **Do not** allow soil to crack after application.
Postemergence (Before Flood)				
acifluorfen + bentazon – 0.25 to 0.5 lb/A + 0.25 to 0.5 lb/A	Storm 4 L — 1.5 pt/A	After rice tillering to boot	Dayflower, flatsedge, hemp sesbania, morningglory, redstem, smartweed, yellow nutsedge	Add a nonionic surfactant at 0.25% v/v.
bentazon – 0.75 to 1 lb/A	bentazon (4 lb/gal formulation) — 1.5 to 2 pt/A or 5 lb/gal formulation — 1.2 to 1.6 pt/A	At least 24 hours before flooding	Dayflower, flatsedge, smartweed, redstem, yellow nutsedge	Apply to actively growing weeds. **Do not** apply to submerged weeds. **Do not** apply more than 2 pounds per acre per season. Mix with propanil to increase weed spectrum. Add a nonphytotoxic crop oil concentrate at 1.25% v/v.

ED_005172C_00002010-00076

Rice Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
bispyribac-sodium – 0.02 to 0.033 lb/A	Regiment 80 WP — 0.4 to 0.67 oz/A	3-leaf rice to 0.5-inch internode elongation	Barnyardgrass, junglerice, johnsongrass, hemp sesbania, ducksalad, Pennsylvania smartweed	See Regiment label for a list of adjuvants approved by Valent. Apply in at least 10 gallons per acre and **do not** exceed 1.06 ounces per acre per year. **Avoid off-site movement** to soybean. It provides little or no control of sprangletop. Medium-grain varieties may be more sensitive to Regiment under stressed conditions.
carfentrazone – 0.025 to 0.05 lb/A	Aim 2 EC — 1.6 to 3.2 oz/A	At least 2-leaf rice and weeds up to 4 inches tall	Cocklebur, hemp sesbania, morningglory, smartweed	**Do not** apply more than 8.6 ounces per season. If flood is lowered, return to normal 24 hours following treatment. Avoid applications from flag leaf emergence through harvest-aid application. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
carfentrazone + halosulfuron – 0.025 to 0.05 lb/A + 0.032 to 0.063 lb/A	Aim 2 EC — 1.6 to 3.2 oz/A + halosulfuron (75% formulation) — 0.67 to 1.33 oz/A	At least 2-leaf rice and weeds up to 4 inches tall	Flatsedge, hemp sesbania, morningglory, smartweed (1- to 2-leaf), yellow nutsedge	See *Special Instructions and Remarks* for Aim and halosulfuron. Add nonionic surfactant at 0.25% v/v.
carfentrazone + quinclorac – 0.015 to 0.03 + 0.19 to 0.375 lb/A	Aim 2 EC — 1 to 2 oz/A + Various formulations (see product label for specific rates); Broadhead 70 DF — 6 to 12 oz/A	From 2-leaf rice stage and before flooding	Barnyardgrass, morningglory, hemp sesbania, other annual grass and broadleaf weeds	See *Special Instructions and Remarks* for Aim and quinclorac. Add nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
clomazone – 0.3 to 0.6 lb/A	clomazone (3 lb/gal formulation) — 0.8 to 1.6 pt/A	1- to 2-leaf rice	Residual control of annual grasses	See *Special Instructions and Remarks* for clomazone. For control of grass weeds emerged at application, include a postemergence grass herbicide such as Clincher SF, propanil, quinclorac, or Ricestar HT.
clomazone + quinclorac – 0.3 to 0.5 lb/A + 0.3 to 0.5 lb/A	clomazone (3 lb/gal formulation) — 0.8 to 1.33 pt/A + Various formulations (see product label for specific rates) or Obey 2.5 ZC — 32 to 52 oz/A	1- to 5-leaf rice	Residual control of annual grasses; barnyardgrass (1- to 2-leaf), broadleaf signalgrass, hemp sesbania, eclipta; morningglory (2- to 6-leaf)	See *Special Instructions and Remarks* for clomazone and quinclorac. Mix with other herbicides, such as Newpath or propanil, to broaden spectrum. Add a nonphytotoxic crop oil concentrate at 1 quart per acre.
cyhalofop-butyl – 0.25 to 0.28 lb/A	Clincher SF 2.38 EC — 13.5 to 15 oz/A	1-leaf rice up to 60 days before harvest	Barnyardgrass, broadleaf signalgrass, fall panicum, seedling johnsongrass, sprangletop	Apply in at least 10 gallons per acre by air or ground. Soil moisture is critical for good activity. Mixing with broadleaf or sedge herbicides can result in loss of grass control. **Do not exceed 25 ounces per acre per year.** Add a nonphytoxic crop oil concentrate or methylated seed oil at 1 quart per acre.
fenoxaprop + safener – 0.077 to 0.1088 lb/A	Ricestar HT 0.58 EC — 17 to 24 oz/A	1-leaf rice to tillering but before panicle initiation	Barnyardgrass, sprangletop, broadleaf signalgrass, seedling johnsongrass, fall panicum	**Do not** apply within 48 hours of an application of methyl parathion. Soil moisture is critical for good activity. Mix only with approved herbicides on Ricestar HT label.
florpyrauxifen-benzyl – 0.026 lb ai/A	Loyant 0.21 EC — 1 pt/A	2-leaf rice until 60 days prior to harvest	Barnyardgrass, rice flatsedge, hemp sesbania, Palmer amaranth	Greatest efficacy will be achieved with applications within 5 days before flooding. No more than two applications can be made in a single season. Loyant should not be mixed with other herbicides containing propanil. Cotton, soybean, vegetables, flowers, and ornamental trees and shrubs are extremely sensitive to Loyant. Add methylated seed oil at 0.5 pint per acre.
halosulfuron – 0.032 to 0.063 lb/A	halosulfuron (75% formulation) — 0.67 to 1.33 oz/A	Prior to rice emergence until after flooding	Yellow or purple nutsedge (1- to 6-inch, 0.67 oz/A; 6-to 12-inch sedges, 1 to 1.33 oz/A)	**Do not** apply within 48 days of harvest. **Avoid off-site movement** to soybeans. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.

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Rice Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
halosulfuron + prosulfuron – 0.049 to 0.099 lb/A	Gambit 79 WG — 1 to 2 oz/A	Prior to rice emergence until after flooding	Pennsylvania smartweed, yellow nutsedge, annual weeds	**Do not** apply within 48 days of harvest. Avoid off-site movement to soybean. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate or methylated seed oil at 1% v/v.
halosulfuron + thifensulfuron – 0.024 + 0.0028 lb/A	Permit Plus 75 WG — 0.75 oz/A	Before rice emergence until 48 days before harvest	Pennsylvania smartweed, yellow nutsedge, annual weeds	**Do not** apply within 48 days of harvest. **Avoid off-site movement** to soybean. **Do not** exceed 1.5 ounces per acre in a season. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
imazosulfuron – 0.15 to 0.19 lb/A	League 75 WDG — 3.2 to 4 oz/A	2-leaf rice but before 2-inch internode elongation	Hemp sesbania, morningglory, annual weeds	See League label for a list of adjuvants and mixtures approved by Valent. Soybeans may not be planted for 12 months after League application. **A half-mile buffer to emerged non-STS soybeans is required for aerial applications.**
orthosulfamuron – 0.053 to 0.065 lb/A	Strada 50 WG — 1.7 to 2.1 oz/A	Early postemergence to 0.5-inch internode elongation	Flatsedge, hemp sesbania, northern jointvetch	Mix with other herbicides such as clomazone, Newpath, or propanil to broaden spectrum. See label for surfactant requirements.
orthosulfamuron + halosulfuron – 0.07 to 0.084 lb/A	Strada PRO 54 WG — 2.08 to 2.5 oz/A	Early postemergence to 0.5-inch internode elongation	Hemp sesbania, northern jointvetch, yellow nutsedge	Mix with other herbicides such as clomazone, Newpath, or propanil to broaden spectrum. See label for surfactant requirements. Only one application is allowed per year.
orthosulfamuron + quinclorac – 0.28 to 0.44 lb/A	Strada XT2 70 WG — 6.5 to 10 oz/A	Early postemergence to 0.5-inch internode elongation	Barnyardgrass, broadleaf signalgrass, hemp sesbania, morningglory, northern jointvetch, flatsedge	See the label for surfactant requirements. Only one application is allowed per year. See *Special Instructions and Remarks* for quinclorac and Strada.
penoxsulam – 0.031 to 0.036 lb/A	Grasp 2 SC — 2 to 2.3 oz/A	Emergence to 60 days before harvest	Eclipta (up to 7-leaf), hemp sesbania, northern jointvetch, flatsedge, ducksalad (up to 4-leaf), and barnyardgrass	Little to no control of sprangletop, broadleaf signalgrass, and fall panicum. May cause stunting and root pruning, especially if higher than labeled rates are applied. **Avoid use on high pH soils (>7.8).** Add a nonphytotoxic crop oil concentrate or methylated seed oil adjuvant at 1 quart per acre.
penoxsulam + triclopyr – 0.22 to 0.30 lb/A	Grasp Xtra 1.74 SC — 16 to 22 oz/A	2- to 3-leaf rice to 0.5-inch internode elongation	Barnyardgrass and broadleaf weeds	See *Special Instructions and Remarks* for Grasp and Grandstand. Add nonphytotoxic crop oil concentrate or methylated seed oil at 1 quart per acre.
propanil – 3 to 6 lb/A	Various formulations (see product label for specific rates)	1- to 4-leaf barnyardgrass	Barnyardgrass and other annual grasses and broadleaf weeds	Apply in 10 gallons of water for aerial application and 15 to 20 gallons of water for ground application. If grass is in the 4- to 5-leaf stage, apply 4 to 5 pounds of active ingredient per acre. To prevent reinfestation, flood 1 or 2 days after application. Complete spray coverage is necessary. Weed foliage must not be covered with water at time of application. **Avoid off-site movement** to susceptible crops. Consult label concerning adjuvant use.
propanil – 6 to 8 lb/A (For split application where flooding is delayed)	Various formulations (see product label for specific rates)	3 to 4 lb/A when weeds are in 1- to 3-leaf stage and second 3 to 4 lb/A treatment when needed	Barnyardgrass, sprangletop, and other annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for propanil. Flood 1 or 2 days after final application. This treatment may not provide satisfactory control of sprangletop species.
propanil + bensulfuron – 3 to 5 lb/A + 0.038 to 0.063 lb/A	Various formulations (see product label for specific rates) + Londax 60 DF — 0.75 to 1 oz/A or Duet 4.03 F — 3 to 5 qt/A	1 to 7 days before flood	Annual grasses and broadleaf weeds; yellow nutsedge	See *Special Instructions and Remarks* for propanil. For best results, maintain flood and keep water as static as possible.

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Rice Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
propanil + halosulfuron – 3 to 4 lb/A + 0.032 to 0.063 lb/A	Various formulations (see product label for specific rates) + halosulfuron (75% formulation)	Emerged weeds	Eclipta, flatsedge, hemp sesbania, northern jointvetch, morningglory, yellow nutsedge	See *Special Instructions and Remarks* for propanil and halosulfuron.
propanil + triclopyr – 3 to 4 lb/A + 0.125 to 0.25 lb/A	Various formulations (see product label for specific rates) + Grandstand 3 SL — 0.5 to 0.67 pt/A	After rice reaches 2-leaf stage and before weeds exceed 6 inches	Barnyardgrass, morningglory, hemp sesbania, northern jointvetch, eclipta	See *Special Instructions and Remarks* for propanil and Grandstand. Flood should be delayed for 72 hours after application. **Do not** exceed Grandstand at 0.5 pint per acre before 4-leaf rice and utilize up to 0.67 pints per acre after 4-leaf stage.
propanil + pendimethalin – 3 to 4 lb/A + 0.75 to 1 lb/A	Various formulations (see product label for specific rates) + pendimethalin (3.8 lb/gal formulation) — 1.6 to 2.1 pt/A or 3.3 lb/gal formulation — 1.8 to 2.4 pt/A	After rice emerges and barnyardgrass is in 1- to 3-leaf stage	Postemergence control of barnyardgrass and other annual grasses and broadleaf weeds; residual control of barnyardgrass and annual grasses	See *Special Instructions and Remarks* for pendimethalin and propanil. The seedbed should be firm and free of large clods, trash, and surface water at application. Fields should be flushed if adequate rainfall does not occur within 7 days. **Do not** make more than one application of pendimethalin per season.
quinclorac – 0.25 to 0.5 lb/A	Various formulations (see product label for specific rates, **see table at beginning of section for specific rates by soil texture**)	Early postemergence	Barnyardgrass (1- to 2-leaf), broadleaf signalgrass, hemp sesbania, eclipta, morningglory (2- to 6-leaf)	See *Special Instructions and Remarks* for quinclorac. Does not control sprangletop. Soil moisture is critical for good activity. Rainfall or flush will be required for residual grass control from quinclorac after application. Add a nonphytotoxic crop oil concentrate at 1 quart per acre to maximize weed control.
quinclorac + acifluorfen – 0.25 to 0.5 lb/A + 0.125 to 0.25 lb/A	Various formulations (see product label for specific rates) + acifluorfen (2 lb/gal formulation) — 0.5 to 1 pt/A	After rice reaches 3-leaf stage	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for quinclorac. See label for mixing instructions. Add a nonionic surfactant at 0.25% v/v.
quinclorac + acifluorfen + bentazon – 0.25 to 0.5 lb/A + 0.75 lb/A	Various formulations (see product label for specific rates) + Storm 4 L — 1.5 pt/A	After rice reaches 3-leaf stage	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for quinclorac and Storm. See label for mixing instructions. Add a nonionic surfactant at 0.25% v/v.
quinclorac + fenoxaprop + safener – 0.25 to 0.5 lb/A + 0.077 to 0.1088 lb/A	Various formulations (see product label for specific rates) + Ricestar HT 0.58 EC — 17 to 24 oz/A	Small, actively growing weeds	Annual grasses and broadleaf weeds, including eclipta hemp sesbania, morningglory	See *Special Instructions and Remarks* for quinclorac and Ricestar HT. Soil moisture is critical for good activity.
quinclorac + propanil – 0.25 to 0.5 lb/A + 3 to 5 lb/A	Various formulations for each product (see product labels for specific rates)	Early postemergence	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for quinclorac and propanil. See label for instructions on mixing and use of adjuvants.

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Rice Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
saflufenacil – 0.0223 lb/A	Sharpen 2.85 SC — 1 oz/A	3-leaf to 0.5-inch internode elongation	Hemp sesbania, morningglory, Palmer amaranth	**Do not** apply to rice in the spiking to 1-leaf stage. **Do not** use methylated seed oil or nonionic surfactant in postemergence applications. Sequential applications are allowed, but **do not** apply more than 2 ounces per acre per season after rice emergence. **Do not** mix with emulsifiable concentrate herbicides. Add a nonphytotoxic crop oil concentrate at 1 to 2 pints per acre.
triclopyr – 0.25 to 0.375 lb/A	Grandstand 3 SL — 0.5 to 1 pt/A	3-leaf to 0.5-inch internode elongation	Hemp sesbania, eclipta, morningglory, northern jointvetch, redstem	Flood must be delayed 72 hours to prevent rice injury for applications made prior to flood. If flood is lowered for application, **do not** expose the crown of rice plants and wait 48 hours before raising the flood level. **Do not** use on precision-leveled land until the second rice crop. Add a nonionic surfactant at 0.25% or nonphytotoxic crop oil concentrate at 1% v/v.
triclopyr + halosulfuron – 0.25 to 0.375 lb/A + 0.032 to 0.063 lb/A	Grandstand 3 SL — 0.67 to 1 pt/A + halosulfuron (75% formulation) — 0.67 to 1.33 oz/A	3-leaf to 0.5-inch internode elongation	Hemp sesbania, morningglory, northern jointvetch, yellow nutsedge	See *Special Instructions and Remarks* for Grandstand and halosulfuron. Add a nonionic surfactant at 0.25% v/v.
thiobencarb + propanil – 3 to 4 lb/A + 3 to 4 lb/A	Bolero 8 EC — 3 to 4 pt/A + Various formulations (see product label for specific rates) or RiceBeaux 6 EC — 4 qt/A	Annual grasses in 1- to 3-leaf stage, aquatics less than 0.5 inch, and broadleaf weeds less than 2 inches	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for thiobencarb and propanil. Soil should be moist at application and not allowed to crack after application. **Do not** apply to stressed rice. RiceBeaux at 4 quarts per acre provides 3 pints of Bolero and 3 quarts of propanil per acre.
Postemergence (After Flood)				
2,4-D amine – 1 to 1.5 lb/A	Various formulations (see product label for specific rates)	Late tillering stage but before 0.5-inch internode elongation	Hemp sesbania redstem, ducksalad, smartweed, spikerush, water hyacinth, morningglory, dayflower	Follow Mississippi Department of Agriculture Bureau of Plant Industry regulations for phenoxy herbicides. Fields should have shallow flood at treatment. **Do not** apply nitrogen within 5 to 21 days before treatment. Avoid drift to susceptible crops. Add a nonionic surfactant at 0.25% v/v.
acifluorfen – 0.125 to 0.25 lb/A	acifluorfen (2 lb/gal formulation) — 0.5 to 1 pt/A	When hemp sesbania is flowering and prior to early boot stage of rice	Hemp sesbania	**Do not** mix acifluorfen with oils, drift control agents, liquid fertilizers or other pesticides. Apply in 5 to 10 gallons water. See label for other restrictions. Add a nonionic surfactant at 0.25% v/v.
bensulfuron – 0.038 to 0.06 lb/A	Londax 60 DF — 1 to 1.6 oz/A	Apply to flooded field with submerged weeds	Aquatic weeds	Apply after flood but before weeds reach 3-leaf stage. Hold water static for at least 7 days after application. Add a nonphytotoxic crop oil concentrate at 1% v/v or nonionic surfactant at 0.25% v/v.
bispyribac-sodium – 0.034 lb/A	Regiment 80 WP — 0.67 oz/A	Postflood but before 0.5-inch internode elongation	Barnyardgrass, junglerice (4 tiller up to booting)	See label for list of adjuvants approved by Valent. **Avoid off-site movement to soybeans.**
cyhalofop-butyl – 0.25 to 0.28 lb/A	Clincher SF 2.38 EC — 13.5 to 15 oz/A	Postflood	Annual grasses	Mixing with broadleaf or sedge herbicides can result in loss of grass control. **Do not exceed 25 ounces per acre per year.** Add a nonphytotoxic crop oil concentrate or methylated seed oil at 1 quart per acre.
halosulfuron – 0.47 to 0.63 lb/A	halosulfuron (75% formulation) — 1 to 1.33 oz/A	Postflood to 48 days before harvest	Hemp sesbania, jointvetch, flatsedge	**Avoid off-site movement to soybean. Do not** apply more than 1.3 ounces per acre in a season. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.

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Rice Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
halosulfuron + prosulfuron – 0.049 to 0.099 lb/A	Gambit 79 WG — 1 to 2 oz/A	Postflood to 48 days before harvest	Pennsylvania smartweed, yellow nutsedge, annual weeds	**Do not** apply within 48 days of harvest. Avoid off-site movement to soybean. Do not exceed 2 ounces per acre per year. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate or methylated seed oil at 1% v/v.
orthosulfamuron – 0.065 lb/A	Strada 50 WG — 2.1 oz/A	Postflood before 0.5-inch internode elongation	Hemp sesbania, northern jointvetch	See label for surfactant requirements. This product is used to prevent black seed production by hemp sesbania and northern jointvetch.
orthosulfamuron + halosulfuron – 0.084 + lb/A	Strada PRO 54 WG — 2.5 oz/A	Postflood before 0.5-inch internode elongation	Hemp sesbania, northern jointvetch	See label for surfactant requirements. This product is used to prevent black seed production by hemp sesbania and northern jointvetch.
orthosulfamuron + quinclorac – 0.28 to 0.44 lb/A	Strada XT2 70 WG — 6.5 to 10 oz/A	Postflood before 0.5-inch internode elongation	Barnyardgrass, broadleaf signalgrass, hemp sesbania, morningglory, northern jointvetch	See *Special Instructions and Remarks* for quinclorac. See label for surfactant requirements. Only one application is allowed per year. **Do not** apply on precision-leveled land until the second rice crop.
penoxsulam – 0.036 to 0.044 lb/A	Grasp 2 SC — 2.3 to 2.8 oz/A	Postflood to 60 days before harvest but before heading if targeting barnyardgrass	Barnyardgrass (prior to heading), hemp sesbania, jointvetch, ducksalad	Emergency salvage treatment. Regrowth of treated weeds may occur. Add a nonphytotoxic crop oil concentrate or methylated seed oil adjuvant at 1 quart per acre.
propanil + triclopyr – 2 to 3 lb/A + 0.25 to 0.38 lb/A	Various formulations (see product label for specific rates) — 2 to 3 qt/A + Grandstand 3 SL — 0.5 to 1 pt/A	Postflood before 0.5-inch internode elongation	Broadleaf weeds, including hemp sesbania less than 5 feet tall	See *Special Instructions and Remarks* for propanil and Grandstand. Consult propanil label concerning adjuvant use. Floodwater should cover the soil surface and root area of treated plants.
Preharvest				
carfentrazone – 0.025 lb/A	Aim 2 EC — 1.5 oz/A	Rice moisture content is ≤ 25%	Morningglory	Aim labeling requires application at least 3 days before harvest. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
sodium chlorate – 4.5 lb/A	Various formulations (see product label for specific rates)	7 days before harvest	Desiccation of weeds and lodged rice	Allow 7 days between application and harvest. Apply in 10 gallons water per acre.

RED RICE CONTROL. Take steps to prevent the introduction of this weed into rice fields. These steps include use of rice seed free of red rice, cleaning equipment before entering uninfested fields, and hand-roguing of light infestations. Where severe infestations occur, several cycles of a 2-year soybean or a 1-year sorghum/1-year soybean rotation with rice are suggested. During the years out of rice, strive for 100% red rice control. Use a combination of preemergence and postemergence herbicides recommended for the control of red rice. A combination of shallow spring and fall disking in conjunction with clod disruption also should be used to reduce the soil reserves of red rice by stimulating germination and destroying germinated seed. When rice is planted, an early-season variety should be used. It should be planted late to allow for additional spring tillage and seeded at a rate that allows a good competitive stand. The early-season varieties mature earlier, thereby limiting the amount of red rice that shatters before harvesting, as well as extending the time interval for additional fall tillage.

ED_005172C_00002010-00081

Grain Sorghum Weed Management

Weed Response Ratings for Sorghum Herbicides[1]

	Herbicide group numbers	Barnyardgrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Goosegrass	Johnsongrass—rhizome	Johnsongrass seedling	Annual morningglory	Cocklebur	Common lambsquarters	Hemp sesbania	Palmer, spiny amaranth, waterhemp	Prickly sida (teaweed)	Sicklepod	Smooth, redroot pigweed	Crop tolerance (*G = good, F = fair*)
Preemergence																	
Atrazine	5	6	5	7	4	6	0	3	8	8	9	7	9	8	8	9	F
Atrazine + metolachlor/*S*-metolachlor + safener	5, 15	8	8	9	8	9	0	6	8	8	9	7	9	8	8	9	G
Atrazine + Outlook	5, 15	8	8	9	8	9	0	6	8	8	9	7	9	8	8	9	G
Lexar EZ	27, 15, 5	9	9	9	8	8	0	5	9	9	9	9	9	9	9	9	G
Metolachlor/*S*-metolachlor + safener	15	8	8	9	9	9	0	6	3	0	6	2	8	4	5	8	G
Outlook	15	8	8	9	8	9	0	6	5	0	7	2	8	6	4	8	G
Sharpen	14	1	1	1	1	1	1	1	7	6	7	7	9	7	5	9	G
Verdict	14, 15	8	7	8	7	8	0	5	8	-	7	6	9	7	5	9	G
Warrant	15	8	8	7	8	7	0	4	4	0	-	0	7	5	-	8	G
Postemergence																	
2,4-D	4	0	0	0	2	1	0	0	9	9	9	9	9	8	8	9	F
Atrazine	5	6	6	6	4	5	0	3	8	9	8	6	8	8	7	8	G
Atrazine + crop oil concentrate	5	7	7	7	5	6	2	3	8	9	9	7	9	9	8	9	F
Bentazon	6	0	0	0	0	0	0	0	4	9	5	2	0	7	0	0	G
Dicamba	4	0	0	0	0	0	0	0	9	8	9	9	9	-	8	9	G
Huskie + atrazine	6, 27, 5	6	6	6	5	6	0	0	9	9	9	-	9	9	8	9	G
Halosulfuron	2	0	3	3	3	3	3	3	5	9	5	4	6	7	6	8	G
Limuron	7	8	8	8	8	7	0	6	8	7	9	8	8	8	8	8	F
Paraquat (directed/hooded sprayer only)	22	8	8	8	8	8	3	7	5	5	7	2	8	6	9	8	F
Peak	2	0	0	0	0	0	0	0	8	6	8	8	7	9	8	9	G
Quinclorac	4	8	8	7	6	6	0	0	8	-	6	8	3	-	-	3	G
Quinclorac + atrazine	4, 5	8	9	8	6	7	0	4	9	9	8	9	8	8	7	8	G
Yukon	2, 4	0	3	3	3	3	3	3	9	8	9	9	9	8	8	9	G

Rating Scale: 0-3 = none to slight; 4-6 = fair; 7-8 = good; 9-10 = excellent.
[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

ED_005172C_00002010-00082

Grain Sorghum Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Preplant/Preemergence				
acetochlor – 1.13 to 2.25 lb/A	Warrant 3 CS — 3 to 6 pt/A	Preemergence	Annual grasses and small-seeded broadleaf weeds	**Sorghum seed must be treated with an approved chloroacetamide herbicide safener.** Warrant will not control emerged weeds. **Do not** use more than 8 pints per acre per cropping season. Use the lower rate on coarse-textured soils with low organic matter.
atrazine – 1.6 lb/A	atrazine 4 (lb/gal formulation) — 1.6 qt/A or 90% formulation — 1.8 lb/A	Preplant or preemergence	Annual grasses and broadleaf weeds	**Do not** use on sand, loamy sand, or sandy loam or any soil with less than 1% organic matter. **Do not** plant crops other than corn or sorghum until the year after treatment. If treatment is made after June 10, crops other than corn or sorghum should not be planted the following year. **Do not** exceed 2 pounds of active ingredient per acre per year.
dimethenamid-P – 0.75 to 0.94 lb/A	Outlook 6 EC — 16 to 20 oz/A	Preemergence	Annual grasses and small-seeded broadleaf weeds	**Do not** use on forage sorghum. **Sorghum seed must be treated with an approved chloroacetamide herbicide safener.** See label for tank mix applications and for restrictions.
glyphosate – 1 to 1.5 lb/A	Various formulations (see product label for specific rates)	Preplant or preemergence	Annual, biennial, and perennial grasses and broadleaf weeds	Use of flood-jets is not suggested. If tillage is intended after treatment, wait at least 3 days (7 days for perennial weeds) after application. Avoid drift to nontarget species or areas. Glyphosate may be mixed with soil-applied herbicides for residual activity.
mesotrione + atrazine + *S*-metolachlor – 2.08 to 2.78 lb/A	Lexar EZ 3.7 SC — 2.25 to 3 qt/A	Preemergence	Annual grasses and broadleaf weeds	**Sorghum seed must be treated with an approved chloroacetamide herbicide safener.** Applying Lexar EZ more than 7 days before planting reduces risk of crop injury. A split application of 50% applied 7 to 21 days before planting and 50% applied preemergence may be used. **Do not** apply more than 3 quarts per growing season. **Do not** apply to emerged sorghum.
paraquat – 0.63 to 1 lb/A	paraquat (2 lb/gal formulation) — 2.5 to 4 pt/A or 3 lb/gal formulation — 1.68 to 2.67 pt/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	**Avoid off-site movement** to emerged vegetation. May be mixed with most preemergence herbicides. Apply in a minimum of 10 gallons of water by ground or 5 gallons by air. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
saflufenacil – 0.022 to 0.044 lb/A	Sharpen 2.85 SC — 1 to 1.5 oz/A	Preplant or preemergence	Horseweed; other broadleaf weeds	Mix with glyphosate or paraquat to improve control of other emerged weeds. **Do not** apply after grain sorghum emergence or severe injury may occur. **Do not** apply to coarse soils or those with < 1.5% organic matter. Add methylated seed oil at 1% v/v plus ammonium sulfate.
saflufenacil + dimethenamid-P – 0.44 to 0.80 lb/A	Verdict 5.67 EC — 10 to 18 oz/A	Preplant up to 14 days before planting or preemergence	Annual grasses and broadleaf weeds	**Sorghum seed must be treated with an approved chloroacetamide herbicide safener.** Herbicide must be applied before sorghum emergence or severe crop injury will occur. **Do not** use on soil with less than 1.5% organic matter. Use the lower rate on coarse-textured soils. **Do not** apply more than 25 fluid ounces per acre per cropping season.
S-metolachlor/metolachlor + safener – 0.96 to 1.6 lb/A	Various formulations (see product label for specific rates)	Preemergence	Annual grasses and small-seeded broadleaf weeds	**Sorghum seed must be treated with an approved chloroacetamide herbicide safener.** See label for rotation restrictions.
S-metolachlor/metolachlor + atrazine + safener – 0.8 to 1 to 1.6 lb/A + 1 to 1.3 to 1.6 lb/A	Various formulations (see product label for specific rates)	Preplant or preemergence	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine and *S*-metolachlor/metolachlor.
Postemergence				
2,4-D amine – 0.3 to 0.5 lb/A	Various formulations (see product label for specific rates)	See special instructions	Broadleaf weeds	**Do not** treat during boot, flower, or dough stage. One application per season. **Do not** feed or harvest within 30 days of application.

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Grain Sorghum Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
acetochlor – 1.13 to 2.25 lb/A	Warrant 3 CS — 3 to 6 pt/A	Postemergence to sorghum up to 11 inches tall and with up to (5 to 6 leaves	Annual grasses and small-seeded broadleaf weeds	**Sorghum seed must be treated with an approved chloroacetamide herbicide safener.** This treatment will not control emerged weeds. **Do not** use more than 8 pints per cropping season. Use the lower rate on coarse-textured soils and low organic matter.
atrazine – 2 lb/A	atrazine (4 lb/gal formulation) — 2 qt/A or 90% formulation — 2.2 lb/A	Small, actively growing weeds before sorghum reaches 12 inches	Annual grasses and broadleaf weeds	**Do not** exceed 2 pounds of active ingredient per acre per year. **Do not** use on sand or sandy loam soils. **Do not** use when sorghum is under stress or crop is wet from recent rainfall. If applied after June 10, **do not** plant with crops other than corn or sorghum the following year. See label for other restrictions.
atrazine – 1.2 lb/A + crop oil concentrate	Atrazine 4 L — 1.2 qt/A or 90 DF — 1.3 lb/A + crop oil concentrate — 1 qt/A	Small, actively growing weeds to sorghum 4 to 12 inches tall	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for atrazine. Be sure oil is not contaminated or crop injury may result.
bentazon – 0.75 to 1 lb/A	Basagran 4 L — 1.5 to 2 pt/A or 5 L — 1.2 to 1.6 pt/A	Small, actively growing weeds before sorghum heading	Cocklebur, prickly sida (2 to 3 inches), smartweed	Rainfall within 4 hours after application will reduce effectiveness. **Do not** graze treated sorghum for at least 12 days after the last treatment. **Do not** apply more than 1 pound of active ingredient per season. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
dicamba – 0.25 lb/A	dicamba (4 lb/gal formulation) — 0.5 pt/A	Small, actively growing weeds before sorghum is 8 inches tall	Morningglory, sicklepod, other broadleaf weeds	**Avoid off-site movement to soybean.** Ground application only.
halosulfuron – 0.032 to 0.047 lb/A	halosulfuron (75% formulation) — 0.67 to 1 oz/A	Small, actively growing weeds between 2-leaf sorghum and head emergence	Nutsedge, cocklebur, hemp sesbania	See the label for tank mixture with atrazine, dicamba, or 2,4-D and for restrictions. **Do not** use more than 1 ounce per season. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
halosulfuron + dicamba – 0.25 lb/A	Yukon 67.5 WG — 6 oz/A	Small, actively growing weeds between 2-leaf stage and when sorghum is 15 inches-tall	Horseweed, nutsedge, ragweed, broadleaf weeds	See *Special Instructions and Remarks* for dicamba and halosulfuron. Apply as a single application with the total application rate not to exceed 6 ounces per season. **Do not** graze or feed treated sorghum forage or silage for 30 days after treatment. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
linuron – 0.5 to 1.0 lb/A	Linuron 50 DG — 1 to 2 lb/A or 4 L — 1 to 2 pt/A 4 L	Directed spray to sorghum 12 to 15 inches tall	Annual grasses and broadleaf weeds	Use shields and/or gauge wheels to direct the spray to base of the sorghum. Keep spray off the upper leaves and whorl of sorghum. Keep spray pressure low to prevent injury to sorghum. **Do not** apply within 15 days of harvest. Add a nonionic surfactant at 0.5% v/v.
prosulfuron – 0.43 to 0.57 lb/A	Peak 57 WDG — 0.75 to 1 oz/A	Small, actively growing weeds when sorghum is 5 to 30 inches tall	Broadleaf weeds	**Do not use on forage sorghum.** See label for mixtures with atrazine, dicamba, or 2,4-D. Plant only STS soybeans the year following application; apply only the low rate if cotton will be planted the following year; allow 10 months between application and planting for both cotton and soybeans Add a nonionic surfactant at 0.25% v/v.
pyrasulfotole + bromoxynil – 0.21 to 0.26 lb/A	Huskie 2.06 EC — 12.8 to 16 oz/A	Small, actively growing weeds between 3-leaf stage and when sorghum is 30 inches and/or before flag-leaf emergence	Waterhemp, Palmer amaranth, redroot pigweed, other broadleaf weeds	**Do not** apply more than 36 ounces per acre per year. Forage sorghum may be cut or grazed 7 days after application, but **do not** cut for hay within 30 days after application. Aerial or chemigation is prohibited. **Do not** use flood-jet or air-induction nozzles. Injury may occur if Huskie is applied where acreage has been treated previously with mesotrione. Add nonionic surfactant at 0.25% v/v plus AMS at 1 lb/A.

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Grain Sorghum Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
pyrasulfotole + bromoxynil + atrazine – 0.21 to 0.26 lb/A + 0.5 to 1 lb/A	Huskie 2.06 EC — 12.8 to 16 oz/A + atrazine (4 lb/gal formulation) — 0.5 to 1 qt/A or 90% formulation — 056 to 1.1 lb/A	Small, actively growing weeds before sorghum reaches 12 inches	Waterhemp, Palmer amaranth, redroot pigweed, other broadleaf weeds	See *Special Instructions and Remarks* for atrazine and Huskie.
quinclorac – 0.34 to 0.5 lb/A	Various formulations (see product label for specific rates + atrazine (4 lb/gal formulation) — 0.5 to 1 qt/A or 90% formulation — 056 to 1.1 lb/A)	Small, actively growing weeds before sorghum reaches 12 inches	Barnyardgrass, morningglory, hemp sesbania, other grass and broadleaf weeds	Annual grass should be less than 2 inches tall for effective control. **Do not** use liquid fertilizer as a carrier or apply more than 64 ounces of Facet L per year. Add a nonphytotoxic crop oil concentrate or methylated seed oil at 1% v/v.
quinclorac + atrazine – 0.34 to 0.5 lb/A + 0.5 to 1 lb/A	Various formulations (see product label for specific rates)	Small, actively growing weeds before sorghum reaches 12 inches	Barnyardgrass, foxtail, broadleaf signalgrass, morningglory, hemp sesbania, other grass and broadleaf weeds	See *Special Instructions and Remarks* for atrazine and quinclorac. Mixing quinclorac with atrazine should improve annual grass control.
Directed Sprays/Hooded Sprayer				
carfentrazone – 0.008 to 0.016 lb/A	Aim 2 EC — 0.5 to 1 oz/A	See special instructions	Morningglory, pigweed, waterhemp, velvetleaf	Apply to row middles of emerged crop with a hooded sprayer. Hooded sprayers must be designed and adjusted to prevent spray deposition on green tissue or foliage of crop. Base application rate on weed size. Add nonionic surfactant at 0.25% v/v.
paraquat – 0.25 to 0.5 lb/A	paraquat (2 lb/gal formulation) — 1 to 2 pt/A or 3 lb/gal formulation — 0.67 to 1.33 pt/A	After sorghum is 12 inches tall	Annual grasses and broadleaf weeds	**For hooded or shielded sprayers:** Use sprayer with skids and direct between rows and prevent spray contact with plant. **Without hooded or shielded sprayers: Do not** exceed 30 psi. Use precision equipment adjusted to spray no more than lower 3 inches. **Do not** spray during windy conditions. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
Preharvest				
carfentrazone – 0.016 to 0.031 lb/A	Aim 2 EC — 1 oz/A	After grain is fully mature, when black layer has formed and kernels hard	Morningglory and other broadleaf weed desiccation	**Do not** apply within three days of harvest. Add nonionic surfactant at 0.25% v/v.
glyphosate – 0.75 to 1.5 lb/A	Various formulations (see product label for specific rates)	After grain reaches 30% moisture or less and kernel black layer has formed	Johnsongrass, desiccation of green vegetation	Allow a minimum of 7 days before harvest or grazing.
sodium chlorate – 6 lb/A	Various formulations (see product label for specific rates)	After sorghum grain has 25% or less moisture	Desiccation of most annual grasses and broadleaf weeds	Apply on a bright sunny day when air temperature is above 85 degrees and relative humidity is below 65%. Broadleaf weeds may be defoliated but there will be little desiccation. Add nonionic surfactant at 0.5% v/v for aerial and 0.25% v/v for ground application.

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Small Grain Weed Management

Weed Response Ratings for Herbicides Applied in Small Grains[1]

	Herbicide group numbers	Annual bluegrass	Carolina foxtail	Cheat	Italian ryegrass	Little barley	Buttercup	Chickweed	Coreopsis	Curly dock	Cutleaf evening-primrose	Henbit	Horseweed	Mayweed	Mustard species	Shepherds-purse	Vetch	Virginia pepperweed	Wild garlic
2,4-D	4	0	0	0	0	0	9	4	8	6	9	4	9	6	8	7	9	9	7
Axial XL	1	1	3	4	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Axiom	5, 15	9	0	5	6	2	8	8	-	2	2	8	9	-	9	8	5	-	0
Dicamba	4	0	0	0	0	0	9	8	-	9	9	7	9	-	-	8	9	9	-
Finesse Cereal and Fallow	2	9	-	-	-	3	9	9	-	8	9	9	-	-	-	9	3	-	5
Harmony Extra	2	2	9	0	9	8	9	0	8	6	8	6	7	0	0	0	9	6	8
Huskie	6, 27	0	-	0	-	-	-	9	-	8	8	8	9	9	9	8	-	9	0
Metribuzin	5	9	6	7	3	7	8	9	6	0	0	7	8	5	7	4	0	9	0
Osprey	2	9	9	3	9	5	7	6	-	0	0	5	4	3	5	7	7	-	0
Peak	2	4	0	0	0	0	8	8	-	8	8	8	7	8	6	7	8	-	8
PowerFlex HL	2	5	8	8	9	5	8	9	8	7	0	9	3	9	9	8	8	8	0
Prowl H_2O	3	3	6	3	6	3	8	8	2	0	4	8	5	0	8	8	0	-	0
Zidua or Zidua SC	15	9	9	9	9	9	-	-	-	-	-	-	7	-	-	-	0	-	2

Rating Scale: 0–3 = none to slight; 4–6 = fair; 7–8 = good; 9–10 = excellent.

[1]Control expected under optimum conditions. Mississippi State University does not guarantee these estimates since many factors cause herbicide performance to vary. Resistance to recommended use rates of some herbicides has been identified in certain weed species in Mississippi.

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Small Grain Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Preplant/Preemergence — Wheat or Barley				
chlorsulfuron + metsulfuron – 0.0094 to 0.023 lb/A	Finesse Cereal and Fallow 75 DF — 0.2 to 0.5 oz/A	Preplant or preemergence	Broadleaf weeds, annual bluegrass, volunteer corn, non-ALS resistant Italian ryegrass	**Do not** apply to soils with a pH above 7.9. **Minimum rotational cropping interval for STS soybeans is 6 months; non-STS soybeans, corn, sorghum, and cotton require 18 months.** Annual bluegrass and Italian ryegrass activity may be improved with a sequential application of metribuzin. Wheat seed planted less than 1 inch deep (broadcast seeding) are more susceptible to crop injury.
Delayed Preemergence to Early Postemergence — Wheat				
pyroxasulfone – 0.05 to 0.08 lb/A	Zidua 85 WG — 1 to 1.5 oz/A or 4 SC — 1.75 to 4 oz/A	Delayed preemergence after wheat seeds have germinated and have shoots longer than 0.5 inch, up until the 4th tiller stage	Italian ryegrass, annual bluegrass, annual weeds	Wheat must be planted with a drill to ensure complete seed coverage and sufficient seeding depth (0.5 to 1.5 inches) to minimize crop injury. Crop residue covering more than 25% of the soil surface may reduce herbicide effectiveness. This herbicide will not control germinated or emerged weeds.
pyroxasulfone + carfentrazone – 0.063 to 0.141 lb/A	Anthem Flex 4 SE — 2 to 4.5 oz/A	Delayed preemergence after wheat seeds have germinated and have shoots longer than 0.5 inch, up until the 4th tiller stage	Italian ryegrass, annual bluegrass, annual weeds	Wheat must be planted with a drill to ensure complete seed coverage and sufficient seeding depth (0.5 to 1.5 inches) to minimize crop injury. Crop residue covering more than 25% of the soil surface may reduce herbicide effectiveness. This herbicide will not control germinated or emerged weeds.
Postemergence — Wheat, Oats, Barley, Rye				
2,4-D amine – 0.48 to 0.96 lb/A; 2,4-D LV esters – 0.21 to 0.5 lb/A; or 2,4-D acid formulation – 0.21 to 0.7 lb/A	Various formulations (see product label for specific rates)	From full tillering until stem elongation	Wild mustard, vetch, buttercup, and pepperweed	Apply to emerged and actively growing weeds. This treatment may be applied in combination with liquid nitrogen fertilizer. Oats are less tolerant of 2,4-D than wheat. **Do not** apply when grains are in boot to dough stage. Provides poor control of wild garlic, henbit, and curly dock.
dicamba + 2,4-D – 0.13 + 0.50 lb/A	dicamba (4 lb/gal formulation) — 0.25 pt/A + Various formulations (see product label for specific rates)	From full tillering until stem elongation	Wild mustard, vetch, buttercup, and pepperweed	See *Special Instructions and Remarks* for 2,4-D. The low-volatile ester formulation should be used where wild garlic and/or onions are a problem. See the label for injury precautions and grazing restrictions for lactating dairy cows. Add nonionic surfactant at 0.25% v/v. Provides poor control of wild garlic, henbit, and curly dock.
2,4-D acid + dicamba acid – 0.13 + 0.3 lb/A	Latigo 4.2 L — 1 pt/A	From full tillering until stem elongation	Wild mustard, vetch, buttercup, and pepperweed	Consult label for application instructions, injury precautions, and grazing restrictions.
Early Postemergence — Wheat, Barley, Rye, Triticale				
pyrasulfotole + bromoxynil – 0.18 to 0.24 lb/A	Huskie 2.06 EC — 11 to 15 oz/A	From 1-leaf up to flag leaf stage	Broadleaf weeds	Check the label for weeds that are controlled and those that are only partially controlled. Use 80- to 110-degree flat fan nozzles that deliver medium spray droplets and 50-mesh or larger screens. **Do not** use flood-jet or cone nozzles. Check the label for aerial application instructions.
Postemergence — Wheat				
flufenacet + metribuzin – 0.17 to 0.43 lb/A	Axiom 68 DF — 4 to 10 oz/A	From spiking to 2-leaf wheat stage	Broadleaf weeds, annual bluegrass, and ryegrass	Wheat seed must be planted 1 to 2 inches deep (generally best achieved by drill-planting, rather than broadcast seeding methods). Axiom rate should vary with soil texture. Axiom must be applied preemergence to weeds. Apply as a broadcast spray by ground equipment at 10 or more gal per acre. **Do not** add crop oil concentrate or other oil-based adjuvants with mixtures. **Do not** allow animal grazing for 30 days after application.

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Small Grain Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
mesosulfuron – 0.013 lb/A	Osprey 4.5 WDG — 4.75 oz/A	From wheat emergence through jointing	Non-ALS resistant Italian ryegrass, annual bluegrass	Wheat injury may occur if nitrogen is applied within 14 days of Osprey application. **Do not** apply within 30 days of forage harvest or within 60 days of hay, grain, and straw harvest. Application must include (1) methylated seed oil with 10% emulsifier or greater at a rate of 1.3 to 1.5 pints of per acre; or (2) a nonionic surfactant at 0.5% v/v plus either ammonium sulfate (1.5 to 3 pounds per acre) or urea-ammonium nitrate (1 to 2 quarts per acre).
metribuzin – 0.094 to 0.14 lb/A	metribuzin (75% formulation) — 2 to 3 oz/A or 4 lb/gal formulation — 3 to 4.5 oz/A	During fall when wheat is actively growing and has at least 2 leaves and 1-inch secondary roots	Annual bluegrass and annual broadleaf species	Crop tolerance to metribuzin may vary depending upon variety, wheat health, and root development. Seed planted less than 1 inch deep (broadcast seeding) are more susceptible to crop injury. **Do not** use on soils with less than 0.75% organic matter. **Do not** use crop oil concentrate or any adjuvant containing vegetable or petroleum oils. **Do not** apply in combination with fluid fertilizer.
pendimethalin – 0.71 to 1.43 lb/A	Prowl H_2O 3.8 CS — 1.5 to 3 pt/A	From 1-leaf wheat stage up to before flag leaf is visible	Italian ryegrass, annual grasses and broadleaf weeds	Seed should be planted at least 0.5 to 1 inch deep to avoid crop injury. Prowl H_2O may be mixed with postemergence herbicides registered in wheat. Prowl H_2O will only provide residual weed control. Plant residue may inhibit weed control, so only use in tilled seedbeds. Rate is dependent upon soil texture. Apply no more than 2 pints per acre on coarse-textured soils.
pyroxsulam – 0.26 lb/A	PowerFlex HL 13 DG — 2 oz/A	From 3-leaf wheat stage up to joint	Italian ryegrass, annual grasses and broadleaf weeds	**Do not** mix with dicamba, 2,4-D amine, MCPA, or organophosphate insecticides. **Do not** apply organophosphate products for 5 days before or 5 days after application. **Do not** use on wheat varieties sensitive to ALS herbicides. Consult label for specific instructions on crop rotation restrictions, tank mix compatibility, tank cleanout, application with liquid N fertilizer, and harvest and grazing intervals. Add nonionic surfactant at 0.25% v/v.
Postemergence — Wheat, Barley				
pinoxaden – 0.053 lb/A	Axial XL 0.42 EC — 16.4 oz/A	From 2-leaf stage up to pre-boot	Italian ryegrass, annual bluegrass	Additional surfactant is not required. Apply to small, actively growing Italian ryegrass. Axial XL may be mixed in spray solution containing up to 50% nitrogen fertilizer. Only one application is allowed per crop season. **Do not** graze or harvest forage for hay for 30 days after application. **Do not** harvest for grain or straw for livestock feed within 60 days of application.
Postemergence — Wheat, Oats, Rye				
prosulfuron – 0.018 lb/A	Peak 57 WDG — 0.5 oz/A	From 3-leaf stage until stem elongation	Broadleaf weeds, wild garlic	See label concerning mixtures with dicamba and restrictions. **Do not** plant cotton or non-STS soybeans for 10 months after application. **Do not** graze or feed forage for 30 days after application. **Do not** harvest for grain and silage for 60 and 40 days after application, respectively. Add nonionic surfactant at 0.25% v/v.
Postemergence — Wheat, Oats, Triticale, Barley				
thifensulfuron + tribenuron – 0.014 to 0.028 lb/A	Harmony Extra 50 SG with TotalSol — 0.45 to 0.9 oz/A	From 2-leaf wheat stage up to before flag leaf is visible	Broadleaf weeds, wild garlic, curly dock	Apply to actively growing annual broadleaf weeds less than 4 inches tall. For wild garlic control, use 0.75 to 0.9 ounces per acre when weeds are less than 12 inches tall with 2 to 4 inches of new growth. Two applications may be made per crop season provided the total amount does not exceed 1.5 ounces per acre. For oats, use 0.45 to 0.6 ounces per acre. Add nonionic surfactant at 0.25% v/v unless liquid N comprises at least 50% of the spray volume.
Preharvest — Wheat				
carfentrazone – 0.016 to 0.032 lb/A	Aim 2 EC — 1 to 2 oz/A	After wheat has reached 30% grain moisture and at least 3 days before harvest	Broadleaf weeds	Thorough spray coverage is essential for satisfactory performance. **Do not** apply more than 2 ounces per season. Aim may be mixed with glyphosate to improve control of grasses and other weeds. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.

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Small Grain Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
glyphosate – 1 lb/A	Various formulations (see product label for specific rates)	After wheat has reached 30% grain moisture and at least 7 days before harvest	Annual grasses and broadleaf weeds	**Do not** use on wheat grown for seed. **Avoid drift to nearby crops that are not glyphosate tolerant.**
Preharvest — Wheat, Barley, or Triticale				
saflufenacil – 0.022 to 0.044 lb/A	Sharpen 2.85 SC — 1 to 2 oz/A	After wheat has reached 30% grain moisture and at least 3 days before harvest	Broadleaf weeds	**Do not** apply on labeled crops grown for seed production. Thorough spray coverage is essential for satisfactory performance. Allow up to 7 days for optimum desiccation, depending upon environmental conditions. May be mixed with glyphosate to improve control of grasses and other weeds. Add methylated seed oil at 1% v/v plus ammonium sulfate.

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Peanut Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
Preplant/Preemergence For a broad spectrum of grasses and broadleaf weeds, use of a combination of herbicides may provide greater control than single materials. This may be accomplished through tank mixtures or overlays of a preemergence over a preplant herbicide. Where overlays or combinations are used, they should be applied according to prescribed rate and manner indicated on the respective labels.				
ethalfluralin – 0.56 to 1.13 lb/A	ethalfluralin (3 lb/gal formulation) — 1.5 to 3 pt/A or 10% formulation — 5.6 to 11.3 lb/A	Up to 3 weeks before planting	Annual grasses and small-seeded annual broadleaf weeds	Mix uniformly in the top 2 to 3 inches of soil soon after application. Bedding must not expose untreated soil. Use low rate for coarse soils and high rate for clay soils.
glyphosate – 1 to 1.5 lb/A	Various formulations (see product label for specific rates)	Preplant or preemergence	Annual, biennial, and perennial grasses and broadleaf weeds	Use of flood-jets is not suggested. If tillage is intended after treatment, wait at least 3 days (7 days for perennial weeds) after application. Avoid drift to nontarget species or areas. Glyphosate may be mixed with soil-applied herbicides for residual activity.
paraquat – 0.63 to 1 lb/A	paraquat (2 lb/gal formulation) — 2.5 to 4 pt/A or 3 lb/gal formulation — 1.68 to 2.67 pt/A	Preplant or preemergence	Annual and perennial grasses and broadleaf weeds	**Avoid off-site movement** to emerged vegetation. May be mixed with most preemergence herbicides. Apply in a minimum of 10 gallons of water by ground or 5 gallons by air. Add a nonionic surfactant at 0.25% v/v or a crop oil concentrate at 1% v/v.
diclosulam – 0.024 lb/A	Strongarm 84 WG — 0.45 oz/A	Preplant, preplant incorporated, or preemergence	Broadleaf weeds	Incorporate into the top 1 to 3 inches of the final seedbed. If surface-applied, at least 0.25 to 0.5 inch of supplemental moisture is needed for activation. Mix with other residual herbicide to improve weed control spectrum. It offers poor control of sicklepod. Nutsedge control is inconsistent. See label for complete rotation restrictions: cotton—10 months; corn—18 months (10 months-IR hybrids); and soybeans—0 months.
imazethapyr – 0.063 lb/A	imazethapyr (2 lb/gal formulation) — 4 oz/A	Preplant incorporated, preemergence, or split with postemergence application	Annual grasses and broadleaf weeds; yellow and purple nutsedge suppression	**Do not** apply more than 4 ounces per season, but rate may be split with 2 ounces applied preplant incorporated or preemergence and 2 ounces applied postemergence. **Do not** graze or feed treated forage to livestock. Rotation restrictions: cotton and sorghum — 18 months; small grains — 4 months. Add nonionic surfactant at 0.25% v/v.
metolachlor – 2 to 2.5 lb/A or *S*-metolachlor – 1.3 to 1.6 lb/A	Various formulations (see product label for specific rates)	Preplant incorporated within 14 days of planting or preemergence	Annual grasses and small-seeded broadleaf weeds; yellow nutsedge suppression	Incorporation should place the herbicide no deeper than 2 inches. If a dry period follows surface application, a shallow incorporation may be beneficial before peanuts emerge. Rainfall is required to activate surface application. Optimum control when rainfall occurs within 10 days after application.
acetochlor – 0.94 to 1.5 lb/A	Warrant 3 CS — 1.25 to 2 qt/A	Preplant or preemergence	Annual grasses, carpetweed, pigweeds, purslane, Florida pusley, lambsquarters, nightshade	Preplant treatments must have cultivation or 0.5 to 0.75 inch of precipitation or overhead irrigation for activation. **Do not** apply more than 4 quarts per season. **Do not** exceed three applications per season. Allow at least 7 days between sequential applications. Warrant may be used in combination with other products to increase the weed control spectrum and for control of emerged weeds at the time of application.
pendimethalin – 1 lb/A	pendimethalin (3.8 lb/gal formulation) — 2 pt/A or 3.3 lb/gal formulation — 2.4 pt/A	Preplant up to 60 days before planting or preemergence	Annual grasses and small-seeded broadleaf weeds	Incorporate 1 to 2 inches deep. To prevent decreased pegging, adequate incorporation via equipment, overhead irrigation, or rainfall must occur within 48 hours of application.
sulfentrazone + carfentrazone – 0.081 to 0.19 lb/A	Spartan Charge 3.45 SL — 3 to 7 oz/A	Preplant and preemergence up to 3 days after planting	Pigweed, morningglory; other annual broadleaf weeds	**Do not** apply more than 7 fluid ounces per 12-month period. Peanut chlorosis and stunting may occur at pH 7.0 and above, as well as under cold and wet growing conditions. **Do not** use on soils classified as sand, which have less than 1% organic matter. **Do not** irrigate when peanuts are cracking.

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Peanut Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
alachlor – 2 lb/A	alachlor (4 lb/gal formulation) — 2 qt/A	Preemergence	Annual grasses and small-seeded broadleaf weeds	Optimum control is obtained when rainfall occurs within 10 days after application. Rates up to 4 pounds of active ingredient may be used for some weeds specified on label; e.g., yellow nutsedge. Because of the potential for above tolerance levels of alachlor metabolites, certain peanut buyers may require certification of peanuts grown without alachlor.
flumioxazin – 0.064 to 0.096 lb/A	flumioxazin (51% formulation) — 2 to 3 oz/A or 4 lb/gal formulation — 3 oz/A	Preemergence no later than 2 days after planting	Prickly sida, morningglory, pigweeds, horseweed; other annual broadleaf weeds	**Do not** irrigate when peanuts are cracking. Rainfall or irrigation at cracking will cause temporary crop injury that should not result in reduced yields if applied according to the label. Agitation within the spray tank should continue until spray solution has been applied. Product should be applied within 6 hours of mixing.
Postemergence Cultivation is often justified as a supplement to chemical weed control. However, haphazard cultivation that disturbs developing pegs or throws soil on the plant will reduce yield and quality. Southern blight (stem rot, *Sclerotium rolfsii*) is often more severe following such practices. Precision cultivation is recommended using flat sweeps set to run shallow in the middle. The use of fenders or shields to prevent soil movement onto plants is a good practice. Rolling cultivators also can be used effectively, but gangs should be set for minimum soil shifting. Positive depth and lateral control of all cultivating equipment is recommended.				
2,4-DB – 0.2 to 0.4 lb/A	2,4-DB (1.75lb/gal formulation) — 0.9 to 1.8 pt/A or 2 lb/gal formulation 0.8 to 1.6 pt/A	2 to 12 weeks after planting. **Do not** apply within 30 days of harvest	Cocklebur, annual morningglory, common ragweed, and sicklepod	**Do not** make more than two applications per season. **Do not** apply to peanuts within 30 days of harvest. **Do not** feed treated vines or peanut hay to livestock. **Do not** apply to peanuts if suffering from lack of water. **Check individual 2,4-DB labels for different use rates and restrictions.**
acetochlor – 0.94 to 1.5 lb/A	Warrant 3 CS — 1.25 to 2 qt/A	Postemergence through R1 (beginning bloom) growth stage.	Annual grasses, carpetweed, pigweed, purslane, Florida pusley, lambsquarters, nightshade, and waterhemp	Preplant treatments must have cultivation or 0.5 to 0.75 inch of precipitation or overhead irrigation for activation. **Do not** apply more than 4 quarts per season. **Do not** exceed three applications per season. Allow at least 7 days between sequential applications. Apply before weeds emerge, as this product will not control emerged weeds.
acifluorfen – 0.125 to 0.5 lb/A	acifluorfen (2 lb/gal formulation) — 0.5 to 2 pt/A	Small, actively growing weeds	Hemp sesbania, morningglory, pigweeds (less than 2 inches)	**Do not** apply to crop or weeds under stress from weather, pests or other herbicides. **Do not** apply within 75 days of harvest. **Do not** apply more than 2 pints during the growing season. Rainfall received within 6 hours of application may reduce control. **Do not** use treated plants for feed or forage. Add nonionic surfactant at 0.25 to 0.5% v/v.
bentazon – 0.5 to 0.75 to 1 lb/A	bentazon (4 lb/gal formulation) — 1 to 1.5 to 2 pt/A or 5 lb/gal formulation — 0.8 to 1.2 to 1.6 pt/A	Small, actively growing weeds	Cocklebur, prickly sida (2 to 3 inches), smartweed	Use a minimum of 40 psi pressure. **Do not** apply if peanuts show prior herbicide damage or during periods of drought or cold weather. **Do not** apply more than 2 quarts per season. As a late rescue treatment for cocklebur, apply 1.5 pints per acre before blooming up to 24 inches tall and repeat in 10 to 14 days. Only partial control may be obtained. Add a nonionic surfactant at 0.25% v/v or a nonphytotoxic crop oil concentrate at 1% v/v.
bentazon + acifluorfen – 0.75 lb/A	Storm 4 L — 1.5 pt/A	Small, actively growing weeds	Broadleaf weeds	**Do not** apply Storm to peanuts that have been subject to stress conditions. **Do not** apply more than a total of 1.5 pints of Storm within 75 days of peanut harvest. Add crop oil concentrate at 1 pint per acre or substitute nonionic surfactant at 0.125% v/v.
carfentrazone – 0.032 lb/A	Aim 2 EC — 2 oz/A	At least 7 days before harvest	Morningglory, pigweed, velvetleaf	**Do not** apply more than 2 ounces per acre as a harvest aid. Only rotate field to a carfentrazone-registered crop.
clethodim – 0.063 to 0.13 lb/A	clethodim (1 lb/gal formulation) — 12 to 16 oz/A or 2 lb/gal formulation — 6 to 8 oz/A	Small, actively growing weeds	Annual grasses, johnsongrass, bermudagrass	**Do not** apply (1) within 40 days of harvest, (2) more than 32 ounces per acre per season, (3) if rainfall is expected within 1 hour, or (4) to stressed plants.

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Peanut Weed Management

Situation and active ingredient rate per broadcast acre	Formulated product per broadcast acre	Time of application	Weeds controlled	Special instructions and remarks
diclosulam – 0.024 lb/A	Strongarm 84 WG — 0.45 oz/A	Postemergence up to 28 days after planting	Tropical spiderwort, common ragweed, cocklebur, eclipta, bristly starbur, wild radish	See *Special Instructions and Remarks* for Strongarm. Strongarm has a 24C label for control of tropical spiderwort in peanuts. Apply when tropical spiderwort plants are small. Larger plants will be stunted, but will rarely die.
imazapic – 0.5 to 1 lb/A	Cadre 2 AS — 4 oz/A	At cracking to within 90 days of harvest	Sicklepod, morningglory, Florida beggarweed, common cocklebur, nutsedge	Shallow cultivation may improve control of some species. Rainfall within 3 hours of application may reduce control. Rotation restrictions: cotton and sorghum — 18 months; small grains — 4 months Add nonionic surfactant at 0.25% v/v.
imazethapyr – 0.063 lb/A	imazethapyr (2 lb/gal formulation) — 4 oz/A	At cracking or postemergence	Annual grasses and broadleaf weeds; yellow and purple nutsedge suppression	See *Special Instructions and Remarks* for Pursuit.
lactofen – 0.2 lb/A	Cobra 2 EC — 12.5 oz/A	After peanuts reach the 6-leaf stage	Hemp sesbania, morningglory, prickly sida, common ragweed, pigweed	Preharvest interval is 90 days. Add a nonphytotoxic crop oil concentrate at 1% v/v.
metolachlor – 2 to 2.5 lb/A or *S*-metolachlor – 1.3 to 1.6 lb/A	Various formulations (see product label for specific rates)	Postemergence to 90 days before harvest	Annual grasses and small-seeded broadleaf weeds; yellow nutsedge suppression	Rainfall is required to activate surface application. Optimum control when rainfall occurs within 10 days after application. See specific product labels for preharvest intervals and maximum use rates. **Do not** use Dual II Magnum formulation after peanut emergence.
paraquat – 0.13 lb/A	Various formulations (see product label for specific rates)	At cracking or early postemergence up to 14 days after ground cracking	Sicklepod, Florida beggarweed, Texas panicum; broadleaf weeds	Peanut foliage injury is usually temporary. Conditions of high humidity, wet foliage, and/or wet soils result in greater foliage burn. Thrips injury retards crop recovery. Mix with bentazon or Storm on larger weeds. When used alone, paraquat is not effective on smallflower morningglory, prickly sida, wild radish, or tropic croton.
paraquat + bentazon – 0.13 lb/A + 0.25 to 0.5 lb/A	paraquat (2 lb/gal formulation) — 0.52 pt/A or 3 lb/gal formulation — 0.35 pt/A + bentazon (4 lb/gal formulation) — 0.5 to 1 pt/A or 5 lb/gal formulation — 0.4 to 0.8 pt/A	At cracking through 28 days after ground cracking	Annual grasses and broadleaf weeds	See *Special Instructions and Remarks* for paraquat and bentazon. **Do not** apply after flower initiation. **Do not** make more than two applications per crop. One pint of bentazon is needed for nutsedge control. Use 0.5 pint of bentazon if it is added only as a safener.
pyroxasulfone – 0.08 to 0.11 lb/A	Zidua 0.85 WG — 1.5 to 2.1 oz/A or 4 SC — 2.5 to 3.5 oz/A	After cracking	Annual grasses and small-seeded broadleaf weeds	Zidua **may not** be used preemergence in peanut. There is no established preharvest interval between application and peanut harvest. This product is a postemergence residual herbicide and will not control emerged weeds. May be mixed with other postemergence products; see label.
sethoxydim – 0.19 to 0.38 lb/A	Poast 1.5 EC — 16 to 24 oz/A	Small, actively growing weeds	Annual grasses, seedling and rhizome johnsongrass, bermudagrass, red rice	Apply over the top of peanuts or as a semi-directed spray to the grasses. **Do not** apply (1) to grasses under drought stress or herbicide injury; (2) if rainfall is expected within one hour after application; (3) within 40 days of harvest. Add a a nonphytotoxic crop oil concentrate at 1% v/v.
Rope Wick				
paraquat – 0.2 to 0.25 lb/A	Gramoxone SL 2 SL — mix 1 part Gramoxone to 1.5 parts water for a 40–50% solution.	When height differential is achieved between target weeds and peanut canopy	Glyphosate-resistant Palmer amaranth; prevents or minimizes seed production	Calibrate to apply up to 2 pt/A of herbicide water mixture. Position applicator at least 6 inches above peanut canopy. Apply through a recirculating rope or carpet roller wicking applicator. Set to avoid dripping onto peanut canopy. Use low ground speed (less than 5 mph). If possible, treat in late afternoon or early evening to enhance control of large weeds. **NOTE (State Label 24c).** Add nonionic surfactant at 0.25% v/v.

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FORAGE CROPS

MSMA is not labeled, and is therefore illegal, to apply to bermudagrass or other forage grasses grown for livestock consumption.

REPLANTING RESTRICTIONS FOR FORAGES ***(See product labels for crops not listed.)***[1]

	Legumes		Pasture Grasses			
Product	Alfalfa	Clover	Bahia	Bermuda	Fescue	Rye
2,4-D+Dicamba+Metsulfuron at 0.25 oz/A plus 1 pt/A	4 m	4 m	-	4 m	4 m	4 m
2,4-D+Picloram	1 y	1 y	3 w	3 w	3 w	3 w
2,4-D+Triclopyr	3 w	3 w	3 w	3 w	3 w	3 w
Chaparral	bioassay	bioassay	ns	ns	fall	ns
Cimarron Plus at 0.25 oz/A	4 m	4 m	-	4 m	4 m	4 m
Dicamba (per pint applied per acre)	120 d	120 d	30 d	30 d	30 d	30 d
Diuron	2 y	2 y	2 y	2 y	2 y	2 y
Glyphosate	1 w	1 w	1 w	1 w	1 w	1 w
Grazon Next	bioassay	bioassay	-	-	-	-
Imazapyr	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Lineage Clearstand	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Metsulfuron	bioassay	bioassay	ns	ns	fall	fall
Milestone	bioassay	bioassay	-	-	-	-
Maverick/Outrider	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay	12 m + bioassay
Overdrive	30 d	30 d	30 d	30 d	30 d	30 d
Paraquat	0 d	0 d	0 d	0 d	0 d	0 d
Pastora	12 m	12 m	-	4 m	-	4 m
Pasturegard	1 m	1 m	3 w	3 w[2]	3 w	3 w
Pursuit	4 m	4 m	40 m	40 m	40 m	4 m
Redeem R&P	bioassay	bioassay	14 d	14 d	14 d	14 d
Triclopyr	3 w	3 w	3 w	3 w	3 w	3 w
Surmount	bioassay	bioassay	12 m	12 m	12 m	12 m
Telar	bioassay	bioassay	bioassay	bioassay	bioassay	bioassay
Velpar	2 y	2 y	2 y	2 y	2 y	2 y

[1]D, m, w, and y following numbers in this table indicate days, months, weeks, and years, respectively.
[2]Interval applies to seeded bermudagrass cultivars.

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WEED RESPONSE RATINGS FOR FORAGE HERBICIDES

Herbicides / Weeds	Bahiagrass	Bitterweed	Blackberry	Bulrush	Bullthistle	Buttercup	Chickweed	Cogongrass	Common Ragweed	Crabgrass	Curly Dock	Dogfennel	Eastern Red Cedar	Foxtail	Goldenrod	Groundsel	Henbit	Horsenettle	Horseweed	Johnsongrass	Lanceleaf Ragweed	Little Barley	Mullein	Multiflora Rose	Nutsedge	Osage Orange	Red Sorrel	Smartweed	Smooth Pigweed	Smutgrass	Tall Fescue	Tropical soda apple	Vaseygrass	Wild Garlic
Preemergence																																		
Diuron	N	H	N	-	N	H	H	N	H	H	N	N	-	H	N	N	H	N	H	N	N	H	N	N	N	N	R	H	H	N	N	N	N	N
Postemergence																																		
2,4-D amine	N	H	N	H	H	H	N	N	H	N	R	N	R	N	R	N	R	N	R	N	R	N	N	N	N	R*	N	R	R	N	N	N	N	N
2,4-D ester	N	H	N	R	H	H	R	N	H	N	R	N	R	N	R	N	R	N	R	N	R	N	N	R	N	R	N	R	R	N	N	N	N	R
2,4-DB	N	R	N	-	R	R	R	N	R	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	N	N	N	N	N
2,4-D+Dicamba	N	H	R	H	H	H	H	N	H	N	H	H	H	N	H	N	H	R	H	N	H	N	R	R	N	N	R	H	H	N	N	N	N	R
2,4-D+Picloram	N	H	R	H	H	H	R	N	R	N	H	H	H	N	H	R	R	R	H	N	R	N	R	R	N	H	H	H	H	N	N	R	N	R
2,4-D+Triclopyr	N	H	R	-	H	H	R	N	H	N	H	R	R	N	H	N	R	R	H	N	R	N	N	R	N	N	R	H	H	N	N	N	N	N
Buctril	N	N	N	-	N	R	R	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	R	N	N	N	N	N	N
Chaparral	N	N	H	N	R	H	R	N	R	N	R	N	R	N	H	-	R	R	R	N	R	N	N	R	N	-	R	R	H	N	N	H	N	R
Cimarron Max	H	H	H	R	H	H	H	N	H	N	H	H	H	N	H	H	H	R	H	N	H	N	H	H	N	N	H	H	H	N	R	N	N	H
Dicamba	N	H	R	N	H	H	H	N	H	N	H	H	R	N	H	N	H	R	H	N	R	N	N	R	N	R	H	H	H	N	N	N	N	N
Diuron	N	N	N	N	N	N	N	N	N	R	N	N	N	R	N	N	N	N	N	N	R	R	N	N	N	N	N	N	N	N	N	N	N	N
Glyphosate	H	R	R	R	N	R	R	R	R	R	R	R	R	R	N	N	N	N	R	R	N	R	N	R	N	N	R	R	R	R	H	R	R	H
Grazon Next	N	R	R	-	R	R	R	-	R	N	R	N	-	N	R	N	R	R	R	N	R	N	-	N	N	N	N	-	-	N	N	N	N	N
Imazapyr	N	N	N	N	N	R	R	R	R	N	N	R	N	R	N	N	R	N	N	R	R	R	R	R	R	N	R	R	R	N	R	N	R	N
Maverick/Outrider	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	H	N	N	N	N	R	N	N	N	N	N	N	N	N	N
Metsulfuron	H	H	R	N	R	H	H	N	N	N	H	N	R	N	N	H	H	N	R	N	N	N	H	R	N	N	H	H	H	N	N	N	N	H
Milestone	N	R	N	N	R	R	-	N	R	N	R	N	N	N	-	-	R	R	R	N	R	N	-	N	N	N	-	R	-	N	N	H	N	N
Overdrive	N	R	N	N	R	H	R	N	R	N	R	R	N	N	R	N	R	N	R	N	R	N	N	N	N	N	R	R	R	N	N	N	N	R
Paraquat	N	N	N	N	N	H	H	N	R	N	N	N	N	H	N	N	H	N	N	-	N	H	N	N	-	N	N	N	N	N	H	N	-	H
Pastora	R	-	R	N	N	H	R	N	-	N	-	-	N	R	-	-	R	R	R	R	-	-	-	N	N	-	-	-	-	-	-	N	R	-
PastureGard	R	R	H	N	R	R	R	N	R	N	H	R	R	N	R	R	R	R	R	N	R	N	R	H	N	H	R	R	R	N	R	H	N	R
Pursuit	-	-	-	N	N	N	-	N	N	R	N	N	N	N	-	-	N	-	-	R	R	R	-	-	N	R	N	-	H	N	N	N	N	N
Redeem R+P	N	H	N	N	H	H	H	N	H	N	H	H	R	N	H	R	H	R	R	N	H	N	R	N	N	N	R	H	R	N	N	N	N	H
Sethoxydim	N	N	N	N	N	N	N	N	N	R	N	N	N	R	N	N	N	N	N	N	N	R	N	N	N	N	N	N	N	N	R	N	N	N
Surmount	N	H	H	N	H	H	R	N	R	N	H	H	H	N	H	R	R	H	H	N	R	N	R	H	N	H	H	H	H	N	N	R	N	R
Telar	N	N	N	N	R	N	R	N	N	N	R	N	N	N	N	R	R	N	R	N	N	N	N	N	N	N	N	N	R	N	N	N	N	N
Triclopyr	R	R	H	N	R	R	R	N	R	N	H	R	R	N	R	R	R	R	R	N	R	N	R	H	N	H	R	R	R	N	R	H	N	R
Velpar	N	N	R	N	N	R	R	N	N	N	N	N	H	N	N	N	R	N	N	N	N	N	N	H	N	R	N	N	N	H	N	N	N	N

H = Highly recommended R = Recommended N = Not recommended *Cut surface treatment

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HAYING, GRAZING, AND SLAUGHTER RESTRICTIONS FOR LIVESTOCK

Product	Dairy Animals: Lactating Grazing	Dairy Animals: Lactating Haying	Dairy Animals: Nonlactating Grazing	Dairy Animals: Nonlactating Haying	Meat Animals: Grazing	Meat Animals: Haying	Slaughter
	(days)						
2,4-D amine[3]	7	30	7	30	0	30	3
2,4-D choline	0	14	0	14	0	14	3
2,4-D ester[3]	7	30	7	30	7	30	3
2,4-D + Dicamba	7	37	0	37	0	37	30
2,4-D + Picloram	7	30	0	30	0	30	3
2,4-D choline + picloram	7	30	0	30	0	30	3
2,4-D + Dicamba + Metsulfuron	7	37	0	37	0	37	30
Buctril							
spring treatment	30	30	30	30	30	30	-
fall/winter treatment	60	60	60	60	60	60	-
Butyrac							
established alfalfa	30	30	30	30	30	30	-
seedling alfalfa, clover	60	60	60	60	60	60	-
Chaparral	0	0	0	0	0	0	-
Clethodim	15	15	15	15	15	15	-
Cimarron Plus	0	0	0	0	0	0	–
Dicamba							
1/2 qt/A or less	7	37	0	0	0	0	30
1-2 qt/A	40	70	0	0	0	0	30
2,4-D + Triclopyr							
2 gal or less/A	14	NS[1]	0	7	0	7	3
2-4 gal/A	NS	NS	14[2]	14	14[2]	14	3
Diuron	70	70	70	70	70	70	-
Glyphosate							
legumes							
preplant, preemerge, at-plant <44 oz/A	0	0	0	0	0	0	-
>44 oz/A	56	56	56	56	56	56	-
alfalfa preharvest	1.5	1.5	1.5	1.5	1.5	1.5	-
spot treatment (<10% total acres)	14	14	14	14	14	14	-
renovation < 44 oz	1.5	1.5	1.5	1.5	1.5	1.5	-
renovation > 44 oz	56	56	56	56	56	56	-
grass pastures							
preplant, preemerge, renovation	56	56	56	56	56	56	-
spot or wiper treatment	14	14	14	14	14	14	-
Grazon Next	0	7	0	7	0	7	-
Imazapyr	0	7	0	7	0	7	-
Journey	0	7	0	7	0	7	-
Lineage Clearstand	0	7	0	7	0	7	–
Metribuzin	28	28	28	28	28	28	-
Metsulfuron	0	0	0	0	0	0	-
Milestone	0	0	0	0	0	0	-
Maverick/Outrider	0	14	0	14	0	14	-
Overdrive	0	0	0	0	0	0	-
Paraquat							
alfalfa/clover							
dormant/clover	-	60	-	60	-	60	-
between cuttings	30	30	30	30	30	30	-
bermudagrass, dormant	-	40	-	40	-	40	-
Pastora	0	0	0	0	0	0	0
PastureGard	NS	14	0	14	0	14	3
Pursuit	30	30	30	30	30	30	30
Prowl							
Alfalfa							
≤ 2.1 qt/A	28	28	28	28	28	28	-
> 2.1 qt/A	50	50	50	50	50	50	-
Grass forage	0	0	0	0	0	0	-
Redeem R+P	14	NS	0	7	0	7	3
Sharpen	0	0	0	0	0	0	-
Sethoxydim	7	20	7	20	7	20	-
Surmount	14	7	0	7	0	7	3
Triclopyr choline	0	14	0	14	0	14	3
Triclopyr ester							
2 qt or less/A	14	NS	0	7	0	7	3
2-4 qt/A	NS	NS	14[2]	14	14[2]	14	3
4-6 qt/A	NS	NS	14[2]	NS	14[2]	NS	3
Telar	0	0	0	0	0	0	-
Velpar	0	38	0	38	0	38	-

[1]NS indicates next season.
[2]If the area treated is less than 25 percent of grazing area, there is no restriction for nonlactating or meat animals.
[3]Restrictions vary among manufactured products. Refer to particular product label for specific restrictions.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 16.

Consult labels for approved adjuvants.

Herbicide use may require some waiting period before haying or grazing — SEE ABOVE.

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Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
Preemergence				
Bermudagrass, at planting				
diuron at 0.8 to 2.4 lb/A	80 WP at 1 to 3 lb, or 4L at 1.6 to 4.8 pt/A in 25 gal water.	At sprigging.	Many annuals including signalgrass and some seedling perennials.	May temporarily burn emerged bermuda and permanently injure Alicia. For control of small emerged weeds, use low rate plus surfactant. SEE PAGE 91.
Sorghum-sudan hybrids				
atrazine at 1.6 lb/A	1.8 lb 90DF or 2 lb 80WP or 3.2 pt 4L in 25 gal water.	Sorghum should be completely germinated and emerged and weeds not more than 1.5 inches high.	Annual grass and broadleaf weeds.	**Do not** use on sand or loamy sand. May injure winter annuals that follow high rates.
Postemergence				
Alfalfa seedling				
bromoxynil at 0.25 to 0.37 lb/A	1 to 1.5 pt/A.	Fall or spring when majority of alfalfa has a minimum of 4 trifoliate leaves.	Annual broadleaf weeds.	**Do not** add surfactant or crop oil unless specifically recommended. SEE PAGE 91.
pendimethalin at 1 to 2 lb/A	Prowl H_2O at 1.1 to 2.1 qt/A in 20 to 40 gal water.	Before grasses and small-seeded broadleaf weeds start to germinate. After alfalfa has two trifoliate leaves but before it exceeds 6 inches tall.	Annual grasses and small-seeded broadleaf weeds.	Do not exceed 4.2 quarts per acre per season. Do not harvest alfalfa less than 28 days after applications of 2.1 quarts per acre or less.
Alfalfa only				
clethodim at 0.094 to 0.125 lb/A	6 to 8 oz/A (2 lb/gal formulation) in up to 20 gal water with 1 qt/A crop oil concentrate.	To actively growing annual or perennial grasses.	Most grasses.	Do not apply more than 32 ounces per acre to alfalfa. Do not apply a broadleaf herbicide within 1 day before or after application.
Alfalfa, Clover, seedling and established				
imazethapyr at 0.05-0.09 lb/A	Pursuit at 3 to 6 oz/A with 0.25% nonionic surfactant or 1 qt/A crop oil concentrate and 1-2 qt/A liquid N fertilizer or 2.5 lb/A spray grade ammonium sulfate.	Seedling legumes with at least 2 fully expanded trifoliate leaves or established, dormant or semi-dormant alfalfa or between cuttings.	Broadleaf weeds and certain grasses.	**Do not** exceed 6 ounces per acre per year. **Do not** apply during the last year of the stand. **Do not** feed, graze, or harvest alfalfa within 30 days of application. In the event of stand failure, **do not** reseed alfalfa within 4 months after application. This treatment will suppress growth of grasses, such as fescue, ryegrass, and small grains seeded with legumes.
sethoxydim at 0.19 to 0.47 lb/A	1 to 1.25 pt/A (1.5 lb/gal formulation) in up to 20 gal water at 40-60 psi by ground. Add 2 pt/A oil concentrate.	To actively growing grasses.	Most grasses.	Apply no more than 5 pints per acre in one season. SEE PAGE 91.

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Forage Crops, Continued

Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
Alfalfa, established				
metribuzin at 0.38 to 0.75 lb/A	0.5 to 1 lb/A (75 DF) or 0.8 to 1.5 pt/A (4 lb/gal formulation) in 20 to 40 gal water.	Winter dormant established	Chickweed, henbit and other winter annuals.	Apply only to winter dormant alfalfa no earlier than 12 months after seedling. SEE PAGE 91.
paraquat at 0.28 lb/A	0.75 pt/A (3 lb/gal formulation) or 2.2 pt/A (2 lb/gal formulation) in 20 to 40 gal water.	After cuttings.	Annual grasses and broadleaf weeds.	Apply to stands at least 1 year old and within 5 days after cutting. Add 1 quart of nonionic surfactant per 100 gallons of spray solution. SEE PAGE 91.
pendimethalin at 1 to 4 lb/A	Prowl H_2O at 1.1 to 4.2 qt/A in 20 to 40 gal water.	Before grasses and small-seeded broadleaf weeds start to germinate and alfalfa reaches 6 inches tall.	Annual grasses and small-seeded broadleaf weeds.	Do not exceed 4.2 quarts per acre per season. Do not harvest alfalfa less than 28 days after applications of 2.1 quarts per acre or less or 50 days after applications of more than 2.1 quarts per acre. Pendimethalin can be applied fall, winter, spring, or between cuttings.
Grass pastures, established				
2,4-D at 0.5 to 1 lb/A	1 to 2 pt/A (4 lb/gal formulation) in 10 to 20 gal water.	To actively growing weeds.	Buttercup, bitter weed, woolly croton, and others, except dogfennel, horsenettle, and smartweed.	**Do not** treat during long droughts and to **annual legumes** until after seed production. SEE PAGE 91.
2,4-D LV ester at 0.5 to 1 lb/A	1 to 2 pt/A (4 lb/gal formulation) in 10 to 20 gal water.	November to March when crop is well established, weeds are young, but before flowering of weeds.	Mustard, turnips, dock, buttercup, and others.	Apply during a clear, warm, sunny period when weeds are young and tender. May injure young, tender ryegrass. Add 0.5 to 1 quart of surfactant per 100 gallons of spray solution for improved control especially when applied during cool weather. SEE PAGE 91.
2,4-D at 0.38 to 1.4 lb/A plus dicamba at 0.12 to 0.5 lb/A	1 to 4 pt/A (3.87 lb/gal formulation) in 20 to 40 gal water.	When weeds are young and actively growing.	Most broadleaf weeds and some hard-to-control weeds, such as dogfennel and smartweed.	Weeds should be less than 10 inches tall for lower rates. Same precautions as for dicamba alone. Clipping large weeds not dead in 2 to 3 weeks will improve control. SEE PAGE 91.
2,4-D at 0.24 to 2 lb/A plus picloram at 0.06 to 0.54 lb/A	1 to 8 pt/A or 1 to 2% solution (2.54 lb/gal formulation) in 20 to 40 gal water.	When weeds are actively growing and not stressed.	Most broadleaf weeds and some hard-to-control weeds, such as dogfennel, horsenettle, and woody brush.	Use lower rates early in the season when weeds are very small. Use higher rates for larger annual weeds or established perennials or woody brush. SEE PAGE 91.
aminopyralid at 0.06 to 0.11 lb/A	Milestone at 4 to 7 oz/A in 20 gal water with 0.25% v/v nonionic surfactant.	To actively growing broadleaf weeds.	Tropical soda apple, others.	Milestone will severely damage legumes. Do not plant legumes until successful field bioassay proves concentrations will not damage crop. Manure and urine from animals grazed on treated sites or fed treated hay within the last 3 days will injure legume or broadleaf plants. Manure should not be used in areas where sensitive broadleaf plants will be placed.

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Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
aminopyralid at 0.06 to 0.11 lb/A + 2,4-D at 0.5 to 0.9 lb/A	Grazon Next at 1.5 to 2.6 pt/A in 20 gal water with 0.25% v/v nonionic surfactant.	To actively growing weeds.	Broadleaf weeds.	Grazon Next will severely damage legumes. Do not plant legumes in treated areas until field bioassay proves herbicide residues will not damage crop. Manure and urine from animals grazed on treated sites or fed treated hay within the last 3 days will injure legumes or damage broadleaf plants. Manure should not be used in areas sensitive broadleaf plants will be placed.
aminopyralid at 0.04 to 0.13 lb/A plus Metsulfuron at 0.006 to 0.02 lb/A	Chaparral at 1 to 3.3 oz/A for broadcast or 2.5 to 3.3 oz/100 gal for spot treatments	Use lower rate for young, annual weeds and higher rate for older or perennial weeds.	Broadleaf weeds.	Treatments will severely injure legumes, bahiagrass, or fescue. Use nonionic surfactant at 1 quart per 100 gallons of spray; however, applications to tall fescue should not exceed 1 pint per 100 gallons. Do not rotate to any crop within 1 year after treatment. Do not plant forage legumes until bioassay verifies residues will not injure crop. Do not seed ryegrass within 4 months after application. Do not use treated plants or manure around desirable broadleaf plants. Do not move animals from treated fields onto fields with legumes without first moving into untreated field for 3 days.
chlorsulfuron at 0.01 to 0.06 lb/A	Telar at 0.25 to 1.33 oz/A.	Apply to young, actively growing annual weeds and while biennial or perennial weeds are still in rosette.	Annual and some biennial and perennials.	Make only one application per season. Do not exceed 1.3 ounces per acre per season. Add 1 to 2 quarts nonionic surfactant per 100 gallons of spray.
dicamba at 0.25 to 2 lb/A	0.5 to 2 pt/A for broadcast or 25 to 50% solution in oil for individual stem or cut stump treatments (2.67 lb/gal formulation).	When weeds are actively growing for foliar treatments or prior to active spring growth for stem applications with oil.	Most broadleaf weeds and small brush.	**Do not** broadcast spray more than 1 quart per acre in one season. **Do not** exceed 1 pint per acre on small grains grown for pasture. SEE PAGE 91.
diflufenzopyr at 0.005 to 0.01 lb/A plus dicamba at 0.015 to 0.03 lb/A	Overdrive at 4 to 8 fl oz/A.	Apply to young, actively growing weeds.	Annual and perennial broadleaf weeds.	Use low rate for annuals, high rate for biennials and perennials. Add 1 quart of nonionic surfactant per 100 gallons of spray or 1.5 to 2 pints per acre of methylated seed oil. Do not exceed 8 ounces per acre per season. Do not plant any rotational crop within 30 days of application. Do not apply to small grains grown for grazing. SEE PAGE 91.
imazapyr at 0.03 to 0.75 lb/A	2 to 48 oz/A spot broadcast or 0.5 to 5% solution for handgun spot treatment (2 lb/gal formulation) with 0.25% v/v nonionic surfactant.	To actively growing weeds and woody species as foliar spray or to dormant trees and brush as injection, hack and squirt, or cut stump treatment.	Several annual and perennial grasses and broadleaf weeds plus vines and undesirable woody plants.	Do not treat more than 10% of the area grazed or cut for hay. Treatments will damage desirable forage species. Do not apply more than 48 ounces per acre per year.

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Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
imazapyr + metsulfuron at 0.03 to 0.4 + 0.005 to 0.06 lb/A	Lineage Clearstand at 0.8 to 10 oz in 20 gal water plus 0.25% nonionic surfactant (v/v).	To actively growing weeds and brush as foliar spray or to dormant trees and brush as injection, hack and squirt, or cut stump treatment.	Annual and perennial grasses and broadleaf weeds and brush.	Do not exceed 10 ounces per acre per year. Do not treat more than 10% of the area grazed or cut for hay. Treatments will damage desirable forage species.
pendimethalin at 0.8 to 3.5 lb/A	Prowl H_2O at 1.1 to 4.2 qt/A in 20 to 40 gal water.	Apply to established cool-season grass forages (six or more tillers per plant) or warm-season forages that have been mowed or cut once.	Annual grasses and small-seeded broadleaf weeds, such as spiny amaranth, bitterweed, and spurge.	**Do not apply to warm-season grass forage after spring greenup before first cutting.** It may be applied in single application or in sequential applications 30 days apart. The current label **expires April 30, 2019**. Do not apply if surface water is on field. Do not apply more than 4.2 quarts per acre per season.
picloram at 0.44 to 0.89 lb/A plus fluroxypyr at 0.36 to 0.72 lb/A	Surmount at 3 to 6 pt/A or 0.5 to 2% solution for spot treatment.	Apply to actively growing weeds.	Many broadleaf weeds and hard-to-control perennial weeds and woody plants.	Use lower rate for small annual weeds, higher rates for larger annuals or established perennials. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray. SEE PAGE 91.
saflufenacil at 0.02 to 0.08 lb/A	Sharpen at 1 to 4 oz in 20 gal water with 1% methylated seed oil (MSO). Add AMS at 1 to 2% w/v for applications to dormant forage grasses.	Before weeds exceed 3- to 6-inch height.	Broadleaf weeds	Do not exceed 1 ounce per acre per application when applied to actively growing bermudagrass or apply to actively growing bahiagrass, buffalograss, or switchgrass. Do not apply more than 6 ounces per acre per season. Do not apply to annual grass forages, alfalfa, or clovers.
triclopyr at 0.25 to 2 lb/A	1 to 4 pt/A broadcast, 1 to 1.5% solution for spot spraying weeds, or 20 to 33% solution with oil for dormant woody stem (4 lb/gal formulation).	When weeds are actively growing for broadcast or spot sprays or before bud break for applications with oils to woody stems.	Broadleaf weeds and woody vines, shrubs, and trees.	Add 1 to 2 quarts nonionic surfactant per 100 gallons with broadcast sprays. SEE PAGE 91.
triclopyr at 0.42 to 1.1 lb/A + clopyralid at 0.14 to 0.38 lb/A	Redeem R&P at 1.5 to 4 pt/A	To actively growing grasses.	Broadleaf weeds.	Use lower rates for weeds such as bitter sneezeweed, ragweed, thistle, marshelder, and croton; higher rates for spiny pigweed, horsenettle, and dogfennel.
triclopyr at 0.38 to 1.5 lb/A plus fluroxypyr at 0.125 to 0.5 lb/A	PastureGard at 2 to 8 pt/A for broadcast applications, or 1 to 2% solution for spot treatment, or 50:50 mix with oil and 10% penetrant for individual woody stem or cut stump treatment.	Apply foliar treatments to weeds that are actively growing and not stressed, and mixtures with oils to dormant stems.	Broadleaf annual and perennial weeds, including tropical soda apple, or woody perennials, such as vines, brambles, shrubs, and trees.	Use low rates for small annual weeds, higher rates for large annuals or perennials. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray for applications. SEE PAGE 91.

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Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
triclopyr at 0.25 to 1 lb/A + 2,4-D at 0.5 to 2 lb/A	1 to 4 qt/A or 1 to 1.5% solution with water for broadcast or 1 to 4% solution with oil (3 lb/gal formulation) for dormant woody stems.	When weeds are actively growing for broadcast applications or just before breaking dormancy for woody stem treatments.	Annual and perennial broadleaf weeds and some woody vines and shrubs.	Adding 1 to 2 quarts of nonionic surfactant per 100 gallons of spray may enhance control. Do not reseed pastures within 3 weeks after treatment. Do not exceed 4 quarts per acre per season. Do not apply to newly seeded grasses until after tillering. SEE PAGE 91.
Bermuda and Bahiagrass, established				
hexazinone 0.69 to 1.13 lb/A	Velpar L 2.75 to 4.5 pt/A.	To actively growing smutgrass from May to October 15.	Smutgrass and many broadleaf weeds.	**Do not** apply near the root system of desirable woody plants such as oak trees. Apply with 1 quart of surfactant per 100 gallons of water. SEE PAGE 91.
sulfosulfuron at 0.06 to 0.09 lb/A	Maverick/Outrider at 1.3 to 2 oz in 20 gal water with 0.25% nonionic surfactant (v/v).	To actively growing weeds.	Johnsongrass, sedges, ryegrass, mustards, and buttercup.	Sequential applications can be made no sooner than 40 days after the previous treatment. Do not exceed 2.66 ounces per acre per year.
Bermudagrass, established				
imazapic + glyphosate at 0.06 to 0.19 + 0.1 to 0.4 lb/A	Journey at 10 to 32 oz/A broadcast or as 0.625 to 13% solution for spot treatments.	To actively growing weeds	Vaseygrass, Johnsongrass, crabgrass, signalgrass, barnyardgrass, sandbur, and nutsedge	Methylated seed oil is preferred over nonionic surfactant. Use 1.5 to 2 pints per acre for broadcast or 1% for spot applications. Do not apply during transition from dormant to active growth. Do not apply to 'World Feeder,' Tifton 85, or hybrid bermudagrass. Do not exceed 21 ounces per acre on Coastal bermudagrass. Do not apply within 30 days of aeration. Bermudagrass growth will likely be suppressed 30 days.
metsulfuron methyl 0.0038 to 0.015 lb/A	Metsulfuron at 0.1 to 0.4 oz/A in a minimum of 10 gal/A or 1 oz/100 gal for spot applications.	To actively growing weeds. For bahiagrass control, use 0.3 oz after green-up and before seedhead formation.	Pensacola bahia, wild garlic, buttercup, bitter sneezeweed, pigweed, and woolly croton.	Add 0.5 to 1 quart of nonionic per 100 gallons of spray solution surfactant. Will not control Argentine bahiagrass. **Do not apply to Bahiagrass pastures.** Following Cimmarron applications at 0.1 to 0.3 ounce per acre, red, white, or sweet clover, bermudagrass, ryegrass, or tall fescue can be planted after 4 months; wheat after 1 month; barley or oats after 10 months. Do not apply more than 1.67 ounce per acre per season. Do not use on soils with pH above 7.9.
metsulfuron + 2,4-D + dicamba 0.004 to 0.011 + 0.36 to 0.72 to 1.4 + 0.125 to 0.25 to 0.5	Cimarron Max 0.1 to 0.3 oz/A Part A + 1 to 2 to 4 pt/A Part B	To actively growing weeds	Bahiagrass, woolly croton, bitter sneezeweed, vetch, dock, garlic dogfennel, marestail, blackberry, multiflora rose, and many other annual and perennial weeds	Add 1 quart of nonionic surfactant per 100 gallons of finished spray solution. Does not control 'Argentine' bahiagrass. Do not apply more than 1.67 ounces of Part A per acre per season.
nicosulfuron at 0.35 to 0.53 lb/A + metsulfuron methyl at 0.009 to 0.014 lb/A	Pastora at 1 to 1.5 oz/A with 0.25% nonionic surfactant (v/v)	To actively growing annual grassy weeds less than 2 inches tall, annual broadleaf weeds less than 4 inches tall, and some perennial weeds.	Johnsongrass, vaseygrass, ryegrass, and many broadleaf weeds	Crop oil concentrate at 1% (v/v) may increase weed control but may also increase potential for bermudagrass injury. Bermudagrass must be established for at least one season before application.

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Crop, weed, or situation and active chemical per treated land acre	Formulation needed for 1 acre treated broadcast	Time of application	Weeds controlled	Special instructions and remarks
Bermudagrass, dormant				
paraquat at 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant.	Mid-March.	Emerged annual broadleaf weeds and grasses in dormant bermuda.	Add 1 quart of nonionic surfactant per 100 gallons of spray solution. Must be applied prior to seed head emergence for satisfactory control of little barley. SEE PAGE 91.
Bermudagrass and Bahiagrass, sod suppression				
paraquat at 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant.	Early fall to sods not exceeding 3 inches in height.	Supresses summer grass while winter annuals establish.	Add 1 quart of nonionic surfactant per 100 gallons of spray. SEE PAGE 91.
Endophyte-Infested Tall Fescue Destruction				
paraquat 0.25 to 0.5 lb/A	1 to 2 pt/A (2 lb/gal formulation), 0.8 to 1.6 pt/A (2.5 lb/gal formulation), or 0.6 to 1.3 pt/A (3 lb/gal formulation) in 20 to 40 gal water with 0.25% v/v nonionic surfactant followed by a second application 10 to 21 days later at the same rate.	When fescue is actively growing.	Endophyte-infected fescue and annuals.	Add 0.5 or 1 quart of nonionic surfactant per 100 gallons of spray solution. If new growth appears within 10-14 days, make a second application. Do not exceed 3 pints per acre. SEE PAGE 91.
glyphosate at 0.75 lb/A	Glyphosate 4/5 lb/gal at 2/1.2 pt in 3 to 10 gal water plus 0.5 to 1% surfactant	When fescue is actively growing in the fall and plants are 6 to 12 inches tall.	Endophyte-infected fescue and other annual plants.	A sequential application of 1 pint plus surfactant will improve long-term control. SEE PAGE 91.

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TURF GUIDELINES

TURFGRASS TOLERANCE TO HERBICIDES[1]

Herbicide	Common Bermuda	Hybrid Bermuda	Centipede	St. Augustine[2]	Zoysia
2,4-D	Yes	Yes	Y/N	S	Yes
2,4-D + 2,4-DP	Yes	Yes	Y/N	S	Yes
2,4-D + dicamba	Yes	Yes	Y/N	S	Yes
2,4-D + dicamba + sulfentrazone + penoxsulam	Yes	Yes	Y/N	Yes	Yes
2,4-D + fluroxypyr + dicamba	Yes	Yes	Y/N	S	Yes
2,4-D + MCPP	Yes	Yes	Y/N	S	Yes
2,4-D + MCPP + dicamba	Yes	Yes	Y/N	Y/N[1]	Yes
2,4-D + MCPP + dicamba + carfentrazone	Yes	Yes	Y/N	Y/N	Yes
2,4-D + clopyralid + dicamba	Yes	Yes	No	No	Yes
2,4-D + 2,4-DP + dicamba + carfentrazone	Yes	Yes	Y/N	Y/N	Yes
asulam	-	Yes	-	Yes	-
atrazine	Yes	Y/N	Yes	Yes	Yes
benefin	Yes	Yes	Yes	Yes	Yes
benefin + oryzalin	Yes	Yes	Yes	Yes	Yes
bensulide	Yes	Yes	Yes	Yes	Yes
bentazon	Yes	Yes	Yes	Yes	Yes
bromoxynil	Yes	Yes	-	Yes	Yes
bentazon + atrazine	Yes	Yes	Yes	Yes	Yes
carfentrazone	Yes	-	Yes	Yes	Yes
clopyralid	Yes	Yes	Yes	Yes	Yes
clopyralid + triclopyr	Yes	Yes	-	-	-
dicamba	Yes	Yes	Yes	Yes	Yes
dimethenamid	Yes	Yes	Yes	Yes	Yes
dithiopyr	Yes	Yes	Yes	Yes	Yes
DCPA	Yes	Yes	Yes	Yes	Yes
fenarimol	Yes	Yes	-	-	-
fenoxaprop	S	S	S	S	Yes
flazasulfuron	Yes	Yes	Y/N	S	Yes
florasulam	Yes	Yes	Yes	Yes	Yes
fluazifop	S	S	S	S	Yes
flumioxazin	Y/N	Y/N	S	S	S
foramsulfuron	Yes	Yes	-	-	-
halosulfuron	Yes	Yes	Yes	Yes	Yes
imazaquin	Yes	Yes	Yes	Yes	Yes
indaziflam	Yes	Yes	Yes	Yes	Yes
isoxaben	Yes	Yes	Yes	Yes	Yes
MCPP	Yes	Yes	Yes	Yes	Yes
mesotrione	S	S	Yes	Y/N	S
metolachlor	Yes	Yes	Yes	-	Yes
metribuzin	Yes	Yes	-	-	-
metsulfuron	Yes	Yes	Y/N	Yes	Yes
metsulfuron + dicamba	Yes	Yes	Y/N	Y/N	Yes
MSMA	Yes	Yes	S	S	Yes
MSMA + metribuzin	Yes	Yes	-	-	-
oryzalin	Yes	Yes	No	Yes	Yes
oxadiazon	Yes	Yes	Yes	Yes	Yes
pendimethalin	Yes	Yes	Yes	Yes	Yes
penoxsulam	Yes	Yes	Yes	Yes	Yes
pinoxaden	Yes	Yes	No	Yes	Yes
pronamide	Yes	Yes	Yes	Yes	Yes
prodiamine	Yes	Yes	Yes	Yes	Yes
pyrimisulfan + penoxsulam	Yes	Yes	-	-	Yes
quinclorac	Yes	Y/N	S	S	Yes
quinclorac + sulfentrazone	Yes	Yes	Y/N	S	Yes
rimsulfuron	Yes	Yes	-	-	-
sethoxydim	S	S	Yes	S	S
simazine	Yes	Yes	Yes	Yes	Yes
sulfentrazone	Yes	Yes	Yes	Y/N	Y/N
sulfentrazone + metsulfuron	Yes	Yes	Yes	Yes	Yes
sulfosulfuron	Yes	Yes	Yes	Yes	Yes
topramezone	S	S	Yes	S	S
trifloxysulfuron	Yes	Yes	S	-	Yes

[1]Turf tolerance varies depending upon stage of growth, turf health, and time of year. Always read and follow label directions. **S**—susceptible, herbicide known to severely damage or kill turfgrass; **Yes**—tolerant when applied according to label directions; and **Y/N**—Indicates intermediate, use with caution, or at reduced rates. Consult label for product use instructions and restrictions prior to considering use. [2]Use only products with a 0.5 : 1 : 0.1 ratio of 2,4-D: MCPP: and dicamba on St. Augustinegrass.

Consult labels for approved adjuvants. | **Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 16.**

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ESTIMATED PREEMERGENCE CONTROL OF TURFGRASS WEEDS

Weeds	atrazine[1,2] (Aatrex)	benefin (Balan)	benefin + oryzalin (Amaze)	benefin + trifluralin (Ferti-Lome)	bensulide (Bensumec)	dimethenamid[2] (Tower)	dithiopyr (Dimension)	flumioxazin[2,3] (Sureguard or Panther)	indaziflam[2] (Specticle)	isoxaben (Gallery)	metolachlor[2] (Pennant Magnum)	oryzalin[2] (Surflan)	oxadiazon[3] (Ronstar)	oxadiazon[3] + prodiamine	pendimethalin (Pendulum)	prodiamine[1,2] (Barricade)	pronamide (Kerb)	simazine[2] (Princep)
annual bluegrass	G	G	G	G	G	-	E	G	E	N	-	-	G	E	E	E	E	E
bahiagrass	-	G	G	-	G	-	-	-	-	-	-	G	G	-	G	-	-	-
buttercup	N	N	N	-	N	-	-	-	-	-	-	N	F	-	N	-	-	N
carpetweed	-	G	G	-	G	-	-	G	-	F	-	G	E	-	N	-	-	E
chamberbitter	G	-	-	-	-	-	-	-	-	G	-	-	G	-	-	G	-	G
chickweed	E	N	F	G	F	-	-	E	E	E	-	G	F	-	G	-	F	E
clovers	G	N	N	-	N	-	-	-	-	G	-	N	N	-	N	-	-	F
crabgrass	F	G	E	G	E	G	E	-	E	N	F	E	G	E	E	E	-	F
dallisgrass	-	G	G	-	G	-	-	-	-	N	-	G	-	-	G	G	-	-
dandelion	-	N	N	-	N	-	-	G	G	G	-	N	N	-	N	-	-	F
dichondra	E	N	N	-	N	-	-	-	-	-	-	N	N	-	N	-	-	N
Florida betony	E	N	N	-	N	-	-	-	-	-	-	N	N	-	N	-	-	-
Florida pusley	E	N	F	-	F	-	-	-	-	F	-	N	-	-	N	-	-	G
goosegrass	F	F	F	G	F	G	E	G	E	-	-	G	E	E	G	E	-	N
ground ivy	N	N	N	-	N	-	-	-	-	-	-	N	G	-	N	-	-	G
henbit	-	N	N	-	N	-	-	E	E	G	-	N	G	-	N	-	-	E
knotweed	G	N	F	G	F	-	-	-	-	G	-	F	-	-	N	-	-	G
lawn burweed	G	N	N	-	N	-	-	-	-	-	-	N	F	-	N	-	-	E
lespedeza	G	N	N	-	N	-	-	-	-	-	-	N	-	-	N	-	-	F
nutsedge	-	-	-	-	-	G	-	-	G	-	G	-	-	-	-	-	-	-
pennywort	-	N	N	-	N	-	-	-	-	G	-	N	-	-	N	-	-	N
plantain	-	N	N	-	N	-	-	G	G	G	-	N	-	-	N	-	-	N
prostrate spurge	-	N	N	-	N	G	-	G	-	F	-	N	G	-	F	-	-	G
sandbur	F	G	G	-	G	-	-	-	-	-	-	G	G	-	G	-	N	-
shepherd's purse	-	N	N	-	N	G	-	-	-	E	-	N	G	-	N	-	-	E
speedwell	E	N	N	-	N	-	-	-	G	G	-	N	G	-	N	-	-	F
Virginia buttonweed	-	N	N	-	N	-	-	-	-	-	-	N	G	-	F	F	-	G
wood sorrel	G	N	N	-	N	-	-	G	-	-	-	F	G	-	F	-	-	G

E = Excellent, G = Good, F = Fair, N = No control, - = Data not available

[1]Restricted Use Pesticide: For retail sale to and use only by certified applicators or persons under their direct supervision, and only for those uses covered by the Certified Applicator's Certification.

[2]This product is labeled for use primarily in warm-season turf. Read the label for a list of tolerant species.

[3]Liquid formulations of this herbicide are for use only on dormant turf. Granular carriers may be used in green turf when labelled for such use.

ED_005172C_00002010-00103

ESTIMATED POSTEMERGENCE CONTROL CONTROL OF TURFGRASS WEEDS

Weeds	atrazine[1,2] (Aatrex)	bentazon (Basagran)	clopyralid (Lontrel)	clopyralid + triclopyr (Confront)	2,4-D	2,4-D + dicamba + fluroxypyr (Escalade II)	2,4-D + MCPP + dicamba (Trimec)	2,4-D + mecoprop + dicamba + carfentrazone (Speed Zone)	2,4-D + mecoprop + dicamba + sulfentrazone (Surge)	diclofop[3] (Hoxan)	dicamba (Banvel)	diquat[4] (Reward)	fenoxaprop[3] (Acclaim)	florasulam (Defendor)	fluazifop[3] (Fusilade II)	fluroxypyr (Vista XRT)	foramsulfuron (Revolver)	glyphosate[4] (Round-up)	halosulfuron (Sedgehammer)	imazaquin (Image)	mesotrione (Tenacity)	metribuzin (Sencor)	metsulfuron (MSM-Turf, Manor)	metsulfuron + dicamba (Farenheit)	metsulfuron + sulfentrazone (Blindside)	MSMA	MSMA + metribuzin	pronamide[1,2] (Kerb)	quinclorac (Drive)	rimsulfuron (Tranxit)	sethoxydim[3] (Segment)	simazine (Princep)	sulfentrazone (Dismiss)	sulfentrazone + 2,4-D + MCPP + penoxsulam (Avenue South)	sulfentrazone + imazethapyr (Dismiss South)	sulfosulfuron (Certainty)	trifloxysulfuron (Monument)	topramezone (Pylex)
annual bluegrass	E	N	N	N	N	N	N	N	N	-	N	G	N	N	-	N	E	E	N	N	N	G	N	N	N	N	N	E	-	E	F	E	N	G	N	G	E	N
bahiagrass	N	-	N	N	N	N	N	N	N	N	N	-	G	N	-	N	N	E	N	N	-	N	E	E	E	F	F	N	-	-	G	N	N	N	N	N	F	-
buttercup	N	-	-	G	F	G	E	E	E	N	E	F	N	-	N	G	-	E	-	-	-	G	-	G	G	N	N	-	-	-	N	N	-	G	-	-	-	-
carpetweed	E	-	N	-	G	E	G	G	G	N	G	N	N	E	N	G	-	E	-	-	F	N	N	N	N	N	G	-	-	-	N	E	-	F	-	-	-	F
chamberbitter	G	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	N	-	-	G	G	G	-	-	-	-	-	-	G	-	-	-	N	F	-
chickweed	E	-	-	E	F	G	E	E	E	N	E	G	N	E	N	G	-	E	-	G	-	G	G	G	G	N	N	F	-	G	N	E	-	E	-	E	E	F
clovers	G	-	E	E	N	E	E	E	E	N	E	P	N	E	N	G	N	E	-	N	-	N	G	E	E	N	N	-	-	-	N	G	F	E	F	N	G	G
crabgrass	F	N	N	N	N	N	N	N	N	-	N	N	E	N	G	N	-	E	-	-	G	N	N	N	N	E	E	N	G	N	G	F	-	N	-	N	-	G
dallisgrass	N	N	N	N	N	N	N	N	N	N	N	N	N	N	-	N	F	E	N	N	N	N	N	N	N	E	E	-	-	N	F	N	N	N	N	N	-	N
dandelion	F	-	-	E	E	E	E	E	E	N	G	N	N	E	N	G	N	E	N	F	-	N	G	G	G	N	N	-	-	-	N	F	-	E	-	F	E	-
dichondra	N	-	-	-	F	G	G	-	-	N	G	N	N	-	N	-	-	E	-	-	-	N	N	N	N	N	N	-	-	-	N	N	-	-	-	-	-	-
Florida betony	N	N	-	G	N	G	G	G	G	N	G	N	N	-	N	-	-	E	N	N	-	N	E	E	E	-	N	-	-	-	N	-	-	-	-	-	-	-
Florida pusley	N	-	-	-	N	-	-	-	-	N	-	N	N	-	N	-	-	E	-	-	-	-	G	G	G	-	N	-	-	-	N	N	-	-	-	-	-	-
goosegrass	N	N	N	N	N	N	N	N	N	E	N	N	G	N	-	N	G	E	N	N	G	N	N	N	F	F	E	N	N	N	F	N	G	-	G	N	N	E
ground ivy	G	-	-	-	G	G	-	-	-	N	-	N	N	-	N	-	-	E	-	-	-	G	G	G	G	N	G	-	-	-	N	N	-	-	-	-	-	-
henbit	E	-	-	E	F	G	E	E	E	N	E	G	N	-	N	G	E	E	-	F	-	G	G	G	E	N	N	-	-	E	N	E	-	E	-	E	E	-
knotweed	G	-	G	-	F	G	G	-	-	N	E	N	N	G	N	-	-	E	-	-	-	N	E	E	E	N	N	-	-	-	N	G	-	-	-	-	N	-
kyllinga	-	-	N	N	N	N	N	N	N	N	N	-	N	N	N	N	N	E	F	F	-	-	N	N	G	-	-	-	-	-	N	N	E	G	E	E	G	-
lawn burweed	E	-	-	-	F	-	G	G	G	N	G	G	N	-	N	-	N	E	N	E	-	G	E	E	E	N	F	N	-	G	N	E	-	G	-	E	E	-
lespedeza	F	-	-	-	F	E	G	G	F	N	E	N	N	N	N	E	-	E	-	-	-	N	G	G	G	N	F	-	-	-	N	F	-	G	-	-	-	-
nutsedge, purple	N	N	N	N	N	N	N	N	-	N	N	N	N	-	N	N	-	G	E	E	-	N	N	N	N	F	F	N	-	-	N	N	G	G	E	E	E	-
nutsedge, yellow	N	E	N	N	N	N	-	N	G	N	N	N	N	-	N	N	-	G	E	E	-	N	N	N	N	F	F	N	-	-	N	N	G	G	E	E	E	-
pathrush	-	-	-	-	G	-	G	-	-	-	N	-	N	-	N	-	-	E	-	N	-	-	N	N	N	-	-	-	-	-	-	-	-	-	-	N	-	-
pennywort	F	-	-	G	F	-	F	-	-	N	-	N	N	-	N	-	-	E	-	F	-	-	G	G	G	F	G	-	-	-	N	N	-	-	-	-	-	-
plantain	F	-	G	F	E	G	G	E	E	N	F	N	N	-	N	F	-	E	-	-	-	N	G	G	G	N	N	-	-	-	N	F	-	-	-	-	-	-
prostrate spurge	F	-	N	E	N	G	G	G	G	N	F	N	N	-	N	F	-	E	-	-	-	N	G	G	G	N	N	-	-	-	N	G	-	G	-	-	-	-
ryegrass	-	-	N	-	N	N	N	N	N	-	N	-	N	-	-	N	E	E	N	N	-	-	G	G	G	N	-	E	-	E	-	E	N	N	N	N	E	-
sandbur	-	-	N	N	N	-	N	N	N	-	N	N	-	-	-	-	N	E	-	-	-	N	N	N	N	G	E	N	-	-	F	-	-	-	-	-	-	-
shepherd's purse	E	-	-	-	G	G	G	G	G	N	G	G	N	E	N	-	-	E	-	-	F	G	G	G	G	N	N	-	-	-	N	E	-	E	-	-	-	-
speedwell	-	-	G	-	N	-	F	F	F	N	N	G	N	-	N	N	-	E	-	N	F	N	N	N	N	N	N	-	-	-	N	-	-	E	-	N	-	-
tall fescue	N	N	N	N	N	N	N	N	N	N	N	N	-	N	N	N	-	G	N	N	N	N	N	N	N	N	N	N	-	-	F	N	N	-	N	F	G	N
torpedograss	N	N	N	N	N	N	N	N	N	N	N	N	-	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	G	-	N	N	N	N	-	N	F	-
tufted lovegrass	N	-	N	N	N	N	N	N	N	N	N	-	G	-	G	N	N	E	N	N	E	N	N	N	N	N	N	-	N	N	N	N	G	N	G	N	N	E
Virginia buttonweed	N	-	-	F	N	E	G	G	G	N	F	N	N	F	N	E	-	E	-	N	-	N	E	E	E	N	N	-	-	-	N	N	-	E	G	N	G	-
wild garlic	N	-	N	F	F	F	F	F	F	N	F	N	N	-	N	-	F	G	-	E	-	N	F	F	F	N	N	N	-	E	N	N	F	E	F	N	E	-
wood sorrel	G	-	-	-	N	F	F	F	F	N	G	N	N	-	N	G	-	E	-	F	-	N	G	G	G	N	N	-	-	-	N	G	-	E	-	-	-	-

E = Excellent, G = Good, F = Fair, N = No control, - = Data not available

[1]Restricted Use Pesticide: For retail sale to and use only by certified applicators or persons under their direct supervision, and only for those uses covered by the Certified Applicator's Certification.

[2]This product is labeled for use primarily in warm-season turf. Read the label for a list of tolerant species.

[3]At normal use rates, this product will kill desired bermudagrass turf.

[4]This product is considered nonselective and should not be used on desirable turf unless turf loss can be tolerated or turf can be replaced.

Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Preplant — *new lawns or other turf areas*					
metam sodium	0.9 - 1.72 gal of 4.62 lb/gal	37.5 - 75 gal/A of 4.26 lb/gal	159 - 319	Dormant weed seed	Mix with water and apply uniformly to plowed soil. Water adequately after applying to seal the soil, and maintain soil moisture for next few days per label instructions, if a gas-proof cover is not used. Till 5-7 days after treating on sandy soil or 14 days on clay soil. Soil temperature should be above 60 °F. Soil should be moist at the time of application. Although a gas-proof cover such as plastic is not required, efficacy is generally increased with one. **Additional Comments Restricted Use Pesticide**
glyphosate	4.5 - 8.8 tbsp of 3 lb ae/gal 3.2 - 5.5 tbsp of 4 lb ae/gal 1.5 - 0.75 oz of 64.9% dry formulation	3 - 5 qt/A of 3 lb ae/gal 2.2 - 3.7 qt/A of 4 lb ae/gal 67 - 112 oz of 64% DF See table on pages 12-13 for other formulations	2.25 - 3.75 lb ae/A	Most annuals and perennials including bermudagrass	Turfgrass renovation. Follow label specification. **Do not** mow or till for 7 days after treatment. Turfgrass may be established as soon as control is accomplished. Consult label to determine if surfactant is needed.
diquat	0.5 - 0.75 fl oz of 2 lb/gal	16 - 32 fl oz/A of 2 lb/gal	0.25 - 0.5	Most annuals	Turfgrass renovation. Same as glyphosate. Use 0.25% v/v nonionic surfactant.
dazomet	8 lb of a 99G formulation	350 lb of a 99G formulation	347	Annual weeds and reduction of root-propagated weeds such as bermudagrass and sedges	Follow the label for tillage and water requirements both pre- and postapplication. Use lettuce seed bioassay to determine if it is safe to plant or sprig after application. For use on golf greens and tees.

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Preemergence — *lawns and general turf*					
Apply only to established warm-season turfgrasses. Many preemergence herbicides may not be applied during the establishment year. Consult labels for restrictions.					
Apply in sufficient water to insure uniform coverage. A carrier volume of 20–40 gallons of water per acre is recommended.					
Apply before weeds emerge. Most preemergence herbicides have no postemergence activity.					
Irrigate with a minimum of 0.5 inch of water following application to activate.					
atrazine	0.75 - 1.5 fl oz of 4 lb/gal 0.4 - 0.8 oz of 90 WDG 3.74 - 5 lb of 20-0-20 containing 0.9% atrazine 3 lb of 35-0-0 containing 0.8% atrazine	1 to 2 qt/A or 4 lb/gal or 1.1 to 2.2 lb/A of 90%	1 - 2	Annual bluegrass, henbit, chickweeds, clovers, lawnburweed, and other broadleaf weeds	Apply after Oct. 1 for control of winter weeds or in late winter to control summer weeds. Use lower rate for annual bluegrass control and on hybrid bermudagrass. **Do not** make more than two applications per year. **Do not** use around trees and ornamentals. **Do not** use in areas overseeded with cool-season turfgrasses or in areas where water may move from treated areas to areas overseeded with cool season turfgrasses.
benefin	3 lb of 2.5 G	120 lb/A of 2.5 G	3	Crabgrass, annual bluegrass, and other grassy weeds	Apply March 1 for summer weed control. For winter weed control, apply in August or September. Follow directions on label. **Do not** use on golf-putting greens.
benefin + oryzalin	3.4 lb of 2G	150 lb/A of 2 G	3	Annual grasses including goosegrass	**Do not** use on golf greens.
benefin + trifluralin	6 - 8 lb of 0.86% on fertilizer or 2.25 - 3.50 lb of 2G	100 - 150 lb/A of 2 G	2 - 3	Annual grasses and some small seeded broadleaves	**Do not** use on golf greens.
bensulide	7 - 10 lb of 2 G	600 - 750 lb/A of 2 G	12 - 15	Crabgrass, annual bluegrass, and other grassy weeds	Same as benefin. If used on golf putting greens, apply at least 120 days before overseeding. Some root pruning can be expected.
DCPA	5.1 oz of 75 WP	14 lb/A of 75 WP	10.5	Crabgrass, annual bluegrass, creeping speedwell, and spurges	Early spring applications may be made to new turfgrass seedlings after the grasses have exhibited a uniform greening of the newly sprouted grass, preferably when 1 to 2 inches in height.
dimethenamid	0.48 - 0.73 fl oz of 6 lb/gal product	21 - 32 fl oz of 6 lb/gal product	1 - 1.5	Bittercress, crabgrass, goosegrass, purslane, sedges, and spurge	Other than on golf courses, this product is restricted to warm-season turf only. Apply to well-established turf. Do not apply more frequently than every 35 days, and do not apply more than 64 fluid ounces per year (3 pounds of active ingredient).
dithiopyr	1.5 fl oz of 1 lb/gal product or 0.35 oz of 40 WSP	2 qt/A of 1 EC 0.95 lb/A of 40 WSP	0.5 (EC) 0.38 (WSP)	Annual grasses	May be used early postemergence for crabgrass prior to tillering. Consult label for use directions and precautions.

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
dithiopyr + isoxaben	3.4 - 5 lb	150 - 200 lb	1.13 - 1.5	annual grass and broadleaf weeds	**Do not** use on golf greens.
flumioxazin	0.18 - 0.28 oz of the 51% WG	8 - 12 oz of the 51% WG	0.25 - 0.38	Annual bluegrass and winter annual broadleaf weeds	Do not use on cool-season turf. Apply only to dormant bermudagrass after winter dormancy has begun.
indaziflam	0.14 - 0.23 fl oz of 0.622 lb/gallon or 2.9 - 4.6 lb of 0.0224% G	6 - 10 fl oz of 0.622 lb/gal or 125 - 200 lb/A of 0.0224% G	0.29 - 0.049	Annual broadleaf and grassy weeds, including crabgrass, goosegrass, and annual bluegrass	This treatment is safe on bermuda, centipede, St. Augustine, and Zoysia. Do not apply to golf course greens or tees. Do not apply to cool-season turf species. Do not exceed 0.09 pound of active ingredient per acre within a 12-month period. Applications in areas with poor growing conditions may lead to thin turf cover.
isoxaben	0.25 - 0.5 oz	0.66 - 1.33 lb/A of 75 DF	0.5 - 1	Annual broadleaf weeds	**Do not** apply to golf course greens or tees.
metolachlor	1-2 oz of 7.62 EC	1.3 to 2.6 pt/A of 2.62 EC	1.2 - 2.4	Yellow nutsedge	Apply before March 1.
oryzalin	1.1 + 1.1 fl oz of 4 lb/gal or 1 + 1 oz 75 WSP	1.5 + 1.5 qt/A of 4 lb/gal	1.5 + 1.5	Annual grasses including goosegrass	**Do not** use on golf greens. Make sequential application 8 weeks after initial application.
oxadiazon	2.5 - 4.5 lb of 2G	100 to 200 lb/A of 2 G	2 - 4	Goosegrass, crabgrass, and some small-seeded broadleaf weeds	**Do not** use on centipedegrass. **Do not** apply to wet turfgrass.
oxadiazon + prodiamine	4.5 lb of 1.2 G on 38-0-0 fertilizer	200 lb/A of 1.2 G	2.4	Crabgrass, goosegrass, and some broadleaf weeds	**Do not** apply to wet foliage. Contains slow-release fertilizer.
pendimethalin	3 lb of 2 G or 2.5 lb of 2.45 G or 1.75 oz of 60 WDG or 2.7 fl oz of 3.3 lb/gal or 2.3 fl oz of 3.8 CS	150 lb/A of 2 G or 122 lb/A of 2.45 G or 5 lb/A of 60 WDG or 0.9 gal/A of 3.3 EC or 6.3 pt of 3.8 CS	1.5 - 3	Crabgrass, goosegrass, other grasses, and some small-seeded broadleaf weeds	Certain formulations or mixtures containing pendimethalin may be used on bermudagrass greens. Consult label for specific information. Also consult the label for residential and sod farm turfgrass, which is lower than the use rate for commercial turf.
prodiamine	0.36 - 0.83 oz of 65 WG or 0.5 - 1.1 fl oz of 4 FL	1 - 2.3 lb/A of 65 WDG or 21 - 48 fl oz/A of 4 FL	0.65 - 1.5	Annual grasses	Sequential applications may be needed, especially if goosegrass is the target weed. **Do not** make more than two applications per year, and do not apply more than 1.5 pounds of active ingredient per acre per year.

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
prodiamine + simazine + imazaquin	1.1 - 1.47 fl oz of 5FL	48 - 64 fl oz of 5FL	1.88 - 1.5	Annual bluegrass, crabgrass, goosegrass, and other grasses, sedges, and small-seeded broadleaf weeds	Apply this product any time from Sept. 15 through May 31 with the exception of just before and during spring transition. Do not apply if spring transition is imminent or expected within 3-4 weeks unless delayed green up and/or temporary yellowing can be tolerated. Do not apply more than two applications per year or 113 ounces of product total per acre per year. Warm-season turf species only. **Do not use on golf greens.**
pronamide	0.367 oz of 50 WSP	1 lb/A of 50 WSP	0.5	Annual bluegrass	May also be used postemergence.
simazine	0.75 - 1.5 fl oz of 4 lb/gal	1 - 2 qt/A of 4 lb/gal	1 - 2	Annual bluegrass, henbit, chickweed, lawnburweed, and other grass and broadleaf weeds	Apply after Oct. 1 for control of winter weeds or during late winter to control summer weeds. Use lower rate for annual bluegrass control and on hybrid bermudagrass. **Do not** make more than two applications per year. **Do not** use around trees and ornamentals. **Do not** use in areas overseeded with cool-season turfgrasses or in areas where water may move from treated areas to areas overseeded with cool-season turfgrasses. May also be used postemergence (uptake only through soil, irrigate following application to activate).

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
Postemergence					
Use postemergence herbicides when weeds are actively growing, preferably when weeds are in the seedling stage.					
Apply postemergence herbicides in sufficient carrier (water) to provide good coverage, usually 25 – 30 gallons per acre.					
A nonionic surfactant may enhance control. Consult labels to determine if surfactant should be used.					
Appy when temperatures are sufficient for active growth of weeds. For MSMA and other arsenicals, temperature should be above 80 °F. For phenoxy herbicides (2,4-D, etc) temperatures above 70 °F are desirable. Always consult the product label for temperature requirments for maximum efficacy.					
2,4-D (amine) Bermudagrass Centipedegrass Zoysiagrass	1.5 tbsp of 4 lb/gal	1 qt/A or 4 lb/gal	1	Dandelion, dock, plantain, certain clovers, wild garlic, VA buttonweed, other broadleaf weeds	Apply when weeds are young and actively growing. Repeat applications may be necessary. Use low pressure (25 psi) and avoid spray drift onto susceptible flowers and shrubs. Use 0.5 lb on 'Tifgreen' and 'Tifdwarf' bermudagrass.
2,4-D + aminopyralid	0.44 - 0.78 fl oz of 3.74 lb/gal	19 - 34 fl oz of 3.74 lb/gal	0.56 - 1	Broadleaf weeds, including invasive and noxious weeds and certain woody plants	This product is for use in native or natural areas that are not regularly mowed or maintained. Do not apply to centipede, carpet, or St. Augustine grasses. It is not intended for use within maintained turf.
2,4-D + dicamba + sulfentrazone + penoxsulam	1.1 - 1.8 fl oz of 0.8 lb/gal	3.1 - 5 pt/A of 0.8 lb/gal	0.31 - 0.5	Broadleaf and yellow nutsedge, including Virginia buttonweed, dandelion, dollarweed, and spurge	This treatment provides only suppression of yellow nutsedge when the weed is actively growing. Low use rates are recommended for sensitive St. Augustinegrass.
2,4-D choline + fluroxypyr + halauxifen-methyl Bermudagrass Fescue Zoysiagrass	1.1 - 1.5 fl oz of 2.87 + 0.39 + 0.02 lb/gal	3 - 4 pt/A of 2.87 + 0.39 + 0.02 lb/gal	1.1 + 0.15 + 0.008 - 1.50 + 0.20 + 0.027	Winter and summer annual broadleaf weeds	**Do not apply** to golf course putting greens. Do not apply to centipedegrass or St. Augustinegrass. Use a 3-week reapplication interval. Avoid contact with sensitive ornamentals.
2,4-D + mecoprop + dicamba Bermudagrass Centipedegrass Zoysiagrass	1.2 - 1.5 fl oz of 2.03 + 1.08 + 0.21 lb/gal	3 - 4 pt/A	1 + 0.5 + 0.1	Broad spectrum of broadleaf weeds	Many three-way products of this type **[1 : 0.5 : 0.1 ratio of 2,4-D : mecoprop : dicamba]** are available. Labeling varies; most are labeled for use on bermudagrass and zoysiagrass. Few are labeled for use on St. Augustinegrass, and then only at reduced rates. Few with this ratio are labeled for use in centipedegrass. **Consult product labels for specific labeling, including restrictions. Do not** use within drip lines of trees or shrubs. Observe precautions for each component part.

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
2,4-D + mecoprop + dicamba Bermudagrass Centipedegrass Zoysiagrass St.Augustinegrass	0.4 - 0.56 fl oz of 1.5 + 2.77 + 0.31 lb/gal	1 - 1.5 pt/A	0.28 + 0.52 + 0.05	Broad spectrum of broadleaf weeds	A few three-way products of this type **[0.5 : 1 : 0.1 ratio of 2,4-D: mecoprop : dicamba]** are available. Although many of these products may be used on all warm-season turfgrasses, they are targeted for use in St. Augustinegrass.
2,4-D + MCPP + dicamba + carfentrazone Bermudagrass Zoysiagrass	0.75 - 1.5 fl oz of 0.05 + 1.53 + 0.48 + 0.14 lb/gal	2 - 4 pt	0.025 + 0.75 + 0.24 + 0.07	Broad spectrum of broadleaf weeds	**Do not** use on St. Augustinegrass or centipedegrass. Consult label for restrictions. Do not use within drip lines of trees or shrubs. Do not apply when temperatures exceed 90 °F.
2,4-D + MCPP + dicamba + carfentrazone St. Augustinegrass Centipedegrass Bermudagrass Zoysiagrass	0.75 - 1.8 fl oz of 0.04 + 0.52 + 0.2 + 0.05 lb/gal	2 - 5 pt	0.025 + 0.325 + 0.125 + 0.031	Broad spectrum of broadleaf weeds	**Do not** use more than 4 pints per acre except on common bermudagrass. Consult label for restrictions. Do not use within drip lines of trees or shrubs. Do not apply when temperatures exceed 90 °F.
2,4-D + clopyralid + dicamba Bermudagrass Zoysiagrass	0.72 - 1.1 fl oz of 3 - 0.375 + 0.375 lb/gal	2 - 3 pt/A	1.25 + 0.14 + 0.14	Broad spectrum of broadleaf weeds	**Do not** use on centipedegrass or St. Augustinegrass. Not labeled for use on sod farms.
2,4-D + 2,4-DP + dicamba + carfentrazone	0.7 - 1.5 fl oz of 0.51 + 0.30 + 0.05 + 0.04 lb/gal	2 - 4 pt/A	0.128 + 0.075 + 0.0125 + 0.01 - 0.35 + 0.15 + 0.025 + 0.02	Winter and summer annual broadleaf weeds	Do not apply to golf-course greens. Use low rates with caution on sensitive, warm-season turf species, including St. Augustine and centipede grasses. Avoid use when temperatures exceed of 90° F.
asulam St. Augustinegrass Tifway Bermudagrass	3 - 4 tbsp of 3.34 lb/gal	5 pt/A	2	Crabgrass	Sod production use only. **Do not** apply to St Augustinegrass under stress or freshly mowed. **Do not** make more than one application per year.
atrazine + bentazon Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.66 - 0.88 fl oz of 2.5 + 2.5 lb/gal	1.8 - 2.4 pt/A	0.56 + 0.56 - 0.75 + 0.75	Annual and perennial broadleaf weeds and yellow nutsedge	Perennial weeds and sedges require two applications 7-10 days apart. Apply with crop oil concentrate at 2 pints per acre. Apply no earlier than 10 days after sprigging or plugging. Some discoloration and slowing of growth may occur on newly sprigged turfgrasses.

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Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
bentazon Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 fl oz of 4 lb/gal	2 pt/A	1	Yellow nutsedge	Apply to actively growing yellow nutsedge at 10- to 14-day intervals, but no more than three applications per season. **Do not** mow for 3-5 days after application. Will not control purple nutsedge. **Do not** use on golf greens.
bromoxynil Bermudagrass Zoysiagrass St. Augustinegrass Perennial ryegrass	0.375 to 0.75 fl oz of 2 lb/gal	1 - 2 pt	0.25 - 0.5	Broadleaf weeds	For use only on established and newly seeded grasses grown for seed or sod and nonresidential turfgrasses. **Do not** apply with backpack or hand-held equipment.
carfentrazone Bermudagrass Bahiagrass Zoysiagrass St. Augustinegrass Centipedegrass	0.012 - 0.048 fl oz of 1.9 lb/gal	0.55 - 2.1 fl oz	0.008 - 0.03	Broadleaf weeds	Works best as an addition to other herbicides such as 2,4-D, dicamba, dichloroprop, or other auxin type herbicides or combinations. Provides a faster burndown of weeds.
carfentrazone Bermudagrass Bentgrass	0.154 fl oz	6.7 fl oz	0.099	Silvery thread moss	Apply twice 2 weeks apart. Use a surfactant at 1 quart per 100 gallons. Repeated applications can be made but not to exceed 0.40 pound of active ingredient per acre. It is labeled for bermudagrass and bentgrass greens.
chlorsulfuron Bermudagrass Zoysiagrass St. Augustinegrass Centipedegrass	0.05 - 0.25 oz	(1 - 5.33 oz/A of 75 DF)	0.08 - 0.24	Tall fescue, perennial ryegrass, chickweed, henbit, and many other broadleaf and grassy weeds	Not for use on sod farms. **Do not** apply in the root zones of desirable trees or shrubs or where runoff may flow into agricultural land.
clopyralid Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.1 - 0.5 fl oz of 3 lb/gal	0.25 - 1.33 pt/A	0.09 - 0.45	Clovers, black medic, and other broadleaf weeds	Can cause injury to desirable legumes and composite species. Consult label for tank-mixing with other postemergence herbicides for broadleaf weed control.
clopyralid + triclopyr Bermudagrass	0.37 – 0.74 fl oz of 0.75 + 2.25 lb/gal	1 - 2 pt/A	0.09 + 0.29	Wild violet, common lespedeza, and other broadleaf weeds	**Do not** use on golf tees or greens. **Do not** use more than 4 pints per acre per year. **Do not** allow contact with desirable trees or shrubs. Mow newly seeded turf two or three times prior to first application. Additional applications should not be made less than 4 weeks apart.
dicamba Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 tbsp of 4 lb/gal	0.5 pt/A	0.25	Many broadleaf weeds	**Do not** use within dripline of shrubs or trees. Roots take up the chemical from the soil and some species are damaged. Good for use on golf greens and tees.

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
diclofop Bermudagrass	0.75 - 1 fl oz of 3 lb/gal	32 - 43 fl oz/A	0.75 - 1	Goosegrass	Bermudagrass on golf courses only. May be used on bermudagrass golf greens. Apply postemergence to actively growing goosegrass with four or fewer leaves in a spray volume of 30 to 60 gallons per acre. **Do not** apply to stressed grasses. Activity may be increased on larger goosegrass if applied with a 0.25%, by-volume, nonionic surfactant. **Do not** tank mix with other herbicides, make applications to newly established turfgrass with stolons less than 4 inches, or overseed areas for 3 months following application. **RESTRICTED USE PESTICIDE.**
diquat Dormant Bermudagrass or Zoysiagrass turf only	0.5 - 0.75 fl oz of 2 lb/gal	1 - 2 pt/A	0.25 - 0.5	Winter annual broadleaf and grassy weeds	Bermudagrass or zoysiagrass must be dormant or injury will occur.
fenoxaprop Zoysiagrass	0.64 fl oz of 0.57 lb/gal	28 fl oz/A	0.125	Crabgrass, goosegrass	Zoysiagrass only. **Do not** apply to bermudagrass or other warm-season turfgrasses. Consult label for recommended rate according to weed stage at application. **Do not** mow within 24 hours after application.
flazasulfuron Bermudagrass Zoysiagrass Centipedegrass	0.035 - 0.07 oz of 25 DF	1.5 - 3 oz of 25 DF	0.023 - 0.047	Annual and perennial ryegrass, 2- to 3-leaf crabgrass, tall fescue, clovers, and other broadleaf weeds	Repeat applications are necessary for control of crabgrass. Use 0.5 ounce per acre for transition from overseeded perennial ryegrass or roughstalk bluegrass. Use non-ionic surfactant at the rate of 1 quart per 100 gallons.
florasulam Bermudagrass Centipedegrass St. Augustinegrass Tall fescue Zoysiagrass	0.09 fl oz of the 0.42 lb/gal	4 fl oz/A of the 0.42 lb/gal	0.013	Many broadleaf weeds, including dandelion and white clover	Do not apply to golf course putting greens. Do not apply more than 12 fluid ounces per acre per growing season.
fluazifop-p-butyl Zoysiagrass Tall fescue	0.07 - 0.14 oz of 2 lb/gal	3 - 6 oz of 2 lb/gal	0.047 - 0.093	Bermudagrass suppression and control of some annual grasses	Higher rates can cause discoloration. Avoid summer applications. Repeat applications can be made every 28-30 days. Use nonionic surfactant at the rate of 1 quart per 100 gallons. Not for use on residential lawns. Do not use more than 4 ounces per acre on zoysiagrass.
fluroxypyr Bermudagrass Centipedegrass Zoysiagrass St. Augustinegrass	0.25 - 0.5 fl oz of 1.5 lb/gal	11 - 21 fl oz/A of 1.5 lb/gal	0.25 - 0.5	Annual and perennial broadleaf weeds	Do not use on golf greens or tees. Do not use within drip lines of trees and shrubs. Do not apply more than 0.66 pint per acre to bermudagrass or St. Augustinegrass.

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Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
foramsulfuron Bermudagrass Zoysiagrass (consult label for tolerant varieties)	0.2 - 0.6 fl oz of 0.19 lb/gal	8.8 - 26.2 fl oz	0.013 - 0.039	Annual bluegrass, ryegrass, and Poa trivialis	**Do not** use more than 0.4 fluid ounce per 1,000 square feet to remove ryegrass or other overseeding grass from bermudagrass. **Do not** use more than 1.25 ounce per 1,000 square feet per year. **Do not** allow traffic on the treated area until completely dry. May be used up to 2 weeks prior to overseeding with perennial ryegrass.
halauxifen-methyl + florasulam Bermudagrass Centipedegrass Fescue St. Augustinegrass Zoysiagrass	0.016 oz of 40 WG	0.72 oz/A of 40 WG	0.009 + 0.009	Winter and summer annual broadleaf weeds.	**Do not apply to golf course putting greens.** Use a 6-week reapplication interval. Avoid contact with sensitive ornamentals. Observe label recommendations on centipedegrass turf.
halosulfuron Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.03 oz of 75 DF	1.33 oz/A	0.062	Purple and yellow nutsedge Green kyllinga (suppression)	**Do not** use on golf-putting greens. Apply after nutsedge has reached 3- to 8-leaf growth stage. Use 0.5%, by-volume, nonionic surfactant for broadcast applications. A second treatment may be needed 6 to 10 weeks after the initial application. **Do not** make more than two applications with a total use rate not to exceed 0.125 pound per acre per year. **Do not** mow turf for 2 days before or 2 days after application. **Do not** apply to centipedegrass prior to tillering.
imazaquin Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.5 - 1 fl oz of 1.5 lb/gal or 0.13 - 0.26 oz of 70 DG	21 - 42 fl oz/A of 1.5 lb/gal or 5.7 - 11.4 oz/A of 70 DG	0.25 - 0.5	Purple nutsedge, yellow nutsedge, other sedges, and wild garlic	Apply when weeds are actively growing. May be tank mixed with MSMA when used in bermudagrass and zoysiagrass. **Do not** use on golf greens.
mecoprop Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	3 - 5 tbsp of 2 lb/gal	2 - 3.5 qt/A	1 - 1.75	Clovers, spurges	May be used on golf greens. Acts slower than 2,4-D.
mesotrione Centipedegrass St. Augustinegrass Tall fescue Perennial ryegass	0.09 - 0.18 oz of 4 lb/gal	4 - 8 oz of 4 lb/gal	0.125 - 0.25	tufted lovegrass, crabgrass, goosegrass, broadleaf weeds	Apply to St. Augustine on sod farms only. May require second application for control of some annual grasses. Use surfactant at the rate of 1 quart per 100 gallons.
metribuzin Bermudagrass	0.2 - 0.25 oz of 75 DF or 0.5 - 1 tbsp of 4 lb/gal	8 - 10.6 oz/A of 75 DF	0.37 - 0.5	Many winter annual broadleaf weeds	Use on dormant bermudagrass only. See below for tank-mix with MSMA for goosegrass control. Follow all label precautions.

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
metsulfuron Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.006 - 0.023 oz of 60 DF	0.25 - 1 oz/A of 60 DF	0.009 - 0.04	Bahiagrass and many winter and summer broadleaf and grassy weeds, and for removal of overseeded perennial ryegrass	'Meyer' and 'Emerald' zoysiagrass only. **Do not** apply more than 0.5 ounce per acre to centipedegrass. Some discoloration to turfgrasses may occur. Use of a surfactant at 1 quart per 100 gallons of solution will increase performance, but it may also increase chlorosis of turfgrasses.
MSMA Bermudagrass Zoysiagrass	1 - 2 fl oz of 6 lb/gal	1.3 - 2.6 qt/A of 6 lb/gal	2 - 4	Crabgrass, dallisgrass	Repeat applications at 7- to 10-day intervals are necessary. Best results are obtained when adequate soil moisture is present. Apply only when temperatures are above 80 °F. **Do not** use on newly established turfs until turfgrasses are well established. Read the product label for restrictions. **MSMA is no longer permitted for use on commercial and residential lawns or sports fields. Use of MSMA on golf course, sod farms, and highway rights-of-way is still permitted.**
MSMA + metribuzin (Tank mix) Bermudagrass	1 fl oz/A of 6 lb/gal + 0.9 g of 75 DF	1.3 qt/A of 6 lb/gal + 1.33 oz/A of 75 DF	2 + 0.0625	Goosegrass	Use only on bermudagrass turf on golf course fairways and commercial sod farms. Add 0.25% by volume of an agricultural grade surfactant. Repeat application in 7-10 days and delay mowing 3 days following each application for maximum control. Read the product label for restrictions. **MSMA is no longer permitted for use on commercial and residential lawns or sports fields. Use of MSMA on golf course, sod farms, and highway rights-of-way is still permitted.**
penoxsulam Bermudagrass Centipedegrass St. Augustinegrass Tall fescue Zoysiagrass	Typically sold as a granular fertilizer formulation, thus no recommended product use rate		0.02 - 0.045	Many broadleaf weeds and some sedges	Do not apply to golf course greens or tees. Do not apply to centipedegrass during winter dormancy. Avoid contact with desirable ornamental shrubs and trees. Do not collect grass clippings for compost or for use as mulch around plants. Tall fescue is more prone to injury, thus use rates are lower.
pinoxaden	0.22 - 0.44 fl oz of 0.42 lb/gal	9.6 - 19.2 fl oz	0.032 - 0.063	For control of tropical signalgrass, carpetgrass, crabgrass, bahiagrass, and dallisgrass; suppression of torpedograss	This treatment controls some annual and perennial grasses within bermuda, Zoysia, and St. Augustine (sod only) grasses. It must be applied in combination with Adigor surfactant. Manuscript has a safener added to prevent or reduce turf injury.

Herbicide and Tolerant Turfgrass	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
pronamide Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.36 - 0.73 oz of 50 WSP	1 lb/A of 50 WSP	0.5 -1.5	Annual bluegrass	Apply November to February, best before January, and apply 0.5 to 1 inch of water immediately after application. **Do not** apply chemical to overseeded turf. **Do not** apply where lateral water movement may carry chemical to overseeded turf. **Do not** apply a wetting agent within 14 days before or after application. Pronamide is not labelled for use on residential lawns.
pyrimisulfan	2.5 - 5.5 lb	109 - 240 lb	0.03 - 0.06	Sedges, rushes, and broadleaf weeds	**Do not** use on golf greens.
quinclorac Bermudagrass Zoysiagrass	0.367 oz of 75 DF or 1.45 fl oz of 1.5 lb/gal liquid	1 lb of 75 DF or 64 fl oz/A of 1.5 lb/gal liquid	0.75	2- to 3-leaf crabgrass and many broadleaf weeds	Use methylated seed oil at 1.5 pints per acre. Some injury to turfgrasses may occur. More than one application may be needed to control crabgrass. Adding pendimethalin with the first applications will increase crabgrass control. Do not apply in the root zone of ornamentals or to golf course collars or tees.
	0.245 + 0.245 + 0.245 oz of 75 DF or 1 + 1 + 1 fl oz of 1.5 lb/gal liquid	0.67 + 0.67 + 0.67 lb of 75 DF or 43 + 43 + 43 fl oz of 1.5 lb/gal liquid	0.5 + 0.5 + 0.5	Torpedograss suppression	Best control of torpedograss can be achieved with 0.5 pound of active ingredient per acre applied three times at 2- to 3-week intervals. Use with methylated seed oil at 1.5 pints per acre.
quinclorac + MCPP + dicamba Bermudagrass Zoysiagrass	1.45 fl oz	64 fl oz	1.225	2- to 3-leaf crabgrass, torpedograss suppression, and many broadleaf weeds	Use methylated seed oil at 1.5 pints per acre. Some injury to turfgrasses may occur. More than one application may be needed to control crabgrass. Adding pendimethalin with the first applications will increase crabgrass control. Do not apply in the root zone of ornamentals or to golf course collars or tees.
quinclorac + sulfentrazone Bermudagrass Zoysiagrass Centipedegrass Tall Fescue	0.367 - 0.735 oz of 75 DF	16 - 32 oz of 75 DF	0.75 to 1.5	2- to 3-leaf crabgrass, torpedograss suppression, many broadleaf weeds, kyllinga, and some sedges	Good spray coverage is recommended for control of sedges. Use of surfactant is not recommended.
rimsulfuron Bermudagrass	0.6 g	1 - 2 oz/A of 25 DF	0.0156 - 0.0312	Annual bluegrass, overseeded perennial ryegrass, and broadleaf weeds	For use in non-overseeded bermudagrass, including sod farms, golf courses, professionally managed college and professional sports fields, and industrial and commercial lawns. Not for use in residental lawns. Lateral movement may occur and injure overseeded grasses downslope from the treated area. Use lower rate for removing overseeded perennial ryegrass. May be applied up to 2 weeks prior to overseeding perennial ryegrass.

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Herbicide	Rate/1,000 square feet	Rate/A	Active ingredient lb ai/A	Weeds controlled	Time of application and special instructions
sethoxydim Centipedegrass	0.5 - 0.75 fl oz of 1 lb/gal	23 - 36 fl oz/A of 1 lb/gal	0.18 - 0.28	Crabgrass and other annual grasses	Use in centipedegrass only. Apply no sooner than 3 weeks after greenup. **Do not** mow within 7 days before or after application. **Do not** apply to seedling centipedegrass until new stolons are 3 inches long. **Do not** exceed 3 pints per acre per season. Professional applicators only.
simazine Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.75 - 1.5 fl oz of 4 lb/gal	1 - 2 qt/A of 4 lb/gal	1 -2	Annual bluegrass, henbit, chickweed, lawnburweed, and other grass and broadleaf weeds	Uptake only through soil. Irrigate following application to activate.
sulfentrazone Bermudagrass St. Augustinegrass Centipedegrass Zoysiagrass Bahiagrass	0.09 - 0.27 oz of 4 lb/gal	4 - 12 oz of 4 lb/gal	0.125 - 0.375	sedges, kyllinga, and broadleaf weeds	Apply to established grasses or after two mowings on newly seeded or sodded turf that has an established root system. Do not add surfactant. Not for use on golf course greens or tees.
sulfentrazone + metsulfuron Bermudagrass Centipedegrass St. Augustinegrass Zoysiagrass	0.149 - 0.23 oz of 66 DF	6.5 - 10 oz of 66 DF	4.29 lb of the 66 DF product	Many broadleaf summer and winter annual weeds, including Virginia buttonweed and dollarweed	Do not apply to golf course putting greens. Do not include surfactant unless injury can be withstood.
sulfentrazone + prodiamine Bermudagrass Centipedegrass Zoysiagrass	0.413 - 0.551 fl oz	18 - 36 fl oz	0.57 - 1.125	Annual grasses	For preemergence and early postemergence of annual grasses such as crabgrass. Do not exceed 1.125 pounds of active ingredient per year. Do not apply to greens or tees. Do not exceed 24 fluid ounces per acre on Centipedegrass or Zoysiagrass.
sulfosulfuron Bermudagrass St. Augustine Centipedegrass Zoysiagrass	0.5 g of 75WG	0.75 - 2 oz of 75WG	0.035 - 0.094	Sedges, kyllinga, annual bluegrass, lawnburweed, and other winter annuals	Apply no sooner than 7 days prior to overseeding perennial ryegrass. Use nonionic surfactant at the rate of 1 quart per 100 gallons. May be applied to commercial or residential turf. **Do not** apply to greens.
trifloxysulfuron Bermudagrass Zoysiagrass	0.008 - 0.013 oz of 75 WG	0.33 - 0.56 oz/A	0.015 - 0.026	Annual bluegrass, ryegrass, nutsedges, kyllinga, broadleaf weeds, and torpedograss suppression	Use low rate to remove overseeded perennial ryegrass and Poa trivialis to aid in spring transition of bermudagrass. Use surfactant at a rate of 1 quart per 100 gallons. **Do not** use more than 1.7 ounces per acre per year. **Do not** allow traffic on the treated area until completely dry. May be used up to 3 weeks prior to overseeding perennial ryegrass.
		0.1 - 0.3 oz/A		Overseeded perennial ryegrass and roughstalk bluegrass	

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IMPROVED RIGHTS-OF-WAY/INDUSTRIAL

Oust Precautions —

1. Avoid applying during rainy periods or when soils are water saturated.
2. Do not apply on newly planted areas. Spray only on good stands that are in their third year of growth.
3. Do not spray when ground is frozen.
4. Do not spray near irrigation canals, ditches, etc.
5. Do not spray areas that will be planted to crops or apply where lateral water movement from treated areas to crop areas may occur.
6. Spring or summer applications of Oust may cause "brownout" and/or bermudagrass kill. Public complaints may result.

Situation and Application Timing	Herbicide	Rate/A	Comments
FALL			
Sept. 15 to Oct. 1	aminocyclopyrachlor Method 240SL	0.5 - 1 oz ai 2 - 4 fl oz	Do not apply during the first growing season. Applications before complete greenup may delay greenup. Addition of methylated seed oil may increase injury. Do not exceed 18 ounces of product per acre per year.
	indaziflam Esplanade 200SC	0.05 - 0.07 lb ai 3.5 - 5 fl oz	Bahiagrass, bermudagrass, and centipedegrass are tolerant. Fescue and ryegrass are not tolerant. Application can be repeated, but do not exceed 10 fluid ounces per year.
	foramsulfuron + iodosulfuron + thiencarbazone Derigo	0.7 - 1.4 + 0.07 - 0.14 + 0.3 - 0.6 oz ai 3 - 6 oz	Do not apply to cool-season grasses. Applications to bahiagrass will cause growth suppression. Do not exceed 6 ounces of product per acre per year. Nonionic surfactant is recommended. Do not use organosilicone surfactants.
	pendimethalin	2 - 4 lb ai	Apply in areas to control Italian ryegrass resistant to ALS-inhibiting herbicides. Applications should be made as late as possible during September before emergence.
	prodiamine	0.75 - 1 lb ai	Apply in areas to control Italian ryegrass resistant to ALS-inhibiting herbicides. Applications should be made as late as possible during September before emergence.
LATE FALL			
October to December	2,4-D	1 - 2 lb ae	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	aminocyclopyrachlor Method 240SL	0.5 - 1 oz ai 2 - 4 fl oz	Do not apply during the first growing season. Applications before complete greenup may delay greenup. Addition of methylated seed oil may increase injury. Do not exceed 18 ounces of product per acre per year.
	aminopyralid Milestone	0.1 lb ai 7 fl oz	This treatment is for winter broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	aminocyclopyrachlor + chlorsulfuron Perspective	1.9 oz ai 0.8 oz ai 4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Can be used on bermudagrass and bahiagrass roadsides.
	aminocyclopyrachlor + metsulfuron Streamline	1.9 oz ai 0.6 oz ai 4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Do not use on bahiagrass roadsides.
	clopyralid Transline	0.1 - 0.5 lb ai 0.25 - 1.33 pt	This treatment is for control of broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	dicamba	0.5 - 1 lb ai	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
	diflufenzopyr + dicamba Overdrive	0.1 - 0.2 oz ae 0.3 - 0.5 oz ae 4 - 8 oz	This treatment is for control of broadleaf weeds. Add 1 quart of surfactant per 100 gallons of spray.

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Situation and Application Timing	Herbicide	Rate/A	Comments
LATE FALL			
October to December	diuron	2 - 3 lb ai	Diuron controls Italian ryegrass (which is resistant to Oust) and some other winter annuals.
	foramsulfuron + iodosulfuron + thiencarbazone Derigo	0.7 - 1.4 + 0.07 - 0.14 + 0.3 - 0.6 oz ai 3 - 6 oz	Do not apply to cool-season grasses. Applications to bahiagrass will cause growth suppression. Do not exceed 6 ounces of product per acre per year. Nonionic surfactant is recommended. Do not use organosilicone surfactants.
	flumioxazin + pyroxasulfone Piper	2 - 3.4 + 2.6 - 4.3 oz ai 6 - 10 oz	Apply only to dormant bahiagrass or bermudagrass. This treatment controls emerged weeds less than 2 inches tall. Add nonionic surfactant if weeds have emerged in application site.
	glyphosate	0.375 - 0.75 lb ae/A	Applications can be made using 16 fluid ounces per acre of a 4# glyphosate during October while bermudagrass is actively growing. Once bermudagrass is completely dormant, rates can be increased to 32 fluid ounces per acre using a 4# glyphosate.
	glyphosate + 2,4-D	48 - 64 fl oz	This treatment provides broadleaf and grass control. The low rate should be used until bermudagrass is dormant.
	sulfometuron	1 - 2 oz	Do not add surfactant. Sulfometuron controls winter annuals and fescue and suppresses early summer annuals. Fall applications, compared with later applications, permit earlier spring greenup of bermudagrass and reduce chance of injury to nearby crops. Do not spray areas that will be planted to crops.
	triclopyr	0.33 - 1.5 lb ae	This treatment is for control of emerged broadleaf weeds. Apply with the addition of 0.25 or 0.5% v/v nonionic surfactant.
WINTER			
January to March	aminocyclopyrachlor Method 240SL	0.5 - 1 oz ai 2 - 4 fl oz	Do not apply during the first growing season. Applications before complete greenup may delay greenup. Addition of methylated seed oil may increase injury. Do not exceed 18 ounces of product per acre per year.
	aminocyclopyrachlor + chlorsulfuron Perspective	1.9 oz ai 0.8 oz ai 4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period.
	aminocyclopyrachlor + metsulfuron Streamline	1.9 oz ai 0.6 oz ai 4.75 oz	This treatment controls winter annual and perennial broadleaf weeds. Use 0.25–0.5% v/v nonionic surfactant for postemergence applications. Do not exceed 11 ounces per acre in a 365-day period. Do not use on bahiagrass roadsides.
	aminopyralid Milestone	0.1 lb ai 7 fl oz	For broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	chlorsulfuron 75 DF	0.5 to 1 oz	For broadleaf weed control. Add 1 of quart of surfactant per 100 gallons of spray. Can be used in bermudagrass and bahiagrass.
	diflufenzopyr + dicamba Overdrive	0.1 - 0.2 oz ae 0.3 - 0.5 oz ae 4 - 8 oz	For broadleaf weed control. Add 1 quart surfactant per 100 gallons of spray.
	flumioxazin + pyroxasulfone Piper	2 - 3.4 + 2.6 - 4.3 oz ai 6 - 10 oz	Apply only to dormant bahiagrass or bermudagrass. This treatment controls emerged weeds less than 2 inches tall. Add nonionic surfactant if weeds have emerged in application site.

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Situation and Application Timing	Herbicide	Rate/A	Comments
January to March *continued*	glyphosate + 2,4-D	48 - 64 fl oz	Controls winter annuals, tall fescue, and some weeds that may be tolerant to Oust. Apply Campaign before bermudagrass greenup initiates in the spring or injury may result.
	glyphosate	0.56 - 0.75 lb ae	Controls winter annuals, tall fecue, and some weeds that may be tolerant to Oust. Will control annual ryegrass, which has developed resistance to Oust. Apply glyphosate before bermudagrass greenup initiates in the spring or injury may result. Consult the label to determine if surfactant is needed.
January to Feb. 15	imazapic 2L	8 - 12 fl oz	Imazapic 2L controls tall fescue, Italian ryegrass, and winter annuals. Avoid applying Plateau after bermudagrass initiates greenup.Bahiagrass should be completely dormant or injury will occur. Do not exceed 12 ounces per acre in 1 year. See the label for recommended additive.
	sulfometuron 75 DF	0.5 oz	Controls winter annuals and provides tall fescue suppression. Less likely to cause delay in bermudagrass greenup than March-April treatment.
SPRING			
March and April	aminocyclopyrachlor Method 240SL	0.5 - 1 oz ai 2 - 4 fl oz	Do not apply during the first growing season. Applications before complete greenup may delay greenup. Addition of methylated seed oil may increase injury. Do not exceed 18 ounces of product per acre per year.
	aminopyralid Milestone	0.1 lb ai 7 fl oz	For broadleaf control. Add 1 quart of surfactant per 100 gallons of spray solution.
	diflufenzopyr + dicamba Overdrive	0.1 - 0.2 oz ae 0.3 - 0.5 oz ae 4 - 8 oz	For broadleaf weed control. Add 1 quart of surfactant per 100 gallons of spray. Apply in early spring prior to emergence of susceptible crops.
	foramsulfuron + iodosulfuron + thiencarbazone Derigo	0.7 - 1.4 + 0.07 - 0.14 + 0.3 - 0.6 oz ai 3 - 6 oz	Do not apply to cool-season grasses. Applications to bahiagrass will cause growth suppression. Do not exceed 6 ounces of product per acre per year. Nonionic surfactant is recommended. Do not use organosilicone surfactants.
	flumioxazin + pyroxasulfone Piper	2 - 3.4 + 2.6 - 4.3 oz ai 6 - 10 oz	Apply only to dormant bahiagrass or bermudagrass. This treatment controls emerged weeds less than 2 inches tall. Add nonionic surfactant if weeds have emerged in application site.
	indaziflam Esplanade 200SC	0.05 - 0.07 lb ai 3.5 - 5 fl oz	Bahiagrass, bermudagrass, and centipedegrass are tolerant. Fescue and ryegrass are not tolerant. Application can be repeated, but do not exceed 10 fluid ounces per year.
	sulfometuron 75 DF	0.5 oz	Add 0.5% v/v surfactant. Begin application to actively growing weeds in late winter to early spring. Controls a wide variety of winter and spring annuals, including bedstraw and corn speedwell and suppresses tall fescue. When 0.5 ounce of Oust is used, less delay in bermudagrass greenup will likely be observed. If brownout or delay in bermudagrass greenup is not acceptable, refer to the fall Oust application.
	triclopyr 2,4-D dicamba clopyralid Transline	0.33 - 1.5 lb ae/A 1 - 2 lb ae 0.5 - 1 lb ai 0.1 - 0.5 lb ai 0.25 - 1.33 pt	Apply to cover weeds using 30 to 50 gallons of spray per acre. Add 2 quarts of surfactant to each 100 gallons of spray per acre. Apply in early spring prior to emergence of susceptible crops. Controls emerged broadleaf weeds.
Tall fescue seedhead suppression	sulfometuron 75 DF	0.25 oz	Apply before seedheads emerge in spring. Add 2,4-D and/or dicamba (Banvel 720) plus 1 quart per acre surfactant to improve broadleaf control. **Do not** add surfactant with Oust alone. Does not control tall fescue.

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Situation and Application Timing	Herbicide	Rate/A	Comments
SUMMER			
Bermudagrass release			The following treatments can follow spring or fall Oust applications if needed or may be used alone.
	aminocyclopyrachlor Method 240SL	0.5 - 1 oz ai 2 - 4 fl oz	Applications before full greenup may delay greenup. Do not apply during the first growing season. Certain trees and crops are highly sensitive. Avoid applications that could result in damage to desirable woody vegetation or crops.
Annual weed and grass control plus Johnsongrass	nicosulfuron + metsulfuron Pastora	0.7 - 1.4 oz ai 0.19 - 0.38 oz ai 1.25 - 1.5 oz	This treatment controls annual and perennial grasses, including rhizome johnsonrass, itchgrass, and bahiagrass. It also provides suppression of vaseygrass and foxtails. Use 0.25% v/v nonionic surfactant or 1% v/v crop oil concentrate (COC). Use of COC may increase chances of bermudagrass injury. The treatment will control many broadleaves, as well, such as pigweeds and wooly croton. Do not use on bahiagrass or fescue.
Annual weeds and johnsongrass	sulfometuron 75 DF	0.5 - 1 oz	Use low rate to control most annuals and high rate where johnsongrass is a problem. Poor control of vaseygrass, broomsedge, and dallisgrass.
Annual weeds and johnsongrass	imazapic	8 - 12 fl oz	Controls johnsongrass, crabgrass, common ragweed, and provides suppression of bahiagrass and other weeds. Do not exceed 12 ounces per acre in one year. See label for recommended additive.
late spring to summer	MSMA — 6 lb/gal or 6.6 lb/gal	3.3 - 4 pt or 3 - 3.6 pt	Same as above. Use on well-established bermudagrass to control most weed species including johnsongrass. Add surfactant as above.
late spring to summer	glyphosate	0.28 - 0.375 lb ae/gal	Use on well-established bermudagrass to suppress johnsongrass and control annual and perennial grass weeds, such as crabgrass, knotroot foxtail, tall fescue, and dallisgrass. Some discoloration of bermudagrass may occur. Consult the label to determine if surfactant is needed.
Johnsongrass	sulfosulfuron Outrider 75 DF	0.1 oz ai 1.33 oz	For johnsongrass control in bermudagrass and bahiagrass highway rights-of-way and similar areas. Highly selective for johnsongrass control with little or no injury to these turfgrasses. Consult label for other weeds controlled.
Bahiagrass seedhead suppression	sulfometuron 75 DF	0.5 oz	Apply before seedheads emerge in spring or soon after mowing in summer. Add 2,4-D and/or dicamba (Banvel 720) plus 1 quart per acre of surfactant to improve broadleaf control. **Do not** add surfactant with Oust alone. Does not control bahiagrass.
	imazapic 2L	2 - 3 fl oz	Provides only seedhead suppression of bahiagrass. Do not expect weed control. Raise mowing height to leave adequate existing foliage since new growth will be suppressed.
	glyphosate	0.14 - 0.18 lb ae	Apply before seedheads emerge in spring or soon after mowing in summer. Will provide approximately 45 days of vegetative growth and seedhead suppression. Consult the label to determine if surfactant is needed.
Broomsedge suppression	(See above — SUMMER Bermudagrass Release — annuals and many perennials).		
Hemp sesbania control	linuron 4L	0.5 lb ai 1 pt	Add 2 quarts of surfactant per 100 gallons of spray. Apply 40 to 50 gallons of spray per acre to ensure good coverage of emerged sesbania.
	metsulfuron	0.5 to 1 oz	Add 1 quart of surfactant per 100 gallons of spray. **DO NOT** use in bahiagrass.

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VEGETABLE CROPS

Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
SPECIAL PRECAUTION: *Many vegetable crops, especially cucumbers, are sensitive to residual herbicides like substituted ureas and traizines. Use care following these chemicals with susceptible crops for up to one year.*				
Beans — lima and snap				
bentazon *Basagran 4 SL*	0.5 to 1 lb ai 1 to 2 pt	Cocklebur, yellow nutsedge, and velvetleaf.	After beans have 1 to 2 expanded trifoliate leaves.	Sequential applications 7 to 10 days apart may be needed for control. Do not apply more than 2 quarts per acre per season or within 30 days of harvest. Do not use crop oil concentrate with applications on snap or pole beans.
metolachlor *Dual Magnum* *Dual Magnum II*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, in- corporate in top 2 inches of soil within 14 days before planting.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals, top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray mix.
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest of dry or 15 days of harvest of succulent beans.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	Apply and incorporate before planting.
Beans — lima only				
imazethapyr *Pursuit 2EC*	0.023 to 0.047 lb ai 1.5 to 3 oz	Annual broadleafs and grasses.	Preplant incorporated or after planting.	Pursuit DG may be tank-mixed with grass herbicides.
Beans — snap only				
clomazone *Command 3ME*	0.15 to 0.25 lb ai 0.4 to 0.67 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence	Place seed below treated zone. Use lower rates on coarse soil, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vege-table production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Erratic control of pigweed. Thorough agitation required.
quizalofop *Assure II*	0.04 to 0.08 lb ai 6 to 12 oz	Annual and perennial grasses.	After grasses emerge.	Add 1 quart crop oil concentrate per 100 gallons. Do not apply within 15 days of harvest.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Cantaloupe and Watermelon				
bensulide *Prefar*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Immediately before planting.	Apply and incorporate before planting. Has 18 months restriction for crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Emerged annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.15 to 0.25 lb ai 0.4 to 0.67 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence.	**Watermelon only.** Place seed below treated zone. Use lower rates on coarse soil, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Apply when vines have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation required.
ethalfluralin *Curbit* 3 lb/gal	1.125 to 1.68 lb ai 3 to 4.5 pt	Grasses and small-seeded broadleaf weeds.	Immediately after planting.	**Do not** incorporate prior to planting. **Do not apply any later than 2 days after planting. Do not apply under mulch.**
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses, plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplating. Use low rates on coarse, middle rate on medium, and high rate on fine textured soils. **Do not** incorporate, apply under plastic mulch or crop covers, broadcast over transplants, or make more than one application per season.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
halosulfuron *Sandea*	0.38 to 0.56 oz ai 0.5 to 0.75 oz	Purple nutsedge, pigweed, ragweed, smartweed plus others.	Pre.	**Cantaloupe, honeydew, and crenshaw melons only**. Direct seeded without plastic mulch, apply after planting but before cracking. If used with plastic mulch, apply after final bed shaping but before laying plastic. Do not seed into treated areas less than 7 days after laying plastic. If transplanting without plastic mulch, do not transplant into treated areas within 7 days after application. If transplanting with plastic mulch, apply Sandea after final bed shaping but before laying plastic. Do not transplant within 7 days after application.
	0.38 to 0.56 oz ai 0.5 to 0.75 oz		Post.	**Cantaloupe, honeydew, and crenshaw melons only**. Direct seeded bareground or with plastic mulch, apply after crop has 3 to 5 true leaves but before flowering. Postemergence applications to transplants should not be made less than 14 days after transplanting. For best results on nutsedge, a sequential application may be needed.
	0.38 to 0.75 oz ai 0.5 to 1 oz		Row middles only.	**Watermelons or melons above**. Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month-period. Do not apply overtop of plastic mulch or to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints crop oil concentrate per acre. **Do not** apply within 14 days of harvest.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	3- to 4-true leaf stage.	Apply as a directed spray be-tween rows and incorporate.

Cole Crops – broccoli, cabbage, and cauliflower

clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
clomazone *Command 3ME*	0.25 to 0.5 lb ai 0.67 to 1.3 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	After transplanting.	**Cabbage only.** Place transplant roots below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
clopyralid *Stinger 3 EC* *Spur*	0.09 to 0.187 lb ai 0.25 to 0.5 pt 0.25 to 0.5 pt	Emerged broadleaf weeds.	Post.	Clopyralid will control most legume weeds. **Do not** apply within 30 days of harvest. **See the label for rotational restrictions.**
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	At seeding or transplanting.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
oxyfluorfen *Goal*	0.25 to 0.5 lb ai 1.25 to 2.5 pt	Small-seeded annual broadleaf.	After soil preparation prior to transplanting.	Severe crop response may result if transplants are under stress.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	**Do not** apply within 30 days of harvest.
trifluralin *Treflan 4EC*	0.5 to 1 lb ai 1 to 2 pt	Grasses.	Prior to planting.	Apply and incorporate before planting.
Cucumber				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Immediately before planting.	Apply and incorporate before planting. Has 18 month restriction for crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.15 to 0.38 lb ai 0.4 to 1 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before or after seeding but before crop emergence.	Place seed below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Apply when vines have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation required.
ethalfluralin *Curbit* 3 lb/gal	1.125 to 1.68 lb ai 3 to 4.5 pt	Grasses and small-seeded broadleaf weeds.	Immediately after planting.	**Do not** incorporate prior to planting. **Do not** apply any later than 2 days after planting. **Do not** apply under mulch.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplanting. Use low rate on coarse, middle rate on medium, and high rate on fine textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.56 oz ai 0.5 to 0.75 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others.	Pre.	Direct seeded without plastic mulch, apply after planting but before cracking. If used with plastic mulch, apply after final bed shaping but before laying plastic. Do not seed into treated areas less than 7 days after laying plastic. If transplanting without plastic mulch, do not transplant into treated areas within 7 days after application. If transplanting with plastic mulch, apply Sandea after final bed shaping but before laying plastic. Do not transplant within 7 days after application.
			Post.	Direct seeded bareground or with plastic mulch, apply after crop has 3 to 5 true leaves but before flowering. Postemergence applications to transplants should not be made less than 14 days after transplanting. For best results on nutsedge, a sequential application may be needed.
	0.38 to 0.75 oz ai 0.5 to 1 oz		Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Greens — collard, kale, mustard, and turnip				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not harvest within 14 days of harvesting greens or within 30 days of root harvest.
clopyralid *Stinger 3 EC* *Spur*	0.09 to 0.187 lb ai 0.25 to 0.5 pt 0.25 to 0.5 pt	Emerged broadleaf weeds.	Post.	Clopyralid will control most legume weeds. **Do not** apply within 30 days of harvesting collards, kale, mustard, and turnip roots. Do not apply within 15 days of harvesting turnip greens. **See the label for rotational restrictions.**
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Apply to weed-free soil. Thorough agitation is required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred). Use only for kale and mustard.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Use only for collards and turnips. Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Annual and perennial grasses.	After grass emergence.	**Do not** apply to turnips. Use 2 pints of crop oil concentrate per acre. Mustard can be harvested after 14 days; wait 30 days for all other brassica crops.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	**Do not** use on turnip greens except for processing greens.
Okra				
carfentrazone *Aim 2EC*	0.008 to 0.025 lb ai 0.5 to 1.6 oz	Wide spectrum of broadleaf weeds (2 to 4 inches).	Hooded sprayer.	Add either crop oil concentrate at 1% or nonionic surfactant at 0.25%. Coverage is essential. Hooded sprayer must totally enclose spray pattern to prevent crop damage.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	Before planting.	Apply and incorporate before planting.
Onion				
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 10 lb	Germinating grasses, purslane, wild verbana, chickweed.	At seeding, transplanting, and/or layby.	Apply to weed-free soil. Thorough agitation required.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Emerged annual and perennial grasses.	Post.	**Dry bulb only.** Use nonionic surfactant at 0.25% v/v. Do not apply within 45 days of harvest.
flumioxazin *Chateau WDG*	0.032 to 0.064 lb ai 1 to 2 oz	Small-seeded, annual broadleaf weeds.	Post-transplant, before weed emergence.	**Apply to dry bulbs only.** Flumioxazin can be applied at the 2- to 6-leaf stage if onions are transplanted and at the 3- to 6-leaf stage if direct-seeded. **Do not** exceed 3 ounces per year. **Do not** include a surfactant. Do not apply within 45 days of harvest.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
oxyfluorfen *Goal* 1.6 lb/gal	0.12 to 0.5 lb ai 0.6 to 2.5 pt	Broadleaf weeds.	When onions have at least 2 true leaves.	Multiple treatments may be applied. **Do not** exceed 0.5 pound (2.5 pints) per acre per year. Use only on dry bulb onions.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	Apply preemergence as a broadcast treatment when onions have 2 to 9 true leaves.	**Do not** apply to green, bunching onions or leeks. Do not incorporate or injury will occur. Do not exceed 3.6 pints per acre per season or apply within 45 days of harvest.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.
trifluralin *Treflan 4EC*	0.375 to 0.62 lb ai 0.75 to 1.25 pt	Grasses, pigweed, purslane.	Up to 60 days before harvest.	Postplant as directed. Spray between rows.
Pepper				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 20 days of harvest.
clomazone *Command 3ME*	0.5 to 1 lb ai 0.67 to 2.67 pt	Annual grasses and some broadleaf weeds.	Soil application prior to seeding or transplanting.	All peppers (including bell, hot, pimento, and sweet, except banana). Some varieties may be injured. Seeds or transplants should be placed below the treated barrier. If stand failure occurs, peppers may be replanted, but do not make a second application. **Do not** exceed 2 pints per acre per season. **Do not** graze, harvest for food, or feed cover crops planted less than 9 months following Command application. **Do not** apply within 1,500 feet of towns, subdivisions, commercial subdivisions, commercial vegetable or fruit production, commercial nurseries, or greenhouses.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	4 to 6 weeks after transplanting or direct seeded plants at 4 to 6 inches height.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 lb ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. **Do not** apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. **Do not** apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each l00 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 20 days of harvest.
trifluralin *Treflan 4EC*	0.5 to 1 lb ai 1 to 2 pt	Grasses, pigweed, purslane.	Before transplanting.	Apply and incorporate before transplanting.
Potatoes, Irish				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	At planting or up to 9 weeks after planting.	Apply to weed-free soil. Thorough agitation required.
EPTC *Eptam-7E*	3 lb ai 3.5 pt	Grasses, pigweed, nutsedge (stunts swinecress).	Preplant, postplant, postemergence.	See label for specific use in structions. **Do not** let EPTC come in contact with seed piece.
flumioxazin *Chateau SW 51%*	0.047 lb ai 1.5 oz	Several broadleaf weeds.	After hilling, preemergence to weeds.	A minimum of 2 inches of soil must cover vegetative portion of potato plant or crop injury may occur.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
linuron *Lorox 50DF*	0.5 to 1 lb ai 1 to 2 lb	Annual grasses and broadleaf weeds.	Pre.	Apply before crop emergence. Plant seed at least 2 inches deep. Use lower rates on coarse textured soils, higher rates on medium or fine textured soils. Add 0.5% by volume nonionic surfactant if emerged weeds are present.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Pre- or postplant incorporated or preemergence after final drag off.	Cool, wet conditions after application may delay maturity and/or reduce yield of Superior and other early- maturing varieties.
metribuzin 4 lb/gal or 75% DF	0.5 to 1 lb ai 1 to 2 pt or 0.67 to 1.33 lb	Most small-seeded annuals.	After planting and before crop emergence or after crop emergence for certain white-skinned varieties.	Use lower rates on sandy soil. **Do not** use postemergence on early-maturing, smooth-skinned white or red varieties. **Do not** plant treated area to crop other than potatoes for 1 year after treatment. **Do not** plant sensitive crops such as onions, cole crops, or cucurbit during the growing season following application of metribuzin.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	After planting but before potatoes and weeds emerge.	Incorporation not required if adequate rainfall or irrigation for crop and weed emergence occurs within 7 days.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
rimsulfuron *Matrix DF 25%*	0.016 lb ai 1 oz	Several broadleaf weeds and select grasses.	After hilling to clean newly prepared seedbed, pre-emergence to weeds.	Needs rainfall for activation within 5 days. Do not apply within 60 days of harvest. Read the label for crop rotational guidelines.
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.
Pumpkin				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Before planting.	Incorporate 1 to 2 inches deep. Has 18 months restriction on crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Add crop oil concentrate at 1% by volume of finished spray. Do not exceed 8 ounces per acre per application or 32 ounces per acre per season. Do not apply within 14 days of harvest.
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplating. Use low rate on coarse, middle rate on medium, and high rate on fine-textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 oz ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.
S-metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.27 lb ai 1 to 1.33 pt 1 to 1.33 pt	Small-seeded, annual broadleaf weeds, grasses, and nutsedge.	Pre.	Apply between rows and/or hills. **Do not** apply within 30 days of harvest.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Southern peas				
bentazon *Basagran* 4 lb/gal	0.75 to 1 lb ai 1.5 to 2 pt	Cocklebur.	Postemergence after at least three nodes have developed on peas.	Some yellowing, bronzing or speckling of leaves may occur. **Do not** apply more than 1 pound per acre of bentazon in one season. Use low rate for 2- to 6-leaf-stage cocklebur and high rate for 6- to 10-leaf-stage cocklebur.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	Immediately after planting.	Apply to weed-free soil. Thorough agitation required.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
imazethapyr *Pursuit 2EC*	0.023 to 0.047 lb ai 1.5 to 3 oz	Annual broadleafs and grasses.	Preplant incorporated or at planting.	Pursuit DG may be tank-mixed with a registered grass herbicide.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, incorporate in top 2 inches of soil within 14 days before planting.
pendimethalin *Prowl H_2O*	0.5 to 1.5 lb ai 1 to 3.2 pt	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporated up to 60 days before planting.	**Do not** apply preemergence to southern peas as injury may occur. If stand failure occurs, any crop registered for Prowl 3.3EC preplant incorporated may be replanted, but do not work soil deeper than herbicide incorporation zone.
quizalofop *Assure II 0.88 EC*	0.04 to 0.08 lb ai 6 to 16 oz	Emerged annual and perennial grasses.	Post.	Do not apply within 30 days of harvest. Add 1 gallon of crop oil concentrate or 1 quart of nonionic surfactant per 100 gallons of spray mix. Crop oil concentrate may cause leaf speckling under hot and humid conditions.
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest of dry or 15 days of harvest of succulent peas.
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, purslane.	1 to 3 weeks before planting.	Apply and incorporate before planting.
Squash				
bensulide *Prefar 4E*	4 to 6 lb ai 4 to 6 qt	Annual grasses.	Before planting.	Apply and incorporate before planting. Has 18-month restriction on crops not labeled.
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 14 days of harvest.
clomazone *Command 3ME*	0.25 to 0.5 lb ai 0.67 to 1.33 pt	Annual grasses and some broadleaf weeds, but poor pigweed control.	Before seeding or just before transplanting or to row middles between plastic covered rows.	Place seed below treated zone. Use lower rates on coarse soils, higher rates on fine soils. Do not apply within 1,200 feet of towns or housing developments, commercial fruit/nut/vegetable production, commercial greenhouses, or nurseries. Do not apply within 45 days of harvest. Temporary yellowing may occur.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, chickweed.	When plants have 4-5 true leaves.	Apply to weed-free soil. Thorough agitation is required.
ethalfluralin + clomazone *Strategy*	0.4 to 1.2 lb ai 0.13 to 0.38 lb ai 2 to 4 to 6 pt	Annual grasses plus some broadleaf weeds.	Before weeds emerge.	Apply after seeding but before crop emergence or as a banded spray between row middles after crop emergence or transplanting. Use low rate on coarse, middle rate on medium, and high rate on fine-textured soils. **Do not** incorporate. **Do not** broadcast over transplants. **Do not** apply within 45 days of harvest. **Do not** apply more than once per season. **Do not** apply under plastic mulch or crop covers.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea*	0.38 to 0.75 oz ai 0.5 to 1 oz	Purple nutsedge, pigweed, ragweed, smartweed, plus others.	Row middles only.	Apply to row middles only, taking precautions to avoid contacting vegetable foliage or minimizing deposits on plastic mulch. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution. Do not exceed 2 ounces per acre per 12-month period. Do not apply over the top of plastic mulch or apply to crops treated with soil-applied organophosphate insecticides. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 14 days of harvest.
Sweet corn				
atrazine 4L 90% DF	2 lb ai 2 qt 2.2 lb	Annual grasses, pig weed, purslane, morningglory.	Immediately after planting.	Atrazine gives better results where soil moisture is not limited. Provides poor control of signalgrass.
bentazon *Basagran 4 lb/gal*	0.75 to 1 lb ai 1.5 to 2 pt	Cocklebur, tall morningglory, and other broadleaf weeds.	Postemergence, as directerd spray, after corn is at least 12 inches tall.	**Do not** apply overtop or injury may occur. Do not apply within 3 weeks before tasseling. Add 2 pints of nonionic surfactant per 100 gallons of spray.
carfentrazone *Aim*	0.008 lb ai 0.33 oz	Cocklebur, ragweed, pigweed, smartweed, and prickly sida.	Preplant.	Sweet corn can be treated anytime between 30 days before planting until corn has eight collars. Apply to postemerged weeds only. Add 1 quart of nonionic surfactant per 100 gallons of spray solution.
dimethenamid *Outlook*	0.75 to 1.5 lb ai 1 to 2 pt	Annual grasses and small-seeded, broadleaf weeds.	Immediately after planting.	May be tank mixed with atrazine.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
dimethenamid + atrazine *Guardsman*	0.7 to 1.3 + 0.8 to 1.5 lb ai 2.5 to 4.5 pt	Annual grasses and broadleaf weeds.	Soil applied before or after planting or early postemergence.	**Do not** harvest within 50 days after treatment. Do not exceed 2.5 pounds of active ingredient atrazine total per acre per year. Do not apply over the top of corn in liquid fertilizer as injury may occur. Do not apply over the top of corn more than 8 inches tall.
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Permit*	0.5 oz ai 0.67 oz	Nutsedge, cocklebur, pigweed, ragweed, and smartweed.	Post.	Apply over the top or with drop nozzles anytime between spike and layby. All cultivars have not been tested for tolerance. Check with seed supplier for tolerance. Do not apply to 'Jubilee' sweet corn. Do not make more than two applications per year or exceed 0.67 ounce per application. **Do not** apply to sweet corn previously treated with a soil applied organophosphate insecticide or apply an organophosphate insecticide within 7 days before or 3 days following Sempra application. Always add nonionic surfactant at 1 quart per 100 gallons of spray solution.
metolachlor *Dual Magnum* *Dual II Magnum*	0.95 to 1.91 lb ai 1 to 2 pt/A 1 to 2 pt/A	Annual grasses and some small-seeded broadleaf weeds.	Preplant incorporate or at planting.	If preplant incorporated, in-corporate in top 2 inches of soil within 14 days before planting.
metolachlor + atrazine *Bicep II or* *Bicep II Magnum*	0.95 to 1.91 lb ai + 1 to 2 lb ai 1.5 to 3 qt 1.3 to 2.6 qt	Annual grasses and broadleaf weeds.	Soil applied before or after planting or postemergence broadcast or directed spray.	**Do not** exceed 2.4 quarts as soil-applied treatment if soils contain less than 3% organic matter. Do not exceed 2.5 pounds of active ingredient atrazine total per acre per year. Do not apply over the top of corn in liquid fertilzer as injury may occur. Do not graze or feed treated forage within 30 days after application. Do not apply over the top of corn more than 8 inches tall.
nicosulfuron *Accent 75 DF*	0.5 oz ai 0.67 oz	Johnsongrass and other annual weeds.	Postemergence, after sweet corn emergence up to 12-inch sweet corn or up to and including five leaf collars.	For corn 12 to 18 inches, apply with drop nozzles. **Do not** apply to sweet corn taller than 18 inches or with six or more leaf collars. **Do not** exceed one application per year. Some sweet corn varieties may be less tolerant than others
pendimethalin *Prowl H_2O* atrazine (several) 4L or 90DF	0.5 to 1.5 lb ai 1 to 3.2 pt 2 lb ai 2 qt or 2.2 lb	Annual grasses and broadleaf weeds.	Early postemergence from spike to 4-leaf corn but before weeds exceed 1 inch tall.	**Do not** apply (1) Prowl 3.3EC alone or with other products, (2) preplant incorporated, (3) Prowl H_2O + atrazine in liquid fertilizer.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
Sweet potato				
carfentrazone-ethyl *Aim EC*	0.031 lb ai 2 oz	Emerged weeds.	At least 7 days preplant—burndown.	Applications must include a nonionic surfactant (2 pints per 100 gallons) or crop oil concentrate (1 to 2 gallons per 100 gallons).
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	Post.	Use nonionic surfactant at 0.25% v/v. Do not apply within 30 days of harvest.
clomazone *Command 3 ME*	0.48 to 1.25 lb ai 1.33 to 3.33 pt	Annual grasses and certain broadleaf weeds.	Immediately prior to or after transplanting.	**Do not** apply within 95 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, and chickweed.	At transplanting or up to 6 weeks after transplating.	Apply to weed-free soil. Thorough agitation is required.
fluazifop Fusilade DX	0.094 to 0.25 lb ai 6 to 16 oz	Grasses.	After grass emergence.	Add either crop oil concentrate at 1% or nonionic surfactant at 0.25%. Do not harvest within 55 days of application.
flumioxazin *Valor SX*	0.032 to 0.08 lb ai 1 to 2.5 oz	Certain broadleaf weeds.	2 to 5 days prior to transplanting.	**Do not** apply over the top of sweet potatoes. Do not use greenhouse-grown transplants. Tank-mix with Command only if applied pretransplant.
fomesafen *Reflex*	0.25 lb ai 1 pt	Most broadleaf weeds, including nonresistant PPO Palmer amaranth. Partial control of yellow nutsedge before emergence and desiccation of top growth if emergence has already occurred.	Before transplanting as a soil-surface application.	**Do not** apply more than 1 pint of Reflex per acre per year. Do not make more than one Reflex application per year. Do not apply Reflex within 70 days of harvest. Do not apply Reflex and Valor to the same field. **Growers can obtain this label only by going to the Syngenta-sponsored website and registering as a user. Register once every calendar year. Do not distribute the label. Growers/users must have the label in their possession at the time of application.** **https://www.syngenta-us.com/labels/indemnified-label-login**
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
metolachlor *Dual Magnum 7.62 EC*	0.95 to 1 lb ai 1 to 1.33 pt	Annual and yellow nutsedge, annual grasses, and some broadleaf weeds.	Posttransplant to slips and preemergence to weeds.	Use only on field-grown 'Beauregard' transplants. There is a risk of injury to transplants if heavy rainfall occurs shortly after application. Do not apply so that the herbicide is allowed to be concentrated over the transplant row. Do not incorporate after application. Do not apply in irrigation water. Make only one application to sweet potatoes per growing season. **NOTE (State Label 24c)**
sethoxydim *Poast*	0.28 to 0.46 lb ai 1.5 to 2.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 30 days of harvest.
Tomato				
clethodim *SelectMax*	0.07 to 0.125 lb ai 9 to 16 oz	Annual and perennial grasses.	After grasses emerge.	Use nonionic surfactant at 0.25% v/v. Do not apply within 20 days of harvest.
DCPA *Dacthal W-75*	4.5 to 10.5 lb ai 6 to 14 lb	Germinating grasses, purslane, wild verbena, and chickweed.	4-6 weeks after transplanting or direct-seeded plants at 4 to 6 inches height.	Apply to weed-free soil. Thorough agitation is required.

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Herbicide	Broadcast rate per acre	Weeds controlled	Time of application	Limitations, remarks
glyphosate *Several formulations*	0.375 to 1.5 lb ae *Consult label for specific use rates.*	Annuals at lower rates; perennials at higher rates.	Apply to weeds before or after planting, but before crop emergence.	Rate should be adjusted to weed species at the time of application. Avoid contact with desirable plants. For spot applications, use a 2% by volume solution. Refer to specific product label to determine the need of an adjuvant. Allow 3 days between treatment and planting (if planting has not occurred).
halosulfuron *Sandea 75 DF*	0.024 to 0.036 lb ai 0.5 to 0.75 oz	Nutsedges and some broadleaf weeds.	Pre.	Use on transplant tomatoes only. Apply under plastic mulch for nutsedge suppression. Sandea is more effective when applied to emerged nutsedges. Wait at least 7 days before transplanting into treated areas.
	0.024 to 0.036 lb ai 0.5 to 0.75 oz		Post.	Use on transplant tomatoes only. Apply to transplants that are established and actively growing. Do not apply sooner than 14 days after transplanting.
	0.38 to 0.768 oz ai 0.5 to 1 oz		Apply in row middles before vining on emerged 4- to 8-inch nutsedges.	Use on transplant and direct-seeded tomatoes. Avoid contact with tomato foliage or minimize deposition on plastic mulch. Do not exceed 2 ounces per acre per 12-month period. Do not apply to tomatoes treated with a soil-applied organophosphate insecticide. Do not apply an organophosphate insecticide 21 days before or until 3 days after a Sandea application.
metolachlor *Dual Magnum 7.62 EC*	0.95 to 1.91 lb ai 1 to 2 pt	Annual grasses and some broadleaf weeds.	Preplant post-directed.	In plasticulture, apply to preformed beds prior to applying plastic mulch. Postdirect to transplants after first settling rain or irrigation event.
metribuzin 4 lb/gal or 75% DF	0.5 to 1 lb ai 1 to 2 pt or 0.67 to 1.33 lb	Most small-seeded annuals.	Postemergence when tomatoes have 5 to 6 leaves and before weeds are more than 1 inch tall.	Apply specified dosage in single or multiple applications in a minimum of 20 gallons of water and 14 days between applications. **Do not** treat seeded or transplanted tomatoes until plants have reached the 5- to 6-leaf stage or until transplants have recovered from transplant shock and new growth is evident. **Do not** apply within 3 days after periods of cool, wet, or cloudy weather or crop injury will occur. **Do not** apply within 24 hours of other pesticide applications.
paraquat *Several formulations*	0.5 to 1 lb ai *Consult label for specific use rates.*	Emerged annuals. Top kill of perennials.	Before crop emergence.	Weeds emerging after application will not be controlled. Add 2 pints of nonionic surfactant to each 100 gallons of spray.
rimsulfuron *Matrix DF 25%*	0.016 to 0.031 lb ai 1 to 2 oz	Several broadleaf weeds and select grasses.	Postdirected to young, actively growing weeds (less than 1 inch).	Add nonionic surfactant at 0.25% v/v. For residual control, this treatment needs rainfall for activation within 5 days. Do not apply within 45 days of harvest. Read the label for crop rotational guidelines.
sethoxydim *Poast*	0.28 lb ai 1.5 pt	Grasses.	After grass emergence.	Use 2 pints of crop oil concentrate per acre. **Do not** apply within 20 days of harvest.
trifloxysulfuron *Envoke 75%*	0.004 to 0.009 lb ai 0.10 to 0.20 oz	Yellow nutsedge, cocklebur, morningglory, and several other broadleaf weeds.	Wait 2 weeks after transplanting before application. Post-directed to young, actively growing weeds. Tomato plants should be large enough to avoid spray contact with growing point.	This treatment is only for transplanted tomatoes grown in plastic. Add nonionic surfactant at 0.25% v/v. Do not apply if treated with a soil-applied organophosphate (OP) insecticide, and wait 21 days before or 7 days after foliar OP treatment. Do not apply within 45 days of harvest. Read the label for crop rotational guidelines. **NOTE (State Label 24c).**
trifluralin *Treflan 4EC*	0.5 to 0.75 lb ai 1 to 1.5 pt	Grasses, pigweed, and purslane.	Before transplanting.	Incorporate 1 to 1.5 inches.

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ORNAMENTAL CROPS

Many manufacturers' labels list tolerant herbaceous and woody ornamentals species by common name. This listing may apply to one species or all species within a genus. This information is believed to be correct according to the manufacturer's label at the time this publication was prepared. However, species may be added to or deleted from labels at any time. ALWAYS CHECK THE LABEL AT THE TIME OF USE to make sure the herbicide is labeled for the species on which you intend to use it.

Always check label for specific precautions and application directions. Proceed cautiously and limit acreage treated until you have gained firsthand experience in the use of herbicides.

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
BULBS, CORMS, TUBERS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species. Do not** apply peat moss before treating with Betasan. For use on tulips and narcissus only.
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clethodim0.01–	0.04 oz of 2 lb/gal formulation or 0.02–0.08 oz of 0.94 lb/gal formulation + NIS at 0.25% v/v	0.09–0.5	Apply only to actively growing grasses at recommended weed heights.	Grassy weeds.	**Consult the label for a listing of tolerant species.**
clopyralid	0.01–0.05 oz Clean Slate	0.09–0.5	Actively growing weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Do not apply this product in a tank mix to woody ornamental plants.
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G 0.75–1.5 of	dimethenamid-P + 1–2 of pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 16.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species**. Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant	0.25-0.375	Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
napropamide	0.3–0.44 oz Devrinol 50-DF Ornamental	4–6	Preemergence.	Preemergence control of certain annual broadleaf weeds and annual grasses.	Consult the label for a listing of tolerant species. Apply to freshly weeded soil before weeds germinate or during the fall and winter. Devrinol can be applied to newly planted container stock after the soil has settled from first watering, field-grown nursery stock, dichondra, and established plants. Devrinol needs mechanical incorporation (such as a power tiller) or irrigation or natural moisture within 2–3 days for optimum results.
oryzalin	0.05 - 0.1 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to gladiolus bulbs larger than 1 inch in diameter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** In the spring, **do not** apply to tulip plants that have emerged to a height greater than 0.75 inch. Deep plow prior to planting any crop after this use.
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
prodiamine, isoxaben 0.09–	0.20 fl oz of Gemini 3.7 SC	0.65–1.50 of prodiamine + 0.45–1.00 of isoxaben	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Gladioli corms less than 1 inch in diameter may be injured by preplant applications of Treflan G.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
HERBACEOUS ANNUAL FLOWERING PLANTS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species. Do not** apply peat moss before treating with Betasan.
bentazon 0.055–	0.075 oz Basagran® T/O + 0.075 oz Oil Concentrate	0.75–1	See label for most effective application timing for various weeds.	Broadleaf weeds and sedges.	Consult the label for a listing of tolerant species. Apply Basagran T/O around landscape and ornamental trees, shrubs, flowers, and other plants as a directed spray away from the foliage of desired plants, unless otherwise directed. Injury may occur when applying Basagran T/O as a directed spray under the tree line or over the roots of sycamore and rhododendron. Do not apply if the risk of injury to these plants is not acceptable.
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clethodim0.01–	0.04 oz of 2 lb/gal formulation or 0.02–0.08 oz of 0.94 lb/gal formulation + NIS at 0.25% v/v	0.09–0.5	Apply only to actively growing grasses at recommended weed heights.	Grassy weeds.	**Consult the label for a listing of tolerant species.**
clopyralid	0.01–0.05 oz Clean Slate	0.09–0.5	Actively growing weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Do not apply this product in a tank mix to woody ornamental plants.
DCPA	1/2 lb 5G	10-15	After establishment.	Germinating grass and certain broadleaf weeds.	**Consult recent labels for complete listing of tolerant crop species.** Apply to clean soil after transplanting or following establishment. **Do not** incorporate more than 2 inches. **Do not** use on button pink, carnation, pansy, phlox, sweet william, or alternanthera.
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species**.
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G	0.75–1.5 of dimethenamid-P + 1–2 of pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	Consult the label for a listing of tolerant species. Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3-5 inches high or 2 weeks after transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Incorporate thoroughly in top 2 inches of soil if plant is 3-5 inches tall or 2 weeks af ter transplanting. Beds must be clean at time of treatment.
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant		Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply until after soil around plant roots has settled. Apply to weed-free soil. Needs 0.5-inch of water to activate within 21 days.
napropamide	0.3–0.44 oz Devrinol 50-DF Ornamental	4–6	Preemergence.	Preemergence control of certain annual broadleaf weeds and annual grasses.	**Consult the label for a listing of tolerant species.** Apply to freshly weeded soil before weeds germinate or during the fall and winter. Devrinol can be applied to newly planted container stock after the soil has settled from first watering, field-grown nursery stock, dichondra, and established plants. Devrinol needs mechanical incorporation (such as a power tiller) or irrigation or natural moisture within 2–3 days for optimum results.
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5 - inch rain or equivalent is necessary to activate or may be shallowly cultivated to 1-2 inches. **Do not** use on soils containing more than 3% organic matter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed the recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Slight leaf speckling has been observed on a few species with no reduction in vigor or growth.
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.
HERBACEOUS PERENNIAL FLOWERING PLANTS AND PERENNIAL GROUNDCOVERS					
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species.** Do not apply peat moss before treating with Betasan.
bentazon	0.055–0.075 oz Basagran® T/O + 0.075 oz Oil Concentrate	0.75–1	See label for most effective application timing for various weeds.	Broadleaf weeds and sedges.	**Consult the label for a listing of tolerant species.** Apply Basagran T/O around landscape and ornamental trees, shrubs, flowers, and other plants as a directed spray away from the foliage of desired plants, unless otherwise directed. Injury may occur when applying Basagran T/O as a directed spray under the tree line or over the roots of sycamore and rhododendron. Do not apply if the risk of injury to these plants is not acceptable.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clethodim	0.01–0.04 oz of 2 lb/gal formulation or 0.02–0.08 oz of 0.94 lb/gal formulation + NIS at 0.25% v/v	0.09–0.5	Apply only to actively growing grasses at recommended weed heights.	Grassy weeds.	**Consult the label for a listing of tolerant species.**
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G	0.75–1.5 of dimethenamid-P + 1–2 of pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species.** Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3-5 inches high or 2 weeks after transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Incorporate thoroughly in top 2 inches of soil if plant is 3-5 inches tall or 2 weeks after transplanting. Beds must be clean at time of treatment.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant		Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species.** Apply after soil around plant roots has settled.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germination of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformly mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses.
metolachlor	2 tbsp Pennant 7.8E/gal water. Spray to wet plant- ing area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	**See label for complete listing of tolerant species.** Direct spray towards the base of established ornamentals transplanted a minimum of 10 days. **Do not** use on ornamental perennial monocots.
napropamide	0.3–0.44 oz Devrinol 50-DF Ornamental	4–6	Preemergence.	Preemergence control of certain annual broadleaf weeds and annual grasses.	**Consult the label for a listing of tolerant species.** Apply to freshly weeded soil before weeds germinate or during the fall and winter. Devrinol can be applied to newly planted container stock after the soil has settled from first watering, field-grown nursery stock, dichondra, and established plants. Devrinol needs mechanical incorporation (such as a power tiller) or irrigation or natural moisture within 2–3 days for optimum results.
oxyfluorfen + oryzalin	3.7 oz Rout Ornamental Herbicide	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in greenhouses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in green houses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants, **Do not** apply when extreme cold (< 35 °F) is expected.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
oxyfluorfen, prodiamine	0.23 lb Biathlon	Oxyfluorfen — 2 Prodiamine — 0.75	Before weed germination.	Broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** Apply Biathlon when at least 0.5 inch of irrigation or rainfall is expected within 24 hours after application. For best results, use in established beds or on soil surfaces left undisturbed during the period when weed control is desired.
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5-inch rain or equivalent is necessary to activate. May be shallowly cultivated (1-2 inches). **Do not** use on soils containing more than 3% organic matter.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use. **Do not** apply to ornamental plantings where the likelihood of runoff onto lawn areas containing cool-season turfgrass species exists as severe injury or death may occur. Over-application may result in crop injury or excessive soil residue.
oxadiazon	0.45 lb of Ronstar G	4	Before weed seed germination.	Annual broadleaf and grass weeds.	**Consult label for listing of tolerant species.** Apply any time during year. Irrigation following treatment improves activity. **Do not** apply to wet foliage. **Do not** incorporate physically, but apply before rainfall or irrigate to activate. **Do not** disturb the soil surface by cultivation after treatment. **Do not** apply under conditions in which granules will collect on leaves or in rosettes of plants such as yucca and liriope.
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
pendimethalin	0.01 to 0.02 oz Pendulum WDG or 0.17 to 0.23 lb Pendulum 2G	1.5 to 3	Fall or spring before weed emergence.	Annual grasses and broadleaf weeds.	**Consult label for complete listing of tolerant crop species.** Apply to established plantings only. Apply to weed-free soil and irrigate. Over-application in cool, wet soils can increase injury.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
prodiamine, isoxaben 0.09–	0.20 fl oz of Gemini 3.7 SC	0.65–1.50 of prodiamine + 0.45–1.00 of isoxaben	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Very slight leaf speckling has been observed on a few species with no reduction in vigor or growth.
simazine + metolachlor	0.05-0.07 oz + 0.07-0.11 oz Princep 4L + Pennant 7.8E or 1.4-2.8 oz Derby 5G	0.8-1 + 2-3	10 days after transplant.	Annual grasses and broadleaf weeds.	**Liriope only.** Apply before weeds emerge or after existing weeds are removed. Use high rates on fine-textured soils and low rate on coarse-textured soils where light infestations of broadleaf weeds are expected. Prolonged wet soil conditions after the herbicide is applied will reduce the length of weed control.
sulfosulfuron	0.003 oz Certainty	0.06	Actively growing weeds.	Selective control of annual and perennial grass, broadleaf, and sedge weeds.	**Consult the label for a listing of tolerant species.** This product is for use in woody ornamentals, perennial groundcovers, and warm-season ornamental grasses. Best results are obtained when weeds are not disturbed by mowing for at least 2 days before and after application.
trifluralin	0.18 lb Treflan 5G	4.0	After plants become established.	Annual grasses and some broadleaf weeds.	**Consult label for list of tolerant crops**. Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.

ED_005172C_00002010-00146

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
ORNAMENTAL GRASSES					
bentazon	0.055–0.075 oz Basagran® T/O + 0.075 oz Oil Concentrate	0.75–1	See label for most effective application timing for various weeds.	Broadleaf weeds and sedges.	**Consult the label for a listing of tolerant species.** Apply Basagran T/O around landscape and ornamental trees, shrubs, flowers, and other plants as a directed spray away from the foliage of desired plants, unless otherwise directed. Injury may occur when applying Basagran T/O as a directed spray under the tree line or over the roots of sycamore and rhododendron. Do not apply if the risk of injury to these plants is not acceptable.
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clopyralid	0.01–0.05 oz Clean Slate	0.09–0.5	Actively growing weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Do not apply this product in a tank mix to woody ornamental plants.
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G	0.75–1.5 of dimethenamid-P + 1–2 of pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS	Broadcast — 0.25–0.5	Succulent, actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.

ED_005172C_00002010-00147

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species.** Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species.** Do not apply until after soil around plant roots has settled.
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germination of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformly mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses.

ED_005172C_00002010-00148

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
metolachlor	2 tbsp Dual Magnum 7.8E/gal water. Spray to wet planting area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	See label for complete listing of tolerant species. Direct spray towards the base of established ornamentals transplanted a minimum of 10 days.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants.
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.
pendimethalin	0.01 to 0.02 oz Pendulum WDG or 0.17 to 0.23 lb Pendulum 2G	1.5 to 3	Fall or spring before weed emergence.	Annual grasses and certain broadleaf weeds.	**Consult recent label for complete listing of tolerant crop species.** Apply to established plantings only. Apply to weed-free soil and irrigate. Over-application in cool, wet soils can increase injury.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
prodiamine, isoxaben 0.09–	0.20 fl oz of Gemini 3.7 SC	0.65–1.50 of prodiamine + 0.45–1.00 of isoxaben	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
sulfosulfuron	0.003 oz Certainty	0.06	Actively growing weeds.	Selective control of annual and perennial grass, broadleaf, and sedge weeds.	**Consult the label for a listing of tolerant species.** This product is for use in woody ornamentals, perennial groundcovers, and warm-season ornamental grasses. Best results are obtained when weeds are not disturbed by mowing for at least 2 days before and after application.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
WOODY ORNAMENTAL PLANTS					
alachlor	0.15 oz Intrro or Micro-Tech	0.5	Apply as a directed spray after transplanting or to established plantings before weed emergence.	Annual grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This treatment is for use on juniper and yew. Repeat applications may be required for sustained weed control. DO NOT exceed two applications or a total of 4 quarts per year. DO NOT retreat within 21 days. Applications during periods when the temperature exceeds 90°F may cause injury to ornamentals.
bensulide	0.48-0.8 lb Betasan 3.6G or 0.55-0.92 oz 4E	7.5-12.6	Apply and irrigate before weed germination.	Annual grasses and some small-seeded broadleaf weeds.	**Consult label for complete listing of tolerant crop species. Do not** apply peat moss before treating with Betasan. For landscape and field use.
bentazon	0.055–0.075 oz Basagran® T/O + 0.075 oz Oil Concentrate	0.75–1	See label for most effective application timing for various weeds.	Broadleaf weeds and sedges.	**Consult the label for a listing of tolerant species.** Apply Basagran T/O around landscape and ornamental trees, shrubs, flowers, and other plants as a directed spray away from the foliage of desired plants, unless otherwise directed. Injury may occur when applying Basagran T/O as a directed spray under the tree line or over the roots of sycamore and rhododendron. Do not apply if the risk of injury to these plants is not acceptable.
cinnamon oil, clove oil	6.4 oz/gal Spray to runoff. WEED ZAP		This product will only control actively growing, emerged green vegetation.	Annual and perennial broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** This product does not translocate. It will affect only those plants that are coated with the spray solution.
clethodim	0.01–0.04 oz of 2 lb/gal formulation or 0.02–0.08 oz of 0.94 lb/gal formulation + NIS at 0.25% v/v	0.09–0.5	Apply only to actively growing grasses at recommended weed heights.	Grassy weeds.	**Consult the label for a listing of tolerant species.**
clopyralid	0.01–0.05 oz Clean Slate	0.09–0.5	Actively growing weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Do not apply this product in a tank mix to woody ornamental plants.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
DCPA	1/2 lb 5G	10-15	After establishment.	Germinating grass and certain broadleaf weeds.	**Consult recent labels for complete listing of tolerant crop species.** Apply to clean soil after transplanting or following establishment. **Do not** incorporate more than 2 inches.
dimethenamid	0.05–0.07 oz Tower Herbicide	1–1.5	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dimethenamid, pendimethalin	0.23–0.46 lb FreeHand 1.75G	0.75–1.5 of dimethenamid-P + 1–2 of pendimethalin	Preemergence. See label for appropriate timing.	Certain annual grasses, annual broadleaf weeds, and sedges.	**Consult the label for a listing of tolerant species.**
dichlobenil	0.23 to 1.14 lb Casoron 4G	4 to 20	4 weeks after transplanting in early spring and fall.	Annual and perennial weeds.	**Consult recent label for complete listing of tolerant crop species.** Apply only to a well prepared weed-free soil before seeds of annual weeds germinate or after cultivation to remove all growing weeds. **Do not** apply until 4 weeks after transplanting. **Do not** use in seed beds, transplant or cutting beds, or in greenhouses. **Do not** use on extremely sandy soils. Shallow incorporation or sprinkler irrigation immediately after application is recommended. This product is effective only during cool seasons in Mississippi (air temperature < 70 °F).
diquat	Spot Spray — 0.75 fl oz/gal. + NIS Broadcast — 0.04–0.08 fl oz + NIS Broadcast — 0.25–	0.5 Succulent,	actively growing weeds.	Nonselective weed control.	DO NOT spray on desirable plants.
glyphosate, diquat	Spot Spray — 4–8 oz/gal of Roundup QuickPro or 6.7–13.3 fl oz/gal of Razor Burn. Broadcast — 0.08–0.33 oz of Roundup QuickPro Herbicide or 0.55 fl oz of Razor Burn	Roundup QuickPro — 1.64–6.57 Glyphosate + 0.07–0.27 Diquat Razor Burn — 7.5 Glyphosate + 0.39 Diquat	See instructions.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when perennial weeds are treated after they reach the reproductive growth stage (seedhead initiation in grasses and bud formation in broadleaves). Best results are obtained when brush weeds are treated when they are in the seedling growth stage. In many situations, retreatment is required on larger plants.

ED_005172C_00002010-00151

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
dithiopyr	0.04 oz of Dimension Ultra 40WP or 0.07 fl oz of Dimension Ultra 2SC or 1–.15 fl oz of Dimension EC or 0.05–0.07 fl oz of Dimension 2EW	Dimension Ultra — 0.5 Dimension — 1.33–2	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult the label for a listing of tolerant species.** Apply as a directed spray in established ornamentals or as a broadcast over-the-top spray to certain established ornamentals (see ornamental plant listing). Make directed sprays to the soil at the base of the ornamentals. All products can be used on landscape ornamentals. Dimension Ultra 40WP can be used on field-grown ornamentals. Dimension 2EW can be used on field-grown and container ornamentals.
EPTC	1/2 lb 2.3G	5	Post plant after growth of crop plants is 3- to 5-inches high or 2 weeks ater transplanting.	Certain annual weeds and nutsedge.	**Consult recent label for complete listing of tolerant crop species.** Crop species tolerance varies with formulation. Must be incorporated thoroughly in top 2 inches of soil growth if plant is 3-5 inches tall or 2 weeks after transplant. Beds must be clean at time of treatment.
fenoxaprop	0.03–0.09 fl oz Acclaim Extra	0.06–0.17	Emerged grasses. Refer to label for timing.	Annual and perennial grasses.	**Consult the label for a listing of tolerant species.** Acclaim Extra controls only grasses that are emerged at the time of spraying. Young, actively growing grass weeds are more easily controlled than larger grass weeds. Avoid applications to ornamentals under stress due to lack of moisture, chemical injury, or temperature extremes.
fluazifop	0.04 to 0.06 oz Fusilade II + 1/2 pt nonionic surfactant	0.25-0.375	Apply to actively growing grasses before they exceed recommended application growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species**. Use only nonionic surfactant with Fusilade on ornamentals. Applications of Fusilade may be made over the top of some ornamentals and only as a directed spray to prevent contact of spray with foliage on other ornamentals.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
flumioxazin	0.35 lb of BroadStar or 0.02–0.03 fl oz of SureGuard	BroadStar — 0.38 or SureGuard — 0.25–0.38	For preemergence, see label for appropriate timing for various crops and sites. For postemergence, apply to actively growing weeds.	Annual broadleaf and grassy weeds.	Consult the label for a listing of tolerant species. Postemergence treatments are most effective when applied under sunny conditions at temperatures above 65°F. Use these herbicides in containerized and field-grown (in-ground) woody, ornamental shrubs and trees, groundcovers, and nonbearing fruit and nut trees grown in nurseries. BroadStar should not be applied in residential or commercial landscapes. SureGuard may be used in landscapes.
glufosinate	Spot Spray — 2–4 fl oz per gal of Finale Spray to wet. Broadcast — 0.07–0.22 fl oz of Finale	0.5–1.5	Best results are obtained when weeds are actively growing.	Nonselective weed control.	DO NOT spray on desirable plants.
glyphosate, prodiamine	0.3–0.58 fl oz of ProDeuce	glyphosate — 4–8 prodiamine — .75–1.5	For best results, apply during warm, sunny weather (above 60°F).	Preemergence — broadleaf and grass weeds. Postemergence — Nonselective weed control.	**Consult the label for a listing of tolerant species.** DO NOT spray on desirable plants. Use around the base or in mulched beds of WELL-ESTABLISHED (at least 6 months old) plants, shrubs, or trees. DO NOT apply in an area that will be planted or seeded for 6 months after application when applying at the rate of 3 fluid ounces per 1,000 square feet or for 12 months after application when applying at the rate of 5.75 fluid ounces per 1,000 square feet.
halosulfuron	Spot Spray — 0.03 oz + NIS per gallon to treat 1,000 sq ft Broadcast — 0.002–0.003 oz + NIS	0.03–0.06	For postemergence control, apply when nutsedge has reached the 3- to 8-leaf stage of growth. A second treatment may be required 6–10 weeks after the first.	Controls purple nutsedge, yellow nutsedge, and horsetail. Suppresses Kyllinga spp.	**Consult the label for a listing of tolerant species.** This product may be applied at recommended rates as a post-directed spray around any established woody ornamental species in landscaped areas. For transplanted woody ornamentals, allow 3 months after transplanting before applying this product. Avoid contact with leaves of desirable plants since foliar injury, discoloration, or death may result.

ED_005172C_00002010-00153

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
imazaquin	0.45 to 0.6 tsp Image	0.5	Apply to established ornamentals.	Broadleaf weeds, wild garlic, onion, and sedges.	**Consult label for listing of tolerant species.** Add 0.25% nonionic surfactant to spray mix. **Do not** apply to container-grown plants.
indaziflam	0.02–0.04 fl oz of Marengo 0.01–0.03 fl oz of Specticle FLO 0.008–0.01 oz of Specticle 20 WSP 0.23–0.46 lb of Marengo G or Specticle G	Marengo — 0.04–0.08 Specticle FLO — 0.03–0.06 Specticle 20 WSP or Marengo G or Specticle G — 0.05–0.06	Preemergence. See label for appropriate timing for various woody crops and sites.	Annual grasses and broadleaf weeds.	Consult label for listing of tolerant species. All products can be used on landscape and production woody ornamentals and hardscapes. Marengo and Marengo G can be used on floors in greenhouses, shade houses, and hoop houses.
isoxaben	0.02-0.05 oz Gallery 75 DF	0.5-1.0	Late fall or early summer prior to weed emergence.	Broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply until after soil around plant roots has settled. Apply to weed-free soil. Needs 0.5-inch of water to activate within 21 days. For field and container use. Some liners are also registered.
isoxaben + trifluralin	0.23-0.46 lb Snapshot 2.5 TG	0.5-1 + 2-4	Late summer to early fall or in early spring prior to germination of target weeds or post cultivation.	Certain broadleaf weeds and annual grasses.	**Consult label for listing of tolerant groundcover species.** Optimum weed control when activated within 3 days of application with irrigation or rainfall. May also be activated with cultivation equipment capable of uniformily mixing the herbicide into the upper 1-2 inches of soil. Failure to activate within 3 days of application may result in erratic control of annual grasses. **Do not** apply to nursery seedbeds or transplant beds, unrooted liners or cuttings planted in pots for the first time, pots less than 4 inches wide, or newly transplanted ornamentals. **Do not** apply over 600 lb per acre per year.
metolachlor	2 tbsp Dual Magnum 7.8E /gal water. Spray to wet planting area.	2-4	Apply before weeds emerge or after removal of existing weeds.	Grassy weeds and some broadleaf weeds.	**See label for complete listing of tolerant species.** Direct spray towards the base of established ornamentals transplanted a minimum of 10 days. For field use only.
metolachlor + simazine	0.09-0.18 lb Derby 5G	2-4	Apply prior to weed emergence.	Grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Do not apply until soil has settled around plant roots. If applied to wet foliage, apply overhead irrigation to remove herbicide granules.

ED_005172C_00002010-00154

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
napropamide	0.3–0.44 oz Devrinol 50-DF Ornamental	4–6	Preemergence.	Preemergence control of certain annual broadleaf weeds and annual grasses.	**Consult the label for a listing of tolerant species.** Apply to freshly weeded soil before weeds germinate or during the fall and winter. Devrinol can be applied to newly planted container stock after the soil has settled from first watering, field-grown nursery stock, dichondra, and established plants. Devrinol needs mechanical incorporation (such as a power tiller) or irrigation or natural moisture within 2–3 days for optimum results.
naptalam	0.6–1.2 fl oz Alanap-L	4–8	Preemergence and early growth of weeds.	Broadleaf weeds.	**Consult the label for a listing of tolerant species.** Alanap-L may be used for broadleaf weed control in woody nursery-stock transplants or established plants. Direct spray to strike nursery stock no more than 2–3 inches above the soil line. Avoid application to nursery plant foliage. Do not use on herbaceous plants.
oryzalin	0.15 - 0.3 oz Surflan AS	0.75 - 1.5	2 to 4 weeks after planting but prior to weed emergence.	Annual grasses and small-seeded broadleaf weeds.	**Consult label for listing of tolerant species.** A 0.5-inch rain or equivalent is necessary to activate or may be shallowly cultivated to 1-2 inches. Do not use on soils containing more than 3% organic matter. Landscape use only.
oryzalin + benefin	0.175-0.35 lb XL 2G	0.75 + 0.75	2 to 4 weeks after planting and final hilling, but prior to emergence of annual weeds.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Deep plow prior to planting any crop after this use. For field and container use. Registered on selected liners.
oxadiazon	0.45 lb of Ronstar G	4	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for complete listing of tolerant species.** Apply anytime during year. Irrigation following treatment improves activity. **Do not** apply to wet foliage. **Do not** incorporate phsically, but apply before rainfall or irrigate to activate. **Do not** disturb the soil surface by cultivation after treatment. **Do not** apply under conditions in which granules will collect on leaves or in rosettes of plants such as yucca and liriope.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
oxadiazon + prodiamine	0.45 lb of RegalStar G	1 lb + 0.2 lb	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for listing of tolerant species.** No more than two applications per year are recommended.
oxyfluorfen	0.18-0.37 oz Goal 2E	1-2	Preemergence or postemergence.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Use 0.25% nonionic surfactant if weeds are present.
oxyfluorfen + oryzalin	3.7 oz Rout Ornamental Herbicide	2 + 1	After transplants become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants. **Do not** use in greenhouses. **Do not** incorporate physically. Water is necessary to activate this product. **Do not** use on bedding plants. For container and field use.
oxyfluorfen + oxadiazon	0.22 lb Regal O-O	2 + 1 lb	Before weed seed germination.	Annual broadleaf and grassy weeds.	**Consult label for listing of tolerant crops.** Excellent activity for bittercress.
oxyfluorfen + pendimethalin	3.7 oz Ornamental Herbicide II 2 + 1	After transplants	become established and before weeds emerge.	Annual grasses and broadleaf weeds.	**Consult label for listing of tolerant species. Do not** apply to wet foliage or whorl-leaved plants.
oxyfluorfen, prodiamine	0.23 lb Biathlon	oxyfluorfen — 2 prodiamine — 0.75	Before weed germination.	Broadleaf and grassy weeds.	**Consult the label for a listing of tolerant species.** Apply Biathlon when at least 0.5 inch of irrigation or rainfall is expected within 24 hours after application. For best results, use in established beds or on soil surfaces left undisturbed during the period when weed control is desired.
paraquat	0.09–0.15 fl oz of 2 lb/gal formulation or 0.06–0.12 fl oz of 2.5 lb/gal formulation or 0.06–0.1 fl oz of 3 lb/gal formulation	5–8	Small, emerged weeds.	Nonselective weed control.	This treatment is for use on shade and ornamental trees. Weeds 1–6 inches in height are the easiest to control. Larger weeds may be more difficult to control. When weeds have been grazed or mowed, allow them to regrow to a height of 2–4 inches before spraying, if possible. DO NOT allow spray to contact fruit, foliage, or green stems of desirable plants. Use a shield or wrap plants when spraying around young trees or vines. DO NOT apply more than five sprays per year.

ED_005172C_00002010-00156

Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
pelargonic acid	1.33–13 fl oz/gal Scythe		Young, succulent weeds.	Nonselective weed control.	DO NOT spray on desirable plants. Best results are obtained when spray solutions cover all leaf surfaces. Mature, woody weeds are less susceptible. Repeat applications as needed to give desirable levels of weed control.
prodiamine	0.05–0.11 fl oz of liquid (4FL) formulation or 0.04–0.08 oz of granular (65WG) formulation	0.66–1.5	In fall or spring before weeds germinate or after weeds are removed.	Preemergence control of many grass and broadleaf weeds.	**Consult the label for a listing of tolerant species.** This product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
prodiamine, isoxaben 0.09–	0.20 fl oz of Gemini 3.7 SC	0.65–1.50 of prodiamine + 0.45–1.00 of isoxaben	Preemergence. See label for appropriate timing for various crops and sites.	Grasses and broadleaf weeds.	**Consult label for listing of tolerant species.** Product is most effective when activated by at least 0.5 inch of rainfall or irrigation or shallow incorporation (1–2 inches) before weed seeds germinate and within 14 days after application.
pronamide	0.07-0.15 oz Kerb 50W	1-2	Late fall prior to weed emergence.	Annual grasses and certain broadleaf weeds.	**Consult label for listing of tolerant species.** Apply to established plantings only.
sethoxydim	0.08 fl oz Vantage	0.28	Apply to actively growing grasses before they exceed the recommended growth stages shown on the label.	Grassy weeds.	**Consult recent label for complete listing of tolerant crop species.** Not intended for domestic use, except by professional applicators. Slight leaf speckling has been seen on a few species with no reduction in vigor or growth.
simazine	0.9-3.8 oz Princep 4G	25-100	Apply early spring after first year of establishment.	Most annual broadleaf weeds and some annual grasses.	**Consult label for list of tolerant crops.** For use on conifers only.
sulfosulfuron	0.003 oz Certainty	0.06	Actively growing weeds.	Selective control of annual and perennial grass, broadleaf, and sedge weeds.	Consult the label for a listing of tolerant species. This product is for use in woody ornamentals, perennial groundcovers, and warm-season ornamental grasses. Best results are obtained when weeds are not disturbed by mowing for at least 2 days before and after application.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
trifluralin	1.8 lb Treflan 5G	4.0	After plants become established.	Grassy weeds.	**Consult label for list of tolerant crops for Treflan 5G.** Use lower rates on light soils and heavier rates on heavy soils. Use lower rates if physically incorporated and higher rates if applied to the surface and watered in.
trifluralin, isoxaben, oxyfluorfen	0.23–0.46 lb Showcase	trifluralin — 2–4 isoxaben — 0.25–0.5 oxyfluorfen — 0.25–0.5	Preemergence.	Preemergence control of certain broadleaf weeds and annual grasses.	**Consult the label for a listing of tolerant species.** Showcase needs to be activated within 3 days. A single rainfall or sprinkler irrigation of 0.5 inch or more or flood irrigation is required for activation. Repeat applications at 0.35 or 0.46 pound per 100 square feet should not be made sooner than 60 days after a previous application of Showcase.
CHRISTMAS TREES					
Preplanting					
trifluralin 0.5 to 1.0 lb	Treflan 4E — 1 to 2 pt	Preplant incorporated and post plant.	Most annual grasses and a few small-seeded broadleafs.	For Scotch, loblolly, white pine, and red cedar. Apply to weed-free soil and incorporate immediately. Applications may be made to establish plantings by setting incorporating tools to throw treated soil around the plants.	

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Time of application	Weeds controlled	Special instructions and remarks
Preemergence				
hexazinone 1.0 to 1.7 lb	Velpar L — 4-7 pt per acre.	Do not use in 2- to 5- year-old plantations.	Pre- and post-emergence control of many annual grasses.	See label for tree varieties cleared. Velpar L can be applied over the top or as a direct spray. **Do not** add surfactant if applied over the top of trees. Use directed sprays if applied after bud break and add 1 quart surfactant per 100 gal spray to improve postemergence activity. If multiple applications are used for postemergence control, use 2 to 4 pints each application.
metolachlor 2.0 to 3.9 lb/A	Pennant Liquid Herbicide — 7.8 lb/gal 2 to 4 qt/A	Before weeds emerge.	Annual grasses and yellow nutsedge.	Apply in 10 or more gallons water prior to emergence of weeds but after soil has settled around the transplant. Cultivate or control emerged weeds with postemergence herbicides. A second application may be needed to provide control for an extended period. Use 2 pints for coarse textured, low organic matter soils and the 4-pint rate for high organic clay soils or where yellow nutsedge is a problem.
napropamide 4.0 to 6.0 lb/A	Devrinol 50WP — 8 to 12 lb	Postplant, established, before weed germination.	Most annual grasses and a few small-seeded broadleafs.	Apply over the top of newly planted or as a directed spray to establish plantings. Apply any time of year but make application to weed-free soil. Rainfall, irrigation, or mechanical incorporation 1 to 2 inches deep ensures control. Often provides season-long control of annual grasses and many small-seeded broadleaf weeds.
oryzalin 2 to 4 lb	Surflan 4 lb/gal WP — 4 to 6 pt in 20 to 40 gal water	Late winter or early spring before weeds germinate.	Annual grasses and a few small-seeded broadleafs.	For short-season control apply lower rates. Increase rates for longer control. May be applied over the top of trees. Use after trees are planted and soil is settled. If low rates are used, one additional treatment in the late spring or early summer will likely be needed.
oxyfluorfen 1.0 to 2.0 lb/A	Goal 2XL 1.6E — 4.0 to 8 pt	Postplant.	Pre and postemergence control of small annual grasses and broadleafs.	For many conifer species. Apply after transplanting while trees are still dormant. Add 0.25% surfactant if weeds have emerged. Generally 5 pt/acre rate provides acceptable control, but heavy weed pressure (many small weeds or larger weeds) may require the higher rates. Ground application only.
pendimethalin 2 to 4 lb/A	Stomp — 4 lb/gal 2 to 4 qt/A	Before weed seeds germinate.	Certain annual grasses and broadleafs.	Apply in 20 gallons water to established plantings. May be applied over the top of trees. It will not control emerged weeds. Rainfall or irrigation must be applied to initiate control. Use the low rate for short-term control and the high rate for long-term control.
simazine 2.0 to 4.0 lb/A	4L - 2 to 4 qt Princep 5G — 50 to 100 lb	Spring or fall before weed germination.	Annual grasses and broadleafs.	For red cedar and white pine. Remove weed growth before applying or kill using postemergence herbicide. Trees must be 3 years old.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 16.

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Time of application	Weeds controlled	Special instructions and remarks
Postemergence				
clethodim	Prism — 17 to 34 oz in 5 to 40 gal of spray solu tion. Use 0.25% v/v nonionic surfactant.	When grass is 1-18 in. high (follow table on label).	Most grasses.	**Do not** apply directly to water or to areas where runoff is likely to occur.
fluazifop-butyl 0.1-0.2 a.i. lb/A	Fusilade DX — 8 to 16 oz in 10-40 gal water. Add 1 qt non-ionic surfactant or 4 qt crop oil concen-trate per 100 gal spray.	When grass is between 1-6 inches tall.	Most grasses.	**Do not** tank mix Fusilade with other herbicides. Check label for labelled species.
glyphosate 0.75 to 3.7 lb ae	glyphosate — 1.0 to 5.0 qt 3 lb ae/gal formulation in 10 to 40 gal water.	Anytime weeds are actively growing.	Most vegeta-tion covered.	Apply to undesirable vegetation in 20 to 40 gal-lons water. Use low rate for small annual weeds and high rate for perennials. For annual weeds less than 6 in tall in small areas mix 1 to 2 fl oz per gallon or for annual weeds mor than 6 in tall or perennial weeds, mix 2 to 3 fl oz per gallon and spray lightly to cover. Delay plantings and cultivations for at least 5 days for best weed control. When spraying adjacent to small desir-able plants, use a shield to prevent spray from from contacting the green part of plants. Repeat as needed to maintain control.
hexazinone 0.90 to 1.8	See preemergence section.			
paraquat 0.5 to 1.0	1.33 to 2.5 pt of 1.5 lb/gal formu-lation	When weeds are 1 to 6 inches tall.	Most annuals; top kill of perennials.	Add 1 quart of nonionic surfactant to each 100 gallons spray. Apply as directed spray to pre-vent contact of spray with green stems or foliage. Keep pressure low. **Do not** spray when windy.
sulfometuron-methyl	See preemergence section.			

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Crop, weed, or situation and herbicide	Herbicide rate formulation per 100 sq ft	Active ingredient lb/A	Time of application	Weeds controlled	Special instructions and remarks
PERIPHERAL AND NONCROP AREAS					
glyphosate	1% (v/v) - 1.3 fl oz or 2.6 tbsp 3 lb ae/gal water 2% (v/v) - 2.6 fl oz or 5.2 tbsp 3 lb ae/gal water	1-3	While weeds are actively growing.	Most annual and perennial weeds less than 6 in tall. Annual weeds over 6 in tall and perennial weeds.	**Avoid contact with desirable vegetation. Do not** spray green bark or foliage of any desirable vegetation. For optimal controlof perennial weeds apply during seed production or 2 to 4 weeks before frost.
paraquat	0.07 - 0.11 oz Gramoxone Max 2.5EC	0.56-0.94	Anytime to foliage of weeds only.	All vegetation contacted.	Apply for full coverage of weeds. Best results are obtained when weeds are young and succulent. Repeat application as needed. The addition of nonionic surfactant (0.5-1 pint per 100 gallons spray solution) is recommended. **Use in NONCROP AREAS**. Prevent contact with desirable vegetation. **Use protective clothing when applying paraquat.**
gluphosanate-ammonium	0.15-0.4 oz of Finale® (11.3%), depending on weed and stage of growth (see label)	0.21-0.37	While weeds are actively growing.	Most annual and perennial weeds.	Avoid contact with desirable vegetation. Spray to wet foliage. **Do not enter or allow entry of maintenance workers into treated areas during the restricted-entry interval (rei) of 12 hours. Wear personal protective equipment (ppe) indicated on label.**
diquat	4 tsp Reward® plus 1 tsp 75% nonionic surfactant per gallon	1.0	Apply to young weeds since control decreases as weeds mature.	Most above-ground grasses and broadleaf weeds.	Apply for full coverage and thorough weed contact. Retreatment may be necessary to control grasses and established weeds. Avoid spray contact with foliage of food crops or ornamental plants. **Do not enter or allow entry of maintenance workers into treated areas, or allow contact with treated vegetation wet with spray, dew or rain, without appropriate protective clothing until spray has dried.**

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FRUIT AND NUT CROPS

SUGGESTED USES OF HERBICIDES ON FRUIT AND NUT CROPS

Herbicide	Apple	Blackberry	Blueberry	Grape	Peach	Pecan	Strawberry
2,4-D	Yes[1, 2]	No	No	No	Yes	Yes	No
Bentazon[3]	Yes	Yes	Yes	Yes	Yes	Yes	No
Carfentrazone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clethodim	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes[3]	Yes
Clopyrolid	Yes	No	No	No	Yes	No	Yes[4]
Dazomet	No	No	No	No	Yes[5]	No	Yes[5]
DCPA	No	No	No	No	No	No	Yes[7]
Dichlobenil	Yes[1,6]	Yes[2]	Yes[4]	Yes[4]	No	No	No
Diquat[3]	Yes	Yes	Yes	Yes	Yes	Yes	No
Diuron	Yes[1]	Yes	Yes[1]	Yes[7]	Yes[7]	Yes[7]	No
Fluazifop[3]	Yes[1]	No	No	Yes	Yes	Yes	No[5]
Flumioxazin	Yes	Yes	Yes[8]	Yes[8]	Yes[8]	Yes	Yes[9]
Fluroxypyr	Yes[2, 10]	No	No	No	No	No	No
Glufosinate	Yes[1]	No	Yes	Yes	Yes	Yes	No
Glyphosate	Yes	Yes	Yes	Yes	Yes[11]	Yes	Yes
Halosulfuron	Yes[1]	Yes	Yes[1]	No	No	Yes[1]	No
Hexazinone	No	No	Yes[6]	No	No	No	No
Indaziflam	Yes[7]	No	No	Yes	Yes	Yes	No
Isoxaben[7]	Yes	No	Yes	Yes	Yes	Yes	No
Mesotrione	Yes	No	Yes	No	Yes	Yes	No
Methyl Bromide	No	No	No	No	No	No	Yes
Napropamide	No	Yes	Yes	Yes	No	Yes	Yes
Norflurazon	Yes[1, 6]	Yes[1]	Yes[12]	Yes[11]	Yes[12]	Yes[12]	No
Oryzalin	Yes	Yes	Yes	Yes	Yes	Yes	No
Oxyfluorfen	Yes[13]	No	No	Yes[7]	Yes	Yes	No
Paraquat	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pendimethalin	Yes[5]	No	No	Yes	Yes	Yes	Yes
Pronamide	Yes	No	Yes	Yes	Yes	No	No
Rimsulfuron[1]	Yes	No	No	Yes	Yes	Yes	No
Sethoxydim	Yes[2]	Yes	Yes	Yes	Yes	Yes	Yes
Simazine	Yes	Yes	Yes	Yes	Yes[7]	Yes[11]	No
Terbacil	Yes[7]	Yes[1]	Yes[1]	No	Yes[14]	No	Yes

[1]Apply to orchards at least 1 year old.
[2]Do not apply within 14 days of harvest.
[3]Do not apply to crops that will bear harvestable fruit within 12 months.
[4]Do not apply within 30 days of harvest.
[5]Apply to nonbearing crops only.
[6]Do not apply earlier than 4 weeks after transplanting.
[7]Apply to plants established 3 years or more.
[8]Do not apply less than 2 months before transplanting.
[9]Must be applied a minimum of 30 days before transplant.
[10]Do not apply to trees less than 4 years old.
[11]Apply to plants established at least 2 years.
[12]Apply to plants at least 6 months old.
[13]Do not apply when foliage or fruit are present.
[14]Do not apply within 60 days of harvest.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 16.

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Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
2,4-D Formula 40 3.8 lb/gal	0.5-1 lb ai 1-2.1 pt	Strawberry	After last picking.	Most broadleaf weeds.	Use in established plantings after last picking. **Do not** apply unless possible injury to crop is acceptable. **Do not** apply to bare ground.
benefin + oryzalin XL 2G	2.5 lb ai 150 lb 2G	Bearing: Apple Nonbearing: Blackberry Blueberry Grape Peach Pecan	Before weeds germinate.	Many annual grasses and small seeded broadleaf weeds.	Rainfall or irrigation critical for acceptable weed control. Emerged weeds must be controlled before application. Do not apply within 1 year of harvest. Do not re-enter treated sites within 12 hours after application. Do not apply to nonbearing crops within 1 year of harvest.
bentazon Basagran	0.75-1 lb ai 1.5 to 2 pt	Bearing: Peach Pecan Nonbearing: Apple Blackberry (at or before planting only) Blueberry Grape	Apply only as a DIRECTED spray when weeds are actively growing. Keep spray off green foliage and stems.	Many broadleaf weeds, including coffee senna, dayflower, smartweed, prickly sida, sesbania, wild mustard, wild poinsettia, and yellow nutsedge.	Do not apply within 1 year of harvest. Adding crop oil concentrate at 1 quart per acre improves control of certain weeds. Do not apply to stressed plants or injury may occur. Do not exceed 2 pints per acre per application or total application of 4 pints per acre per year. Do not graze animals in treated fields or use hay from treated fields for animal feed or bedding. Basagran is only available to use via supplemental label. Do not apply to nonbearing crops within 1 year of harvest.
carfentrazone-ethyl Aim EC	0.5-2 oz/A 0.008-0.031 lb ai	Apple Blackberry Blueberry Grape Peach Pecan Strawberry	When weeds are actively growing.	Most broadleaf weeds.	Use a minimum of 20 gallons of spray per broadcast acre. A nonionic surfactant or crop oil concentrate is required. Apply as a directed spray.
clethodim 2 lb/gal Select Max 1 lb/gal	0.09-0.13 lb ai 6-8 oz 12-16 oz	Bearing: Blackberry Blueberry Nonbearing: Apple Grape Peach Pecan Strawberry	Apply only as a DIRECTED spray with nonionic surfactant at the rate of 1 qt per 100 gal spray.	Annual and perennial grasses.	Sequential applications to strawberry should not be made less than 14 days apart. Do not apply within 4 days of strawberry harvest. Do not apply to other fruit or nut crops within 1 year of harvest. Do not exceed 8 ounces per acre per application or 32 ounces per acre per year. Do not apply if rainfall is expected within 1 hour after treatment. Do not apply to nonbearing crops within 1 year of harvest.
clopyralid Stinger 3 lb/gal	5.3 fl oz 0.124 lb ai	Apple Strawberry Peach	Postemergence.	Broadleaf weeds.	Do not use surfactant. Do not tank-mix with other herbicides. Do not apply within 30 days of harvest. Make one to two applications per year not to exceed 10.6 fluid ounces per acre per year. Make only one application in the spring. Minor leaf cupping may occur.

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Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
dazomet Basamid G	350 lb 347 lb ai	Nonbearing: Strawberry Peach	Preplant (plastic culture).	All weeds.	Apply at soil temperatures of 54–64°F. Do not apply to soil temperatures below 43°F and above 103°F. After application, seal the soil by watering or by tarp. Aerate soil by cultivation 7 to 12 days after application. This treatment is for use in non-bearing crops only.
DCPA Dacthal 75% WP	8-12 lb 6-9 lb ai	Strawberry	Before weed emergence.	Annual grasses and some small-seeded broadleaf weeds.	Apply no more than 9 lb a.i/A for establishment plantings nor 10.5 lb a.i/A to established plantings. **Do not** apply after first bloom. Rainfall or irrigation following applications improves weed control.
dichlobenil 4% G Barrier 50W Casoran CS	4-6 lb ai 100-150 lb 8-12 lb 1.4-2.8 gal 1.4-2.8 lb ai	Apple Blackberry Blueberry Grape	Preemergence in late winter to early spring after plants established at least 4 weeks.	Many annual and perennial grasses and broadleafs.	Apply as directed spray be fore weed seed germinate. Use low rate for annuals if application is followed by more than 0.5-inch of water. Use high rate for perennials or if incorporation is poor.
diquat Reglone Desiccant	0.25-0.5 lb ai 1.5-2 qt	Nonbearing: Apple Blackberry Blueberry Grape Peach Pecan	Apply only as a DIRECTED spray with nonionic surfactant at the rate of 1 qt per 100 gal spray.	Small broadleaf and grassy weeds.	Do not apply within 1 year of harvest. Do not allow spray to contact green foliage, stems, or fruit. Do not graze treated sites. This treatment is for use in nonbearing crops only.
diuron Diuron 80 WDG 4 lb/gal Direx Diuron 4L 4 lb/gal	Check label for rates.	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring or early summer. Add 0.5% surfactant if weeds have emerged.	Annual grasses and broadleaf weeds.	Apples must be established at least 1 year, and peaches and pecans must be established at least 3 years. Do not apply on soils containing less than 1% organic matter. Do not use on sand, loamy sand, or gravelly soils.
diuron Karmex, Diuron 80DF Direx 4L + terbacil Sinbar 80WDG	1-2 lb 1.6-3.2 pt + 1 lb ai 0.8-1.6 lb ai + 0.8 lb ai	Apple Blueberry Grape Peach Pecan	Preemergence.	Broad-spectrum weed control.	Use only under apple trees established in the orchard at least 2 years. Apply in spring or after harvest in the fall before weeds emerge or to weeds less than 2 inches tall. Do not use on trees grafted on full-dwarf rootstocks.
indaziflam Alion	1.67 lb/gal at 5 fl oz	Apple Grape Peach Pecan	Preemergence.	Broad-spectrum weed control.	Use only on well-established plants (varies by crop). Avoid direct or indirect spray contact with crop foliage, green bark, roots, or fruit, as it may cause localized crop injury or death. Only trunks with callused, mature brown bark may be sprayed.

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Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
fluazifop Fusilade DX	0.1-0.4 lb ai 6-24 fl oz	Bearing: Peach Pecan Nonbearing: Apple Grape	Warm weather when grasses are actively growing.	Grasses.	Apply to cover young actively growing annual and perennial grasses at least one hour before rain. Apply using 2 pt crop oil concentrate or 1/2 pint surfactant in 25 gallons spray. Do not apply to nonbearing crops within 1 year of harvest.
flumioxazin Chateau 51 WDG	0.09-0.38 lb ai 3-12 oz	Apple Blackberry Blueberry (highbush) Grape Peach Pecan Strawberry	Before weeds emerge. Mix with other herbicides if weeds are present.	Annual grasses and broadleaf weeds.	Prevent spray contact with trees established less than 1 year or blueberries established less than 2 years. Do not apply to newly planted crops before soil has settled. Do not allow spray to contact strawberry foliage, and do not apply after fruit set. Apply after final harvest up to bud break to crops other than strawberry. Do not apply within 60 days of harvest for apple, grape, peach, and pecan; do not apply within or 21 days for strawberry. Annual treatments should not exceed 3 ounces per acre for strawberry, 12 ounces per acre for blueberry, or 24 ounces per acre for other crops.
fluroxypyr Starane Ultra Comet 1.5	0.35-0.7 lb ai 0.7-1.4 pt 0.66-2.66 pt	Apple	While weeds are small and actively growing.	Broadleaf weeds.	Do not apply during bloom or within 14 days of harvest. Do not apply more than once per year; applications should not exceed 1.4 pints per acre annually. Do not use on trees less than 4 years old.
glufosinate ammonium Rely 200	0.75-1.5 lb ai 48–96 oz/A	Apple Grape Blueberry Peach Pecan	Apply low rate if weeds are less than 6 in. tall or high rate if weeds are 6 in. or more tall. Apply 2.4 fl oz/gal for spot treatment.	Broadleaf, grasses, and sedges.	Avoid contact with foliage or green tissue of desirable vegetation. Do not harvest within 14 days after application. Do not apply to apples planted less than 1 year. Do not exceed 12 qt/A/year in berries.

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Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
glyphosate	0.75 - 2.25 lb ae 1% (v/v) - 1.3 fl oz or 2.6 tbsp 3 lb ae/gal water or 1 gal 3 lb ae/100 gal water 2% (v/v) - 2.6 fl oz or 5.2 tbsp 3 lb ae/gal water or 2 gal 3 lb ae/100 gal water	Apple Blackberry Blueberry Grape Peach Pecan Strawberry	When weeds are actively growing.	Most annual weeds less than 6 in tall. Most annual weeds over 6 in tall and perennial weeds.	Apply as a directed spray, avoiding contact with foliage, green stems or open wounds of crop. In peach orchards, apply to trees at least 2 years old with shielded sprayer that prevents contact with any part of trees. Do not apply within 90 days after first bloom. For optimal control of perennial weeds, apply during seed production or 2 to 4 weeks before frost.
halosulfuron Sandea	0.024-0.063 lb ai 0.5-1.33 oz	Apple Blackberry Blueberry Pecan	While weeds are actively growing.	Sedges and some broadleaf weeds.	Do not apply to trees established less than 1 year. Do not exceed 2 ounces per acre per year or allow spray solution to contact trunk, stem, or foliage. Allow 45 days between sequential applications to blueberry. Add 0.25% by volume non-ionic surfactant.
hexazinone Velpar L	1-2 4-8 pt	Blueberry (highbush)	In spring before lower leaves expand.	Grasses and broadleaf weeds.	Do not apply to plants established less than 3 years. Avoid drift onto foliage to minimize injury. Do not apply to flooded fields. Do not apply within 90 days of harvest.
isoxaben Gallery 75 DF	0.5-1 lb ai 0.6-1.3 lb	Nonbearing: Apple Blueberry Grape Peach Pecan	Preemergence in late fall or early summer.	Broadleaf weeds.	**Do not** apply before soil around plant roots has firmed. **Do not** apply to plants that will bear harvestable fruit within 12 months. This treatment is for use in nonbearing crops only.
mesotrione Callisto	Up to 6 oz/A	Apple Blueberry Peach Pecan	Preemergent prebloom.	Most broadleaf weeds.	Two 3-oz/A applications may be used, but make no more than two applications per year. Using a crop oil is recommended. Do not apply after the onset of bloom. Apply as a directed spray
methyl bromide	See label	Strawberry	Preplant (plastic culture). Preemergence (matted row).	All weeds.	Inject into the soil 4 to 6 inches deep and cover with black plastic immediately. Soil moisture should be near field capacity, and soil temperature should be at least 50°F at the treatment depth. Allow at least 2 weeks before planting.

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Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
napropamide Devrinol 50% DF	2-4 lb ai 4-8 lb	Blackberry Blueberry Grape Pecan Strawberry	Preemergent before weed emergence.	Annual grasses and small-seeded broadleaf weeds.	Rainfall or irrigation within 24 hours of application is necessary for weed control. Application may be made immediately after planting and once each year following. Application to strawberry should be delayed until the desired number of daughter plants are established. **Do not** apply from bloom to harvest.
norflurazon Solicam 80% DF	2-4 lb ai 2.5-5 lb	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before weeds emerge. Use when plants are dormant, before weeds emerge.	Annuals.	Avoid contact with leaves and fruit. Use lower rates on lighter soils and higher rates on heavier soils. One application per year. See label for tank mixes.
noflurazon Solicam 80DF + simazine Princep, Simazine 90 DG Princep, Simazine 4L	2.5-5 lb + 2.2-4.4 lb 2-4 qt 2-4 lb ai + 2-4 lb ai	Apple	Preemergence.	Broad-spectrum weed control.	Do not use on trees established in the orchard less than 1 year. Do not use on sand, loamy soil, or gravelly soils. Tank-mix with paraquat, glufosinate, or glyphosate for control of emerged weeds.
oryzalin Surflan AS 4 lb/gal	2-6 lb ai 4-12 pt	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before weeds emerge.	Annual grasses and small-seeded broadleaf weeds.	Rainfall or irrigation following applications improves weed control. Existing weeds should be destroyed before application. Use lower rates for short-term control and higher rates for long-term control. May be tank mixed with diuron or simazine. See label for specific crop and rate recommendations.
oryzalin Surflan 4 AS 4 lb/gal oryzalin 4 lb/gal + simazine Princep, Simazine 90 DG Princep, Simazine 4L	2-4 qt + 2.2-4.4 lb 2-4 qt 2-4 lb ai + 2-4 lb ai	Apple	Preemergence	Annual grass and broadleaf weeds	Apply under trees established in the orchard for at least 1 year. Apply in the spring before annual weeds emerge. Do not apply to gravelly, sandy, or loamy sand soils. Add paraquat or glyphosate for control of emerged weeds.
oxyfluorfen Goal 2XL	0.5-2 lb ai 2-8 pt	Apple Grape Peach Pecan	Preemergence or postemergence. Add 0.25% nonionic surfactant if weeds are emerged.	Annual grasses and broadleaf weeds.	**Do not** apply after bud swell or if foliage, fruit, or nuts are present.

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Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
paraquat Gramoxone SL	0.6-1.2 lb ai 2-4 lb Add up to 1 pt of a suitable nonionic surfactant to 100 gal of spray solution.	Apple Blackberry (Brambles) Blueberry Grape Peach Pecan Strawberry	When weeds are actively growing before 6 inches tall.	Annuals and top kill of perennial weeds.	Avoid contact with crop plant. **Do not** graze treated area. **Do not** apply when nuts to be harvested are on ground. **Must be used by certified applicator.** May be tank mixed with simazine. See label for specific crops and rates. Brambles and blackberries: apply before emergence of new shoots as injury may occur.
pendimethalin Prowl H_2O 4 lb/gal Prowl or Pendimethalin 3.3 EC 3.3 lb/gal	Check label for rates.	Apple Grape Peach Pecan Strawberry	Apply before weeds emerge in the spring	Annual grasses and small-seeded broadleaf weeds	Do not apply to newly planted trees until the soil has settled and no cracks are present. Adequate rainfall or overhead irrigation within 7 days of application is required for effective control. For peach and pecan, do not apply within 60 days of harvest.
pronamide Kerb 50 W	1-4 lb ai 2-8 lb	Apple Blueberry Grape Peach	Preemergence or postemergence. Late fall or early winter.	Annual and perennial grasses and broadleaf weeds.	**Do not** apply more than 4 lb Kerb/season to blueberries. Apply to established blueberries only.
rimsulfuron Matrix FNV 25 WG	1 oz ai 4 oz	Apple Grape Peach Pecan	Preemergence of broadleaf weeds; or while weeds are actively growing.	Broadleaf weeds	Do not apply to trees established less than 1 year or exceed 4 ounces per acre per year. Allow 7 days between application and harvest for apple. Allow 14 days between application and harvest for other crops. Add 0.25% by volume nonionic surfactant.
sethoxydim Poast 1.5E	0.2-0.5 lb ai 1-2.5 pt	Bearing: Apple Blackberry Blueberry Grape Strawberry Nonbearing: Peach Pecan	Postemergence when grasses are actively growing.	Annual and perennial grasses.	Rate dependent upon grass species, size, and growing conditions. Always add 2 pt Crop Oil Concentrate to each 100 gal spray. Do not apply to nonbearing crops within one year of harvest. Do not apply to nonbearing crops within 1 year of harvest. **Preharvest intervals:** Apple 14 days Blueberry 30 days Grape 50 days Strawberry 30 days

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Herbicide	Broadcast rate lb or pt/A	Crops	Time of application	Weeds controlled	Remarks, limitations
simazine Princep 4 lb/gal 90%DG	1.6-4 lb ai 2-8 pt 1.75-4.4 lb	Apple Blackberry Blueberry Grape Peach Pecan	Preemergent in spring before bud break of crop.	Annuals and perennials.	One year establishment before application in apple, blackberry, blueberry, and peach, 2-year establishment before application in pecan and 3-year establishment before application in grape. May be used in combination with paraquat. See label for instructions on specific crops and rates.
terbacil Sinbar 80% WDG	0.4-3.2 lb ai 0.5-4 lb	Apple Blackberry Blueberry Peach Strawberry	Preemergent in spring or fall.	Annuals.	Treat only when bushes have been established for at least one year. Consult label for correct application technique. Do not apply to soils with less than 1% organic matter.
triflurali + isoxaben Snapshot 2.5TG	2.5-5 lb ai 100-200 lb	Nonbearing: Apple Blackberry Blueberry Grape Peach Pecan	Preemergent prior to weed germination or immediately after cultivation.	Many broadleaf summer and winter annual weeds.	Do not apply within 1 year of harvest. Do not apply to newly transplanted crops until soil has settled and no visible soil cracks exist. Do not exceed 600 pounds per acre per year. Sequential applications of 150 pounds per acre or more should not be made within 60 days of previous applications. This treatment is for use in nonbearing crops only.

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WOODY PLANTS

General recommendations for applying herbicides to forest trees, brush, and woody vines.

CUT-SURFACE TREATMENTS: FOREST TREES

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Injection	Trees 1 inch in diameter and larger.	Any season, but growing season treatments are most effective. Avoid sap rise and leaf expansion in spring if possible.	(1) 2,4-D (amine) — 4 lb/gal.	Apply 1 ml solution in each cut; space cuts 2 inches apart, edge to edge about waist high.
			(2) triclopyr (3 lb ae/gal) diluted 1 part 3 lb ae/gal 1 part water.	
			(3) picloram + 2,4-D (Pathway).	Use on all species any time of year. Overlap injector cuts on hard-to-kill species, such as hickory, dogwood, ironwood, and ash. Do not allow picloram to spill into the root zone of desirable and very susceptible species such as yellow poplar and pine.
			(4) imazapyr (4 lb ae/gal) dilute solution: mix 4-6 oz Arsenal AC per gallon of water.	Make cuts through the bark completely around the tree with not more than 2 inches between cut edges. Spray or brush Arsenal AC solution into the cuts until thoroughly wet.
			(5) imazapyr concentrated solution: mix 25 oz with no more than 103 oz water.	Make one cut for every 3 inches diameter breast height. Spray 1 ml into each cut. Best results obtained from September - March.
			(6) glyphosate (3 lb ae/gal) diluted 1 part Accord SP: 2 parts water.	Apply 1 ml of solution for every 2 inches trunk diameter.
Stump	Sprout control on cut hardwood stumps, particularly on species that sprout profusely: oaks, maple, beech, hickories.	Any season, but most effective as soon as possible after cutting; if possible, treat the same day of cutting.	(1) 2,4-D (amine) — 20 lb/100 gal.	Apply with low volume knapsack sprayer using solid-cone nozzle of medium orifice.
			(2) picloram + 2,4-D (Pathway).	
			(3) triclopyr — 20-25% 4 lb ae/gal + 10% surfactant, + 65-70% diesel fuel.	Triclopyr in diesel fuel can be applied to stumps as late as 3 months after cutting.
			(4) imazapyr (Chopper GEN2) — mix 8-12 oz Chopper GEN2 per gallon of water, diesel, or penetrating oil.	Spray or brush the Chopper GEN2 solution onto the cambium area (just inside the bark) of freshly cut stumps until thoroughly wet.
			(5) imazapyr (4 lb ae/gal) — mix 4-6 oz per gallon of water.	Spray or brush the imazapyr solution onto the cambium area (just inside the bark). Ensure that the solution thoroughly wets the entire cambium.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 16.

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Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
BARK, FOLIAGE, AND SOIL TREATMENTS: BRUSH AND FOREST TREES				
Basal Bark	Scattered brush or "clumps" of hardwood brush and small trees. Can be used on species remaining after foliar spray. Expect poor control on root-suckering species: black locust, hickories, and sassafras. Best results on trees less than 3 inches diameter.	Any season (Avoid leaf expansion).	(1) 2,4-D + 2,4-DP (LV esters) — 8 to 12 lb each per 100 gal oil.	Drench lower 12 to 15 inches of plant. Density of brush will determine rate per acre.
			(2) triclopyr — 1.5 gal 4 lb ae/gal + 98.50 gal diesel fuel.	Spray the lower 1.5 to 2 feet of brush to runoff, ensuring coverage of root crown.
			(3) 2 gal triclopyr 4 lb ae/gal + 25 gal diesel + 0.5 gal surfactant + 72.5 gal water.	Follow label directions for mixing. Apply as above.
			(4) triclopyr + picloram — 1-2 gal Access in oil to make 100-gal mix.	Works best on basal diameters up to 6 inches. Drench lower 1.5 to 2 feet of stem.
		Late summer, fall, and winter. Reduced control may occur during sap rise or leaf expansion in spring.	(1) imazapyr (Chopper GEN2) — mix 8-12 oz Chopper GEN2 per gallon of water, diesel, or penetrating oil.	Apply to wet the lower 12-18 inches of hardwood stems less than 4 inches in diameter at breast height. Ensure that the roots of desirable hardwoods do not extend into the treated area.
Stream-Line thinline	Same as above except best on trees less than 3 inches diameter with juvenile bark	Best results obtained in March-June.	(1) triclopyr 20-25% 4 lb ae/gal + 10% v/v surfactant + 60-75% diesel fuel.	With a backpack sprayer and a straight stream nozzle, a 2- to 3-inch-wide band of herbicide is sprayed on each stem. Treat the stem from two sides if it is 1- to 3-inch diameter to ensure that the herbicide completely encircles the stem.
Selective Hardwood Control in Pine Plantations	Hardwood sprouts and large trees in young (1- to 6-year-old) pine stands	July through early October.	(1) imazapyr (4 lb ae/gal) apply 16-32 oz Arsenal AC per acre in 10-15 gal water. Add 0.25% v/v nonionic surfactant.	Apply as a broadcast spray to release loblolly and Virginia pine. Use 12-16 oz Arsenal AC to release slash pine or shortleaf pine stands at the end of the third growing season or thereafter.
			(2) imazapyr (8-9 oz 4 lb ae/gal) + metsulfuron (1-1.5 oz metsulfuron 60%) per acre.	Apply broadcast in 10-15 gallons of spray per acre.
			(3) imazapyr (4 lb ae/gal) mix 1 oz per gallon of water. Add 0.5% v/v minimum nonionic surfactant.	Apply to individual hardwood crowns. Spray to obtain good coverage of the entire crown, but not to the point of runoff. Effective in controlling hardwood sprouts less than 7 feet in height for forest site preparation and pine release. Use as a directed spray to release any conifer species.

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Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliage Spray (low volume, aerial, non-selective)	Large tracts of mixed brush and hardwoods on utility rights-of-way and for range and pasture establishment. All unwanted small trees and shrubs for site preparation in advance of seeding or planting forest trees.	During growing season from late spring to early summer. Effectiveness is decreased during periods of drought.	(1) 8-12 lb 2,4-DP (LV esters) per 30 gal water per acre.	Use aerial application, low-volume sprayer. Use drift control agent in mixture. See Weedone 2,4-DP label for specific instructions.
			(2) 2 lb each of 2,4-D and 2,4-DP (LV esters) and 1.66 lb MSMA per 10 gal water.	Apply 10 gallons of spray per acre before planting to reduce competition from mixed hardwoods and brush.
			(3) triclopyr + picloram + 2,4-D — 0.5 gal 4 lb ae/gal + 1.5 gal Tordon 101 mixture.	Apply 10-15 gallons of spray per acre.
			(4) 0.5 gal Garlon 4 + 0.5 gal Tordon K.	Apply 10-15 gallons of spray per acre.
			(5) hexazinone 1-3 gal Velpar L per acre. Rate depends on soil texture.	For exact rate of Velpar L, consult label. Rate dependent on soil texture.
		Midsummer to fall.	(1) glyphosate — 6-8 qt 3 lb ae/gal in 10 gal water. Addition of nonionic surfactant at 2.5% v/v is recommended.	
			(2) imazapyr — 28-32 oz of Chopper GEN2 per acre. Addition of a nonionic surfactant at 0.5-1% v/v, or 1-2.5% MSO, is recommended.	Best results are obtained from late summer or early fall applications; however, Chopper GEN2 can be applied year-round.
		Late summer to early fall.	(1) imazapyr (Chopper GEN2) — apply 28-30 oz per acre in 10-15 gal water. Add 0.5-1% v/v nonionic surfactant.	
			(2) imazapyr + glyphosate — 28-30 oz Chopper GEN2 + 4-5 qt. Add 0.5-1% v/v nonionic surfactant.	
			(3) imazapyr + triclopyr — 28-30 oz Chopper GEN2 + 32-40 oz 4 lb ae/gal. Add 0.5-1% v/v nonionic surfactant.	
			(4) imazapyr + metsulfuron methyl 28-30 oz Chopper GEN2 + 1-2 oz Escort XP. Add 0.5-1% v/v nonionic surfactant.	
		During growing season from leaf out to fall colors.	(1) glyphosate + imazapyr — 4-5 qt Accord SP + 28-32 oz Chopper GEN2 per acre in 10-15 gal of water. Add 0.5% v/v crop oil or 0.5% nonionic surfactant.	Apply as a broadcast spray by ground equipment or helicopter for forest site preparation.
			(2) glyphosate + triclopyr — 4-6 qt Accord SP + 1-2 qt 4 lb ae/gal + 2.5% v/v nonionic surfactant.	Apply 10-15 gallons solution per acre.
			(3) fosamine + imazapyr — 4.6 qt Krenite UT + 20-24 oz Chopper GEN2 + 1.5% v/v nonionic surfactant in 10-15 gal of water.	Apply as a broadcast spray by ground equipment or helicopter for forest site preparation.
	Heavy hardwood competition and residual pine.	Full leaf to Aug. 1.	(1) 2 qt Tordon K + 1 qt 4 lb ae/gal + 20-24 oz Chopper GEN2.	Use nonionic surfactant at 0.5% v/v.
			(2) 4-8 qt Krenite UT + 20-24 oz Chopper GEN2 + 1% v/v nonionic surfactant.	
			(3) 2 oz metsulfuron 60% + 3 qt 3 lb ae/gal + 1% v/v nonionic surfactant.	Spray to wet.
			(4) imazapyr + glyphosate — 28-32 oz Chopper GEN2 + 5-6 qt glyphosate. Add 0.5-1% v/v nonionic surfactant.	

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Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
	Light hardwood competition and residual pine and grasses.	Full leaf to Aug. 1.	(1) 2 qt Tordon K + 1-2 pt 4 lb ae/gal triclopyr + 8-10 oz Arsenal.	Use nonionic surfactant at 0.5% v/v.
			(2) 8 qt Tordon 101M + 8-10 oz imazapyr.	
		June 1 to leaf drop.	(3) 4-8 qt Krenite UT + 16-20 oz imazapyr + 1% v/v nonionic surfactant.	Use higher rates for Virginia and Shortleaf pine. Spray to wet.
Foliage Spray (high volume, ground)	Scattered brush or "clumps" of hardwood brush. Can be used on species not controlled by prior sprays, such as maple, oak, ash, and persimmon growing along fence rows, highways, rights-of-way, and other non-crop areas.	Late spring and summer from time foliage is fully developed. Dormant season ineffective.	(1) 2-3 lb each of 2,4-D and 2,4-DP (LV esters) per 100 gal water.	Apply uniformly over top of brush as a coarse spray. With back-pack sprayer, wet all foliage to point of runoff. With hydraulic sprayer, apply 200 to 600 gallons of spray mixture per acre, depending on height and density of brush.
			(2) 1-3 qt triclopyr 4 lb ae/gal per 100 gal water.	Apply 100-400 gallons of spray per acre depending on size and density of woody plants. Spray to wet.
		Growing season from leaf out to fall colors.	(1) glyphosate — 2-4 qt of 3 lb ae/gal per 100 gal of water. Add 1-2 qt nonionic surfactant.	Apply 100-200 gallons of spray per acre. Spray to wet.
		Late spring to fall color	(1) 4-8 qt Krenite UT + 2 oz Escort XP per 100 gal water + 1% v/v nonionic surfactant.	Apply 100 gallons per acre. Spray to wet.
			(2) 2 oz Escort XP + 3 qt triclopyr 3 lb ae/gal + 1% v/v nonionic surfactant per 100 gal water.	Spray to wet.
Soil application with hand-gun applicator	Individual trees or scattered "clumps" of trees or brush. Can be used to treat large tracts with mixed brush and hardwoods.	Mid-March through May. Rain after application is required to activate the herbicide.	2-4 ml of 25% hexazinone (Velpar L) for each inch of stem diameter. For grid pattern to use in site preparation, refer to Velpar L label.	Apply undiluted with exact-delivery hand-gun applicator. Direct treatment to soil within 3 feet of root collar of trees to be controlled. For large trees requiring more than one delivery, make applications on opposite sides of the stem. Rate of herbicide when applied in a grid pattern will depend on soil texture. Refer to the Velpar L label for exact rates.
Soil application (dry materials)	Individual trees.	Early spring applications are most effective.	(1) 75% hexazinone (Velpar DF VU) — 0.07-0.1 oz per inch diameter of tree.	Apply completely around base of tree. **Do not** apply in root zone of desirable plants. If root grafting occurs, some desirables may be killed outside the treatment area. Increase rates on fine-textured soils (clay, etc.). If slope is greater than 12-15%, damage down the slope from treatment area may occur.
	"Clumps" of brush of all species and sizes. Forestry site preparation and rights-of-way.	Apply before or during period of active growth of species to be controlled, when rainfall can be expected for soil activation.	(1) 75% hexazinone (Velpar DF) — 2.5 to 5.5 lb/A depending on soil texture.	Apply with aerial or ground equipment.

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Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Selective herbaceous weed control in pine plantations	Grasses and broadleaf weeds, such as fescue, bahiagrass, goldenrod, dogfennel, broomsedge, etc.	Late winter to early spring before substantial growth occurs in spring.	(1) sulfometuron — 2-6 oz sulfometuron per acre depending on weed complex.	Apply with ground or aerial sprayers delivering between 5-25 gallons per acre. Limit the application to 4 ounces per acre when applied over seedlings.
			(2) sulfometuron plus imazapyr — 2 oz Oust XP plus 4 oz Arsenal AC per spray acre.	Addition of Arsenal AC increases control of johnsongrass, bermudagrass, and other difficult species.
			(3) sulfometuron plus hexazinone — 2 oz Oust XP plus 2 to 3 pt Velpar L per acre.	Apply with ground or aerial sprayers at 5-25 gallons per acre
		Mid- to late spring after growth of weeds has begun.	sulfometuron plus glyphosate — 2-3 oz Oust XP plus 12-16 oz Accord SP per acre.	Apply in at least 10 gallons total solution. Addition of Roundup or Accord SP provides broad spectrum control of herbaceous weeds. Take care to ensure that spray does not contact plant foliage.
		Early spring to midsummer.	imazapyr (Arsenal AC) — Apply 4-10 oz per acre in 20-30 gal water. Add 0.25% v/v nonionic surfactant or less.	Best not to add surfactant for slash pine. Apply as a broadcast spray or as a 5- to 6-foot-wide band centered over pine rows. Labeled for loblolly, Virginia, and slash pine plantations.
		Late spring to midsummer.	1 oz Escort XP + 4-6 oz Arsenal AC in 10-30 gal water. Add 0.25% v/v nonionic surfactant or less.	Loblolly pine only.
DIFFICULT-TO-CONTROL WOODY PLANTS				
Foliar spray	Easter Red Cedar	Summer	Tordon K — 0.25% solution in 1% diesel: water emulsion.	Spray to wet foliage.
			Tordon 101M — 32 oz + 4 oz nonionic surfactant in 5 gal water.	Spray to wet foliage.
Injection			Pathway — inject 3 to 4 ml for each 3 feet of tree height.	
Foliar spray	Green Ash	Summer	Triclopyr (ester) — Use 48 fl oz/A 4 lb/gal with 0.5% v/v nonionic surfactant.	Spray to wet foliage.
			Metsulfuron methyl — Use 2 oz/A with 0.5% v/v nonionic surfactant.	Spray to wet foliage.
Foliar spray	Osage Orange	March-June	metsulfuron methyl (Escort XP) — 1 to 2 oz per 100 gal water with 0.5% nonionic surfactant.	Apply as high volume foliar spray. Treat to runoff.
Basal bark			triclopyr (4 lb ae/gal) — Use 13 oz Garlon 4 + 13 oz Cide-Kick II surfactant + 100 oz diesel fuel.	Apply to smooth bark on stems no larger than 3 inches in diameter.
Foliar spray	Post Oak	Summer	Triclopyr (ester) — Use 24 fl oz/A 4 lb/gal with 0.5% v/v nonionic surfactant.	Spray to wet foliage.
			Imazapyr — Use 48 fl oz/A 2 lb/gal or 24 fl oz/A 4 lb/gal with 0.5% v/v nonionic surfactant.	Spray to wet foliage.
Foliar spray	Privet	May-Aug.	imazapyr (4 lb ae/gal) — Use a 1% v/v solution with 0.5% v/v nonionic surfactant in water.	Spray to wet foliage. May require retreatment if sprouting occurs.
		May-Sept.	metsulfuron methyl (Escort XP) — 4 oz/100 gal water + 1% v/v nonionic surfactant.	Spray to wet. May require retreatment if sprouting occurs. Can be tank mixed with Arsenal.
		February - April	glyphosate (4 lb ae/gal) — 2 qt/A or a 5% solution (6 oz with 122 oz of water) from a backpack sprayer.	Spray to wet. Provides excellent control (90 + %), but sprouting may occur.

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Woody Plants, Continued

Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Yaupon	May-June	6 qt glyphosate 3 lb ae/gal per acre + 2 qt triclopyr 4 lb ae/gal per acre	Spray to wet.
Foliar spray	Switchcane or Bamboo	May-Sept.	glyphosate (Roundup or Accord SP) — 4 qt/A + 1% volume to volume nonionic surfactant.	Best results are obtained after burning or cutting patches and applying spray to sprouts.
		Early spring	hexazinone — 8-10 qt/A — Velpar L	Sites should be dry at application time.
Basal Aminocyclopyr-achlor (Method)	Callery pear	Before bud break	10-20% solution + bark penetrator	
Foliar		May-August	10-18 fl oz/A	
Frill or Cut Stump		April-October	0.5-1 ml/incision every 2 in DBH or 5-10% solution	
Injection	Chinese tallow	May-Feb.	triclopyr (3 lb ae/gal) Pathfinder II imazapyr (4 lb ae/gal)	Apply in dilutions and spacings specified on herbicide label. Nontarget plants may be killed or injured by root uptake of Arsenal.
Stumps	Chinese tallow	May-Feb.	triclopyr	Per label instructions, apply to stump tops immediately after cutting.
Basal Bark	Chinese tallow	Before bud break	20% v/v solution triclopyr (4 lb ae/gal)	Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark.
Seedling and Saplings	Chinese tallow	Jul.-Oct.	1% v/v solution imazapyr (4 lb ae/gal) 30% v/v solution Krenite S 2% v/v solution triclopyr 4 lb ae/gal 2% v/v or 64 oz/A solution imazamox (Clearcast)	Spray to wet foliage (add 0.5% nonionic surfactant to all mixtures) except Clearcast application, which receives 1% MSO.
Soil surface	Chinese tallow	Growing season	Velpar L	Apply one squirt with a spot gun per 1 inch stem diameter within 3 feet of the stem or in a grid pattern at spacings specified on the herbicide label. For treatment of extensive infestations in forest situations. Nontarget plants may be killed or injured by root uptake.
Injection and Stumps	Mimosa (silktree)	May-Feb.	triclopyr (3 lb ae/gal) imazapyr (4 lb ae/gal)	Make stem injection using herbicide dilutions as specified on herbicide label. For felled trees, apply these herbicides to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal.
Bark or Basal Bark	Mimosa (silktree)	Before bud break	20% v/v solution triclopyr (4 lb ae/gal)	Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark.
Seedlings and Resprouts	Mimosa (silktree)	Jul.-Oct.	2% v/v solution triclopyr (3 or 4 lb ae/gal) 2% v/v solution glyphosate 3 lb ae/gal 0.2-0.4% v/v solution Transline	Spray to wet foliage (add 0.5% nonionic surfactant to Garlon 3A and Garlon 4 mixtures).

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Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Injection and Stump	Tree-of-Heaven (Ailanthus)	Midsummer	triclopyr (3 lb ae/gal) Pathfinder II picloram + 2,4-D (Pathway) imazapyr (4 lb ae/gal)	Make stem injections in large trees then apply herbicide. For felled trees, apply herbicide to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal.
Basal Bark	Tree-of-Heaven (Ailanthus)	Midsummer.	20% v/v solution triclopyr (3 lb ae/gal)	Apply to young bark of saplings as basal spray in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor).
Foliage Spray	Tree-of-Heaven (Ailanthus)	July-Oct.	1% v/v solution imazapyr (4 lb ae/gal) 30% v/v solution (Krenite S) 2% v/v solution triclopyr (4 lb ae/gal)	Spray to wet all foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake.
Foliage spray	Baccharis	Midsummer	5-6 qt/A triclopyr (4 lb ae/gal)	Spray to wet foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake. (Add 0.5% nonionic surfactant or 1% MSO.)
Foliage spray	Palmetto	spring	2 qt/A 4 lb ae/gal + 2 oz/A metsulfuron 60%	Spray to wet all foliage. Add 1-2% v/v MSO to spray solution. May require sequential applications for complete control.
WOODY VINES				
Foliage Spray and Soil Application	Poison Ivy	Late spring application most effective.	(1) picloram + 2,4-D — Use 2-3 gal Tordon 101 or Grazon P+D mixture in 15-50 gal water.	Broadcast over root zone. Use picloram only where desirable trees with root zone in the treatment area are expendable.
			(2) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.
		Mid-to late summer.	(1) 4-5 qt Accord SP or Roundup (glyphosate) per acre broadcast or 2% solution with hand sprayer.	Apply as foliar spray while leaves are green. Repeat applications may be necessary. Use the higher rate for plants that have reached woody stage of growth.
Foliar spray	Japanese Honeysuckle	Late spring and summer.	(1) 2,4-D (LV ester) — 4 lb/gal in 100 gal diesel. (2) glyphosate — wet all foliage with a 2% Roundup or Accord SP solution.	Apply as a foliage spray thoroughly wetting all foliage and stems. Density will determine volume of spray per acre. Spot treat regrowth as required. Generally requires a followup or second application.
			(3) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.
			(4) apply 1-2 oz Escort XP or Cimarron per acre in water solution.	Can damage black cherry or cottonwood.
Foliage spray and soil application	Wisteria	Aug.-Sept.	(1) picloram (Tordon K — 0.5 gal/A) (2) glyphosate (Accord SP — 8 qt/A) (3) dicamba (3% Banvel or Clarity) (4) metsulfuron (Escort XP or Cimarron — 1 oz/A) (5) clopyralid (Transline — 21 oz/A).	All treatments provided 90% brownout in first year — all to be reevaluated. (Add 0.5% nonionic surfactant to all mixtures.)

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Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Kudzu	Late spring to midsummer.	(1) picloram + 2,4-D — 1-2 gal Tordon 101 or Grazon P+D mixture in 20 gal water.	Apply as foliage spray after full leaf expansion; repeat when regrowth appears. Will damage pines and hardwoods.
			(2) dicamba + 2,4-D — 3 lb dicamba + 5.5 lb of 2,4-D in 20 gal water.	Note: Use for pine vs. hardwood.
			(3) Escort XP or Cimarron — 4 oz/A.	Can apply over/under pine. Apply after full leaf. Use with 1 quart of nonionic surfactant per 100 gallons of water. Will damage black cherry, cottonwood, winged elm, dogwood, and some other hardwoods.
			(4) Transline — 21 oz/A.	Can apply over or under pines. Can apply around hardwoods but may injure leguminous species.
		Midsummer to fall.	aminocyclopyrachlor + chlorsulfuron — 10 oz/A with 0.5% v/v nonionic surfactant.	
Foliar spray	Multiflora Rose	Spring.	(1) dicamba — Mix 1 gal Clarity or Vanquish in 100 gal water.	Apply as a foliage spray after full leaf expansion; repeat when regrowth occurs.
			(2) 2,4-D (LV ester) — 4 lb in 100 gal water.	Addition of up to 5 gallons of diesel fuel per 100 gallons of spray will improve control.
			(3) 1-3 qt Garlon 4 or Remedy per 100 gal of water.	Spray to wet foliage.
			(4) Escort XP or Cimarron — 0.75-1 oz per 100 gal water.	See Escort XP above.
		Summer.	(1) glyphosate (Accord SP) (3 lb ae/gal) — 1% solution plus 0.5% nonionic surfactant.	Spray to wet foliage.
Foliar spray	Trumpetcreeper	Late summer.	glyphosate (Accord SP) (3 lb ae/gal) — 4 qt/A + 0.25% nonionic surfactant.	Apply at least 4 weeks before frost. May require re-treatment.
Foliar spray	Redvine	Late summer.	Vanquish or Clarity — 2 qt/A	Apply at least 4 weeks before frost. May require re-treatment.
Foliar spray	Grape Vine	Late spring to midsummer.	(1) 2,4-D (LV ester) — 4 lb in 100 gal water.	Spray all foliage until wet. Addition of crop oil will improve control.
			(2) 1-3 qt Garlon 4 or Remedy per 100 gal water.	Spray to wet foliage.
DIFFICULT-TO-CONTROL HERBACEOUS PLANTS				
Foliar spray	Blue Vervain	Late spring to early summer.	(1) Triclopyr 32 oz Garlon 4 or Remedy 48 oz Garlon 3A (2) Grazon P+D (3) Weedmaster	Add 0.25% v/v nonionic surfactant.

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Application technique	Target species	When to apply	Herbicide and rate (active chemical)	How to apply
Foliar spray	Cogongrass (A combination of herbicide treatment following burning or mowing may be more effective than herbicide treatment alone.)	Mid- to late summer.	(1) imazapyr — 48 oz/A or 1% solution of Arsenal or 24 oz/A or 0.5% solution of Arsenal AC with 1 qt nonionic surfactant per 100 gal spray.	Apply in 20 gallons of spray per acre.
			(2) glyphosate — 72 oz/A or 2% solution of 3 lb ae/gal formulation (with 0.5% v/v nonionic surfactant) if none in formulation.	Often requires treatment in consecutive years. Use 20 gallons of spray per acre. Apply mid-July to 2 weeks before killing frost.
			(3) imazapyr + glyphosate — 24 oz/A or 0.5% solution of Arsenal AC or 48 oz/A or 1% Arsenal plus 32 oz/A or 2% Accord SP or glyphosate (3 lb ae/gal) per acre with 0.25% v/v nonionic surfactant + chlorsulfuron.	Apply in 20 gallons of spray per acre.
		April to May.	Method 240SL (aminocyclopyrachlor) at 8 oz/A + 8 fl oz/A imazapyr (2 lb ae/gal) + 0.5% (v/v) nonionic surfactant.	If applied to roadside rights of way, use the full rate on the first year of application, but reduce imazapyr rates to 4 fluid ounces per acre for sequential yearly applications to minimize damage to desirable sod. Application in root zones of desirable trees may cause damage.
Foliar spray	Mistletoe	Winter.	Florel — 2 qt/A in 4 gal water + 0.25% nonionic surfactant.	Spray to wet foliage.
Foliar spray	Johnsongrass	Summer.	(1) Fusilade DX at 8-12 oz/A or 0.5% solution + 0.25% nonionic surfactant or 1% crop oil concentrate.	Spray to wet foliage thoroughly, but not to point of runoff.
			(2) Select at 8-16 oz/A or 0.25% solution + 1% crop oil concentrate.	Spray to wet foliage thoroughly, but not to point of runoff. Split treatments (two 8-ounce treatments) can be used. However, high rates (12 to 16 ounces) should be used if a single treatment is used.
			(3) Outrider at 1.33 oz/A with 1 qt nonionic surfactant per 100 gal spray.	
			(4) glyphosate (3 lb ae/gal) applied as 2% solution in fall. Add 1 qt nonionic surfactant per 100 gal if formulation has none.	
Foliar spray	Horsetail or scouring rush	Summer.	(1) Telar — 1.3 oz/A.	Repeat applications will be required. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray.
			(2) Oust XP — 8 oz/A.	
			(3) Rely — 3% solution.	
			(4) Casoron — 150-200 lb/A of Carson 4G.	
			(5) Hyvar XL — 6-12 gal/A.	
Foliar spray	Itchgrass	Summer-fall.	Glyphosate 2% solution.	Spray itchgrass to wet all foliage. Be careful not to spray nontarget plants.
		Spring.	Hexazinone (Velpar) 0.5-0.53 lb/A.	Spray itchgrass to wet all seedling itchgrass foliage thoroughly. Add nonionic surfactant or oil concentrate.
		Summer-fall.	MSMA 4 lb/A.	Spray itchgrass to wet all foliage. If surfactant is not present in the formulation, add nonionic surfactant at 0.25%. If the objective is to encourage bermudagrass growth, use MSMA alone.
		Summer-fall.	Sethoxydim 1.5 % + 1% crop oil concentrate.	Spray itchgrass to wet all foliage but not to the point of runoff.

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AQUATIC WEEDS

Rates are expressed on basis of active ingredient unless trade product is named. Where weed growth is heavy, treat only a portion of the area at one time to avoid depleting oxygen in the water during decomposition of vegetation. Treatment of entire ponds or lakes heavily infested with aquatic weeds can result in death of fish.

Calculations for amount of herbicide needed on basis of parts per million by weight (ppmw)

Ditch or canal

W = A x L x C x 0.0000625

W = pounds of active ingredient needed
A = cross section area of channel in sq. ft.
L = length of channel in feet
C = desired concentration of herbicide in ppmw

Pond or lake

W = A x D x C x 2.7

W = pounds of active ingredient needed
A = area of water surface in acres
D = average depth in feet
C = desired concentration of herbicide in ppmw

TREATED WATER USE RESTRICTIONS (NUMBERS OF DAYS).

Common Name	Trade Name	Human			Animal	Irrigation		
		Drinking	Swimming	Fish Consumption	Drinking	Turf	Forage	Food Crops
2,4-D		-[ab]	0	0	0	21[bc]	21[bc]	21[bc]
Bispyribac-sodium		0	0	0[d]	-[e]	-[e]	-[e]	-[e]
Carfentrazone-ethyl	Stingray	1	0	0	-[f]	14[g]	14[g]	14[g]
Copper Complexes Copper Sulfate		0[h]	0	0	0	0	0	0
Diquat		1-3	0	0	1	1-3	5	5
Endothall		7-25[i]	0	0	7-25	0	7-25	7-25
Flumioxazin		0	0	0[d]	0	0.5-5[j]	0.5-5[j]	5
Fluridone		0	0	0	0	30	30	30
Glyphosate		0	0	0	0	0	0	0
Imazamox	Clearcast	-[k]	0	0	0	-[k]	-[k]	-[k]
Imazapyr		2	0	0	0	120[l]	120[l]	120[l]
Penoxsulam	Galleon	0	0	0	0	-[m]	-[n]	-[o]
Sodium Carbonate Peroxyhydrate	Pak 27, Phycomycin SCP	0	0	0	0	0	0	0
Triclopyr		-[p]	0	0	0	-[q]	120	120
Acid Blue #9 & Yellow #23 Dyes	Aquashade, Enviro-Blue	0	0	0	0	0	0	0

[a]See the label distance allowed from potable water intake.
[b]A shorter interval may be used if an approved assay indicates less than 0.1 ppm 2,4-D.
[c]Do not use in ditches where water is used to irrigate highly susceptible crops, such as cotton, grapes, and tomatoes unless an approved assay indicates that 2,4-D concentrations are less than 100 ppb.
[d]Do not apply to waters used for crayfish farming.
[e]Do not use for livestock watering or irrigation until residues reach 1 ppb or less.
[f]Treated water may not be used as a source for livestock until an approved assay indicates carfentrazone-ethyl and degradate is below 0.2 ppm.
[g]This is the interval for applications made to more than 20% of water surface. Consult the label for reduced restriction criteria.
[h]Drinking water restrictions are product-specific; read the label carefully.
[i]The manufacturer suggests a 600-foot potable water application set back.
[j]See the table on the label.
[k]Water can be used when an approved assay indicates imazamox concentrations are less than 50 ppb.
[l]Use restrictions can be reduced if an approved assay indicates imazapyr concentrations are less than 1 ppb.
[m]Water treated with penoxsulam can be used for turf irrigation if concentrations are less than 30 ppb.
[n]For other nonfood crop irrigation or for other irrigation uses, contact SePRO Corporation before irrigation if concentrations exceed 1 ppb.
[o]Do not irrigate established food crops, other than rice, until penoxsulam concentrations are no more than 1 ppb in the irrigation water source. Do not irrigate established rice if concentrations in treated water exceed 30 ppb.
[p]Drinking water can be used only when triclopyr concentrations are less than 0.4 ppm by an approved assay.
[q]If triclopyr residues are determined to be nondetectable by an approved assay, there is no restriction for use of irrigation water on established grasses.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 16.

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CONTROL OF SOME COMMON AQUATIC WEEDS WITH HERBICIDES.

	2,4-D	Bispyribac-sodium	Carfentrazone-ethyl	Copper Complexes Copper Sulfate[1]	Diquat	Endothall	Flumioxazin	Fluridone	Glyphosate	Hydrothol 191	Imazamox	Imazapyr	Penoxsulam	Sodium Carbonate Peroxyhydrate	Triclopyr	Acid Blue # & Yellow #23
Algae																
green algae				•												•[2]
blue-green algae (Cyanobacteria)				•										•		•[2]
filamentous and water net				•	•		•			•						
Chara and Nitella				•						•						
Floating Weeds (not attached to bottom)																
duckweed		•	•		•		•	•				•	•			
common salvinia		•	•		•		•		•				•			
giant salvinia		•	•		•		•		•				•			
watermeal			•		•		•	•				•	•			
waterhyacinth	•	•	•		•				•		•	•	•			
water lettuce		•	•		•		•		•		•	•	•		•	
Emergent Weeds (attached to bottom)																
American lotus	•		•		•			•			•				•	
watershield	•		•					•			•				•	
white waterlilly	•		•					•			•	•			•	
frogbit	•	•	•				•					•	•		•	
water pennywort		•	•		•		•				•	•				
Submersed Weeds																
bladderwort					•	•		•	•		•					
coontail					•	•	•	•							•	
bushy pondweeds (*Najas*)					•	•	•	•								
parrotfeather	•	•	•		•	•		•				•	•		•	
Eurasian watermilfoil	•	•	•		•	•	•	•					•		•	
fanwort							•	•							•	
pondweeds (*Potamogeton*)		•			•	•	•	•								
elodea				•	•			•								
hydrilla		•	•	•	•	•	•	•		•			•			
spikerush	•							•								
Marginal Weeds																
alligatorweed	•	•	•		•		•	•	•		•	•			•	
water primrose	•		•		•			•	•		•	•			•	
smartweed	•				•			•	•		•	•			•	
arrowhead	•				•			•				•			•	
willows	•							•	•			•			•	
cattail					•			•	•		•	•				
cutgrass					•			•	•			•				
bulrush								•	•			•				
burweed	•															
phragmites								•	•		•	•			•	

NOTE: It is not intended that any suggested usage in this table be in violation with existing regulations or manufacturer's label.

[1]Use products containing copper with caution because its toxicity to fish and its effectiveness in controlling aquatic weeds depend on total alkalinity of the water.

[2]May reduce the growth of submersed plant species at higher dye concentrations.

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Aquatic weeds	Treatment	Rate	Comments
Algae			
algae	copper sulfate (pentahydrate)	1 to 2 ppmw	Toxicity to fish and algae increases with temperature but decreases with water alkalinity. For water with less than 50 ppm total alkalinity, do not use copper sulfate. For water above 50 ppm, determine the amount of copper to use by dividing total alkalinity (ppm) by 100. This equals the desired copper concentration in the water. Catfish are not very tolerant to copper. Always leave untreated aquatic areas for fish to move into.
	copper complex	0.67 to 0.75 gal per acre-foot	Complexed forms of copper are more active in alkaline water than the sulfate. For water with less than 50 ppm alkalinity, catfish may be killed. Apply a surface spray. Apply when algae begin to grow and water temperature is above 60 °F. Best results when applied on sunny days.
		1.25 to 1.5 gal per acre-foot	Apply when total alkalinity is above 50 ppm.
blue-green (Cyano-bacteria)	sodium carbonate peroxyhydrate	3 to 100 lb per acre-foot	Decaying algae can reduce dissolved oxygen, which can result in fish kills. To avoid oxygen depletion, apply so that 8 to 10 hours of daylight remain. Do not reapply within 48 hours.
Floating			
duckweed	bispyribac-sodium	1 to 2 oz/A of formulated product	Apply bispyribac-sodium as a broadcast spray. Use the higher rate for more mature, denser weed growth. Apply in a minimum of 30 gallons of water per acre to ensure adequate coverage. Allow 30 days between applications, and apply no more than 8 ounces of product per acre per year. Do not exceed four applications per year.
	diquat	1 gal per surface acre	Foliar spray or injection in nonflowing water. **Do not** apply diquat to muddy water. Apply as overall spray in 50 to 150 gallons of water plus 1 pint of nonionic surfactant. Spray marginal areas to reduce reinfestation. Retreat if necessary.
	flumioxazin	6 to 12 oz/A of formulated product	Apply flumioxazin herbicide as a broadcast spray with an adjuvant approved for use in aquatics. Flumioxazin is a contact herbicide that quickly degrades in the water column, so plants that do not initially come in contact with it will not be controlled. Apply flumioxazin in a minimum of 30 gallons of water per acre to all areas of the water body where weeds exist. Coverage is essential for effective control, as all floating weeds need to be exposed to lethal concentrations in all parts of the water body. Any untreated escapes or reintroductions of plants that were not treated will reestablish in areas where surface weeds had previously been controlled. If a second application is required to provide control, make the treatment when returning weeds are first observed, but wait 28 days after the previous treatment. Application of flumioxazin during early morning hours may enhance weed control. When applying to densely packed, actively growing surface weeds, ensure adequate coverage. Rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation.

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Aquatic weeds	Treatment	Rate	Comments
giant salvinia	diquat	0.5 to 0.75 gal per surface acre	Use with an approved aquatic wetting agent at 0.25-1% v/v. Repeat treatments may be necessary for complete control.
	flumioxazin	6 to 12 oz/A of formulated product	Apply flumioxazin herbicide as a broadcast spray with an adjuvant approved for use in aquatics. Flumioxazin is a contact herbicide that quickly degrades in the water column, so plants that do not initially come in contact with it will not be controlled. Apply flumioxazin in a minimum of 30 gallons of water per acre to all areas of the water body where weeds exist. Coverage is essential for effective control, as all floating weeds need to be exposed to lethal concentrations in all parts of the water body. Any untreated escapes or reintroductions of plants that were not treated will reestablish in areas where surface weeds had previously been controlled. If a second application is required to provide control, make the treatment when returning weeds are first observed, but wait 28 days after the previous treatment. Application of flumioxazin during early morning hours may enhance weed control. When applying to densely packed, actively growing surface weeds, ensure adequate coverage. Rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation.
	glyphosate	1 to 2 gal per surface acre	Use with an approved aquatic wetting agent at 0.25-1% v/v.
	carfentrazone-ethyl	0.21 to 0.42 qt per surface acre	Use with an approved aquatic wetting agent at 0.25–1% v/v. Repeat treatments may be necessary for complete control.
waterhyacinth	bispyribac-sodium	1 to 2 oz/A of formulated product	Apply bispyribac-sodium as a broadcast spray. Use the higher rate for more mature, denser weed growth. Apply in a minimum of 30 gallons of water per acre to ensure adequate coverage. Allow 30 days between applications, and apply no more than 8 ounces of product per acre per year. Do not exceed four applications per year.
	DMA-4 IVM	0.5 to 1 gal per surface acre	Spray when plants are actively growing. Delay use of treated water for irrigation or domestic purpose for 3 weeks or until approved assay shows no more than 0.1 ppm 2,4-D acid. For use in water bodies that are still or slow moving. Must be applied by trained or licensed applicators. **Do not** treat more than half of a lake or pond at one time to avoid oxygen depletion and fish kill. In large lakes, leave a 100-foot buffer strip.
	Hardball	0.25 to 0.5 gal per surface acre	
Submersed			
elodea	diquat	2 gal per surface acre	Inject or apply on surface of nonflowing water. **Do not** apply diquat to muddy water.
Eurasian watermilfoil	DMA-4 IVM	0.5 to 1 gal per acre-foot	**Do not** treat more than half of a lake or pond at one time to avoid oxygen depletion and fish kill. In large lakes, leave a 100-foot buffer strip. **Do not** treat within ½ mile of potable water intakes. Treat in spring when milfoil starts to grow. Spray on or inject under water.
	Renovate3	0.7 to 2.3 gal per acre-foot	
	Renovate OTF	20 to 270 lb per surface acre	Application rate is dependent upon the mean water depth in the treated area. Potable water set back distances are dependent upon the total area treated; consult the label for proper set-back distances. Applications should be made in the spring or early summer to actively growing plants.
	Hardball	1 to 5 gal per acre-foot	
	diquat	1 to 2 gal per surface acre	Distribute evenly over infested area. Inject or apply on surface of slow-flowing water. **Do not** apply diquat to muddy water.
	endothall (Aquathol Super K)	0.5 to 2.5 ppmw	Safer to fish than dimethyalkylamine salts. Spray or inject liquids under water. Apply granules evenly with cyclone seeder. Apply as soon as possible after weeds begin to grow and water temperature is above 65 °F. When treating in sections, treat on a 5- to 7-day interval. Use higher rates when spot treating.

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Aquatic Weeds, Continued

Aquatic weeds	Treatment	Rate	Comments
Eurasian watermilfoil	2,4-D (20% granules)	100 to 200 lb per surface acre	Best results when applied in spring to early summer during early growth stage. Apply uniformly using portable spreader (cyclonic seeder). Rate depends upon weed species, weed mass, water depth, and water pH. Repeat application if needed. **Do not** use water for agricultural purposes, watering dairy animals, or domestic purposes.
bladderwort coontail	2,4-D (20% granules)	150 to 100 lb per surface acre	Rates are based on type of water body treated and average water depth. See label for details. **Do not** use water for irrigation from ponds for 30 days or lakes for 7 days after treatment.
elodea hydrilla naiad pondweed coontail Eurasian watermilfoil	Sonar AS Sonar PR Sonar SRP	0.5 to 4 qt per surface acre 10 to 80 lb per surface acre	Fluridone requires a long contact time (more than 60 days) to be effective. A test available from the manufacturer may be advisable for some water bodies to ensure that adequate concentrations of herbicide remain in the waterbody for effective control.
	Biological control		Grass carp can be stocked in ponds and lakes to suppress submersed aquatic plants. Grass carp are typically stocked at rates of 5–30 fish per acre, depending on the size and extent of plant infestation. In new ponds, 2- to 6-inch fish can be stocked. However, in ponds with established bass populations, 8- to 10-inch carp should be stocked to prevent bass from eating them. Grass carp are somewhat specific about which plants they will eat. They prefer tender, nonwoody vegetation and are best suited for control of submersed plants such as some pond-weeds, bushy pondweeds, hydrilla, egeria, and some macro-algae. As grass carp grow, consumption of plant material will decrease. Additional fish should be stocked about every 5 years to maintain plant suppression.
hydrilla	bispyribac-sodium	1.1 to 2.4 oz per acre-foot	Apply bispyribac-sodium at a rate that will produce an initial concentration of 20 to 45 ppb in the water column of the treatment zone. Use the higher concentrations when weed biomass is heavy, when weeds are more mature and topped out, and/or when treating less susceptible plants. For optimal control, repeat applications to maintain desired water column concentrations of bispyribac-sodium for 60 to 90 days after initial application, or until target weeds are controlled. Do not reapply within 14 days after initial application. Do not exceed four applications per year. Multiple applications (up to four per year) of bispyribac-sodium at lower rates may be needed in water bodies where there is a requirement for selective weed control, or where there is a need to control weed species with a longer exposure time requirement. For subsurface applications, do not allow the water concentration to exceed 45 ppb of bispyribac-sodium in the treatment zone for any application (either initial or when retreating to maintain the effective water concentration).

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Aquatic weeds	Treatment	Rate	Comments
hydrilla (continued)	flumioxazin	1.1 to 2.1 lb per acre-foot	Apply flumioxazin at a rate that will produce an initial concentration of 200 to 400 ppb (of active ingredient) in the water column. Flumioxazin is rapidly absorbed by target plants but also breaks down quickly in water with a pH greater than 8.5. The pH of water surrounding mats of submersed vegetation can exceed 8.5 by early to midday due to photosynthetic processes. Application of flumioxazin under these conditions may provide only partial weed control, and regrowth is more likely. For best control, apply flumioxazin in a minimum of 30 gallons of water per acre in the early morning to actively growing weeds and early in the season before surface matting occurs. Complete coverage and sufficient contact time of submersed weeds with flumioxazin is required for optimal performance. Application of flumioxazin with subsurface trailing hoses designed to distribute the herbicide within the plant stand will provide more effective and longer-term control of submersed weeds. Use higher concentrations when weed biomass is heavy and/or weeds are more mature and topped out. Any untreated plants that are left in the water column can re-infest treated areas that had previously been controlled. If a second application is required to provide control, make the treatment once returning weeds are observed, but wait at least 28 days after the last treatment. When applying flumioxazin to densely packed, actively growing submersed weeds, a rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation. If aquatic vegetation is dense, treat submersed weeds in sections to avoid a rapid decrease in dissolved oxygen. Flumioxazin should be applied as a subsurface treatment for hydrilla control. For best control of hydrilla, apply during the late winter/early spring and/or early to late fall. Efficacy of flumioxazin will be enhanced at these timings due to lower potential biomass present and lower pH of the water. If applied to mature topped-out hydrilla, flumioxazin will cause some discoloration and loss of growing tips, but regrowth will be rapid.
Emergent and Marginal			
alligatorweed	Biological control		Chemical treatment may not be necessary if specific biocontrol insects, the alligatorweed flea beatle (*Agasicle hygrophila*) and/or stem borer moth (*Vogtia malloi*), are present. The flea beetle is more active in the southern part of the state, and the stemborer is active throughout the state. These insects may not provide control in areas adjacent to fields subject to heavy insecticide usage; e.g., near cotton fields. Contact your county agent or a qualified entomologist for positive identification.
arrowhead	DMA 4 IVM	0.5 to 1 gal per surface acre	Spray on foliage. Use only formulations labeled for aquatics.
	Hardball	0.25 to 0.5 gal per surface acre	
cattail	glyphosate	3 to 5 qt per surface acre	Spray on foliage. See Rodeo entry below.
cattail pondlily waterlily	imazapyr 2 lb ae/gal	2 to 3 pt per surface acre or 1% solution	Spray on foliage. Add 1 quart of aquatic-approved nonionic surfactant per 100 gallons of spray solution.
Actively growing (floating or emersed) grasses, broadleafs and brush	glyphosate	1.5 to 7.5 pt per surface acre or spot treatments use 0.75 to 1.5% solution	For application to floating or emerged vegetation, undesirable shoreline weeds and brush by air, booms, or handheld equipment using 3 to 20 gallons of spray per acre. Do not expect control of vegetation that has a majority of the leaf surface submerged. Add 1 to 2 quarts of nonionic surfactant to 100 gallons of spray, but use only X-77 if applications are made to aquatic sites. For hand guns, use 3 to 6 quarts of Rodeo in 100 gallons of water depending upon weed species. Spray to wet. For broadcast application, use 1.5 to 2.5 pints for small annuals and 3 to 7.5 pints for perennial weeds and brush.

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Aquatic weeds	Treatment	Rate	Comments
Emergent broadleafs	bispyribac-sodium	1 to 2 oz/A of formulated product	Apply bispyribac-sodium as a broadcast spray. Use the higher rate for more mature, denser weed growth. Apply in a minimum of 30 gallons of water per acre to ensure adequate coverage. Allow 30 days between applications, and apply no more than 8 ounces of product per acre per year. Do not exceed four applications per year.
	carfentrazone-ethyl	4 to 14 oz per acre	Use a nonionic surfactant at 1% v/v. Repeat applications as necessary.
	DMA 4 IVM	0.5 to 1 gal per surface acre	For control of aquatic weeds in lakes, ponds, drainage ditches, and marshes. Apply 2.5 to 4.5 pints per acre of 3.8 pounds per gallon or 1.67 to 3 pints per acre of 5.64 pounds per gallon formulation in 50 to 100 gallons of water.
	Hardball	0.25 to 0.5 gal per surface acre	Spray to wet foliage thoroughly. Apply when leaves are fully developed, actively growing, and are above the water level. Restrict applications to one-third to one-half of lake or pond. Repeat treatment once if needed.
	flumioxazin	6 to 12 oz/A of formulated product	Apply flumioxazin herbicide as a broadcast spray with an adjuvant approved for use in aquatics. Flumioxazin is a contact herbicide that quickly degrades in the water column, so plants that do not initially come in contact with it will not be controlled. Apply flumioxazin in a minimum of 30 gallons of water per acre to all areas of the water body where weeds exist. Coverage is essential for effective control, as all floating weeds need to be exposed to lethal concentrations in all parts of the water body. Any untreated escapes or reintroductions of plants that were not treated will reestablish in areas where surface weeds had previously been controlled. If a second application is required to provide control, make the treatment when returning weeds are first observed, but wait 28 days after the previous treatment. Application of flumioxazin during early morning hours may enhance weed control. When applying to densely packed, actively growing surface weeds, ensure adequate coverage. Rapid decomposition of vegetation resulting from herbicide treatment can result in loss of oxygen in water. A sudden decrease in dissolved oxygen can result in fish suffocation.
	Renovate 3	2 to 8 qt per surface acre	Use a nonionic surfactant at 1% v/v.

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NONCROPLAND

(Herbicides to control all vegetation)

Recommended rates of the herbicides listed below will kill all vegetation. Low rates, and soils of high clay and organic matter or poor distribution of the herbicide, will all increase the number of escaped weeds and make a repeat application needed. Residual herbicides should never be applied near crops, lawns, shrubbery, or other desirable vegetation or where such plants will be planted within one to four years. The soil life of the herbicide depends on soil type, the particular herbicide, and the rate used. Less "runoff" or lateral movement can be expected where the application is made to a dry soil. Some herbicides are taken up only through the root system, whereas others are foliage- and root-absorbed. In many cases, a combination of a foliar active herbicide and a residual soil herbicide is required to provide "burndown" and residual activity. Spring treatments will control annual weeds, but fall applications often are needed for control of deep-rooted perennial weeds. Use chemicals with care around valuable plant species on ditch banks and turnrows or where water may wash them to other areas. Do not contaminate water supplies or irrigation water. Read the label before using.

Always calibrate sprayers before herbicide application. For foliar applications, the spray volume will usually vary between 30 and 40 gallons an acre for light to moderate vegetation; whereas, 100 to 200 gallons an acre are often required for large dense vegetation. Mix the suggested per acre rate of herbicide in appropriate volumes of water and spray to wet the vegetation. Labels sometime give specific mixing instructions for foliar herbicide applications.

It is often desirable to know the length of an acre when band spraying areas such as fencerows, rights-of-way, etc. Below are several examples:

Band width (ft)	Distance required to treat one acre	
	Ft	Miles
1	43,560	8.25
2	21,780	4.13
3	14,520	2.75
4	10,890	2.06
5	8,712	1.65
10	4,356	0.8

Soil Treatments

Herbicide	Amount of formulation per 1,000 sq ft	Amount of formulation per acre	Comments
aminocyclopyrachlor Method 240SL	 0.05-0.09 fl oz	0.5-1 oz ai 2-4 fl oz	Do not apply during the first growing season. Applications before complete greenup may delay greenup. Addition of methylated seed oil may increase injury. Do not exceed 18 ounces per acre per year.
atrazine 4 lb/gal 90% DF	 2.2-3.6 oz 2.-4 oz	 6-10 qt 5.3-11.1 lb	Atrazine will provide good residual activity to shallow-rooted annual and perennial plants. Add surfactant for foliar activity. Use high rates for perennial weeds. The addition of contact or systemic herbicides may be considered to control broad-spectrum vegetative problems. **Do not** exceed 10 lb ai/A/year.
bromacil 80% WP 2 lb/gal 4% G	 1.1-5.5 oz 0.40-2.2 pt 2.3-14 lb	 3-15 lb 2-12 gal 100-600 lb	An effective bare-ground herbicide for johnsongrass and other perennial grasses. Use low rates for annual weeds and higher rates for hard-to-kill perennial weeds. The liquid formulation is not compatible with MSMA, Oust, 2,4-D esters, or other acidic formulations.
bromacil 53% + diuron 27% Krovar II DF	0.75-8.4 oz	2-23 lb	
bromacil 2% + diuron 2%	4.6-9.2 lb	200-400 lb	These diuron-bromacil formulations are effective for control of broad-spectrum weed populations. They control most broadleaf weeds and grasses, both annuals and perennials. Use low rate for short-term control of annuals, intermediate rates for extended control and perennial suppression, and high rates for control of hard to kill perennials and extended preemergence control.

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi — SEE PAGE 16.

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Soil Treatments

Herbicide	Amount of formulation per 1,000 sq ft	per acre	Comments
dichlobenil 4% G 10% G 50% WP	 5.75-7 lb 2.3-2.8 lb 7.5-9 oz	 250-300 lb 100-120 lb 20-24 lb	For general weed control and for under asphalt. Apply to the finished grade and cover area soon after application with asphalt. Dichlobenil has a shorter soil life then bromacil or prometone, but is less injurious to nearby trees and shrubbery. For general control using surface applications, consult individual labels. Apply when air temperature less than 60 °F for best results.
diuron 90% DF diuron 80% WP or simazine 80% WP 4 lb/gal 90% DF 4% G	1.8-5.5 oz 1.8-7.3 oz 2.2-4.4 oz 0.37-7.4 oz 1.8-4 oz 5.75 lb	5-15 lb 15-20 lb 6-12.5 lb 5-10 qt 5-11.1 lb 250-450 lb	Highly effective for seedling control after perennials have been controlled. Should be applied in late winter or early spring. The addition of a contact or systemic herbicide might be considered for improved control of broad- spectrum problem situations.
diuron 40% + bromacil 40%	1.5-11 oz	4-30 lb 2-12 lb 1 to 6 gal	These diuron-bromacil formulations are effective for control of broad-spectrum weed populations. They control most broadleaf weeds and grasses, both annuals and perennials. Use low rate for short-term control of annuals, intermediate rates for extended control and perennial suppression, and high rates for control of hard to kill perennials and extended preemergence control.
diuron 62.22% imazapyr 7.78% Sahara	0.3-0.44 lb	13-19 lb	Use where bare ground is desired in such areas as utility, pipeline, and highway rights-of-way and other noncropland areas. Controls many annual and perennial grasses and broadleaf weeds as well as some brush and vine species. Consult label for recommended adjuvant if used postemergence.
diuron 2% imazapyr 0.5% TopSite	4.6-6.88 lb	200-300 lb	Use where bare ground is desired in such areas as utility, pipeline, and highway rights-of-way and other noncropland areas. Controls many annual and perennial grasses and broadleaf weeds as well as some brush and vine species. Consult label for recommended adjuvant if used postemergence.
flumioxazin + pyroxasulfone Piper	 0.14-0.23 oz	2-3.4 + 2.6-4.3 oz ai 6-10 oz	This treatment controls emerged weeds less than 2 inches tall. Add nonionic surfactant if weeds have emerged in application site.
foramsulfuron + iodosulfuron + thiencarbazone Derigo	 0.07-0.14 oz	0.7-1.4 + 0.07-0.14 + 0.3-0.6 oz ai 3-6 oz	Do not apply to cool-season grasses. Applications to bahiagrass will cause growth suppression. Do not exceed 6 ounces per acre per year. Nonionic surfactant is recommended. Do not use organosilicone surfactants.
hexazinone Velpar 90% SP Velpar L	0.75-4.4 oz 3-15 oz	2-12 lb 1-6 gal	Apply spray in 25 to 100 gallons of water just before or soon after weeds emerge. Use medium to high rates on hard-to-kill species, fine-textured soils or soils with high organic matter, or where season long bare ground is desired. For brush control use medium rates and apply in late winter to early summer as a coarse spray underneath the brush. Lower rates may be used for short-term control or only postemergence control for many annual species. Add 1 quart surfactant to 100 gallons of spray.
indaziflam Esplanade 200SC	0.08-0.16 fl oz	3.5-5 fl oz	Do not exceed 10 fluid ounces per year.

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Soil Treatments

Herbicide	Amount of formulation per 1,000 sq ft	per acre	Comments
prometon Pramitol 25 E	1-5.5 pt	5-30 gal	For use on industrial sites, noncropland, and beneath asphalt pavement. Provides long-lasting residual control. Use higher rate for deep-rooted perennials or beneath asphalt. Do not apply where any roots of desirable plants will enter the treated areas.
Pramitol 5 PS	5-20 lb	217-870 lb	A pelleted herbicide mixture containing chlorate-borate-simazine and prometone. Should be applied before plant growth begins. Will provide more effective control of shallow-rooted plants than prometone alone.
sodium chlorate 30% + sodium metaborate 68%	10-30 lb	435-1,300 lb	There are many formulations available of sodium chlorate + sodium metaborate containing varying amounts of the chlorates-borates. Increase the rate for more dilute formulations. The borate addition reduces fire hazard and provides more effective long-term control of shallow-rooted young plants. Apply before germination of weeds for best results. Also useful before application before paving under asphalt. Very little lateral movement in soils generally occurs. Control can be expected for about one year.
sodium chlorate + sodium metaborate + residual herbicide chlorate 30-40% + borates 47-65% + bromacil 1.5-4% (or) diuron 1.25% (or) prometon 5%	 10-30 lb 20-40 lb 2.5-10 lb 5-20 lb	 435-1,304 lb 870-1,739 lb 110-435 lb 217-870 lb	There are many formulations available containing varying concentrations of these herbicides. There are several granular as well as liquid formulations. Bromacil and prometone are two of the most soluble residual herbicides and can be expected to control deep-rooted perennial plants. These may move from the site of application. Atrazine and diuron are perferred where lateral movement by surface water is expected or where shallow-rooted annual and perennial plant control is desired.
sulfometuron 75%	0.07-10.18 oz	3-8 oz	For use on noncropland, industrial sites, and beneath asphalt pavement. Rate varies with weed type. Desirable plants may be injured if their roots extend into the treated areas.
tebuthiuron 1% diuron 3% Spraykil SK-13	3.44-9.18 lb	150-400 lb	For use in noncropland areas, under paved surfaces, and on industrial sites. Do not use in cropland. Keep animals off treated areas. Do not apply on or near desirable plants. Don't contaminate irrigation ditches or water used for domestic purposes. Do not use in areas where the water table is 5 feet or less, or in areas which are periodically flooded.
tebuthiuron 2% diuron 6 % Sparaykil SK-26	3.44-9.18 lb	150-400 lb	For use in noncropland areas, under paved surfaces, and on industrial sites. Do not use in cropland. Keep animals off treated areas. Do not apply on or near desirable plants. Don't contaminate irrigation ditches or water used for domestic purposes. Do not use in areas where the water table is 5 feet or less, or in areas which are periodically flooded.
tebuthiuron Spike 80% WP Spike 5% G Spike 85% DF	 1.8-7.3 oz 1.8-7.3 lb 1.7-6.9 oz	 5-20 lb 80-320 lb 4.75-18.7	Very effective on broadleaf and woody plants. Has good activity on privet. Use high rates for perennial grass and shrub control. Apply in winter or early spring. Add a contact herbicide if rapid kill of established weeds is desired. Best control of woody plants is obtained when applied in the spring when rain will leach the herbicide into the soil.

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Foliar Treatments

Herbicide	Amount of formulation per 1,000 sq ft	per acre	Comments
2,4-D, 2,4-DP, MCPA, mecoprop, (MCPP), triclopyr, dicamba, or dichlorprop (2,4-DP).	0.75-3 oz	1-4 lb a.i. (or) 1-4 qt of 4 lb/gal formulation	For control of broadleaf species only. Use low-volatile esters during cool or drouthy conditions but not when temperatures or windy conditions present drift problems. Repeat as necessary — provides short-term control. Apply in 50 to 100 gallons water with surfactant to uniformly cover broadleaf weeds. Apply when plants are actively growing. Rates are especially effective on woody plants. Reduced rates may be used for herbaceous broadleaf plants.

Note: There are many prepackage mixtures containing 2,4-D plus one to three other herbicides all of which can be very effective on a wide variety of broadleaf weeds. Herbicides such as 2,4-DP, MCPA, MCPP, dicamba, and triclopyr are all excellent broadleaf herbicides each having a little different spectrum of weed control. See woody plants section for additional information. See labels for specific rates and for weeds controlled. In some cases, you should mix grass herbicides such as MSMA or Roundup to provide total vegetation control. See individual section for suggested rates.

amitrole Amitrole T-21% liquid Amizol-90% powder Also available under several other trade names	 3-6 oz 6-24 oz	 1-2 gal 2-8 lb	Use low rates for annual grasses, broadleaf weeds, poison ivy, and poison oak. Medium rates are for honeysuckle, kudzu, and perennial grass suppression. High rate is for large perennial grasses and woody plants. Apply in 100 gallons/A to wet all foliage after it has fully developed but before frost. Spot treat any regrowth. Amitrole may be mixed with 2,4-D, atrazine, diuron, or simazine for more effective control.
diquat Reward	0.75-1.5 oz	1-2 qt	Applied to fully wet all foliage. Provides kill or "burn back" of most succulent plants. Useful around buildings, walkways, fences, dry ditches, and clear aquatic areas. **Do not** use treated water for animal consumption, spray, or irrigation within 10 days after treatment.
fluazifop Fusilade DX	0.74-1.1 oz	8-16 oz	Apply as a foliar spray for control of annual and perennial grasses. Add to spray solution either 0.25% surfactant or 1.0% crop oil concentrate. Apply to cover actively growing grasses. Repeat treatment as needed as regrowth occurs. See cotton and soybean sections for additional suggestions.
fosamine Krenite S		1.5-3 gal	Apply to brush in late summer or early fall in water to wet all foliage parts. Injury symptoms appear the following spring as failure to produce new leaf growth or growth suppression. Pines may show a response soon after application.
glyphosate	1-3 oz	3-4 qt	Apply as a broadcast treatment in 10-40 gallons of water/A containing 0.5% surfactant when weeds are actively growing. For handgun or spot treatments use 2 to 4 quarts in 100 gallons water containing 0.5% surfactant. Retreat to control regrowth.
imazapyr Arsenal 2 lb/gal		2-6 pt	For control of most annuals and perennials including brush species. May apply preemergence but the preferred treatment, especially for perennials, is foliar applications. Complete kill may require several weeks. Make foliar applications using 20 to 60 gallons spray on acre and add 1 quart surfactant/100 gal spray especially if high spray volumes are used.
MSMA	1.1-2.2 oz	2-4 lb a.i. or 3-6 pt of 6 lb/gal	Apply sufficient water to provide spray coverage - usually 20-50 gallons/A. Use lower rates of MSMA for small annual grasses and upper rates for established perennial grasses. Under adverse growing conditions, use up to 0.5% surfactant. Repeated applications will probably be necessary.
paraquat Gramoxone Inteon	0.9-1.5 oz	1.5-4 pt	Apply in sufficient water to provide spray coverage — usually 20-50 gallons/A. Add 1 quart of nonionic surfactant/100 gal spray. Kills green vegetation covered. Repeat when needed.

sulfometuron
Oust — See Turf Section

See Woody Plants section for additional foliage treatment suggestions.

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EQUIPMENT AND CALIBRATION

Tank-Mixing Precautions

- Read product labels carefully and follow all applicable directions, precautions, and limitations.
- Do not exceed recommended application rates for respective products or maximum allowable application rates for any active ingredient in the tank mix.
- For products packaged in water-soluble packaging, do not tank mix with products containing boron. Also, do not mix in equipment previously used to apply a product mixture containing boron unless the tank and spray equipment have been adequately cleaned. (See Equipment Clean-Out Procedures.)
- Always perform a jar test to ensure the compatibility of products to be tank mixed before mixing a full tank.

Sprayer Agitation

Agitation is an essential design and operational component of the agricultural spray system. Agitation is the hydraulic stirring movement of spray solution. Agitation is necessary to maintain the homogeneous mixture required for uniform performance of the pesticide being applied. Poor agitation usually results in nonuniformity of the pesticide application. This may be most visible as crop injury caused by an excess rate of herbicide when the tank is full or recently refilled. As the tank becomes empty, you may see less control of weeds. The amount of agitation needed for the spray system depends upon the type of agitation being used, the size of the spray tanks, the configuration of the spray tanks, and the type of spray solution being applied. The most common type of agitation system is by-pass agitation where part of the spray pump capacity is used to create agitation inside the spray tanks to maintain a homogenous spray solution.

Spray tank agitation requirements are based on the total size of the spray tanks, the configuration of the spray tanks, and the type of pesticide formulation being applied. The volume of the spray tank agitation also depends on the type of tank agitation system being used. A rule of thumb suggests that about 10 percent of the total tank capacity is needed for sufficient agitation. For example, if the total capacity of two tanks is 300 gallons, then 30 gallons per minute (15 gallons per minute per tank) are needed for adequate agitation when conventional by-pass agitation is used. If the by-pass agitation system has induction jets attached, the total volume required for adequate agitation can be reduced.

In some of the new, very large and irregularly shaped spray tanks, it is more difficult to provide adequate agitation because of the way they are made. These tanks were made to more easily fit the tractor configuration than for spray agitation. More traditional EC, EW and flowable liquid pesticide formulations tend to have lower agitation requirements to maintain a homogenous spray mixture. Some formulation types may be prone to settling, especially if the agitation is inadequate or is stopped. In some situations, you may need to add spray adjuvants. Most agitation problems can be easily corrected with careful design and operation of the agitation system.

Where two or more tanks are used, the agitation system should be designed so that all tanks are agitated continuously once the pesticide is added. The operator must then decide whether to use from both tanks simultaneously or from one tank only. When operating from one tank with a full second tank, two separate pump/control/agitation systems are required to agitate both.

Spray tank agitation systems should include a high-volume spray pump and agitators that are carefully designed and installed. Agitators should be placed in the bottom of the spray tank with jets sweeping towards the ends of the tank so that the tank contents are rolled completely.

Total pump capacity is determined by the agitation requirement and the total nozzle requirement. The pump must have adequate capacity for both needs. If the pump is not large enough, it should be either replaced or a separate pump must be added so that one pump would be delivering the spray boom needs, and one pump would be delivering the agitation system needs.

Sprayer Operation

Agricultural sprayers should be operated so that the required rate of pesticide is delivered to the target site. Do not make applications when conditions are conducive to spray drift, poor spray deposition, or poor target coverage.

- Turn off the spraying system when turning or when booms must be raised to clear obstacles or folded for transport.
- Use check valves in individual nozzle bodies to prevent dripping during turns, transport, or when the sprayer is parked.
- Properly clean the sprayer before transporting, storing, or working in other crops or with other pesticides.

Minimize Drift from Ground Applications

Many variables influence drift from agricultural chemical applications. Focusing on the most important variables provides the applicator the greatest opportunity to minimize off-target movement. Research at Mississippi State University measured the relative importance of variables that influence drift from ground and aerial applications. The tips below are listed in order of importance in reducing drift as found in "Predicting ground boom spray drift" by, D. B. Smith, L. E. Bode and P. D. Gerard, Trans of ASAE 43(3):547-553, 2000.

- Maintain the maximum distance possible from the application to sensitive crops or areas downwind of the application by using buffer zones and by choosing times to spray when wind direction is away from sensitive crops and areas.
- Keep the spray release height and the nozzle to the target distance as low as possible to maintain a uniform application pattern from the nozzle for minimum influence of wind and evaporation. Select the proper nozzle type for the application and the nozzle pattern angle. Set the nozzle tip back or forward at approximately 45 degrees to horizontal to minimize height from boom to target.
- Make applications when wind speed is low (3 to 5 mph, but not dead calm indicating an inversion) and direction is away from sensitive crops and areas.

Applicators may benefit from spraying when temperature is low and humidity is high and with pressures no greater than 40 psi when using pattern-producing nozzles. Shielded and hooded sprayers may be used to minimize exposure of the spray to wind; however, one drift study found greater drift due to wind turbulence around a shield.

Aerial Drift Reduction

The tips below for reducing drift from aerial applications are listed in order of importance as found in Guidelines for Aerial Atomization and Spray Drift Reduction for Mississippi Applicators, MAFES Information Bulletin 251, by D. B. Smith, M. H. Willcutt, D. L. Valcore, J. W. Barry and M.E. Teske, Nov. 1993).

- Use the largest droplet size compatible with proper coverage required for the mode-of-action of the pesticide being used. The Department of Agriculture and Commerce Bureau of Plant Industry now requires a minimum of 300 micron vmd spray for glyphosate applications by air.

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- Maintain the maximum distance possible from the application to sensitive crops or areas downwind of the application by using buffer zones and by choosing times to spray when wind direction is away from sensitive crops and areas.
- Make applications when wind speed is low (3 to 5 mph, but not dead calm indicating an inversion) and direction is away from sensitive crops and areas.

Mississippi regulations require that the outboard nozzles be no more than 70 percent of the wingspan or rotor span. Nozzles placed beyond this boom position contribute to vortex-influenced drift and non-uniform deposition, and they do not increase the effective swath width of the aircraft.

Oklahoma State University Publication E-948, Aerial Pesticide Drift Management, Ron T. Noyes, Dennis Gardisser and Dennis K. Kuhlman, makes this suggestion: "Make applications at a height of 25 to 50 percent of the aircraft wingspan, measured from the top of the canopy to the boom. This will generally equate to a minimum height of 9 to 10 feet to the gear or 10 to 15 feet from boom to target canopy. Flying too low can lead to narrow swaths, non-uniform distribution, and streaking. It may also lead to increased drift potential due to the excessive control surface movements generally associated with 'wheels in the crop' flying. Achieve level flight before spraying and turn off the spray system before pulling up. Do not use excessive aircraft speeds. As air speed increases, the amount of particle breakup and 'rooster tailing' potential increases. Higher airspeeds also increase the hazards of low altitude flying due to reduced pilot reaction time. Equip the spray boom for immediate/positive shut-off through properly installed bleed lines and well-maintained equipment. Attend educational meetings frequently and read all published information possible to increase your knowledge about factors that contribute to drift."

Sprayer Clean-Up

Thoroughly clean the sprayer after completion of the application, before repairs and maintenance, and before equipment storage or making other applications. Thorough cleaning will reduce the potential for product residues being dislodged during subsequent applications or worker exposure to pesticide residues and fumes from welding during repairs and maintenance.

At the End of the Day

At the end of each day of spraying, rinse the interior of the tank with clean water and then partially fill the tank. Flush the boom and hoses. This will reduce the buildup of dried pesticide deposits that may accumulate in the application equipment.

Upon Completion of the Application

Follow pesticide label directions for cleaning the sprayer. If no specific cleaning compound or procedure is recommended on the pesticide label, follow the procedure below:

- Drain the mixing and loading system, placing any remaining pesticide solution into the sprayer tank. Thoroughly rinse the mix vat, transfer pump, holding tank, and hoses. Clean this equipment with an appropriate spray tank cleaner. Remove and thoroughly clean all filters and screens on the mixing and loading system. Add all rinse water to the sprayer tank, washing the inside of the tank in the process. Apply rinse water to the application area.
- Fill the sprayer tank half full with clean water, washing the inside of the tank in the process; then apply the rinse water to the application area. Flush the boom with clean water. Loosen and physically remove any visible deposits.
- Fill the tank with clean water and 1 gallon of household ammonia (contains 3 percent active). Anhydrous ammonia may also be used at the same or stronger concentrations for every 100 gallons of water. Flush the hoses, boom, and nozzles with the cleaning solution. Then add more water to fill the tank completely. Circulate the cleaning solution through the tank and hoses for at least 15 minutes. Allowing the cleaning solution to sit 12 to 24 hours will result in better neutralization of pesticide residues. Apply the rinse solution to the application area or labeled cropland for the pesticide used.
- Remove the nozzles and screens and clean separately in a bucket containing cleaning agent and water using a soft-bristle brush.
- Repeat step 2 without the nozzles and strainers installed.
- Rinse the tank, boom, and hoses with clean water.
- Thoroughly clean exterior surfaces of spray equipment with a pressure washer or steam cleaner and with cleaning solutions recommended on the pesticide label.
- If the sprayer will be stored for long periods or during freezing weather, add about 2 to 5 gallons of a 50 percent antifreeze solution, allow it to circulate with the pump, and leave it in the sprayer to reduce damage caused by rust, corrosion, and freezing.
- Store the sprayer in a secure area away from frequent human and animal traffic patterns. Always lower raised components, place transmission in park, lock brakes, remove any keys, and lock cab and storage shed doors when leaving any equipment.

***Note:** If other cleaners are used, consult the cleaner label for rinse water disposal instructions. If no instructions are given, dispose of the rinse water on site or at an approved waste disposal facility.

Carefully read and follow the individual cleaner instructions. Consult your ag dealer, applicator, or pesticide manufacturer's representative for a list of approved cleaners.

- CAUTION: Do not use chlorine bleach with ammonia solutions as dangerous gases will form. Do not clean equipment in an enclosed area. Rinse all metal sprayer components thoroughly after using chlorine or ammonia cleaning solutions to prevent rusting.
- Steam clean aerial spray tanks to remove any caked deposits before performing the above cleanout procedure.
- When a tank mix with other pesticides has been applied, examine all cleanout procedures and follow the most rigorous procedure.
- In addition to this cleanout procedure, follow all pre-cleanout guidelines on subsequently applied products, as per the individual labels.
- Properly dispose of all empty pesticide containers, cleaning solutions, and rinse water in accordance with federal, state, and local regulations and guidelines. Triple or pressure rinse all empty pesticide containers and then render them unusable by puncturing the container.
- One accepted method of cleaning solution and rinse water disposal is to apply the rinse water to the field area previously treated. Do not exceed pesticide label recommendations for application rate when applying rinse water.
- Always wear the proper personal protective equipment while filling, cleaning, or working on sprayers.

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Spray Tips for Successful Applications

The success of a crop chemical depends on its proper application as recommended by the chemical manufacturer. Proper selection and operation of spray nozzles are very important steps in accurate chemical application. The volume of spray passing through each nozzle plus the droplet size and spray distribution on the target influence weed control.

There is evidence that spray tips may be the most neglected component in today's farming; yet they are among the most critical of items in proper application of agricultural chemicals. For example, a 10 percent over-application of chemical on a twice-sprayed 1,000-acre farm could represent a loss of $2,000-$10,000 based on today's chemical investment of $10-$50 per acre. This does not take into account potential crop damage.

Careful cleaning of a clogged spray tip can mean the difference between a clean field and one with weed streaks. Flat spray tips have finely machined openings to control the spray. Damage from improper cleaning can cause both an increased flow rate and poor spray distribution. Be sure to use recommended strainers in your spray system to minimize clogging. If a tip clogs, use a soft-bristled brush or toothpick to clean it—**never** use a metal object. Use extreme care with soft spray tip materials such as plastic.

A wide selection of equipment is available for application of herbicides for weed control. Follow the manufacturer's guidelines for each specific type of equipment. Selection of the proper nozzle for the desired end-use is critical for proper calibration and application. Available nozzle types, spray patterns, and uses are presented in Table 3.

Precalibration check

Be sure that all sprayer components are free of foreign material and function properly. Inspect nozzle tips and internal parts for obvious wear, defects, proper size and type. Check the flow rate of each nozzle using water. Establish the desired operating pressure and check for uniform output, equal fan angle, and uniform appearance of spray pattern. Replace any nozzle tips having 5 percent more or less than the average flow rate of the other nozzles and/or having obviously different fan angles or patterns. If the average flow rate of the old nozzle tips differs from the flow rate of new nozzle tips or catalog flow rates for new nozzle tips by 10 percent or more, consider replacing with new nozzle tips. Check the flow rate of new nozzle tips before spraying.

Nozzle Height and Uniformity

Type and size of nozzle tip, operating pressure, spray formulation, tip spacing along the boom, tip-to-target distance, fan angle, and angle of nozzle tips in relation to vertical can greatly influence the spray swath uniformity. You can see extreme nonuniformity by spraying onto a prepared surface such as concrete or a dust-covered surface. Rotate fan-type tips approximately 5 degrees from being parallel to the boom so that adjacent spray fans do not interfere with each other. Suggested spray tip heights found in catalogs are a good starting point; however, these tip operating heights may or may not produce the maximum uniformity of application. For a more detailed discussion of spray uniformity and height and recommendations for specific nozzle tips, see Extension Publication 1697 *Improving the Uniformity of Ground Applied Broadcast Sprays* by D.B. Smith and M. H. Willcutt. (Specific recommendations for reducing aerial spray drift can be found in MAFES Information Bulletin 251 *Guidelines for Aerial Atomization and Spray Drift Reduction for Mississippi Applicators* by D.B. Smith, M.H. Willcutt, D.L. Valcore, J.W. Barry, and M.E. Teske.)

Use this formula to determine nozzle size: $GPM = \frac{GPA \times MPH \times Width}{5{,}940}$

The following web sites may be helpful in selecting nozzles, set-up and calibration of spray equipment:

www.agchem.com	Ag.Chem Equipment Co., Minnetonka, MN55343, 800-760-8800
www.teejet.com	Spraying Systems Co. , Wheaton, IL, 770-552-9292
www.delavanagspray.com	Delavan AgSpray Products, Lexington, TN, 800-621-9357
www.sprayers.com	Sprayer Specialties, Inc. Grimes, IA, 800-351-1587

Always be sure to check the rated operating pressure of nozzles when comparing desired flow to rated flow.

1/128th Acre Calibration for Row- and Boom-Nozzle Sprayers

Calibration of sprayers involves selection of the proper nozzle, spraying pressure, and sprayer speed. See Table 3 for selection of nozzles. There are many ways to determine the right combination of these elements. One practical calibration method is given. For a more in-depth discussion of calibration procedures, see Extension Publication 1006 *Calibration of Ground Spray Equipment.*

The 1/128th acre, baby bottle, and 100-foot methods of calibration are based on spraying 1/128th acre. There are 128 ounces per gallon; therefore, ounces sprayed per 1/128th acre equal gallons sprayed per acre. This procedure results in a treated acre calibration. Broadcast herbicide rates should be added to the volume of water calibrated per treated acre.

1. Determine nozzle spacing or swath width. (Note: if you are making **band** applications and use nozzle spacings, you will figure the gallons of spray per **planted** acre.)
2. Refer to Table 1 on next page for length of calibration course and mark calibration course in the field or 340 ft^2/nozzle swath width (feet) course length.
3. Record time required to drive length of calibration course at gear, engine rpm, and implement settings to be used while spraying.
4. Park sprayer, maintain engine rpm used to drive course, and turn on sprayer.
5. Collect all spray from one nozzle for time equal to that required to drive the calibration course.
6. Measure the **ounces** caught. Ounces caught equal gallons per acre of spray applied.
7. Repeat Steps 5 and 6 for several other nozzles.

* **NOTE:** If multiple nozzles are used per row (Figure 4) use the width of area treated by **all nozzles** as the swath width for step 1 and catch the flow from **all** nozzles directed to the row in step 5.

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TABLE 1. DISTANCE FOR EACH NOZZLE TO SPRAY 1/128 ACRE.

Effective Swath Width (in)	Course Distance (feet)
6	681
8	510
10	408
12	340
14	292
16	255
18	227
20	204
22	186
24	170
30	136
36	113
38	107
40	102
42	97
48	85

TABLE 2. CALIBRATION LENGTHS FOR BOOMLESS SPRAYERS.

Effective Swath Width (feet)	Course Distance (feet)
15	363
18	302
20	272
22	248
24	227
26	209
28	194
30	182
32	170
34	160
40	136
47	116
50	109
52	105
56	97
60	91

1/8th Acre Calibration for Boomless Sprayers

1. Turn on sprayer and measure effective swath width (feet). Note: swath width should be visually assessed when the vehicle is moving at 5 mph with very low wind speed and wind direction is parallel to the direction of travel of the spray vehicle.
2. Refer to Table 2 to determine length of calibration course and mark the calibration course in the field.
3. Record time required to drive course at gear, engine rpm, and implement settings to be used while spraying.
4. Park sprayer, maintain same rpm used to drive course, and turn on sprayer.
5. Catch water in plastic garbage bag for time equal to drive the calibration course.
6. Measure the pints caught. Pints collected equal gallons per acre.

TABLE 3. NOZZLE TYPES, SPRAY PATTERNS AND SUGGESTED USES[1].

Type	Spray Pattern	Pressure (psi)	Suggested Use/Comments
Flat Fan	Fan-like pattern of medium droplets. Not uniform across width.	20-40 (15-40 psi for LP nozzle)	Pre- and postemergence, broadcast booms. Available in low pressure tips that reduce clogging and drift potential. Requires 30% overlap for uniform distribution.
Even Fan	Fan-like pattern. Uniform volume across entire width.	20-40	Pre- and postemergence. Good for banding.
Flooding Fan	Wide, flat pattern of coarse droplet.	10-30	Broadcast booms, chemical-fertilizer mixture, layby. Requires 100% overlap for uniform distribution.
Off-Center Flat Fan (up to OCO8)	Flat-fan pattern. Directed to one side of tip. Swath width 20-144 inches.	20-40	Post-directed, low-profile spraying. Larger drops and increased volume deposited on the toe of pattern. Reasonably uniform deposits are not expected.
Large off-Center Flat Fan	Swath directed to one side from 12 to 33 feet width.	30-40	Herbicide application to ditches and roadsides. Reasonably uniform deposits are not expected.
Cone	Circular, with heavy concentration on outside. Small droplets.	40-60	Complete coverage of foliage. Insecticide, fungicide, and growth regulator applications, and Basagran rigs. Use where slight drifting is not hazardous.
Whirl Chamber (Raindrop[tm])	Hollow cone pattern.	5-20	Used on incorporation equipment.
Rotary Atomizers	Flat plane similar to hollow cone. More nearly uniform droplet size.	Device dependent	Low-volume application of herbicides and insecticides.
Boomless Nozzle Cluster	Wide swath (up to 60 feet). Pattern easily distorted by wind. High spray trajectory.	20-40	Pastures and broadcast spraying where obstructions to booms exist. High drift potential. Not suitable for orchard spraying. Reasonably uniform deposits are not expected.

[1]Suggested uses are a composite of recommendations from the manufacturer, research, and Extension. Always follow equipment and chemical label.

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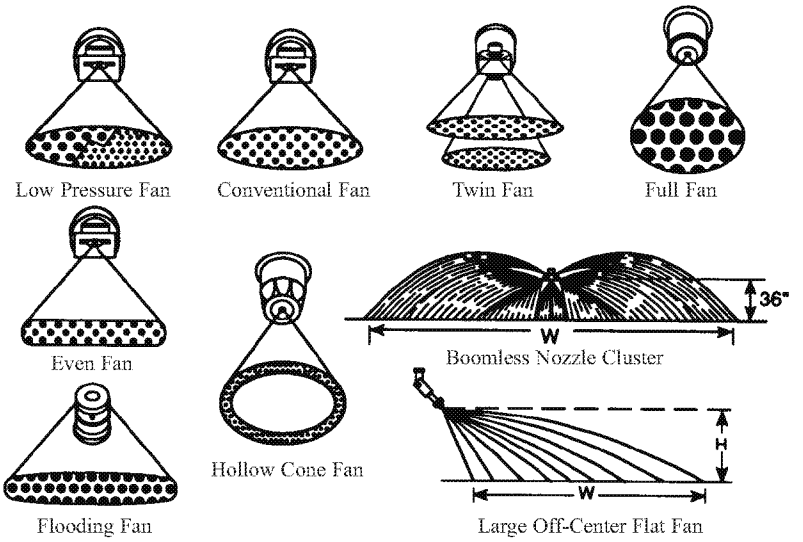
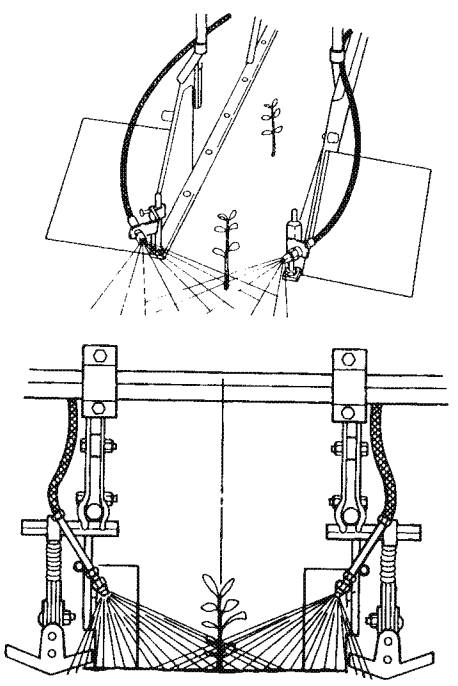
Nozzle Patterns



Typical Nozzle Settings

Typical nozzle arrangements for weed control applications are shown in Figures 1-5.



Figures 1 and 2. Flat-fan nozzles for post-direct spraying. Mount nozzle on row shield and direct spray down and back to provide desired overlap and band width.

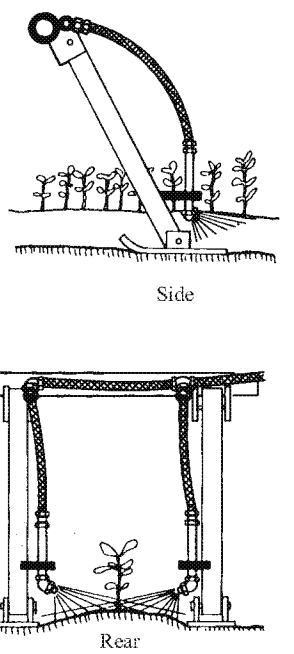


Figure 3. Off-center nozzle for post-direct spraying. Nozzle can be posi tioned further from the crop than regular flat-fan nozzle.

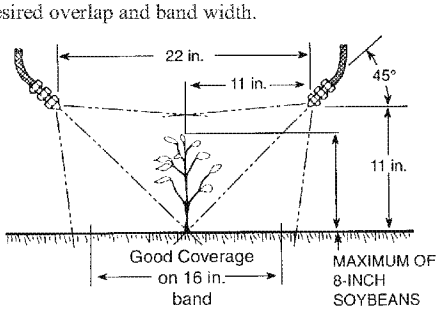


Figure 4. Two-nozzle arrangement for over-the-top applications.

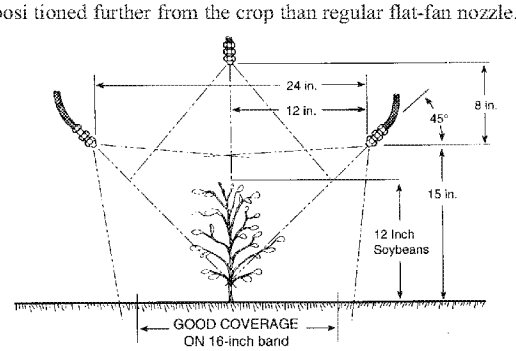


Figure 5. Three-nozzle arrangement for over-the-top applications.

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Shielded Sprayers

Shielded sprayers offer a potential to apply herbicides for preplant burn down and in crop post direct with reduced drift and little or no injury to surrounding crops. However, use precautions to prevent drift and resulting crop injury. The shield alone is not enough to permit safe herbicide application when weather conditions are unfavorable. Abide by the normal recommendations for applying herbicides in a manner to reduce drift. Select a nozzle that will produce as large a drop as practical for coverage, spray volume, and control. Lower pressure or extended range nozzles (15 to 20 psi) should be given preference over more conventional nozzles (40 psi) since fine droplet production will be reduced. Set the hood and the nozzles for the lowest position to give adequate coverage of the weeds to be controlled. Angling the nozzles to the rear will usually give better coverage at a lower height as in any post-direct spraying. Never allow a nozzle to spray against the shield or curtain and accumulate to run-off.

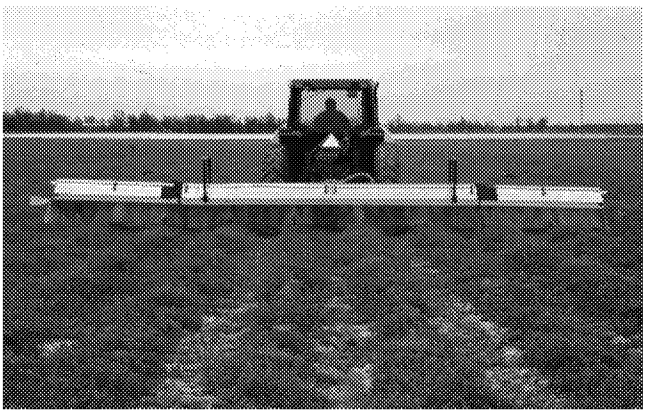

Figure 6. Broadcast shielded sprayer operating in "burn-down"

Figure 7. Shielded sprayer in soybeans

Hooded and Shielded Sprayers

Hooded and shielded sprayers offer a potential to apply herbicides for preplant burn down (figure 6 above) and in crop post direct with little or no injury to surrounding crops. A sprayer hood with multiple nozzle configurations is shown in Figure 8. Use precautions to prevent drift and injury to nontarget crops. Do not use when weather conditions are unfavorable for a safe application. During each application, exercise the following precautions:

- Set hood and nozzles for the lowest position to give adequate coverage of weeds to be controlled.
- Never allow a nozzle to spray against the shield or curtain and accumulate to run-off.
- The hood should be operated in contact with the ground and not bounce when using nonselective herbicide in susceptible crops.
- Make sure flaps or curtains extend into the furrow for maximum protection when spraying crops in raised beds.
- Avoid operating a hooded sprayer on sloping ground.
- Maximum operating speed of the tractor and hoods should not be greater than 5 mph with slower speeds preferred for rough or uneven surfaces.
- Leave a minimum of an 8-inch band centered over the drill row untreated when using nonselective herbicides.
- Avoid spraying weeds that are in direct contact with the crop.
- Select low drift, flat fan type nozzles with a 95-degree included spray fan angle that produce medium to large drops suitable for the desired coverage, application, volume, and control.
- Always read and follow herbicide label directions.

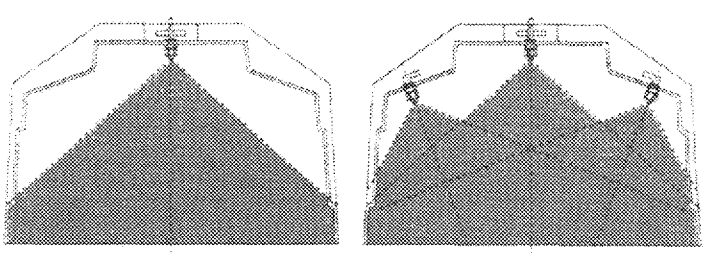

Figure 8. Sprayer hoods with one and three nozzles

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Converting Liquid Formulations

$$\text{Volumetric Application Rate (pt/A)} = \frac{8\text{ pt}}{\text{gal}} \times \frac{\text{Rate (lb ai/A)}}{\text{Concentration (lb ai/gal)}}$$

Example: To apply 1 lb/A active rate of a 4 lb/gal material

$$\frac{8\text{ pt}}{\text{gal}} \times \frac{1\text{ lb ai/A}}{4\text{ lb ai/gal}} = 2\text{ pt/A}$$

Similar conversion to liquid ounces/acre (oz/A) may be accomplished by:

$$\frac{\text{oz}}{\text{A}} = \frac{128\text{ oz}}{\text{gal}} \times \frac{\text{Rate (lb ai/A)}}{\text{Concentration (lb ai/gal)}}$$

Converting Dry Material Formulation

$$\text{Amount of product (lb/A)} = \frac{\text{Technical material rate (lb ai/A)}}{\text{Percent active ingredient (\% ai)}}$$

$$\text{Volumetric Application Rate (oz/A)} = \frac{\text{lb ai/A}}{\text{\% Active}} \times \frac{16\text{ oz}}{\text{lb}}$$

Factors to Convert Broadcast Rate/Acre Banding Applications

$$\text{\% area treated with band} = \frac{\text{Total band width sprayed per pass of implement}}{\text{Total row width covered per pass of implement}} \times 100\%$$

This allows computations for skip-row patterns:

Example: A field planted to 8-40-inch row pattern is 50% treated when a 20-inch band is applied to each row:

$$\frac{8 \times 20}{8 \times 40} \times 100\% = 50\%$$

Conversion Factors

Area Measure

1 square mile (mi^2) = 640 acres
1/4 mi x 1/4 mi = 40 acres
1,320 ft x 1,320 ft = 40 acres
1 acre = 43,560 ft^2
1 acre = 208.7 ft x 208.7 ft
1 acre = 13,068 ft of 40-in. rows
13,756 ft of 38-in. rows
14,520 ft of 36-in. rows
16,335 ft of 32-in. rows
17,424 ft of 30-in. rows
1 acre = 0.405 hectare
1 hectare = 2.47 acres
1 hectare = 10,000 m^2
1 yd^2 = 9 ft^2 = 0.836 m^2
1 ft^2 = 144 in^2 = 0.09 m^2
1 cm^2 = 0.155 in^2

Linear Measure

1 in = 2.54 cm
1 ft = 12 in = 30.48 cm
1 yd = 3 ft = 36 in = 91.44 cm
1 rod = 16.5 ft
1 mi = 5,280 ft = 1.6093 km

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Conversion Factors *(continued)*

Volume and Liquid Measure

1 yd^3 = 27 ft^3 = 0.76 m^3
1 ft^3 = 1,728 in^3 = 0.028 m^3 = 7.48 gal
1 bu = 1.25 ft^3
1 gal = 231 in^3 = 4 qt = 8 pt = 16 cups
1 gal = 128 fl oz =3.785 L = 3,785 ml = 3,785 cm^3
1 qt = 2 pt = 4 cups = 32 oz = 0.946 L = 946 ml
1 pt = 2 cups = 16 oz = 0.473 L = 473 ml
1 cup = 8 oz = 0.24 L = 240 ml
1 fl oz = 2 tbsp = 6 tsp = 1.8 in^3 = 0.02957 L = 29.57 ml
1 tbsp = 3 tsp = 0.5 oz = 14.78 ml
1 tsp = 0.166 oz = 4.92 ml
1 ml = 0.0338 fl oz

Mass (Weights)

1 U.S. ton = 2,000 lb = 0.907 metric ton
1 metric ton = 2,205 lb (avoir)
1 lb = 16 oz = 453.6 g = 0.4536 kg
1 oz = 28.35 g

Velocity Measure

1 mph = 5,280 ft/hr = 88 ft/min = 1.467 ft/sec
1 m/sec = 196.85 ft/min = 2.24 mph
1 m/sec = 1.942 knots

Pressure Measure

1 atm = 14.7 psi = 406.8 inches H_20 @ 40 °F
1 atm = 29.92 inches Hg @ 40 °F = 760 mm Hg @ 4 °C
1 atm = 1.01325 bar
1 psi = 27.68 inches H_20 @ 40 °F = 144 lb/ft^2 = 703.06 kg/m^2 @ 4 °C
1 psi = 6.8948 x 10^3 pascals = 6.895 Kpa = 2.036 inches Hg
1 psi = 70.3 g per cm^2
1 pascal = 10 $dynes/cm^2$ = 1.45 x 10^{-4} psi

Temperature

°C = 5/9 (°F - 32)
°F = (9/5 °C) + 32
°K = °C + 273.16
°R = °F + 459.69

* For additional conversions see http://www.abe.msstate.edu/tools.htm

Abbreviations

A = acres
ai = active ingredient
atm = atmospheres
bu = bushels
cm = centimeters
cm^2 = square centimeters
fl oz = fluid ounces
ft = feet
ft^2 = square feet
ft^3 = cubic feet
g = grams
gal = gallons
H_2O = water
Hg = mercury
in = inches
in^2 = square inches
in^3 = cubic inches
kg = kilograms
km = kilometers
L = liters
mi = miles
ml = milliliters
m = meters
m^2 = square meters
mm = millimeters
mph = miles per hour
oz = ounces
psi = pounds per square inch
pt = pints
qt = quarts
tbsp = tablespoons
tsp = teaspoons
yd = yards
°C = Degrees Celsius
°F = Degrees Fahrenheit
°R = Degrees Rankin
°K = Degrees Kelvin

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WEED IDENTIFICATION AND WEB RESOURCES

Good judgment, representative field scouting, and proper weed identification are critical in obtaining appropriate recommendations. Several weed identification publications are available to aid in identifying weeds, such as the Southern Weed Science Society's *Weeds of the South and Forest Plants of the Southeast*. These books can be purchased from the Southern Weed Science Society or through online vendors such as Amazon, Barnes and Nobles, and others.

Weed Science Society of America
www.wssa.net

Southern Weed Science Society
www.swss.ws

Other Web Sites of Interest:

Crop Data Management Systems	http://www.cdms.net/
Kelly Solutions	http://www.kellysolutions.com/
Greenbook Data Solutions	http://www.greenbook.net/
Invasive Plant Atlas of the Mid-South (IPAMS)	http://www.gri.msstate.edu/ipams
Southeastern Flora	http://www.southeasternflora.com/
USDA Plants Database	http://www.plants.usd.gov/

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GLOSSARY OF HERBICIDES

Efforts were made to determine the chemical companies, trade names, and formulations of herbicides suggested in these guidelines that are labeled with the Mississippi Bureau of Plant Industry. Omission of any products containing the active ingredients listed in this book was not intended.

Use Classification

Certain chemicals have been classified by the U.S. Environmental Protection Agency or the Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry as "Restricted Use" to ensure the safety of persons using them and to ensure the safety of the environment. Only certain formulations may be Restricted Use. Any person who is the end user of these products must be a certified applicator or working under the direct supervision of a certified applicator. To become certified, persons should contact their county Extension office or the Bureau of Plant Industry. All dealers who sell any products that are classified as EPA Restricted Use or State Restricted Use must obtain a dealer license from the Bureau of Plant Industry.

Use classifications are shown in the Glossary for each group of products. Following are the classification categories:

R—Products classified as Restricted Use by EPA. They will contain on the front panel of their labels the wording "Restricted Use Pesticide for retail sale to and use only by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification," or similar wording.

G—Products for general use (not restricted by EPA). They can be bought and used by the general public without certification.

Abbreviations used in this section:

DF or DFG — Dry Flowable

DG — Dispersible Granules

DS — Dry Soluble

G — Granules

P — Pellets

RTS — Ready to Spray

RTU — Ready to Use

SG — Soluble Granules

WDG — Water Dispersible Granules

WDS — Water Dispersible Soluble

W&F — Weed and Feed

WSG — Water Soluble Granules

WP — Wettable Powder

WS — Water Soluble Powder

WSB — Water Soluble Bag

WSP — Water Soluble Packet

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Common chemical name	Company	Trade names and formulations	Use classification
2,4-D	Loveland Prod	Amine 4 2,4-D Weed Killer — 46.5%	G
2,4-D	Dow Agrosciences	GF-2668 MUP — 65.3%	G
2,4-D	Dow Agrosciences	GF-2654 — 56.3%	G
2,4-D	Dow Agrosciences	Enlist One-State RUP Registration — 55.7%	R
2,4-D	Dow Agrosciences	Enlist One — 55.7%	G
2,4-D	Dow Agrosciences	GF-3335-State RUP Section 3 Label — 55.7%	R
2,4-D	Dow Agrosciences	GF-3335 — 55.7%	G
2,4-D	Helena Agri-Enterprises	Weed Rhap LV-6D — 89.5%	G
2,4-D	Helena Agri-Enterprises	BARRAGE HF — 78.1%	G
2,4-D	Helena Agri-Enterprises	UNISON — 19.6%	G
2,4-D	Helena Agri-Enterprises	HARDBALL — 19.6%	G
2,4-D	Helena Agri-Enterprises	Hardball Elite — 29.7%	G
2,4-D	Helena Agri-Enterprises	Unison Edge — 29.7%	G
2,4-D	Nufarm Americas	UAP Timberland Platoon — 47.3%	G
2,4-D	Nufarm Americas	WEEDestroy AM-40 — 46.8%	G
2,4-D	Ragan and Massey	Compare-N-Save 2,4-D Amine Salt Broadleaf Weed Cont. — 46.8%	G
2,4-D	Winfield Solutions	Rugged — 38.4%	G
2,4-D	Dow Agrosciences	Freelexx — 56.3%	G
2,4-D, amine	ADAMA	Defy Amine 4 — 47.2%	G
2,4-D, amine	Alligare	Alligare 2,4-D Amine — 46.8%	G
2,4-D, amine	Helena Agri-Enterprises	2,4-D Amine 4 — 46.8%	G
2,4-D, amine	Loveland Prod	Clean Amine — 46.5%	G
2,4-D, amine	Loveland Prod	Savage Dry Soluble Herb. — 95%	G
2,4-D, amine	Tenkoz	Tenkoz Amine 4 2,4-D Herb. — 46.8%	G
2,4-D, amine	Tenkoz	Tenkoz Amine 4 2,4-D Herb. — 46.8%	G
2,4-D, amine	Marman USA	Amine 4D Weed Killer — 46.8%	G
2,4-D, amine	Marman USA	Amine 6D Weed Killer — 66.8%	G
2,4-D, amine	PBIGordon	Gordon's Amine 400 2,4-D Weed Killer — 46.47%	G
2,4-D, amine	Albaugh	2,4-D Amine 4 — 46.8%	G
2,4-D, amine	Dow Agrosciences	DMA 4 IVM — 46.3%	G
2,4-D, amine	Drexel Chemical	Drexel De-Amine 4 — 47.5%	G
2,4-D, amine	Helena Agri-Enterprises	OPTI-AMINE — 46.7%	G
2,4-D, amine	Innvictis Crop Care	HAVOC AMINE — 47.2%	G
2,4-D, amine	Nufarm	Nufarm Weedar 64 Broadleaf Herb. — 46.8%	G
2,4-D, amine	Sepro	Sculpin G — 20%	G
2,4-D, amine	Southern Ag Insect.	2,4-D Amine Weed Killer — 46.8%	G
2,4-D, amine	VPG	Hi-Yield 2,4-D Sel. Weed Killer — 11.84%	G
2,4-D, amine	Winfield Solutions	Shredder Amine 4 — 47.3%	G
2,4-D, amine	Helena Agri-Enterprises	WEED RHAP A-4D — 46.7%	G
2,4-D, amine	Winfield Solutions	2,4-D Amine 4 — 47.3%	G
2,4-D, amine	VPG	Hi-Yield 2,4-D Amine — 47.2%	G
2,4-D, B	Albaugh	Butyrac 200 — 25.9%	G
2,4-D, B	Albaugh	Butyrac 175 — 23%	G
2,4-D, B	Drexel Chemical	Drexel 2,4-DB DMA 175 — 23%	G
2,4-D, B	Drexel Chemical	Drexel 2,4-DB DMA 200 — 26.1%	G
2,4-D, B	Winfield Solutions	2,4-DB 200 — 25.9%	G
2,4-D, B	Winfield Solutions	2,4-DB 175 — 23%	G
2,4-D, B	Winfield Solutions	2,4-DB 200 — 26.1%	G
2,4-D, B	Winfield Solutions	2,4-DB 1.75 — 23%	G
2,4-D, B	Aceto Ag Chemicals	2,4-DB 175 Herb. — 23%	G
2,4-d, B	Aceto Ag Chemicals	2, 4 DB 200 Herb. — 26.2%	G
2,4-D, ester	Loveland Prod	Low Vol 4 Ester Weed Killer — 65.5%	G
2,4-D, ester	Applied Biochemists	Navigate — 27.6%	G
2,4-D, ester	Winfield Solutions	Shredder E-99 — 87.4%	G
2,4-D, ester	Loveland Prod	Low Vol 6 Ester Weed Killer — 88.8%	G
2,4-D, ester	Loveland Prod	Salvo — 81.8%	G
2,4-D, ester	Nufarm	Weedone LV6 EC Broadleaf Herb. — 87.3%	G
2,4-D, ester	Helena Agri-Enterprises	Weed Rhap LV-4 — 65.9%	G
2,4-D, ester	Innvictis Crop Care	HAVOC LV-Six — 88.4%	G
2,4-D, ester	Innvictis Crop Care	HAVOC LV-Four — 68%	G
2,4-D, ester	Loveland Prod	Whiteout 2,4-D — 60.8%	G
2,4-D, ester	Nufarm	Nufarm Weedone LV4 Solventless — 62.6%	G
2,4-D, ester	Winfield Solutions	Shredder 2,4-D LV4 — 66.2%	G
2,4-D, ester	Winfield Solutions	2,4-D LV6 — 88.8%	G
2,4-D, ester	Winfield Solutions	Shredder 2,4-D LV6 — 88.8%	G
2,4-D, ester	Alligare	Alligare 2,4-D LV 6 — 88.4%	G
2,4-D, ester	Drexel Chemical	Drexel De-Ester LV4 — 65.4%	G
2,4-D, ester	Nufarm	Nufarm Weedone LV4 EC — 67.2%	G
2,4-D, ester	Nufarm	Weedone 650 Herb. — 87.3%	G
2,4-D, ester	PBIGordon	Gordon's LV 400 2,4-D Weed Killer Solvent Free — 61.74%	G
2,4-D, ester	Tenkoz	Tenkoz Lo-Vol 4 2,4-D Low Volatile Herb. — 63.7%	G
2,4-D, ester	ADAMA	Defy LV-4 — 68%	G

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Common chemical name	Company	Trade names and formulations	Use classification
2,4-D, ester	ADAMA	Defy LV-6 — 88.4%	G
2,4-D, ester	Tenkoz	Tenkoz Lo-Vol 4 2,4-D Low Volatile Herb. — 67.2%	G
2,4-D, ester	Albaugh	2,4D LV 4 — 63.7%	G
2.4-D, ester	Drexel Chemical	Drexel De-Ester LV6 — 88.8%	G
2.4-D, ester	Albaugh	Solve 2,4D — 61.74%	G
2.4-D, ester	Winfield Solutions	2,4-D LV4 — 66.2%	G
2.4-D, ester	Albaugh	2,4-D LV 6 — 86.5%	G
Acetic acid	BWI Companies	Nature's Guide 20%Vinegar Weed Cont. — 0.2%	G
Acetic acid	Ecoclean Solutions	Green Gobbler 20% Vinegar Weed Killer — 20%	G
Acetic acid	P.F. Harris	Harris *Since 1922* 20% Vinegar Weed Killer — 20%	G
Acetic acid	Fleischmann's Vinegar	Vinagreen — 20%	G
Acetochlor	Dow Agrosciences	Surpass EC — 70.87%	G
Acetochlor	Dow Agrosciences	Acetochlor Tech. — 95.4%	G
Acetochlor	Dow Agrosciences	Surpass NXT — 75.9%	G
Acetochlor	Dow Agrosciences	Reply Herb. — 75.9%	G
Acetochlor	Dow Agrosciences	Acethochlor Tech. — 95.4%	G
Acetochlor	DuPont	DuPont Breakfree NXT Herb. — 75.9%	G
Acetochlor	Helm Agro U.S.	Fearless Herb. — 75.9%	G
Acetochlor	Loveland Prod	Cadence* NXT Herb. — 75.9%	G
Acetochlor	Monsanto	Harness Herb. — 75.9%	G
Acetochlor	Monsanto	Confidence Herb. — 75.9%	G
Acetochlor	Monsanto	Harness 20G Granular Herb. — 20%	G
Acetochlor	Monsanto	Degree Herb. — 42%	G
Acetochlor	Monsanto	Warrant Herb. — 33%	G
Acetochlor	Rotam N.A.	Salvus — 75.9%	G
Acetochlor	Sharda USA	Asset-S Plus — 70.87%	G
Acetochlor	Sharda USA	Arrest CS — 33%	G
Acifluorfen	Atticus	Derecho — 20.1%	G
Acifluorfen	Summit Agro USA	Acifin 2L — 20.1%	G
Acifluorfen	UPL NA	Ultra Blazer — 20.1%	G
Acifluorfen	Innvictis Crop Care	Levity — 20.1%	G
Acifluorfen	Sharda USA	Sharda Acifluorfen 20.1% SL — 20.1%	G
Acifluorfen	Winfield Solutions	Avalanche Ultra — 20.1%	G
Acifluorfen	Loveland Prod	LPI Acifluorfen Herb. — 20.1%	G
Acifluorfen	Winfield Solutions	Avalanche Ultra (WF RedEagle) — 20.1%	G
Ametryn	Syngenta	EVIK DF Herb. — 78.9%	G
Amicarbazone	Arysta Lifescience N.A.	Xonerate Herb. — 70%	G
Amicarbazone	FMC	Xonerate 2SC Herb. — 23.25%	G
Aminocyclopyrachlor	Bayer Enviro. Science	Method 50SG Herb. — 50%	G
Aminocyclopyrachlor	DuPont	DuPont Aminocyclopyrachlor Tech. — 89.3%	G
Aminocyclopyrachlor	DuPont	DuPont Aptexor Tech. — 89.3%	G
Aminocyclopyrachlor	DuPont	DuPont Aptexor Manufacturing Conc. — 10%	G
Aminocyclopyrachlor	Bayer Enviro. Science	Method 240SL Herb. — 25%	G
Aminopyralid	Dow Agrosciences	Milestone — 40.6%	G
Ammonium nitrate	Mirimichi Green Express	Mirimichi Green PRO Weed Cont. — 40%	G
Ammonium salt of imazaquin	Ambrands	Image Herb. Consumer Conc. — 3.3%	G
Ammonium salt of imazaquin	Ambrands	Image RTS Herb. Consumer Conc. — 3.3%	G
Ammonium soaps of fatty acids	Messinas	PULVERIZE Weed & Grass Killer — 3.68%	G
Ammonium soaps of fatty acids	Messinas	Pulverize Weed & Grass Killer Conc. — 22%	G
Ammonium soaps of fatty acids	Gro Tec	Eliminator Weed & Grass Killer IV RTU — 3.68%	G
Ammonium soaps of fatty acids	Gro Tec	Eliminator Weed & Grass Killer IV Conc. — 22%	G
Ammonium soaps of fatty acids	The Espoma	Weed & Grass Killer — 3.68%	G
Ammonium soaps of fatty acids	This Land Dba — Sunday	Weed Warrior Conc. Grass and Weed Killer — 22%	G
Ammonium soaps of fatty acids	VPG	Natural Guard Brand by Ferti-Lome Grass & Weed Killer Non-Sel. — 22%	G
Ammonium soaps of fatty acids	VPG	Natural Guard Brand by Ferti-lome Grass & Weed Killer Non-Sel. RTU — 3.68%	G
Ammonium soaps of fatty acids	W. Neudorff Gmbh Kg	Finalsan Herbicidal Soap — 22%	G
Asulam	Atticus	Addax 36.2 SL — 36.2%	G
Asulam	Helena Agri-Enterprises	ASULAM 4 F — 36.2%	G
Asulam	UPL NA	Asulox Herb. — 36.2%	G
Asulam	Innvictis Crop Care	Divulge — 36.2%	G
Asulam	Winfield Solutions	Asulam 3.3 Herb. — 36.2%	G
Atrazine	ADAMA	Atrazine DF — 88.2%	R
Atrazine	ADAMA	Atrazine 4L Herb. — 42.9%	R
Atrazine	ADAMA	Atrazine 90 DF — 88.5%	R
Atrazine	Ambrands	Image Herb. for St. Augustinegrass & Centipedegrass — 4%	G
Atrazine	Ambrands	Image Herb. for St. Augustinegrass & Centipedegrass RTS — 4%	G
Atrazine	Drexel Chemical	Drexel Atrazine 4L — 42.2%	R
Atrazine	Drexel Chemical	Drexel Auguzine — 4%	G
Atrazine	Drexel Chemical	Drexel Atrazine 90DF — 88.4%	R
Atrazine	Drexel Chemical	Drexel Atra-5 — 52.5%	R
Atrazine	Helena Agri-Enterprises	HELENA Atrazine 4 F — 42.6%	R

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Common chemical name	Company	Trade names and formulations	Use classification
Atrazine	Helena Agri-Enterprises	Helena Atrazine 90-DG — 88.2%	R
Atrazine	Helena Agri-Enterprises	Atrazine 4 L — 41.12%	R
Atrazine	Innvictis Crop Care	Atra-V 4L — 42.6%	R
Atrazine	Lesco	Lesco Atrazine 1.05% + Fert. 24-0-10 (702199) — 1.05%	G
Atrazine	Loveland Prod	Atrazine 90 WDG Herb. — 88.5%	R
Atrazine	Loveland Prod	Atrazine 4L Herb. — 42.2%	R
Atrazine	Oxon Italia S.P.A.	Oxon Italia Atrazine Tech. II — 96%	G
Atrazine	Scotts	Snap Pac Southern W&F 32-0-4 — 1.44%	G
Atrazine	SIPCAM AGRO USA	Atrazine 90 DF Herb. — 87.72%	R
Atrazine	SIPCAM AGRO USA	Atrazine 4L FLOWABLE Herb. — 41.9%	R
Atrazine	Southern Ag Insect.	Atrazine 4% St. Augustine Lawn Weed Killer — 4%	G
Atrazine	Spectrum Group	Spectracide Weed Stop for Lawns for St. Augustine & Centipede Lawns Conc. — 4%	G
Atrazine	Swiss Farms Prod	Vigoro Southern W&F 29-0-4 — 1.38%	G
Atrazine	Swiss Farms Prod	ACE SOUTHERN WEED & FEED65 — 1.38%	G
Atrazine	Syngenta	Atrazine TECHNICAL — 96%	G
Atrazine	Syngenta	AATREX 4L Herb. — 42.6%	R
Atrazine	Syngenta	AATREX NINE-O — 88.2%	R
Atrazine	Tenkoz	Tenkoz Atrazine 4L Herb. — 42.6%	R
Atrazine	Tenkoz	Tenkoz Atrazine 90DF Herb. — 88.2%	R
Atrazine	Tenkoz	Tenkoz Atrazine 4L Herb. — 42.2%	R
Atrazine	Tenkoz	Tenkoz Atrazine 4L Herb. — 42.9%	R
Atrazine	Turf Care Supply	TCS GrowStar Atrazine 0.92% + Fert. — 0.92%	G
Atrazine	VPG	Hi-Yield Atrazine Weed Killer — 4.08%	G
Atrazine	Winfield Solutions	Atrazine 4L — 42.12%	R
Atrazine	Winfield Solutions	Atrazine 90DF — 88%	R
Benefin	Gowan	Balan Tech. — 96.6%	G
Benfluralin	Andersons	Andersons Pro. Turf Products Crabgrass Prev. w/ 2.5% Balan Herb. — 2.5%	G
Bensulfuron-methyl	RiceCo.	Londax — 60%	G
Bensulide	Gowan	Prefar 4-E Sel. Herb. — 46%	G
Bensulide	PBIGordon	Bensumec 4LF — 46%	G
Bentazon	Southern Ag Insect.	Broadloom Sedge Cont. — 44%	G
Bentazon, sodium salt	Arysta Lifescience N.A.	Basagran Herb. — 44%	G
Bentazon, sodium salt	BASF	Basagran 5L Herb. — 53%	G
Bentazon, sodium salt	BASF	Basagran T&O Herb. — 44%	G
Bentazon, sodium salt	UPL NA	Broadloom T&O Herb. — 44%	G
Bentazon, sodium salt	Winfield Solutions	Basagran Herb. — 44%	G
Bentazon, sodium salt	Winfield Solutions	Basagran — 44%	G
Bentazon, sodium salt	UPL NA	Broadloom Herb. — 44%	G
Bispyribac-sodium	Raymat Crop Science	Arroz 80 — 80%	G
Bispyribac-sodium	Valent U.S.A.	Regiment Herb. — 80%	G
Bispyribac-sodium	Valent U.S.A.	Tradewind Herb. — 80%	G
Bromacil	Bayer Enviro. Science	Hyvar X-L — 21.9%	G
Bromacil	Momar	Weed Away — 4%	G
Bromacil	Pro Chem	Terminator — 2.44%	G
Bromacil	Alligare	Hyvar X IVM Herb. — 80%	G
Bromacil	Alligare	Bromacil 80 — 80%	G
Bromacil	Bayer Enviro. Science	Hyvar X Herb. — 80%	G
Bromacil	Bayer Enviro. Science	Bromacil Tech. Herb. — 97.2%	G
Bromacil	Hill Manufacturing	2574 Ground Zero — 11.5%	G
Bromacil	Pro Chem	Weed Pro — 4%	G
Bromacil	Share	Vegetation Cont. — 0.98%	G
Bromacil	Total Solutions	Weed Easy — 4%	G
Bromacil	Zep	Enforcer Formula 777 E.C. Weed Killer — 1.52%	G
Bromacil, lithium salt	Total Solutions	Banish — 1.2%	G
Carfentrazone-ethyl	FMC	Aim EC Herb. — 22.3%	G
Carfentrazone-ethyl	FMC	QuickSilver T&O Herb. — 21.3%	G
Carfentrazone-ethyl	Sepro	Stingray — 21.3%	G
Chlorimuron-ethyl	Agsurf	Cemax Herb. — 25%	G
Chlorimuron-ethyl	DuPont	DuPont Classic Herb. — 25%	G
Chlorimuron-ethyl	Helm Agro U.S.	Chlorimuron Ethyl TC — 98.3%	G
Chlorimuron-ethyl	Helm Agro U.S.	Sheridan 25 WG — 25%	G
Chlorimuron-ethyl	Nufarm	Curio Herb. — 25%	G
Chlorimuron-ethyl	Redeagle Intl.	Chlorimuron Ethyl Tech. — 99.06%	G
Chlorimuron-ethyl	Redeagle Intl.	Chlorimuron-ethyl 25% WDG — 25%	G
Chlorimuron-ethyl	Sharda USA	Sharda Chlorimuron 25 WDG — 25%	G
Chlorothalonil	Regal Chemical	Chlorostar DF — 82.5%	G
Chlorsulfuron	Bayer Enviro. Science	Telar XP Herb. — 75%	G
Clethodim	ADAMA	Arrow 2 EC Herb. — 26.4%	G
Clethodim	Agrisel USA	Agrisel GrassOut Max Herb. — 26.4%	G
Clethodim	Agromarketing	Clethodim 2 EC — 26.4%	G
Clethodim	Albaugh	Clethodim 2E — 26.4%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Clethodim	Arysta Lifescience N.A.	Trizenta Herb. — 26.4%	G
Clethodim	Arysta Lifescience N.A.	Shadow Herb. — 26.4%	G
Clethodim	Arysta Lifescience N.A.	Shadow Ultra Herb. — 12.9%	G
Clethodim	Arysta Lifescience N.A.	Clethodim 37% MUP Herb. — 37%	G
Clethodim	Arysta Lifescience N.A.	Clethodim 70% MUP Herb. — 70%	G
Clethodim	Arysta Lifescience N.A.	Trizenta 3EC Herb. — 36.7%	G
Clethodim	Arysta Lifescience N.A.	Shadow 3EC Herb. — 36.7%	G
Clethodim	Atticus	Ceridian 2 EC — 26.4%	G
Clethodim	Helena Agri-Enterprises	Omni Brand Clethodim 2 EC — 26.4%	G
Clethodim	Helena Agri-Enterprises	TAPOUT — 12.6%	G
Clethodim	Innvictis Crop Care	AVATAR S2 — 26.4%	G
Clethodim	Innvictis Crop Care	AVATAR — 26.4%	G
Clethodim	Loveland Prod	Intensity Post Emergence Grass Herb. — 26.4%	G
Clethodim	Loveland Prod	Intensity One Post-Emergence Grass Herb. — 12.6%	G
Clethodim	Prime Source	PS Clethodim — 26.4%	G
Clethodim	Redeagle Intl.	Clethodim 2E — 26.4%	G
Clethodim	Rotam N.A.	Dakota — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tenkoz	Volunteer 2EC — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tenkoz	Volunteer Herb. — 26.4%	G
Clethodim	Tide Intl., USA	Tide USA Clethodim 2EC — 26.4%	G
Clethodim	Valent U.S.A.	Envoy Plus Herb. — 12.6%	G
Clethodim	Valent U.S.A.	Select Max Herb. w/ Inside Technology — 12.6%	G
Clethodim	Valent U.S.A.	Select 70% M.U.P. — 70%	G
Clethodim	Valent U.S.A.	Select 37% M.U.P. — 37%	G
Clethodim	Whitetail Institute of N.A.	Arrest Max — 12.6%	G
Clethodim	Willowood	Willowood Clethodim 2EC — 26.4%	G
Clethodim	Winfield Solutions	Cleanse 2EC — 26.4%	G
Clethodim	Winfield Solutions	Cleanse (WF) — 26.4%	G
Clethodim	Winfield Solutions	Select 2EC — 26.4%	G
Clethodim	Winfield Solutions	Section Three Herb. — 36.7%	G
Clodinafop-propargyl	Syngenta	DISCOVER NG — 6.4%	G
Clodinafop-propargyl	Arysta Lifescience N.A.	NextStep NG — 6.4%	G
Clomazone	ADAMA	Vopak 3ME — 31.3%	G
Clomazone	FMC	Command 3ME Microencapsulated Herb. — 31.1%	G
Clomazone	Innvictis Crop Care	CIVIC 3ME — 31.1%	G
Clomazone	Oxon Italia S.P.A.	Clomazone TG — 97%	G
Clomazone	SIPCAM AGRO USA	Caravel Herb. — 31.3%	G
Clomazone	UPL NA	UP-Stage 3CS — 31.1%	G
Clomazone	Willowood	Willowood Clomazone 3ME — 31.1%	G
Clopyralid	Alligare	Sonora Herb. — 40.9%	G
Clopyralid	Dow Agrosciences	Transline — 40.9%	G
Clopyralid	Dow Agrosciences	Lontrel Turf and Orn. — 40.9%	G
Clopyralid	Dow Agrosciences	Stinger — 40.9%	G
Clopyralid	Nufarm Americas	Clean Slate Sel. Herb. — 40.9%	G
Clopyralid	Sharda USA	Bite — 40.9%	G
Clopyralid	Innvictis Crop Care	SAVANT — 40.9%	G
Clopyralid	Lawn and Garden Prod	THISTLEDOWN — 40.9%	G
Cloransulam-methyl	Atticus	FrontRunner — 84%	G
Cloransulam-methyl	Dow Agrosciences	FirstRate — 84%	G
Cloransulam-methyl	Sharda USA	Ankur — 84%	G
Cloransulam-methyl	Summit Agro USA	Traject 4SC — 41%	G
Cloransulam-methyl	Willowood	Willowood Cloran DF — 84%	G
Clothianidin	Valent U.S.A.	Clothianidin Tech. Insecticide — 97.5%	G
Copper	Alligare	Argos — 27.9%	G
Copper	Applied Biochemists	Clearigate EC9 — 3.825%	G
Copper	Sepro	Komeen — 22.9%	G
Copper	Applied Biochemists	Harpoon Aquatic Herb. — 23%	G
Copper	Applied Biochemists	Harpoon Granular Aquatic Herb. — 9.87%	G
Copper	PBIGordon	Gordon's PondMaster Aquatic Herb. — 22.9%	G
Copper	Sepro	SePRO Total Pond — Rescue — 50%	G
Copper	Sepro	Komeen Crystal — 50%	G
Copper	Beaver Plastics	COPPERBLOCK — 11.7%	G
Copper	HCC Holdings	Break Thru R-D Root Destroyer — 1%	G
Copper	PBIGordon	Gordon's PondMaster Copper Sulfate Crystals — 99%	G
Copper	Roebic Laboratories	K-77 Root Killer — 99%	G
Copper	Sanco Industries	Root Destroyer — 99%	G
Copper	SCOTCH	Instant Power Sewer Line Root Destroyer — 99%	G
Copper	UPL NA	Current — 31.27%	G
Copper	VPG	Hi-Yield Root Killer — 99%	G
Copper	Zep	Zep Root Kill — 99%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Cycloate	Helm Agro U.S.	Ro-Neet Herb. — 73.9%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher Tech. — 96.5%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher CA — 29.6%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher SF — 29.6%	G
Cyhalofop-butyl	Dow Agrosciences	Clincher EZ — 18.2%	G
Cymoxanil	DuPont	Curzate 60DF — 60%	G
DCPA	Amvac Chemical	DACTHAL FLOWABLE Herb. — 54.9%	G
Dicamba	Albaugh	Dicamba DMA-State RUP Registration — 48.2%	R
Dicamba	Albaugh	Dicamba DMA — 48.2%	G
Dicamba	BASF	Clarity Herb. — 58.1%	G
Dicamba	BASF	Clarity Herb-State RUP Registration — 58.1%	R
Dicamba	Tenkoz	Detonate Herb. — 56.8%	G
Dicamba	Tenkoz	Detonate Herb-State RUP Registration — 56.8%	R
Dicamba	Winfield Solutions	Clarifier-State RUP Registration — 58.1%	R
Dicamba	Winfield Solutions	Clarifier — 58.1%	G
Dicamba	Albaugh	Dicamba HD-State RUP Registration — 56.8%	R
Dicamba	Albaugh	Dicamba HD — 56.8%	G
Dicamba	BASF	Engenia Herb-State RUP Supplemental Labels — 60.8%	R
Dicamba	BASF	Engenia Herb. — 60.8%	R
Dicamba	DuPont	DuPont Dicamba XP Herb-State RUP Registration — 83.6%	R
Dicamba	DuPont	DuPont Dicamba XP Herb. — 83.6%	G
Dicamba	Helena Agri-Enterprises	Vision — 40%	G
Dicamba	Helena Agri-Enterprises	Vision-State RUP Registration — 40%	R
Dicamba	Helena Agri-Enterprises	Opti-DGA Herb-State RUP Registration — 58.1%	R
Dicamba	Helena Agri-Enterprises	Opti-DGA Herb. — 58.1%	G
Dicamba	Loveland Prod	Strut Herb-State RUP Registration — 56.8%	R
Dicamba	Loveland Prod	Strut Herb. — 56.8%	G
Dicamba	Loveland Prod	Rifle Herb-State RUP Registration — 48.2%	R
Dicamba	Loveland Prod	Rifle Herb. — 48.2%	G
Dicamba	Monsanto	Monsanto Dicamba Tech. 99 LL — 99.4%	G
Dicamba	Nufarm Americas	Diablo-State RUP Registration — 48.2%	R
Dicamba	Nufarm Americas	Riverdale Vanquish Herb. — 56.8%	G
Dicamba	Nufarm Americas	Clash Sel. Herb-State RUP Registration — 56.8%	R
Dicamba	DuPont	DuPont D1691 Herb. — 58.1%	G
Dicamba	Monsanto	XTENDIMAX w/ VaporGrip Technology-State RUP Supplemental Labels — 42.8%	R
Dicamba	Monsanto	XTENDIMAX w/ VaporGrip Technology — 42.8%	R
Dicamba	Winfield Solutions	Sterling Blue DGA — State RUP Registration — 56.8%	R
Dicamba	Bayer Cropscience	DiFlexx Herb. — 56.6%	G
Dicamba	Bayer Cropscience	DiFlexx Herb-State RUP Registration — 56.6%	R
Dicamba	Drexel Chemical	Dicamba DGA Herb. — 58.1%	G
Dicamba	Drexel Chemical	Dicamba DGA Herb-State RUP Registration — 58.1%	R
Dicamba	DuPont	DuPont FeXapan Herb. + VaporGrip Technology-State RUP Supplemental Labels — 42.8%	R
Dicamba	DuPont	DuPont FeXapan Herb. + VaporGrip Technology — 42.8%	R
Dicamba	DuPont	DuPont D1691 Herb-State RUP Registration — 58.1%	R
Dicamba	Innvictis Crop Care	Veritas LV — 58.1%	G
Dicamba	Innvictis Crop Care	Veritas LV-State RUP Registration — 58.1%	R
Dicamba	Monsanto	M1691 Herb-State RUP Registration — 58.1%	R
Dicamba	Monsanto	M1691 Herb. — 58.1%	G
Dicamba	Redeagle Intl.	Dicamba 708 g/L Salt — 58.2%	G
Dicamba	Redeagle Intl.	Dicamba 708 g/L Salt — State RUP Registration — 58.2%	R
Dicamba	Tenkoz	Detonate Herb-State RUP Registration — 58.1%	R
Dicamba	Tenkoz	Detonate Herb. — 58.1%	G
Dicamba	Winfield Solutions	Sterling Blue DGA — 56.8%	G
Dicamba	Winfield Solutions	Sterling Blue-State RUP Registration — 56.8%	R
Dicamba	Winfield Solutions	Sterling Blue — 56.8%	G
Dicamba	Winfield Solutions	Sterling Blue — 58.1%	G
Dicamba	Winfield Solutions	Sterling Blue-State RUP Registration — 58.1%	R
Dicamba	AgSaver	AgSaver Dicamba DMA Salt-State RUP Registration — 48.2%	R
Dicamba	AgSaver	AgSaver Dicamba DMA Salt — 48.2%	G
Dicamba	Alligare	Alligare Dicamba 4-State RUP Registration — 50.2%	R
Dicamba	Alligare	Alligare Dicamba 4 — 50.2%	G
Dicamba	Arysta Lifescience N.A.	Banvel-State RUP Registrations — 49.4%	R
Dicamba	Arysta Lifescience N.A.	Banvel — 49.4%	G
Dicamba	Arysta Lifescience N.A.	Banvel 480 Herb-State RUP Registration — 49.77%	R
Dicamba	Arysta Lifescience N.A.	Banvel 480 Herb. — 49.77%	G
Dicamba	Atticus	Doleac DMA — 50.2%	G
Dicamba	Atticus	Doleac DMA — State RUP Registration — 50.2%	R
Dicamba	Drexel Chemical	Drexel Dicamba Herb-State RUP Registration — 49.77%	R
Dicamba	Drexel Chemical	Drexel Dicamba Herb. — 49.77%	G
Dicamba	Gharda Chemicals	Oracle Dicamba Agricultural Herb. — 49.77%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Dicamba	Gharda Chemicals	Oracle Dicamba Agricultural Herb-State RUP Registration — 49.77%	R
Dicamba	Mey	T-Rex Dicamba Herb-State RUP Registration — 48.2%	R
Dicamba	Mey	T-Rex Dicamba Herb. — 48.2%	G
Dicamba	Rotam N.A.	Topeka — 48.2%	G
Dicamba	Rotam N.A.	Topeka-State RUP Registration — 48.2%	R
Dicamba	Sharda USA	Disha DMA — 49.77%	G
Dicamba	Sharda USA	Disha DMA — State RUP Registration — 49.77%	R
Dicamba	DuPont	DuPont BL1 Herb-State RUP Registration — 77%	R
Dicamba	DuPont	DuPont BL1 Herb. — 77%	G
Dichlobenil	Ambrands	Image Herb. from Lilly Miller Casoron Granules — 2%	G
Dichlobenil	Ambrands	Image Herb. from Lilly Miller Noxall Granules — 2%	G
Dichlobenil	GENERAL CHEMICAL	RootX — 0.55%	G
Dichlobenil	Haviland Consumer Prod	Blast It — 4%	G
Dichlobenil	Lilly Miller Brands	Lilly Miller Casoron Granules — 2%	G
Dichlobenil	Lilly Miller Brands	Lilly Miller Granular Noxall Vegetation Killer — 2%	G
Dichlobenil	Macdermid Ag Solutions	Casoron 4G — 4%	G
Dichlobenil	Macdermid Ag Solutions	Casoron CS — 15.3%	G
Dichlobenil	PBIGordon	Barrier Orn. Landscaping Herb. — 4%	G
Dichlobenil	Roebic Laboratories	Foaming Root Killer — 0.55%	G
Dichlobenil	Roebic Laboratories	Roebic Foaming Root Killer — 0.55%	G
Diclosulam	Dow Agrosciences	Strongarm — 84%	G
dimethenamide-P	BASF	Outlook Herb. — 63.9%	G
dimethenamide-P	BASF	Tower Herb. — 63.9%	G
dimethenamide-P	Loveland Prod	Slider — 63.9%	G
Diquat dibromide	Aceto Ag Chemicals	Aceto Diquat 2L AG Herb. — 37.3%	G
Diquat dibromide	Aceto Ag Chemicals	Aceto Diquat 2L Landscape & Aquatic Herb. — 37.3%	G
Diquat dibromide	Aero Chemical Co	Sudden Death — 1.85%	G
Diquat dibromide	Aero Chemical	Titanic Weed Killer — 4.35%	G
Diquat dibromide	Alligare	Alligare Diquat Herb. — 37.3%	G
Diquat dibromide	Applied Biochemists	Harvester Landscape & Aquatic Herb. — 37.3%	G
Diquat dibromide	Applied Biochemists	Weedtrine D Aquatic Herb. — 8.53%	G
Diquat dibromide	Arch Chemicals	Pond Oasis Aquatic Plant Cont. — 8.53%	G
Diquat dibromide	Durvet	AquaVet Submerged Weeds — 37.3%	G
Diquat dibromide	Helm Agro U.S.	Diquat TC — 42.4%	G
Diquat dibromide	Helm Agro U.S.	Verdure-X-Herb — 37.3%	G
Diquat dibromide	Lake Restoration	Dibrox Herb. — 37.3%	G
Diquat dibromide	Momar	Edger — 1.85%	G
Diquat dibromide	Nufarm Americas	Nufarm Diquat 2L Herb. — 37.3%	G
Diquat dibromide	Nufarm Americas	Nufarm Diquat SPC 2L Landscape & Aquatic Herb. — 37.3%	G
Diquat dibromide	Pro Chem	Pro Chem Edge — 1.85%	G
Diquat dibromide	Rotam N.A.	Rowrunner ATO — 37.3%	G
Diquat dibromide	Sanco Industries	Tsunami DQ — 37.3%	G
Diquat dibromide	Sepro	Littora — 37.3%	G
Diquat dibromide	Sepro	SePRO Total Pond — React — 37.3%	G
Diquat dibromide	Sharda USA	Dessicash L&A Landscape and Aquatic Herb. — 37.3%	G
Diquat dibromide	Sharda USA	Dessicash Ag Desiccant & Herb. — 37.3%	G
Diquat dibromide	Solera ATO	Diquat Landscape and Aquatic Herb. — 37.3%	G
Diquat dibromide	Syngenta	REWARD MANUFACTURING Conc. — 37.3%	G
Diquat dibromide	Syngenta	REWARD LANDSCAPE AND AQUATIC Herb. — 37.3%	G
Diquat dibromide	Syngenta	TRIBUNE Herb. — 37.3%	G
Diquat dibromide	Airmax	Ultra PondWeed Defense — 37.3%	G
Diquat dibromide	Total Solutions	Eliminator — 1.85%	G
Dithiopyr	Bonide Prod	Bonide DuraTurf Crabgrass & Weed Prev. for Lawns & Orn. Beds — 0.27%	G
Dithiopyr	Cont. Solutions	Quali-Pro Dithiopyr 40 WSB — 40%	G
Dithiopyr	Cont. Solutions	Quali-Pro Dithiopyr L — 22%	G
Dithiopyr	Dow Agrosciences	Dimension EC — 12.7%	G
Dithiopyr	Dow Agrosciences	Dimension Ultra 40WP — 40%	G
Dithiopyr	Dow Agrosciences	Dimension 2EW — 24%	G
Dithiopyr	Gro Tec	Expert Gardener Crabgrass & Weed Prev. — 0.25%	G
Dithiopyr	Gro Tec	Sta-Green Crab-Ex Crabgrass & Weed Prev. — 0.25%	G
Dithiopyr	Gro Tec	ProCare Crabgrass & Weed Prev. — 0.25%	G
Dithiopyr	Knox Fert.	Green Thumb Crabgrass Prev. w/ Lawn Food 26-0-3 — 0.13%	G
Dithiopyr	Knox Fert.	Gro Fine Crabgrass Prev. Plus Lawn Food 30-0-4 — 0.13%	G
Dithiopyr	Lebanon Seaboard	GreenView FF Spring Fert. w/ Crabgrass Prev. 26-0-5 — 0.13%	G
Dithiopyr	Lebanon Seaboard	Preen Southern Weed Prev. — 0.27%	G
Dithiopyr	Lebanon Seaboard	Preen Southern Weed Prev. Plus Plant Food — 0.19%	G
Dithiopyr	Lebanon Seaboard	Preen Lawn Crabgrass Cont. — 0.19%	G
Dithiopyr	Lesco	Lesco Dimension 0.10% + Fert. 7-0-0 (701096) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.10% + Fert. 19-0-0 (702005) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.10% + Fert. 0-0-7 (702134) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.10% + Fert. 8-0-0M (702145) — 0.1%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 8-0-0M (702146) — 0.15%	G

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Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 13-2-5M (701001) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 8-0-0 (091139) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 0-0-7 (702135) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 36-0-3 (702204) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 38-0-0 (702205) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 19-0-19M (702023) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 24-0-11 (702027) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 5-0-17 (069143) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 19-0-6 (702024) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.015% + Fert. — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.15% + Fert. 19-0-3 (702440) — 0.15%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% + Fert. 25-0-6 (702441) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% + Fert. 0-0-7 (701150) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% + Fert. 18-0-10 (702032) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% + Fert. 8-0-0 (702136) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% + Fert. 8-0-0M (702147) — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.27G Turf & Orn. Herb. (702265) — 0.27%	G
Dithiopyr	Swiss Farms Prod	Vigoro Crabgrass & Weed Prev. — 0.17%	G
Dithiopyr	VPG	Hi-Yield Turf & Orn. Weed & Grass Stopper — 0.125%	G
Diuron	ADAMA	Karmex DF — 80%	G
Diuron	ADAMA	Direx 4L — 40.7%	G
Diuron	Alligare	Alligare Diuron 80 DF — 80%	G
Diuron	Alligare	Alligare Diuron 4L — 40.7%	G
Diuron	Drexel Chemical	Drexel Diuron 80 Herb. — 80%	G
Diuron	Drexel Chemical	Drexel Diuron 4L — 40%	G
Diuron	DuPont	DuPont Diuron Tech. — 98.4%	G
Diuron	Loveland Prod	Diuron 80 WDG Weed Killer — 80%	G
Diuron	Loveland Prod	Diuron 4L Herb. — 40%	G
d-Limonene	Avenger Prod	Avenger Weed Killer Conc. — 70%	G
d-Limonene	Avenger Prod	Avenger Weed Killer RTU — 17.5%	G
d-Limonene	Avenger Prod	AG Optima Burndown Herb. — 55%	G
Endothall	UPL NA	Hydrothol Granular — 11.2%	G
Endothall	UPL NA	Hydrothol 191 Aquatic — 53%	G
Endothall	UPL NA	Aquathol K — 40.3%	G
Endothall	UPL NA	Aquathol Super K — 63%	G
EPTC	Gowan	Eptam 7E — 87.8%	G
Ethalfluralin	Gowan	Ethalfluralin Tech. — 96%	G
Ethalfluralin	Gowan	Sonalan HFP — 35.4%	G
Ethalfluralin	Loveland Prod	Curbit EC Herb. — 35.4%	G
Ethephon	ADAMA	Ethephon 2SL — 21.7%	G
Ethephon	Adama Celsius Property B.V.	Ethephon 71.3% SL — 71.3%	G
Ethephon	Redeagle Intl.	Ethephon 6 — 54%	G
Ethofumesate	Aquatrols Corp. of America	PoaConstrictor Herb. — 42%	G
Ethofumesate	Bayer Enviro. Science	Prograss Herb. — 19%	G
Ethofumesate	Willowood	Rightline Etho 4SC — 42%	G
Ethyl 1-naphthaleneacetate	Bonide Prod	Bonide Sucker Punch Knock Out Sprouts RTU — 1.15%	G
Ethyl 1-naphthaleneacetate	Lawn and Garden Prod	SUCKER-STOPPER RTU — 1.15%	G
Fenoxaprop-ethyl	Bayer Enviro. Science	Acclaim Extra Herb. — 6.59%	G
Fenoxaprop-p-ethyl	Bayer Cropscience	RiceStar HT Herb. — 6.7%	G
Fenoxaprop-p-ethyl	Loveland Prod	Double Check — 11.53%	G
Fenoxaprop-p-ethyl	SBM Life Science	BioAdvanced Science-Based Solutions Crabgrass Killer for Lawns RTS — 0.41%	G
Fenoxaprop-p-ethyl	SBM Life Science	BioAdvanced Science-Based Solutions Bermudagrass Cont. for Lawns RTS — 0.41%	G
Fenoxaprop	SBM Life Science	BioAdvanced Science-Based Solutions Extreme Crabgrass Killer — 0.41%	G
Fenpyroximate	Sepro	Akari 5SC — 5%	G
Ferric HEDTA	Messinas	Pulverize Weed Killer Conc. — 26.52%	G
Ferric HEDTA	Messinas	PULVERIZE Weed Killer — 1.5%	G
Ferric HEDTA	Bonide Prod	Weed Beater FE Conc. — 26.52%	G
Ferric HEDTA	Bonide Prod	Bonide Weed Beater Fe RTU — 1.5%	G
Ferric HEDTA	SBM Life Science	Natria Lawn Weed & Disease Cont. Conc. — 26.52%	G
Ferric HEDTA	The Hawthorne Gardening	Whitney Farms Lawn Weed Killer1 — 1.5%	G
Ferric HEDTA	This Land Dba — Sunday	Dandelion Doom Conc. — 26.52%	G
Ferric HEDTA	This Land Dba — Sunday	Dandelion Doom — 1.5%	G
Ferric HEDTA	VPG	Natural Guard Brand by Ferti-lome Lawn Weed Killer Sel. RTU — 1.5%	G
Ferric HEDTA	W. Neudorff Gmbh Kg	Fiesta Turf Weed Killer — 26.52%	G
Ferrous sulfate monohydrate	Bonide Prod	Bonide MossMax — 23.5%	G
Flazasulfuron	PBIGordon	Katana Turf Herb. — 25%	G
Flazasulfuron	Summit Agro USA	Mission — 25%	G
Florasulam	Dow Agrosciences	Florasulam Wet Cake Tech. — 99.2%	G
Florasulam	Dow Agrosciences	EF-1343 — 4.84%	G

Common chemical name	Company	Trade names and formulations	Use classification
Florasulam	Dow Agrosciences	Defendor — 4.84%	G
Florpyrauxifen-benzyl	Dow Agrosciences	Loyant — 2.7%	G
Florpyrauxifen-benzyl	Sepro	ProcellaCOR SC — 26.5%	G
Fluazifop-butyl	The Ortho Group	Ortho Grass B Gon Garden Grass Killer — 0.48%	G
Fluazifop-P-butyl	PBIGordon	Ornamec Over-The-Top Grass Herb. — 6.75%	G
Fluazifop-P-butyl	PBIGordon	Ornamec 170 Grass Herb. — 1.7%	G
Fluazifop-P-butyl	Syngenta	FLUAZIFOP-P-BUTYL TECHNICAL — 93%	G
Fluazifop-P-butyl	Syngenta	FUSILADE DX — 24.5%	G
Fluazifop-P-butyl	Syngenta	FUSILADE II TURF & ORNAMENTAL Herb. — 24.5%	G
Flucarbazone-sodium	Arysta Lifescience N.A.	Everest 70% WDG Herb. — 70%	G
Fludioxonil	Syngenta	MAXIM PSP — 0.5%	G
Flumetsulam	Dow Agrosciences	Python WDG — 80%	G
Flumetsulam	FMC	Accolade Herb. — 80%	G
Flumetsulam	Sharda USA	Reptile WDG — 80%	G
Flumiclorac pentyl ester	Valent U.S.A.	Resource Herb. — 10.1%	G
Flumiclorac-pentyl	Valent U.S.A.	Flumiclorac Pentyl Tech. — 98.6%	G
Flumioxazin	ADAMA	Outflank — 51%	G
Flumioxazin	Alligare	Promenade Herb. — 51%	G
Flumioxazin	Alligare	Flumigard Herb. — 51%	G
Flumioxazin	Alligare	Propellor Aquatic Herb. — 51%	G
Flumioxazin	Alligare	Alligare Flumigard SC Herb. — 42%	G
Flumioxazin	Alligare	Promenade SC Herb. — 42%	G
Flumioxazin	Applied Biochemists	Pond-Klear Aquatic Herb. — 44%	G
Flumioxazin	Atticus	Semera 51.0% WDG Herb. — 51%	G
Flumioxazin	Atticus	Semera 51.0% WDG — 51%	G
Flumioxazin	Atticus	Zaltus SX — 51%	G
Flumioxazin	DuPont	DuPont BL3 Herb. — 51%	G
Flumioxazin	DuPont	DuPont BL3 Herb. — 51%	G
Flumioxazin	Innvictis Crop Care	VARSITY — 51%	G
Flumioxazin	Monsanto	Rowel Herb. — 51%	G
Flumioxazin	Nufarm	Flumi 51 WDG Herb. — 51%	G
Flumioxazin	Nufarm	Panther Herb. — 51%	G
Flumioxazin	Nufarm	Tuscany Herb. — 51%	G
Flumioxazin	Nufarm	Fortitude Herb. — 51%	G
Flumioxazin	Nufarm	Lock Down Herb. — 51%	G
Flumioxazin	Nufarm	Panther SC Herb. — 41.4%	G
Flumioxazin	Nufarm	Tuscany SC Herb. — 41.4%	G
Flumioxazin	Nufarm	Clipper SC Aquatic Herb. — 41.4%	G
Flumioxazin	Nufarm	Sureguard SC Herb. — 41.4%	G
Flumioxazin	Nufarm	Lock Down SC Herb. — 41.4%	G
Flumioxazin	Redeagle Intl.	Flumioxazin Tech. — 98.3%	G
Flumioxazin	Redeagle Intl.	Flumioxazin 51% WDG — 51%	G
Flumioxazin	Redeagle Intl.	Flumioxazin 51% WDG — Noncrop — 51%	G
Flumioxazin	Valent U.S.A.	Payload Herb. — 51%	G
Flumioxazin	Valent U.S.A.	SureGuard Herb. — 51%	G
Flumioxazin	Valent U.S.A.	BroadStar Herb. — 0.25%	G
Flumioxazin	Valent U.S.A.	Clipper Herb. — 51%	G
Flumioxazin	Valent U.S.A.	Valor EZ Herb. 2 — 41.4%	G
Flumioxazin	Valent U.S.A.	Flumioxazin Tech. — 97.9%	G
Flumioxazin	Valent U.S.A.	Chateau Herb. SW — 51%	G
Flumioxazin	Valent U.S.A.	Valor SX Herb. — 51%	G
Flumioxazin	Valent U.S.A.	Valor EZ Herb. 1 — 44%	G
Fluometuron	ADAMA	Cotoran 4L — 41.7%	G
Fluometuron	Sharda USA	Sharda Fluometuron 4SC — 41.7%	G
Fluridone	Alligare	Alligare Fluridone — 41.7%	G
Fluridone	Lake Restoration	Spritflo Herb. — 41.7%	G
Fluridone	Sepro	Sonar PR — 5%	G
Fluridone	Sepro	Sonar SRP — 5%	G
Fluridone	Sepro	Sonar Q — 5%	G
Fluridone	Sepro	Avast ! SC — 41.7%	G
Fluridone	Sepro	Sonar A.S. — 41.7%	G
Fluridone	Sepro	SonarOne — 5%	G
Fluridone	Sepro	Sonar RTU — 3.79%	G
Fluridone	Sepro	Sonar Genesis — 6.3%	G
Fluridone	Sepro	Sonar H4C — 2.7%	G
Fluridone	Sepro	SePRO Total Pond — Prevent — 2.7%	G
Fluridone	Sepro	Brake — 13.76%	G
Fluridone	Airmax	Airmax WipeOut PondWeed Defense Aquatic Herb. — 41.7%	G
Fluridone	Airmax	Pond Logic WipeOut PondWeed Defense Aquatic Herb. — 41.7%	G
Fluroxypyr	Dow Agrosciences	Vista XRT — 45.52%	G
Fluroxypyr	Alligare	Alligare Flagstaff Herb. — 45.5%	G
Fluroxypyr	Innvictis Crop Care	STAVE — 45.52%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Fluroxypyr	Sharda USA	Flurox — 45.5%	G
Fluroxypyr	Sharda USA	Fancy — 26.2%	G
Fluthiacet-methyl	FMC	Cadet Herb. — 10.3%	G
Fomesafen	Atticus	Forsyte 1.88 SL — 22.1%	G
Fomesafen	Helena Agri-Enterprises	Sinister — 28.65%	G
Fomesafen	Loveland Prod	Top Gun Herb. — 22.8%	G
Fomesafen	Sharda USA	Shafen Herb. — 22.8%	G
Fomesafen	Sharda USA	Shafen Star — 22.1%	G
Fomesafen	Solera ATO	FOMESAFEN 1.88 Herb. — 22.1%	G
Fomesafen	Syngenta	FOMESAFEN TECHNICAL — 98%	G
Fomesafen	Syngenta	FLEXSTAR — 22.1%	G
Fomesafen	Syngenta	SEDONA — 22.1%	G
Fomesafen	Syngenta	REFLEX Herb. — 22.8%	G
Fomesafen	Syngenta	RINGSIDE — 22.8%	G
Fomesafen	ADAMA	Rumble — 22.1%	G
Fomesafen	Altitude Crop Innovations	PRONTO — 22.1%	G
Fomesafen	Loveland Prod	Top Gun Flex — 22.1%	G
Fomesafen	Redeagle Intl.	Fomesafen Sodium SC — 22.1%	G
Fomesafen	Willowood	Willowood Fomesafen 1.88SL — 22.1%	G
Fomesafen	Winfield Solutions	Agent 1.88 (WF) — 22.1%	G
Fomesafen Sodium	Albaugh	Battle Star — 22.1%	G
Fomesafen Sodium	Drexel Chemical	Drexel Foma 2.0 Herb. — 22.8%	G
Fomesafen Sodium	Drexel Chemical	Drexel Foma 1.88 Herb. — 22.1%	G
Fomesafen Sodium	Innvictis Crop Care	VAMOS — 22.1%	G
Fomesafen Sodium	Solera ATO	FOMESAFEN 2 SL Herb. — 22.8%	G
Foramsulfuron	Bayer Enviro. Science	Revolver Herb. — 2.34%	G
Fosamine ammonium	Albaugh	Krenite S — 41.5%	G
Glufosinate ammonium	Albaugh	Surmise — 24.5%	G
Glufosinate ammonium	Nufarm Americas	Cheetah Pro — 24.5%	G
Glufosinate ammonium	Prime Source	X-Out — 24.5%	G
Glufosinate ammonium	Tide Intl., USA	Tide Glufosinate 280 SL Herb. — 24.5%	G
Glufosinate ammonium	Valent U.S.A.	Scout Herb. — 24.5%	G
Glufosinate ammonium	VPG	Ferti-Lome Decimate Weed & Grass Killer — 24.5%	G
Glufosinate ammonium	Winfield Solutions	Total 2.3 — 24.5%	G
Glufosinate-ammonium	Atticus	Inflame 280 SL — 24.5%	G
Glufosinate-ammonium	BASF	Finale VU Herb. — 11.33%	G
Glufosinate-ammonium	BASF	Finale Herb. — 11.33%	G
Glufosinate-ammonium	BASF	Rely 280 Herb. — 24.5%	G
Glufosinate-ammonium	BASF	Liberty 280 SL Herb. — 24.5%	G
Glufosinate-ammonium	BASF	Noventa Herb. — 24.5%	G
Glufosinate-ammonium	Bayer Cropscience	Glufosinate-Ammonium Tech. — 95%	G
Glufosinate-ammonium	Bayer Cropscience	Rely 280 — 24.5%	G
Glufosinate-ammonium	Bayer Cropscience	Liberty 280 SL Herb. — 24.5%	G
Glufosinate-ammonium	Bayer Enviro. Science	Finale VU Herb. — 11.33%	G
Glufosinate-ammonium	Bayer Enviro. Science	Finale Herb. — 11.33%	G
Glufosinate-ammonium	Cont. Solutions	Nullify A/P — 24.5%	G
Glufosinate-ammonium	Helena Agri-Enterprises	Omni Brand Glufosinate 280SL — 24.5%	G
Glufosinate-ammonium	Loveland Prod	Forfeit 280 — 24.5%	G
Glufosinate-ammonium	Nufarm	Glufosinate-Ammonium Tech. — 96.7%	G
Glufosinate-ammonium	Nufarm	Cheetah Herb. — 24.5%	G
Glufosinate-ammonium	Redeagle Intl.	Glufosinate 280SL — 24.5%	G
Glufosinate-ammonium	Solera ATO	Reckon 280SL Herb. — 24.5%	G
Glufosinate-ammonium	Summit Agro USA	Refer 280 SL — 24.5%	G
Glufosinate-ammonium	UPL NA	Interline Herb. — 24.5%	G
Glufosinate-ammonium	Willowood	Willowood Glufosinate 280SL — 24.5%	G
Glufosinate-ammonium	Winfield Solutions	Total Herb. — 24.5%	G
Glufosinate-ammonium	Winfield Solutions	Total SL — 24.5%	G
Glyphosate	Agrisel USA	GlyPhoSel Pro 41% Weed & Grass Killer w/ 12.5% Surfactant — 41%	G
Glyphosate	Albaugh	Gly Star K-Plus — 48.8%	G
Glyphosate	Alligare	Alligare Dryphosate 75SG — 75.7%	G
Glyphosate	Apex Ag Chem,	SLAM 41 plus — 41%	G
Glyphosate	Apex Ag Chem,	SLAM 54 plus — 53.8%	G
Glyphosate	Argustoli H.C.	Alecto 41-S — 41%	G
Glyphosate	Consus Chemicals	Consus Glyphosate Tech. — 96.6%	G
Glyphosate	Dow Agrosciences	Glyphosate Tech. — 76%	G
Glyphosate	Dow Agrosciences	Glyphosate 62% Tech. Solution — 62%	G
Glyphosate	Dow Agrosciences	Glypro Plus — 41%	G
Glyphosate	Dow Agrosciences	Accord XRT II — 50.2%	G
Glyphosate	Dow Agrosciences	Durango DMA — 50.2%	G
Glyphosate	Dow Agrosciences	Duramax — 50.2%	G
Glyphosate	Dow Agrosciences	RapidFire — 50.2%	G
Glyphosate	Dow Agrosciences	Glyphosate Tech. XG — 96.2%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Glyphosate	DuPont	DuPont Abundit Edge Herb. — 48.7%	G
Glyphosate	Helm Agro U.S.	Helosate 5 Herb. — 50.2%	G
Glyphosate	Innvictis Crop Care	ENVY K-SIX — 48.7%	G
Glyphosate	Loveland Prod	Mad Dog K6 — 48.7%	G
Glyphosate	Loveland Prod	Mad Dog — 41%	G
Glyphosate	Loveland Prod	Mad Dog Plus — 41%	G
Glyphosate	Loveland Prod	Four Power Plus — 41%	G
Glyphosate	Loveland Prod	Kleenup-Pro — 41%	G
Glyphosate	Loveland Prod	Makaze — 41%	G
Glyphosate	Monsanto	Glyphosate Tech. (Wetcake) — 85%	G
Glyphosate	Monsanto	Roundup PRO Conc. Herb. — 50.2%	G
Glyphosate	Monsanto	Roundup PowerMAX II Herb. — 48.8%	G
Glyphosate	Monsanto	Honcho K6 Herb. — 48.7%	G
Glyphosate	Monsanto	K487 Herb. — 48.7%	G
Glyphosate	Sepro	SePRO Total Pond — Emerge — 53.8%	G
Glyphosate	Syngenta	Glyphosate Acid Tech. 2 — 97%	G
Glyphosate	Airmax	Shoreline Defense — 53.8%	G
Glyphosate	Winfield Solutions	Cornerstone 5 Plus — 53.8%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Monsanto	Roundup WeatherMAX Herb. — 48.8%	G
Glyphosate	Monsanto	Roundup PowerMAX Herb. — 48.7%	G
Glyphosate	Monsanto	Roundup ProMax Herb. — 48.7%	G
Glyphosate	Drexel Chemical	Drexel Imitator DA — 34%	G
Glyphosate	Drexel Chemical	Drexel Duplicator 6 Herb. — 49.6%	G
Glyphosate	Helm Agro U.S.	Helosate 75 SG Herb. — 75.7%	G
Glyphosate	Monsanto	MON 8750 Herb. — 95.2%	G
Glyphosate	ADAMA	Glyphogan — 41%	G
Glyphosate	ADAMA	Glyphogan Plus — 41%	G
Glyphosate	ADAMA	Quali-Pro Glyphosate Plus — 41%	G
Glyphosate	AgSaver	AgSaver Glyphosate 53.8% — 53.8%	G
Glyphosate	AgSaver	AgSaver Glyphosate 41% Plus — 41%	G
Glyphosate	Albaugh	Gly Star 5 Extra — 53.8%	G
Glyphosate	Albaugh	Aqua Star — 53.8%	G
Glyphosate	Albaugh	Gly Star Original — 41%	G
Glyphosate	Albaugh	Gly Star Plus — 41%	G
Glyphosate	Albaugh	Gly Star Gold — 41%	G
Glyphosate	Alligare	Glyphosate 5.4 — 53.8%	G
Glyphosate	Alligare	Glyphosate 4 Plus — 41%	G
Glyphosate	Applied Biochemists	Shore-Klear Aquatic Herb. — 53.8%	G
Glyphosate	Applied Biochemists	ShoreKlear-Plus Aquatic Herb. — 18%	G
Glyphosate	Arch Chemicals	Pond Oasis Shoreline Plant Cont. — 18%	G
Glyphosate	Bonide Prod	Bonide KleenUp Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Bonide Prod	HomeFront Weed & Grass RTU — 1.92%	G
Glyphosate	Bonide Prod	Bonide KleenUp Weed & Grass Killer 41% Super Conc. — 41%	G
Glyphosate	Bonide Prod	HomeFront Weed & Grass Killer 41% Super Conc. — 41%	G
Glyphosate	Check-Mark	Trailblazer MAXX — 53.8%	G
Glyphosate	Cheminova A/S	GLYPHOSATE Conc. — 62.5%	G
Glyphosate	Cinmax Intl.	Wynca USA Sunphosate 41% Herb. — 41%	G
Glyphosate	Cont. Solutions	Eraser A/P — 41%	G
Glyphosate	Cont. Solutions	Eraser — 41%	G
Glyphosate	Cont. Solutions	Quali-Pro Glyphosate Plus — 41%	G
Glyphosate	CropSmart	Crop$mart Glyphosate 41% Extra — 41%	G
Glyphosate	Dow Agrosciences	Rodeo — 53.8%	G
Glyphosate	Drexel Chemical	Drexel Imitator Plus — 41%	G
Glyphosate	Drexel Chemical	Drexel Imitator Plus Weed & Grass Killer — 41%	G
Glyphosate	Drexel Chemical	Drexel Imitator RTU — 2%	G
Glyphosate	Drexel Chemical	Drexel Imitator Aquatic Herb. — 53.8%	G
Glyphosate	Durvet	AquaVet Shoreline Weeds — 53.8%	G
Glyphosate	Ez-ject	EZ-Ject Diamondback Herb. Shells — 83.5%	G
Glyphosate	Farmway	Farmway glyphosate 62% Manufacturing Conc. — 62%	G
Glyphosate	Farmway	Farmway-Max Glyphosate 41% — 41%	G
Glyphosate	FMC	Glyfos MUC 62% — 62%	G
Glyphosate	Gro Tec	Eliminator Weed & Grass Killer II Super Conc. — 50.2%	G
Glyphosate	Gro Tec	KnockOut Weed & Grass Killer RTU — 1.92%	G
Glyphosate	Gro Tec	KnockOut Weed & Grass Killer Super Conc. — 41%	G
Glyphosate	Helm Agro U.S.	Helosate 62% MUP — 62%	G
Glyphosate	Helm Agro U.S.	Helosate Plus Advanced — 41%	G
Glyphosate	Innvictis Crop Care	Envy Intense — 41%	G
Glyphosate	Innvictis Crop Care	Envy — 41%	G
Glyphosate	Lawn and Garden Prod	Remuda Full Strength — 41%	G
Glyphosate	Lesco	Lesco Prosecutor Pro Non-Sel. Herb. (702343) — 41%	G
Glyphosate	Lesco	Lesco Prosecutor Pro Non-Sel. Herb. — 41%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Glyphosate	Loveland Prod	Mad Dog 5.4# — 53.8%	G
Glyphosate	Loveland Prod	Cinco — 53.8%	G
Glyphosate	Monsanto	Roundup Custom for Aquatic and Terrestrial Use — 53.8%	G
Glyphosate	Monsanto	Honcho Plus Herb. — 41%	G
Glyphosate	Monsanto	IP410 Herb. — 41%	G
Glyphosate	Monsanto	IP410-A Herb. — 41%	G
Glyphosate	Monsanto	IP410FC Herb. — 41%	G
Glyphosate	Monsanto	Roundup Weed & Grass Killer Super Conc. — 50.2%	G
Glyphosate	Nufarm Americas	AquaNeat Aquatic Herb. — 53.8%	G
Glyphosate	Nufarm Americas	Razor Herb. — 41%	G
Glyphosate	Nufarm Americas	Razor PRO Herb. — 41%	G
Glyphosate	Nufarm Americas	Foresters' Non-Sel. Herb. — 53.8%	G
Glyphosate	Nufarm	Credit 5.4 Extra Non-Sel. Herb. — 53.8%	G
Glyphosate	Nufarm	Credit 41 EXTRA Non-Sel. Herb. — 41%	G
Glyphosate	PBIGordon	Gordon's Liquid Edger 2 — 1%	G
Glyphosate	PBIGordon	GroundWork RTU 2% Weed & Grass Killer — 2%	G
Glyphosate	PBIGordon	GroundWork Conc. 50% Super Weed & Grass Killer — 50%	G
Glyphosate	PBIGordon	GroundWork Conc. 25% Weed & Grass Killer — 25%	G
Glyphosate	PBIGordon	Gordon's Big N' Tuf Weed & Grass Killer Conc. — 25%	G
Glyphosate	PBIGordon	GlyphoMate 41 Weed & Grass Killer + Aquatic Herb. — 41%	G
Glyphosate	PBIGordon	Big N' Tuf Weed & Grass Killer — 41%	G
Glyphosate	PBIGordon	Gordon's PondMaster Surface & Shoreline Herb. — 18%	G
Glyphosate	PBIGordon	Gordon's Stump Killer RTU — 32.3%	G
Glyphosate	PBIGordon	Gordon's Pronto Big N' Tuf — 41%	G
Glyphosate	Ragan and Massey	FarmWorks 41% Glyphosate Grass & Weed Killer — 41%	G
Glyphosate	Ragan and Massey	Compare-N-Save 41% Glyphosate Grass & Weed Killer — 41%	G
Glyphosate	Ragan and Massey	Farm General 41% Glyphosate Grass & Weed Killer — 41%	G
Glyphosate	Ragan and Massey	Compare-N-Save Conc. Weed & Grass Killer 41% Glyphosate — 41%	G
Glyphosate	Ragan and Massey	Farm General Grass & Weed Killer 41% Glyphosate — 41%	G
Glyphosate	Ragan and Massey	FARM GENERAL 53.8% GLYPHOSATE — 53.8%	G
Glyphosate	Ragan and Massey	Farm General Aquatic Herb. — 53.8%	G
Glyphosate	Ragan and Massey	FarmWorks Aquatic Herb. — 53.8%	G
Glyphosate	Sanco Industries	Catt Plex Cattail Cont. — 53.8%	G
Glyphosate	Sepro	AquaPro — 53.8%	G
Glyphosate	Swiss Farms Prod	ACE RTU WEED & GRASS KILLER4 — 1.92%	G
Glyphosate	Swiss Farms Prod	ACE WEED & GRASS KILLER Conc. — 41%	G
Glyphosate	Swiss Farms Prod	Green Light Com-Pleet 41% Systemic Grass & Weed Killer — 41%	G
Glyphosate	Tenkoz	Buccaneer Glyphosate Herb. — 41%	G
Glyphosate	Tenkoz	Buccaneer 5 Extra Herb. — 53.8%	G
Glyphosate	Tenkoz	Buccaneer Plus Glyphosate Herb. — 41%	G
Glyphosate	Total Solutions	Zap-It — 0.96%	G
Glyphosate	VPG	Hi-Yield Super Conc. Killzall II — 41%	G
Glyphosate	VPG	Hi-Yield Super Conc. Killzall Weed & Grass Killer — 41%	G
Glyphosate	VPG	Hi-Yield Killzall Aquatic Herb. — 53.8%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Winfield Solutions	Tomahawk 5 (WF) — 53.8%	G
Glyphosate	Winfield Solutions	Tomahawk 4 (WF) — 41%	G
Glyphosate	Winfield Solutions	Cornerstone Plus — 41%	G
Glyphosate	Zep	Enforcer Weed Defeat Conc. — 41%	G
Glyphosate	Champion Crop Care	Glyphosate 41% — 41%	G
Glyphosate	Monsanto	Ranger PRO Herb. — 41%	G
Glyphosate	Monsanto	MON 0139 62% Tech. Solution — 62%	G
Glyphosate	Monsanto	Roundup PRO Herb. — 41%	G
Halauxifen-methyl	Dow Agrosciences	Elevore — 6.87%	G
Halosulfuron-methyl	Aceto Ag Chemicals	Halomax 75 Herb. — 75%	G
Halosulfuron-methyl	Aceto Ag Chemicals	Profine 75 Herb. — 75%	G
Halosulfuron-methyl	Atticus	Empero — 75%	G
Halosulfuron-methyl	Atticus	Promote — 75%	G
Halosulfuron-methyl	Atticus	Stadia — 75%	G
Halosulfuron-methyl	Atticus	Empero Q-Pak — 5%	G
Halosulfuron-methyl	Cont. Solutions	Sedgemaster — 75%	G
Halosulfuron-methyl	Cont. Solutions	Nutgrass Eliminator — 5%	G
Halosulfuron-methyl	Gowan	Sedgehammer Turf Herb. — 75%	G
Halosulfuron-methyl	Gowan	Sandea Herb. — 75%	G
Halosulfuron-methyl	Gowan	Permit Herb. — 75%	G
Halosulfuron-methyl	Gowan	Sedgehammer+ Herb. — 5%	G
Halosulfuron-methyl	Innvictis Crop Care	PROVENTIX 75 WDG — 75%	G
Halosulfuron-methyl	Nufarm Americas	Nufarm Prosedge Sel. Herb2 — 75%	G
Halosulfuron-methyl	Prime Source	Halo 75 WDG Select — 75%	G
Halosulfuron-methyl	Prime Source	Halo 5WDG Select — 5%	G
Halosulfuron-methyl	VPG	Hi-Yield Nutsedge & Horsetail Cont. — 75%	G
Halosulfuron-methyl	Winfield Solutions	Herbivore Herb. — 75%	G

Common chemical name	Company	Trade names and formulations	Use classification
Hexazinone	Bayer Enviro. Science	Velpar L VU Herb. — 25%	G
Hexazinone	Bayer Enviro. Science	Velpar DF VU Herb. — 75%	G
Hexazinone	Helena Agri-Enterprises	VELOSSA — 25%	G
Hexazinone	Pro Serve	PRONONE POWER PELLET — 75%	G
Hexazinone	Tessenderlo Kerley	Velpar L CU — 25%	G
Hexazinone	Tide Intl., USA	Tide Hexazinone 75 WDG — 75%	G
Hexazinone	Tide Intl., USA	Tide Hexazinone 2SL — 25%	G
Imazamox	ADAMA	Imazamox 120SL — 12.1%	G
Imazamox	ADAMA	Postscript — 12.1%	G
Imazamox	Albaugh	Vulture — 12.1%	G
Imazamox	Alligare	Alligare Imox Herb. — 12.1%	G
Imazamox	Atticus	Octivio — 12.1%	G
Imazamox	Atticus	Castaway — 12.1%	G
Imazamox	BASF	Raptor Herb. — 12.1%	G
Imazamox	BASF	Clearcast Herb. — 12.1%	G
Imazamox	BASF	Beyond — 12.1%	G
Imazamox	Sepro	Clearcast Herb. — 12.1%	G
Imazamox	Albaugh	ImazaCast — 12.1%	G
Imazapic	Alligare	Panoramic 2SL — 23.3%	G
Imazapic-ammonium	BASF	Cadre Herb. — 23.6%	G
Imazapic-ammonium	BASF	Plateau Herb. — 23.6%	G
Imazapic-ammonium	Nufarm	Nufarm Imazapic 2SL Herb. — 23.3%	G
Imazapyr	Agan Chemical Mfg.	Agan Imazethapyr Tech. — 97.6%	G
Imazapyr	Alligare	Alligare Ecomazapyr 2SL — 27.8%	G
Imazapyr	Alligare	Imazapyr 4SL — 52.6%	G
Imazapyr	Alligare	Rotary 2 SL — 27.8%	G
Imazapyr	BASF	Imazapyr Herb. technical — 98.5%	G
Imazapyr	Cont. Solutions	TVC — 27.8%	G
Imazapyr	Nufarm Americas	Nufarm Polaris SP — 27.6%	G
Imazapyr	Rainbow Tech.	Rainbow Weed Cont. (#4422) — 0.5%	G
Imazapyr	Sepro	Habitat — 27.77%	G
Imazapyr	SSI Maxim	SSI Maxim Arsenal 0.5G Herb. — 0.5%	G
Imazapyr	SSI Maxim	Arsenal 5G Herb. — 5%	G
Imazapyr	Whitetail Institute of N.A.	Slay Herb. — 22.87%	G
Imazapyr	Willowood	Willowood Imazapyr 2SL — 22.87%	G
Imazapyr	BASF	Arsenal Herb. Applicators Conc. — 53.1%	G
Imazapyr	BASF	Arsenal Herb. — 27.8%	G
Imazapyr	BASF	Stalker Herb. — 27.6%	G
Imazapyr	BASF	Habitat Herb. — 28.7%	G
Imazapyr	BASF	Chopper Gen2 Herb. — 26.7%	G
Imazapyr	BASF	Arsenal PowerLine Herb. — 26.7%	G
Imazapyr	Ez-ject	EZ-Ject Copperhead Herb. Shells — 83.5%	G
Imazapyr	Nufarm Americas	Nufarm Polaris AC Herb. — 53.1%	G
Imazapyr	Nufarm Americas	Nufarm Polaris Herb. — 27.7%	G
Imazapyr	Nufarm Americas	Nufarm Polaris AC COMPLETE Herb. — 53.1%	G
Imazaquin	Amvac Chemical	Scepter 70 DG Herb. — 70%	G
Imazaquin	Amvac Chemical	Scepter T&O 70 WDG Herb. — 70%	G
Imazaquin	BASF	Scepter Herb. Tech. — 97.6%	G
Imazethapyr	Nufarm	Nufarm Imazapic 2SL IVM Herb. — 23.6%	G
Imazethapyr	ADAMA	Imazethapyr 2 SL — 22.87%	G
Imazethapyr	Atticus	Pemex — 22.87%	G
Imazethapyr	BASF	Imazethapyr Herb. technical — 97.3%	G
Imazethapyr	Helm Agro U.S.	Imazethapyr TC — 99.1%	G
Imazethapyr	ADAMA	Preface — 22.87%	G
Imazethapyr	Albaugh	Thunder — 22.87%	G
Imazethapyr	BASF	Pursuit Herb. — 22.87%	G
Imazethapyr	BASF	Newpath Herb. for Clearfield rice — 22.87%	G
Imazosulfuron	Valent U.S.A.	Imazosulfuron Tech. — 99.5%	G
Imazosulfuron	Valent U.S.A.	Celero Herb. — 75%	G
Imazosulfuron	Valent U.S.A.	League Herb. — 75%	G
Imidacloprid	Albaugh	ImidaStar 2L T&O — 21.4%	G
Imidacloprid	Albaugh	Resonate 480 ST — 40.7%	G
Indaziflam	Bayer Cropscience	Alion Herb. — 19.05%	G
Indaziflam	Bayer Enviro. Science	Esplanade 200 SC — 19.05%	G
Indaziflam	Bayer Enviro. Science	Esplanade F — 19.05%	G
Indaziflam	Bayer Enviro. Science	Marengo — 7.4%	G
Indaziflam	Bayer Enviro. Science	Specticle Flo — 7.4%	G
Indaziflam	Bayer Enviro. Science	Specticle G — 0.0224%	G
Indaziflam	Bayer Enviro. Science	Marengo G — 0.0224%	G
Indaziflam	Bayer Enviro. Science	Marengo Herb. — 7.4%	G
Indaziflam	Bayer Enviro. Science	Specticle FLO Herb. — 7.4%	G
Iodosulfuron-methyl-sodium	Bayer Cropscience	Autumn Herb. — 10%	G

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Iron phosphate (FePO4)	Swiss Farms Prod	Whitney Farms Lawn Weed Killer — 1.5%	G
Isoxaben	Cont. Solutions	Quali-Pro Isoxaben 75 WG — 75%	G
Isoxaben	Dow Agrosciences	Gallery Tech. — 93.5%	G
Isoxaben	Dow Agrosciences	Gallery 75 Dry Flowable — 75%	G
Isoxaben	Dow Agrosciences	Gallery SC — 45.45%	G
Isoxaben	VPG	Ferti-lome Broadleaf Weed Cont. w/ Gallery — 0.38%	G
Isoxaflutole	Bayer Cropscience	Balance Flexx Herb. — 20%	R
Isoxaflutole	Bayer Cropscience	Balance Pro — 40.5%	R
Lactofen	Loveland Prod	Mongoose Herb. — 24%	G
Lactofen	Sharda Cropchem	Sharda Lactofen Tech. — 96.67%	G
Lactofen	Sharda USA	Boa — 24%	G
Lactofen	Valent U.S.A.	Phoenix Herb. — 24%	G
Lactofen	Valent U.S.A.	Cobra Herb. — 24%	G
Linuron	Tessenderlo Kerley	Linex 4L — 40.6%	G
MCPA	Winfield Solutions	Shredder MCPE — 68.7%	G
MCPA	Winfield Solutions	MCPE Phenoxy — 68.7%	G
MCPA	Nufarm Americas	MCPA-4 Amine — 48.58%	G
MCPA	Loveland Prod	Sword — 91%	G
MCPA	Nufarm Americas	Riverdale MCPA LV 4 Ester — 68.7%	G
MCPP-P-potassium	PBIGordon	Mecomec 4 Turf Herb. — 22.53%	G
Mecoprop-P	Nufarm Americas	MCPP-p 4 Amine — 26%	G
Mepiquat chloride	Albaugh	MepStar 6X — 23.5%	G
Mepiquat chloride	Albaugh	Mep Star — 4.2%	G
Mesosulfuron-methyl	Bayer Cropscience	Osprey Herb. — 4.5%	G
Mesotrione	Albaugh	Mesotrione 4SC — 40%	G
Mesotrione	Atticus	Torocity — 40%	G
Mesotrione	Atticus	Cavalllo 4 SC — 40%	G
Mesotrione	Drexel Chemical	Drexel Mesotryone 4L — 40%	G
Mesotrione	DuPont	DuPont BL4 Herb. — 50%	G
Mesotrione	Helm Agro U.S.	Mesotrione TC — 98.6%	G
Mesotrione	Helm Agro U.S.	ARGOS Herb. — 40%	G
Mesotrione	Innvictis Crop Care	UNDERCOVER — 40%	G
Mesotrione	Prime Source	Meso 4 SC Select — 40%	G
Mesotrione	Rotam N.A.	Lucto — 40%	G
Mesotrione	Rotam N.A.	Bellum — 40%	G
Mesotrione	Scotts	Turf Builder Starter Brand Fert. w/ Weed Prev. 21-22-4 — 0.08%	G
Mesotrione	Scotts	Scotts Turf Builder Triple Action Built for Seeding — 0.08%	G
Mesotrione	Sharda Cropchem	Mesotrione Tech. — 99.36%	G
Mesotrione	Sharda USA	Meso Star — 40%	G
Mesotrione	SIPCAM AGRO USA	Quartz Herb. — 40%	G
Mesotrione	SIPCAM AGRO USA	SlipStream — 40%	G
Mesotrione	SIPCAM AGRO USA	Mesotrione Tech. Herb. — 98.8%	G
Mesotrione	Solera ATO	Calleron Herb. — 40%	G
Mesotrione	Syngenta	CALLISTO — 40%	G
Mesotrione	Syngenta	Explorer Herb. — 40%	G
Mesotrione	Syngenta	MESOTRIONE 28% MUP — 28%	G
Mesotrione	Syngenta	TENACITY — 40%	G
Mesotrione	Tide Intl., USA	Tide Mesotrione 4SC — 40%	G
Mesotrione	Tigris	Tigris Meso 4 SC — 40%	G
Mesotrione	UPL NA	Motif Herb. — 40%	G
Mesotrione	Willowood	Willowood Mesotrione 4SC — 40%	G
Mesotrione	Winfield Solutions	Incinerate — 40%	G
Metolachlor	ADAMA	Parallel PCS Herb. — 86.4%	G
Metolachlor	ADAMA	Parallel — 84.4%	G
Metolachlor	Albaugh	Metolachlor 8E — 84.1%	G
Metolachlor	Drexel Chemical	Drexel Me-Too-Lachlor Herb. — 86.4%	G
Metolachlor	Drexel Chemical	Drexel Me-Too-Lachlor II — 84.4%	G
Metolachlor	Helm Agro U.S.	Helmet SPC — 86.4%	G
Metolachlor	Helm Agro U.S.	Helmet — 84.4%	G
Metolachlor	Sharda USA	Metallica — 84.4%	G
Metolachlor	SIPCAM AGRO USA	SIPCAM METOLACHLOR TECHNICAL — 97%	G
Metolachlor	SIPCAM AGRO USA	STALWART C — 84.1%	G
Metolachlor	SIPCAM AGRO USA	STALWART Herb. — 86.4%	G
Metolachlor	Willowood	WILLOWOOD METOLA 8EC — 86.4%	G
Metribuzin	ADAMA	Glory — 75%	G
Metribuzin	ADAMA	Glory 4L — 41%	G
Metribuzin	Agan Chemical Mfg.	Metribuzin Tech. — 98.3%	G
Metribuzin	Bayer Enviro. Science	Sencor 75% Turf Herb. — 75%	G
Metribuzin	DuPont	DuPont BL2 Herb. — 75%	G
Metribuzin	DuPont	AS Metribuzin 75DF — 75%	G
Metribuzin	FMC	BL2 Herb. — 75%	G
Metribuzin	Helena Agri-Enterprises	Omni Brand Metribuzin 75 WDG — 75%	G

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Metribuzin	Helena Agri-Enterprises	Omni Brand Metribuzin 75 DF — 75%	G
Metribuzin	Innvictis Crop Care	DERIVE 75 DF — 75%	G
Metribuzin	Innvictis Crop Care	DERIVE 4L — 41%	G
Metribuzin	Loveland Prod	LPI Metribuzin Tech. — 97.5%	G
Metribuzin	Loveland Prod	Metribuzin 75 — 75%	G
Metribuzin	Tigris	Tigris MTZ 75 DF — 75%	G
Metribuzin	UPL NA	Metricor DF — 75%	G
Metribuzin	UPL NA	TriCor DF — 75%	G
Metribuzin	UPL NA	Metricor 4F — 41%	G
Metribuzin	UPL NA	TriCor 4F — 41%	G
Metribuzin	Valent U.S.A.	MTZ Co-pack — 41%	G
Metribuzin	Valent U.S.A.	Mauler — 41%	G
Metribuzin	Willowood	Willowood Metribuzin 75DF — 75%	G
Metribuzin	Winfield Solutions	Dimetric EXT — 75%	G
Metribuzin	Winfield Solutions	Dimetric DF 75% — 75%	G
Metribuzin	Winfield Solutions	Dimetric Liquid — 33%	G
Metsulfuron-methyl	Agsurf	Ciramet Herb. — 60%	G
Metsulfuron-methyl	Alligare	MSM 60 — 60%	G
Metsulfuron-methyl	Bayer Enviro. Science	Escort XP Herb. — 60%	G
Metsulfuron-methyl	Bayer Enviro. Science	Cimarron Max Part A — 60%	G
Metsulfuron-methyl	Cont. Solutions	MSM Turf Herb. — 60%	G
Metsulfuron-methyl	DuPont	DuPont Ally XP Herb. — 60%	G
Metsulfuron-methyl	FMC	Ally XP Herb. — 60%	G
Metsulfuron-methyl	Helena Agri-Enterprises	Omni Brand MSM 60 DF — 60%	G
Metsulfuron-methyl	Nufarm Americas	Manor Sel. Herb. — 60%	G
Metsulfuron-methyl	Nufarm Americas	Mansion Turf Herb. — 60%	G
Metsulfuron-methyl	Nufarm Americas	Patriot Sel. Herb. — 60%	G
Metsulfuron-methyl	Nufarm	Purestand Sel. Herb. — 60%	G
Metsulfuron-methyl	Precision Cont. Tech.	MSM 60DF — 60%	G
Metsulfuron-methyl	Rotam N.A.	Rometsol Herb. — 60%	G
Metsulfuron-methyl	Rotam N.A.	Plotter Agricultural Herb. — 60%	G
Metsulfuron-methyl	Scotts	Scotts Spot Weed Cont. for Southern Lawns — 0.03%	G
Metsulfuron-methyl	Tide Intl., USA	Tide MSM 60 DF Herb. — 60%	G
MSMA	Luxembourg-pamol	Target 6.6 — 51%	G
MSMA	Luxembourg-pamol	Target 6 Plus — 48.3%	G
MSMA	Drexel Chemical	Drexel MSMA 6.6 — 51.3%	G
MSMA	Drexel Chemical	Drexel MSMA 6 Plus — 47.6%	G
Napropamide	UPL NA	Devrinol DF-XT — 50%	G
Nicosulfuron	Agsurf	Nicoval Herb. — 75%	G
Nicosulfuron	DuPont	DuPont Zest WDG Herb. — 75%	G
Nicosulfuron	DuPont	DuPont Accent Herb. — 75%	G
Nicosulfuron	DuPont	DuPont Accent SC Herb. — 4.2%	G
Nicosulfuron	DuPont	DuPont Accent Q Herb. — 54.5%	G
Nicosulfuron	Rotam N.A.	Primero Agricultural Herb. — 75%	G
Octanoic acid	Loveland Prod	Broclean — 33.4%	G
Orthosulfamuron	Nichino America	STRADA Herb. — 50%	G
Oryzalin	ADAMA	Oryzalin 4 AS — 41%	G
Oryzalin	Cont. Solutions	Quali-Pro Oryzalin 4 — 41%	G
Oryzalin	Lawn and Garden Prod	WEED IMPEDE — 40.4%	G
Oryzalin	Loveland Prod	Oryzalin Coated Granules — 1.67%	G
Oryzalin	UPL NA	Surflan Flex — 34%	G
Oryzalin	UPL NA	Surflan A.S. Agricultural Herb. — 40.4%	G
Oryzalin	UPL NA	Surflan A S Specialty Herb. — 40.4%	G
Oxadiazon	ADAMA	Quali-Pro Oxadiazon 50 MC — 50%	G
Oxadiazon	Bayer Enviro. Science	Ronstar Flo Herb. — 34.1%	G
Oxadiazon	Bayer Enviro. Science	Ronstar G Herb. — 2%	G
Oxadiazon	Bayer Enviro. Science	Ronstar 50 WSP Herb. — 50%	G
Oxadiazon	Cont. Solutions	Quali-Pro Oxadiazon SC — 34.4%	G
Oxadiazon	Cont. Solutions	Quali-Pro Oxadiazon 2G — 2%	G
Oxadiazon	Lesco	Ronstar 0.95% + Fert. 15-0-15 (702495) — 0.95%	G
Oxadiazon	Lesco	Ronstar 0.95% + Fert. 15-5-15 (702495) — 0.95%	G
Oxadiazon	Lesco	Lesco RONSTAR 0.95% + Fert. 30-0-0M (702116) — 0.95%	G
Oxyfluorfen	ADAMA	Galigan 2E — 22.2%	G
Oxyfluorfen	Dow Agrosciences	Goal Tech. Purified — 99%	G
Oxyfluorfen	Dow Agrosciences	Goal 2XL — 22.3%	G
Oxyfluorfen	Dow Agrosciences	GoalTender — 41%	G
Oxyfluorfen	UPL NA	Collide Herb. — 22.3%	G
Paraquat dichloride	Amvac Chemical	Parazone 3SL Herb. — 43.8%	R
Paraquat dichloride	Amvac Chemical	Paraquat Dichloride Tech. — 45.4%	G
Paraquat dichloride	Atticus	Purgatory 3 SL — 43.2%	R
Paraquat dichloride	Drexel Chemical	Drexel Quik-Quat — 43.2%	R
Paraquat dichloride	Innvictis Crop Care	DEVOUR — 43.2%	R

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Paraquat dichloride	Loveland Prod	Paraq — 43.2%	R
Paraquat dichloride	Redeagle Intl.	Paraquat 43.2% SL — 43.2%	R
Paraquat dichloride	Sharda USA	Para-Shot 3.0 — 43.2%	R
Paraquat dichloride	Source Dynamics	Paraquat Conc. — 43.2%	R
Paraquat dichloride	Syngenta	GRAMOXONE SL 2.0 — 30.1%	R
Paraquat dichloride	Syngenta	Gramoxone® SL 3.0 — 43.9%	R
Paraquat dichloride	Tigris	Tigris Paraquat 3 SL — 43.2%	R
Paraquat dichloride	Willowood	Willowood Paraquat 3SL — 43.2%	R
Pelargonic acid	BioSafe Systems	AXXE Broad Spectrum Herb. — 40%	G
Pelargonic acid	SIPCAM AGRO USA	Suerte — 40%	G
Pelargonic acid	The Ortho Group	Ortho Groundclear Weed & Grass Killer2 — 40%	G
Pelargonic acid	The Ortho Group	Ortho Groundclear Weed & Grass Killer1 Conc. — 40%	G
Pelargonic acid	The Ortho Group	Ortho Groundclear Weed & Grass Killer — 5%	G
Pelargonic acid	Vivid Life Sciences	Prizefighter Non-Sel. Herb. — 40%	G
Pelargonic acid	Belchim Crop Protection	Beloukha Garden Herb. — 51.98%	G
Pelargonic acid	BioSafe Systems	BioSafe Weed & Grass Killer RTU — 5%	G
Pelargonic acid	BioSafe Systems	BioSafe Weed & Grass Killer — 40%	G
Pelargonic acid	Gowan	Scythe Herb. — 57%	G
Pendimethalin	BASF	Pendimethalin technical — 95%	G
Pendimethalin	BASF	Prowl Herb. technical — 95%	G
Pendimethalin	BASF	Prowl 3.3 EC Herb. — 37.4%	G
Pendimethalin	BASF	Pendulum 3.3 EC Herb. — 37.4%	G
Pendimethalin	BASF	Pendulum 2G granule Herb. — 2%	G
Pendimethalin	BASF	Pendulum AquaCap Herb. — 38.7%	G
Pendimethalin	BASF	Prowl H2O Herb. — 38.7%	G
Pendimethalin	Drexel Chemical	Drexel Pin-Dee 3.3 T&O — 37.4%	G
Pendimethalin	Drexel Chemical	Drexel Pin-Dee 3.3 EC — 37.4%	G
Pendimethalin	Drexel Chemical	Drexel Aquapen 3.8 Herb. — 38.7%	G
Pendimethalin	Everris NA	Corral 2.68G — 2.68%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 1.15 — 1.15%	G
Pendimethalin	Helena Agri-Enterprises	Helena Pendimethalin — 37.4%	G
Pendimethalin	Innvictis Crop Care	PAVILION 3.3 EC Herb. — 37.4%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% + Fert. 5-10-20 (701078) — 0.86%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% Plus Fert — 0.86%	G
Pendimethalin	Lesco	Lesco PRE-M 1.5% + Fert. 0-0-8 (701079) — 1.5%	G
Pendimethalin	Lesco	Lesco Pre-M 3.3 EC Turf — 37.4%	G
Pendimethalin	Lesco	Lesco Pre-M Aquacap Herb. — 38.7%	G
Pendimethalin	Loveland Prod	Stealth Herb. — 37.4%	G
Pendimethalin	Prime Source	Ike's Sandbur & Crabgrass Prev. — 38.7%	G
Pendimethalin	Scotts	Step 1 Crabgrass Prev. Plus Lawn Food 28-0-7 — 1.29%	G
Pendimethalin	Scotts	Turf Builder Halts Crabgrass Prev. w/ Lawn Food — 1.29%	G
Pendimethalin	Scotts	Turf Builder w/ Halts Crabgrass Prev. 28-0-5 — 1.29%	G
Pendimethalin	Scotts	Turf Builder w/ Halts Crabgrass Prev. 30-3-4, 30-0-4 — 1.29%	G
Pendimethalin	Scotts	Halts — 1.71%	G
Pendimethalin	Scotts	Scotts Halts Crabgrass & Grassy Weed Prev. — 1.71%	G
Pendimethalin	Scotts	SCOTTS WEEDEX PREVENT WITH HALTS — 1.71%	G
Pendimethalin	Scotts	ROUNDUP LANDSCAPE WEED PREVENTER — 1.71%	G
Pendimethalin	Scotts	Scotts Landscape Weed Prev. — 1.71%	G
Pendimethalin	Scotts	Turf Builder w/ Halts Crabgrass Prev. 30-3-4, 30-0-4 — 1.22%	G
Pendimethalin	Tenkoz	Acumen Herb. — 37.4%	G
Pendimethalin	UPL NA	Satellite HydroCap Herb. — 38.7%	G
Pendimethalin	UPL NA	UP-End HydroCap — 38.7%	G
Pendimethalin	UPL NA	Satellite 3.3 — 37.9%	G
Pendimethalin	UPL NA	Satellite Flex Herb. — 39%	G
Pendimethalin	Winfield Solutions	Framework 3.3 EC — 37.4%	G
Penoxsulam	Central Garden & Pet	Pennington Ultragreen Southern W&F 34-0-4 — 0.04%	G
Penoxsulam	Dow Agrosciences	Grasp SC — 21.7%	G
Penoxsulam	Dow Agrosciences	Sapphire — 3.68%	G
Penoxsulam	Knox Fert.	Green Thumb Southern W&F 30-0-3 — 0.04%	G
Penoxsulam	Lebanon Seaboard	Vigoro Coastal W&F 20-0-10 — 0.03%	G
Penoxsulam	Lesco	Lesco LockUp 0.03% + Fert. 17-0-7 (701087) — 0.03%	G
Penoxsulam	Sepro	Galleon SC — 21.7%	G
Penoxsulam	VPG	Ferti-lome Dollar Weed Cont. — 0.04%	G
Picloram	Dow Agrosciences	Tordon K — 24.4%	R
Picloram	Dow Agrosciences	Tordon 22K — 24.4%	R
Picloram	Alligare	Alligare TRIUMPH 22K Herb. — 24.4%	R
Pinoxaden	Syngenta	AXIAL XL Herb. — 5.05%	G
Pinoxaden	Syngenta	Manuscript — 5.05%	G
Potassium laurate	This Land Dba — Sunday	Weed Warrior — 3.68%	G
Prodiamine	ADAMA	Quali-Pro Prodiamine 65 MC Herb. — 65%	G
Prodiamine	Alligare	Alligare Prodiamine 65 WG Herb. — 65%	G
Prodiamine	Cont. Solutions	Quali-Pro Prodiamine 4L — 40.8%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Prodiamine	Cont. Solutions	Prodiamine 65 WDG — 65%	G
Prodiamine	Ferti Technologies NC	Nutrite Pro. Turf Fert. w/ Barricade 0.29% Herb. 0-0-7 — 0.29%	G
Prodiamine	Gro Tec	Expert Gardener Crabgrass Prev. + Fert. III [30-0-3] — 0.37%	G
Prodiamine	Howard Johnson's	H. J.'s Crabgrass Cont. Plus w/ 0.37% Barricade 12-0-3 — 0.37%	G
Prodiamine	Howard Johnson's	Pennington Seed Crabgrass Cont. Plus w/ .37% Prodiamine 0-0-7 — 0.37%	G
Prodiamine	Lesco	Lesco Barricade 0.38% Plus Fert — 0.38%	G
Prodiamine	Lesco	Lesco Barricade 0.38% Plus Fert 0-0-7 — 0.38%	G
Prodiamine	Lesco	Lesco Stonewall 0.20% + Fert. 0-0-7M (701080) — 0.2%	G
Prodiamine	Lesco	Lesco Barricade 0.20% + Fert. 19-0-2 (097206) — 0.2%	G
Prodiamine	Lesco	Lesco Barricade 0.20% + Fert. 19-3-5 (097208) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.20% + Fert. 25-0-7 (701249) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.20% + Fert. 8-0-0M (702150) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.20% + Fert. 0-0-7 (702154) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.20% + Fert. 7-0-0 (702156) — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 24-0-6 (702442) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 0-0-7 (702137) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 8-0-0 (HPRE00105) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 16-3-8 (702542) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 14-0-7 (702051) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 0-0-8M (701006) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 19-0-7 (702053) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 8-0-0M (702153) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 65 WDG Herb. — 65%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% + Fert. 0-0-7 (702155) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% + Fert. 0-0-7M (702148) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% + Fert. 8-0-0M (702152) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% + Fert. 8-0-0M (702151) — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 4L (702498) — 40.7%	G
Prodiamine	Loveland Prod	Signature Evade .375% Crabgrass Prev. Plus — 0.375%	G
Prodiamine	Loveland Prod	Signature Crabgrass Prev. w/ Barricade 0.375% Plus — 0.375%	G
Prodiamine	Loveland Prod	Evade 4 FL — 40.5%	G
Prodiamine	Nufarm Americas	ProClipse 65 WDG — 65%	G
Prodiamine	Prime Source	Prodiamine 4SC Select — 40.5%	G
Prodiamine	Regal Chemical	RegalKade Herb. — 0.5%	G
Prodiamine	Regal Chemical	RegalKade 65WDG — 65%	G
Prodiamine	SIPCAM AGRO USA	SIPCAM PRODIAMINE TECHNICAL — 94.8%	G
Prodiamine	SIPCAM AGRO USA	Sipcam Prodiamine 65 MC — 65%	G
Prodiamine	SIPCAM AGRO USA	CAVALCADE 65 WDG — 65%	G
Prodiamine	SIPCAM AGRO USA	PrimeraOne Prodiamine 65WDG Herb. — 65%	G
Prodiamine	SIPCAM AGRO USA	Cavalcade 4L — 40.7%	G
Prodiamine	SIPCAM AGRO USA	PrimeraOne Prodiamine 4L — 40.7%	G
Prodiamine	Syngenta	BARRICADE 4FL Herb. — 40.7%	G
Prodiamine	Syngenta	RESOLUTE 4FL — 40.7%	G
Prodiamine	Syngenta	PRODIAMINE 65 MUP — 65%	G
Prodiamine	Syngenta	PRODIAMINE TECHNICAL — 96%	G
Prodiamine	Syngenta	RESOLUTE 65WG Herb. — 65%	G
Prodiamine	Syngenta	BARRICADE 65WG — 65%	G
Prodiamine	Syngenta	BARRICADE MC — 65%	G
Prodiamine	United Turf Alliance	ArmorTech Kade 65 WDG — 65%	G
Prometon	ADAMA	Pramitol 25E Herb. — 25%	G
Prometon	Atco Intl.	Scorched Earth — 3.75%	G
Prometon	Loveland Prod	Pramitol 25E Herb. — 25%	G
Prometon	Pro Chem	Weed Kill — 3.73%	G
Prometon	Total Solutions	Turf King — 3.73%	G
Prometon	Winfield Solutions	Pramitol 25E — 25%	G
Prometryn	Syngenta	PROMETRYN TECHNICAL — 97%	G
Prometryn	Syngenta	CAPAROL 4L — 44.4%	G
Pronamide	Dow Agrosciences	Kerb SC — 35.6%	G
Pronamide	Dow Agrosciences	Kerb SC T&O — 35.6%	G
Pronamide	Willowood	RightLine Pronamide 3.3 SC — 35.6%	R
Propanamide	Willowood	Willowood Pronamide 3.3SC — 35.6%	R
Propanil	Innvictis Crop Care	Virtue 4SC — 41.4%	G
Propanil	Innvictis Crop Care	Virtue 4EC — 44.4%	G
Propanil	RiceCo.	RiceShot — 43.5%	G
Propanil	RiceCo.	RiceShot LC* — 43.5%	G
Propanil	RiceCo.	Stam M4 Herb. — 44.8%	G
Propanil	RiceCo.	Stam 80 EDF — 81%	G
Propanil	RiceCo.	SuperWHAM! — 41.2%	G
Propanil	Willowood	Willowood Propanil 4SC — 41.4%	G
Propanil	Willowood	Willowood Propanil 4EC — 44.4%	G
Propoxycarbazone-sodium	Bayer Cropscience	Olympus 70% WDG Herb. — 70%	G
Prosulfuron	Syngenta	PEAK CUSTOM-PAK — 57%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Pyraflufen-ethyl	Nichino America	Venue Herb. — 2%	G
Pyraflufen-ethyl	Nichino America	ET Herb. — 2.5%	G
Pyraflufen-ethyl	Sepro	Octane 2% SC — 2%	G
Pyrimisulfan	PBIGordon	Sedge Stop Nutsedge Weed Killer — 0.025%	G
Pyrimisulfan	PBIGordon	Vexis Herb. Granular — 0.025%	G
Pyrithiobac-sodium	DuPont	DuPont Staple LX Herb. — 33.6%	G
Pyroxasulfone	BASF	Zidua Herb. — 85%	G
Pyroxasulfone	BASF	Zidua SC Herb. — 41.46%	G
Pyroxsulam	Dow Agrosciences	PowerFlex — 7.5%	G
Pyroxsulam	Dow Agrosciences	PowerFlex HL — 13.13%	G
Pyroxsulam	DuPont	DuPont GR1 Herb. — 13.13%	G
Pyroxsulam	FMC	GR1 Herb. — 13.13%	G
Quinclorac	Cont. Solutions	Quinclorac 1.5L — 18.92%	G
Quinclorac	Albaugh	QuinStar 4L — 40%	G
Quinclorac	Albaugh	Armor Tech Quin Pro — 75%	G
Quinclorac	Albaugh	QuinStar Turf — 75%	G
Quinclorac	ADAMA	Zurax — 75%	G
Quinclorac	ADAMA	Quali-Pro Quinclorac 75DF — 75%	G
Quinclorac	ADAMA	Zurax L — 17.79%	G
Quinclorac	Albaugh	QuinStar — 75%	G
Quinclorac	BASF	Quinclorac MUP — 98%	G
Quinclorac	BASF	Drive XLR8 Herb. — 18.92%	G
Quinclorac	BASF	Facet L Herb. — 18.92%	G
Quinclorac	Innvictis Crop Care	Quinvac 75 DF — 75%	G
Quinclorac	Lesco	Lesco Quin-Way 75DF Herb. — 75%	G
Quinclorac	Prime Source	Quinclorac 1.5L Select — 18.92%	G
Quinclorac	Prime Source	Quinclorac 75DF Select — 75%	G
Quinclorac	Sharda USA	Arose — 75%	G
Quinclorac	Sharda USA	Prize — 40%	G
Quinclorac	Agrisel USA	QuinKill Max Crabgrass and Weed Killer — 18.92%	G
Quinclorac	Lesco	Lesco Quin-Way 1.5 L Herb. — 18.92%	G
Quinclorac	Nufarm Americas	Q-Ball Herb. — 18.92%	G
Quinclorac	Prime Source	Ike's Grass Weed Killer — 18.92%	G
Quizalofop-p-ethyl	BASF	Provisia Herb. — 10.3%	G
Quizalofop-p-ethyl	Canyon Group	Targa Herb. — 10.3%	G
Quizalofop-p-ethyl	DuPont	DuPont Assure II Herb. — 10.3%	G
Quizalofop-p-ethyl	Helm Agro U.S.	Quizalofop TC — 95.7%	G
Quizalofop-p-ethyl	Helm Agro U.S.	Quiz — 10.3%	G
Quizalofop-p-ethyl	Sharda USA	Se-CURE EC — 10.3%	G
Rimsulfuron	ADAMA	Quali-Pro Rimsulfuron 25 DF — 25%	G
Rimsulfuron	Agsurf	Ringro Herb. — 25%	G
Rimsulfuron	Alligare	Alligare Laramie 25DF — 25%	G
Rimsulfuron	Atticus	Tetris SG — 25%	G
Rimsulfuron	DuPont	DuPont Matrix Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Matrix FNV Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Resolve SG Herb. — 25%	G
Rimsulfuron	DuPont	DuPont Matrix SG Herb. — 25%	G
Rimsulfuron	FMC	Solida Herb. — 25%	G
Rimsulfuron	Nufarm	Grapple Herb. — 25%	G
Rimsulfuron	Rotam N.A.	Inflict — 25%	G
Saflufenacil	BASF	Treevix powered by Kixor Herb. — 70%	G
Saflufenacil	BASF	Sharpen powered by Kixor Herb. — 29.74%	G
Saflufenacil	BASF	Detail Powered by Kixor Herb. — 29.74%	G
Sethoxydim	BASF	Segment II Herb. — 18%	G
Sethoxydim	BASF	Poast Herb. — 18%	G
Sethoxydim	Bonide Prod	Grass Beater II Over the Top grass Conc. — 18%	G
Sethoxydim	Lawn and Garden Prod	GRASS GETTER — 18%	G
Sethoxydim	VPG	Ferti-lome Over-The-Top Grass Killer — 18%	G
Sethoxydim	VPG	Hi-Yield Grass Killer — 18%	G
Siduron	PBIGordon	Tupersan Herb. Wettable Powder — 50%	G
Simazine	Drexel Chemical	Drexel Simazine 90DF — 90%	G
Simazine	Drexel Chemical	Drexel Simazine 4L — 42.1%	G
Simazine	Loveland Prod	Simazine 90 WDG Herb. — 90%	G
Simazine	Loveland Prod	Simazine 4L Flowable Herb. — 42.8%	G
Simazine	Oxon Italia S.p.A.	Simazine Tech. — 97%	G
Simazine	SIPCAM AGRO USA	SIMTROL 4L SIMAZINE FLOWABLE Herb. — 42.8%	G
Simazine	SIPCAM AGRO USA	SIM-TROL 90 DF Herb. — 90%	G
Simazine	Syngenta	PRINCEP 4L — 41.9%	G
Simazine	Syngenta	PRINCEP LIQUID — 41.9%	G
Simazine	Syngenta	SIMAZINE TECHNICAL — 97%	G
Simazine	Syngenta	PRINCEP CALIBER 90 Herb. — 90%	G
Simazine	Winfield Solutions	Simazine 4L — 41.9%	G

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Common chemical name	Company	Trade names and formulations	Use classification
S-Metolachlor	Atticus	SpiruS — 83.7%	G
S-Metolachlor	Atticus	StreliuS II — 82.4%	G
S-Metolachlor	DuPont	DuPont(tm) Cinch® Herb. — 82.4%	G
S-Metolachlor	DuPont	DuPont EverpreX Herb. — 83.7%	G
S-Metolachlor	Innvictis Crop Care	VISOR S-MOC II Herb. — 82.4%	G
S-Metolachlor	Innvictis Crop Care	VISOR S-MOC Herb. — 83.7%	G
S-Metolachlor	Syngenta	S-METOLACHLOR TECHNICAL — 98%	G
S-Metolachlor	Syngenta	DUAL MAGNUM — 83.7%	G
S-Metolachlor	Syngenta	MEDAL EC — 83.7%	G
S-Metolachlor	Syngenta	DUAL II MAGNUM — 82.4%	G
S-Metolachlor	Syngenta	MEDAL II EC — 82.4%	G
S-Metolachlor	Syngenta	DUAL II G MAGNUM — 16%	G
S-Metolachlor	Syngenta	PENNANT MAGNUM — 83.7%	G
S-Metolachlor	Tenkoz	Brawl Herb. — 83.7%	G
S-Metolachlor	Tenkoz	Brawl II Herb. — 82.4%	G
S-Metolachlor	UPL NA	Moccasin Herb. — 87.3%	G
S-Metolachlor	UPL NA	Moccasin II Plus Herb. — 82.4%	G
S-Metolachlor	Winfield Solutions	Charger Max — 82.4%	G
S-Metolachlor	Winfield Solutions	Charger Basic — 83.7%	G
Sulfentrazone	Amvac Chemical	Surepyc — 39.6%	G
Sulfentrazone	Bonide Prod	Sedge Ender — 0.05%	G
Sulfentrazone	FMC	Sulfentrazone Tech. — 91%	G
Sulfentrazone	FMC	Spartan 4F Herb. — 39.6%	G
Sulfentrazone	FMC	Zeus XC Herb. — 39.6%	G
Sulfentrazone	FMC	Ambition1 Herb. — 39.6%	G
Sulfentrazone	FMC	Dismiss Turf Herb. — 39.6%	G
Sulfentrazone	FMC	Ortho Weed B Gon FLEX — 39.6%	G
Sulfentrazone	Helena Agri-Enterprises	Antares Herb. — 39.6%	G
Sulfentrazone	Helm Agro U.S.	Sulfentrazone TC — 98.1%	G
Sulfentrazone	Helm Agro U.S.	Helm Sulfentrazone 4F — 39.6%	G
Sulfentrazone	Helm Agro U.S.	Zone 4F — 39.6%	G
Sulfentrazone	Innvictis Crop Care	VANDAL 4SC — 39.6%	G
Sulfentrazone	Prime Source	Sulfentrazone 4SC Select — 39.6%	G
Sulfentrazone	Redeagle Intl.	Sulfentrazone 39.6% SC — 39.6%	G
Sulfentrazone	Sharda USA	Intensa — 39.6%	G
Sulfentrazone	Summit Agro USA	Nassau 4SC — 39.6%	G
Sulfentrazone	Summit Agro USA	Sulfin 4SC — 39.6%	G
Sulfentrazone	The Ortho Group	Ortho Nutsedge Killer for Lawns — 0.05%	G
Sulfentrazone	The Ortho Group	ORTHO Nutsedge Killer for Lawns RTS — 1.4%	G
Sulfentrazone	Tigris	Tigris Sulfen 4 SC — 39.6%	G
Sulfentrazone	United Turf Alliance	ArmorTech SULF 396 XL — 39.6%	G
Sulfentrazone	UPL NA	Boycott Herb. — 40.7%	G
Sulfentrazone	UPL NA	Shutdown Herb. — 40.7%	G
Sulfentrazone	VPG	Ferti-Lome Weed-Out Nutsedge Cont. RTU — 0.05%	G
Sulfentrazone	Willowood	Willowood Sulfen 4SC — 39.6%	G
Sulfentrazone	Willowood	RightLine Sulfen 4 SC — 39.6%	G
Sulfometuron methyl	Alligare	Alligare SFM 75 — 75%	G
Sulfometuron methyl	Bayer Enviro. Science	Oust XP Herb. — 75%	G
Sulfometuron methyl	Nufarm Americas	Spyder Sel. Herb. — 75%	G
Sulfometuron methyl	Precision Cont. Tech.	SFM 75 — 75%	G
Sulfosulfuron	Valent U.S.A.	Outrider Herb. — 75%	G
Sulfosulfuron	Valent U.S.A.	Certainty Turf Herb. — 75%	G
Tebuthiuron	Alligare	Alligare Tebuthiuron 80 WG — 80%	G
Tebuthiuron	Alligare	Alligare Tebuthiuron 20 P — 20%	G
Tebuthiuron	Dow Agrosciences	Spike 80DF — 80%	G
Tebuthiuron	Dow Agrosciences	Spike 20P — 20%	G
Tebuthiuron	SSI Maxim	Sprakil S-5 Brush Cont. Granules — 5%	G
Tembotrione	Bayer Cropscience	Laudis Herb. — 34.5%	G
Thifensulfuron methyl	DuPont	DuPont Harmony GT XP Herb. — 75%	G
Thifensulfuron methyl	DuPont	Harmony GT Herb. — 75%	G
Thifensulfuron methyl	DuPont	DuPont Harmony SG Herb. (with TotalSol SG) — 50%	G
Thifensulfuron methyl	DuPont	DuPont(tm) Harmony® X-tra 1 Herb. — 50%	G
Thifensulfuron methyl	DuPont	AS Thifensulfuron 50 — 50%	G
Thifensulfuron methyl	FMC	Harmony GT XP Herb. — 75%	G
Thifensulfuron methyl	FMC	Harmony SG Herb. (w/ Totalsol SG) — 50%	G
Thifensulfuron methyl	Nufarm	Treaty Herb. — 75%	G
Thifensulfuron methyl	Rotam N.A.	Volta Agricultural Herb. — 75%	G
Thiobencarb	K-I Chemical U.S.A.	Bolero Tech. — 97.4%	G
Thiobencarb	Valent U.S.A.	Bolero 8 EC — 84%	G
Thiobencarb	Willowood	Willowood Thioben 8EC — 84%	G
Tolpyralate	Summit Agro USA	ShieldEx 400SC Herb. — 35.7%	G
Topramezone	Amvac Chemical	IMPACT Herb. — 29.7%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Topramezone	BASF	Armezon Herb. — 29.7%	G
Topramezone	BASF	Frequency Herb. — 29.7%	G
Topramezone	BASF	Pylex Herb. — 29.7%	G
Topramezone	Sepro	Oasis — 29.7%	G
Tribenuron-methyl	DuPont	DuPont Express XP Herb. — 75%	G
Tribenuron-methyl	DuPont	DuPont Express Herb. (with TotalSol SG) — 50%	G
Tribenuron-methyl	DuPont	AS Tribenuron 50 — 50%	G
Tribenuron-methyl	FMC	Express XP Herb. — 75%	G
Tribenuron-methyl	FMC	Express Herb. (w/ Totalsol SG) — 50%	G
Tribenuron-methyl	Nufarm	Victory Herb. — 75%	G
Tribenuron-methyl	Rotam N.A.	Taquet — 75%	G
Triclopyr	Albaugh	Triclopyr 4E — 61.6%	G
Triclopyr	Alligare	Alligare Triclopyr 4 — 61.6%	G
Triclopyr	Alligare	Alligare Triclopyr 3 — 44.4%	G
Triclopyr	Bonide Prod	Bonide Stump-Out Stump & Vine Killer — 8.8%	G
Triclopyr	Helena Agri-Enterprises	TRYCERA — 29.4%	G
Triclopyr	Southern Ag Insect.	Brush Killer — 8.8%	G
Triclopyr	The Ortho Group	Ortho MAX Poison Ivy & Tough Brush Killer Conc. — 8%	G
Triclopyr	The Ortho Group	Ortho MAX Poison Ivy & Tough Brush Killer RTU — 0.7%	G
Triclopyr	VPG	Ferti-lome Brush Killer Stump Killer — 8.8%	G
Triclopyr	Alligare	Boulder 6.3 — 83.9%	G
Triclopyr	Dow Agrosciences	Pathfinder II — 13.6%	G
Triclopyr	Dow Agrosciences	Turflon Ester — 61.6%	G
Triclopyr	Dow Agrosciences	Element 4 — 61.6%	G
Triclopyr	Dow Agrosciences	Garlon 4 — 61.6%	G
Triclopyr	Dow Agrosciences	Garlon 4 Ultra — 60.45%	G
Triclopyr	Dow Agrosciences	Remedy Ultra — 60.45%	G
Triclopyr	Dow Agrosciences	Forestry Garlon XRT — 83.9%	G
Triclopyr	Dow Agrosciences	Garlon XRT — 83.9%	G
Triclopyr	Dow Agrosciences	Turflon Ester Ultra — 60.45%	G
Triclopyr	Lawn and Garden Prod	TURFLON ESTER — 60.45%	G
Triclopyr	Nufarm Americas	Relegate Sel. Herb. — 61.6%	G
Triclopyr	Ragan and Massey	Brushtox w/ Triclopyr — 61.6%	G
Triclopyr	Ragan and Massey	STUMP STOP — 13.6%	G
Triclopyr	VPG	Hi-Yield Triclopyr Ester — 61.6%	G
Triclopyr	Lesco	Lesco TRICLOPYR 4 ESTER Herb. (702305) — 61.6%	G
Triclopyr	Ambrands	IMAGE Herb. from Lilly Miller Brush & Vine Killer RTS — 8%	G
Triclopyr	Applied Biochemists	Navitrol DPF Aquatic Herb. — 14%	G
Triclopyr	Applied Biochemists	Navitrol Landscape and Aquatic Herb. — 44.4%	G
Triclopyr	Dow Agrosciences	Grandstand R — 44.4%	G
Triclopyr	Dow Agrosciences	Garlon 3A — 44.4%	G
Triclopyr	Dow Agrosciences	Element 3A — 44.4%	G
Triclopyr	Dow Agrosciences	Hammer — 44.4%	G
Triclopyr	Dow Agrosciences	Triclopyr Triethylamine Salt Solution — 44.4%	G
Triclopyr	Lawn and Garden Prod	MONTEREY BRUSH & VINE CONT. — 8.8%	G
Triclopyr	Nufarm Americas	Tahoe 3A Herb. — 44.4%	G
Triclopyr	SBM Life Science	BioAdvanced Science-Based Solutions Brush Killer Plus Conc. — 8.8%	G
Triclopyr	SBM Life Science	BioAdvanced Science-Based Solutions Brush Killer Plus RTS — 8.8%	G
Triclopyr	SBM Life Science	BioAdvanced Science-Based Solutions Durazone Conc. Brush Killer — 8.8%	G
Triclopyr	SBM Life Science	BioAdvanced Science-Based Solutions Brush Killer Plus RTU — 0.8%	G
Triclopyr	Sepro	Renovate 3 — 44.4%	G
Triclopyr	Sepro	Renovate OTF — 14%	G
Triclopyr	The Ortho Group	Ortho Weed B Gon Chickweed, Clover & Oxalis Killer for Lawns RTS — 8%	G
Triclopyr	The Ortho Group	Ortho Weed B Gon Chickweed, Clover & Oxalis Killer for Lawns Conc. — 8%	G
Triclopyr	The Ortho Group	Ortho Groundclear Poison Ivy & Tough Brush Killer1 — 8%	G
Triclopyr	The Ortho Group	Ortho Groundclear Poison Ivy & Tough Brush Killer — 0.7%	G
Triclopyr	Dow Agrosciences	Vastlan — 54.72%	G
Triclopyr	Cont. Solutions	Clear Pasture — 61.6%	G
Trifloxysulfuron-sodium	Syngenta	ENVOKE — 75%	G
Trifloxysulfuron-sodium	Syngenta	MONUMENT 75WG — 75%	G
Trifluralin	Aceto Ag Chemicals	Aceto Trifluralin 4 EC Herb. — 43%	G
Trifluralin	ADAMA	Triflurex HFP — 42.78%	G
Trifluralin	Drexel Chemical	Drexel Trifluralin 4 EC — 44.5%	G
Trifluralin	Fiberweb	Biobarrier Root Cont. System — 17.5%	G
Trifluralin	Gowan	TREFLAN HFP — 43%	G
Trifluralin	Gro Tec	Eliminator Garden Weed Prev. — 1.47%	G
Trifluralin	Helena Agri-Enterprises	TRIFLURALIN 4 EC — 43%	G
Trifluralin	Lebanon Seaboard	Preen Garden Weed Prev. — 1.49%	G
Trifluralin	Lebanon Seaboard	Lebanon Treflan 5G — 5%	G
Trifluralin	Loveland Prod	Trifluralin 10G — 10%	G
Trifluralin	Loveland Prod	Trifluralin HF — 43%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Trifluralin	Miracle Gro Lawns	Miracle-Gro Garden Weed Prev. 1 — 1.47%	G
Trifluralin	Miracle Gro Lawns	Miracle-Gro Shake 'N Feed All Purpose Plant Food Plus Weed Prev. 1 10-10-10 — 0.153%	G
Trifluralin	Andersons	Easy Weeder Flower and Garden Weed Prev. — 1.47%	G
Trifluralin	Albaugh	Trifluralin 4EC — 43%	G
Trifluralin	Gowan	Trifluralin Tech. — 96.3%	G
Trifluralin	Lawn and Garden Prod	VEGETABLE AND ORNAMENTAL WEEDER — 43%	G
Trifluralin	Lesco	Lesco Trifluralin 5G Herb. (702307) — 5%	G
Trifluralin	Andersons	Andersons Pro. Turf Products Weed & Grass Prev. w/ 5% Treflan Herb. — 5%	G
Trifluralin	VPG	Hi-Yield Herb. Granules Containing Treflan — 1.47%	G
Trifluralin	Winfield Solutions	Trust Herb. — 43%	G
Trifluralin	Winfield Solutions	Trust — 44.5%	G
Vinegar	Energen Carolina	Vinegar Weed & Grass Killer — 20%	G
		Defoliants and Desiccants	
Thidiazuron	ADAMA	Klean-Pik 500SC — 42.4%	G
Tribufos	Amvac Chemical	Folex 6EC Cotton Defoliant — 70.5%	G
Flumiclorac pentyl ester	Amvac Chemical	Action — 10.1%	G
Thidiazuron	Arysta Lifescience N.A.	Thidiazuron 4SC — 42.4%	G
Isopropyl myristate	Bayer Healthcare	RESULTIX — 50%	G
Sodium chlorate	Drexel Chemical	Drexel Defol — 28%	G
Sodium chlorate	Drexel Chemical	Drexel Defol 5 — 42.3%	G
Paraquat dichloride	Helm Agro U.S.	Helmquat 3SL — 43.8%	R
Thidiazuron	Innvictis Crop Care	Vacate — 41.4%	G
Tribuphos	Innvictis Crop Care	Quiver — 70.5%	G
Tribufos	Loveland Products	DFT 6 EC Cotton Defoliant — 70.5%	G
Thidiazuron	Loveland Products	Take Down SC Cotton Defoliant — 42.4%	G
Thidiazuron	Nufarm Americas	FreeFall SC Cotton Defoliant — 42.4%	G
Tribufos	Redeagle Intl.	Tribufos 6 — 70.5%	G
Paraquat dichloride	Sinon USA	Bonedry — 43.8%	R
Diquat dibromide	Syngenta Crop Prot.	Reglone Desiccant — 37.3%	G
Thidiazuron	Winfield Solutions	Daze 4SC — 42.4%	G
		Fumigants	
1,3-Dichloropropene	Dow Agrosciences	Curfew — 97.5%	R
1,3-Dichloropropene	Dow Agrosciences	Telone II — 97.5%	R
1-Methylcyclopropene	Flora Life	EthylBloc — 0.14%	G
1-Methylcyclopropene	Flora Life	EthylBloc Sachet — 0.014%	G
Aluminum phosphide	Bernardo Chemicals	Gastoxin Fumigation Tablets — 57%	R
Aluminum phosphide	Bernardo Chemicals	Gastoxin Fumigation Pellets — 57%	R
Aluminum phosphide	Bernardo Chemicals	Gastoxin Fumigation Sachet Chain (100) — 57%	R
Aluminum phosphide	Bernardo Chemicals	Gastoxin Fumigation Sachets (6) — 57%	R
Aluminum phosphide	Bernardo Chemicals	Gastion Fumigation Sachets (50) — 57%	R
Aluminum phosphide	D&D Holdings	Fumitoxin Tablets — 55%	R
Aluminum phosphide	D&D Holdings	Detia Fumex Bags — 57%	R
Aluminum phosphide	D&D Holdings	Fumitoxin Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Tablets — 55%	R
Aluminum phosphide	D&D Holdings	Detia Phos Tablets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Detia Phos Pellets — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Prepac Rope — 55%	R
Aluminum phosphide	D&D Holdings	Degesch Phostoxin Tablet Prepac — 55%	R
Aluminum phosphide	Douglas Products	PH 3 Aluminum Phosphide Fumigation Pellets — 60%	R
Aluminum phosphide	Douglas Products	PH3 Aluminum Phosphide Tablets — 60%	R
Aluminum phosphide	ROC Enterprises	Killz-All 60 Tablets — 60%	R
Aluminum phosphide	ROC Enterprises	Killz-All 60 Pellets — 60%	R
Aluminum phosphide	UPL NA	Weevil-Cide Tablets — 60%	R
Aluminum phosphide	UPL NA	Weevil-Cide Pellets — 60%	R
Aluminum phosphide	UPL NA	Weevil-Cide Gas Bags — 60%	R
Aluminum phosphide	UPL NA	QuickPHlo-R Granules — 77.5%	R
Chloropicrin	Koppers Performance Chem.	TimberFume II — 99.4%	R
Chloropicrin	TriEst Ag Group	Tri-Pic 100 Fumigant — 99%	R
Chloropicrin	TriEst Ag Group	Pic Plus Fumigant — 85.5%	R
Cypermethrin	Spectrum Group	Do it Best Indoor Fogger2 — 0.515%	G
Dazomet	Copper Care Wood Pres.	Super-Fume — 98%	G
Dichlobenil	Douglas Products	Sanafoam Roo-Pru — 50%	G
Ethylene oxide	ARC Specialty Products	Ethylene Oxide — 100%	G
Formaldehyde	TriEst Ag Group	TriEst Microbiocide — 37%	G
Magnesium phosphide	D&D Holdings	Degesch Magtoxin Granules — 94.6%	R
Magnesium phosphide	D&D Holdings	Degesch Fumicel / Strip — 56%	R
Magnesium phosphide	D&D Holdings	Degesch Magtoxin Perpac Spot Fumigant — 66%	R

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Common chemical name	Company	Trade names and formulations	Use classification
Magnesium phosphide	UPL NA	Magnaphos Plate — 56%	R
Malathion	Douglas Products	MaxKill Dusta-Cide 6 — 6%	G
Metam potassium	Amvac Chemical	K-PAM HL — 54%	R
Metam-sodium	Amvac Chemical	VAPAM HL SOIL FUMIGANT — 42%	R
Methyl bromide	Great Lakes Chemical	Meth-O-Gas Q — 100%	R
Methyl bromide	ICL-IP America	Metabrom 100 — 100%	R
Methyl bromide	TriEst Ag Group	Methyl Bromide Quarantine Fumigant — 100%	R
Methyl bromide	Great Lakes Chemical	METH-O-GAS 100 — 100%	R
Methyl bromide	ICL-IP America	Metabrom Q — 100%	R
Methyl bromide	TriEst Ag Group	Methyl Bromide 100 — 100%	R
Phosphine gas	Cytec Industries	ECO2FUME® Fumigant Gas — 2%	R
Phosphine gas	Cytec Industries	VAPORPH3OS® Phosphine Fumigant — 99.3%	R
		Plant Growth Regulators	
1-Methylcyclopropene	AgroFresh	RipeLock Tabs 2.0 — 2%	G
1-Methylcyclopropene	AgroFresh	Landspring WP — 3.8%	G
1-Naphthaleneacetic acid	MAIA Products / Ag. Div.	Hormex Vitamin B1 & Hormone Conc. — 0.24%	G
1-Naphthaleneacetic acid, potassium salt	Amvac Chemical	K SALT FRUIT FIX 800 — 24.2%	G
1-Naphthaleneacetic acid, potassium salt	Amvac Chemical	K SALT FRUIT FIX 200 — 6.25%	G
1-Naphthaleneacetic acid, sodium salt	Valent BioSciences	PoMaxa PGR — 3.5%	G
Abscisic acid	Valent BioSciences	ProTone SG PGR — 20%	G
Acifluorfen, sodium salt	Redeagle Intl.	Aciflurofen 2 — 20.1%	G
Amino ethoxy vinyl glycine hydrochloride	Valent BioSciences	ReTain PGR Soluble — 15%	G
Ancymidol	Fine Americas	Abide — 0.0264%	G
Ancymidol	Sepro	A-Rest — 0.0264%	G
Benzyladenine	Valent BioSciences	MaxCel PGR Solution — 1.9%	G
Chitosan	Ag Nubio	Biorend — 2.5%	G
Chitosan	Ag Nubio	NuPro ST Seed Treatment — 0.25%	G
Chitosan	Visjon Biologics	Exceed SAR Plant Defense Booster — 0.25%	G
Chlormequat chloride	Fine Americas	Citadel — 11.8%	G
Chlormequat chloride	OHP	Cycocel PGR — 11.8%	G
Copper hydroxide	Sepro	SpinOut 260 — 19.6%	G
Copper sulfate pentahydrate	Mid-American Res. Chem.	Foaming Drain Line Root Cont. — 19.8%	G
CPPA	FBSciences	Arcus — 0.9%	G
CPPA	Winfield Solutions	AGM 13027 — 0.18%	G
Cytokinin (as kinetin)	Acadian Seaplants	Stimplex Crop Biostimulant — 0.01%	G
Cytokinin (as kinetin)	Biopro Technologies	Cytogro Hormone Biostimulant — 0.005%	G
Cytokinin (as kinetin)	Bonide Products	Bonide Tomato & Blossom Set Spray RTU — 0.00008%	G
Cytokinin (as kinetin)	Loveland Products	Validate — 0.5%	G
Cytokinin (as kinetin)	Stoller Enterprises	X-CYTE — 0.04%	G
Cytokinin (as kinetin)	VPG	Ferti-lome Tomato & Pepper Set RTU — 0.00008%	G
Cytokinin (as kinetin)	Miller Chem. & Fert.	Cytokin Bioregulator — 0.01%	G
Cytokinin (as kinetin)	Stoller Enterprises,	SUGAR MOVER PREMIER — 0.003%	G
Daminozide	Fine Americas	Dazide 85 WSG — 85%	G
Daminozide	OHP	B-Nine WSG — 85%	G
Dicamba	Sharda USA	DiCash DGA-4 — 58.1%	G
Dichlobenil	OHP	Casoron 4G — 4%	G
Dikegulac sodium	PBIGordon	Atrimmec PGR — 18.5%	G
Ethephon	ADAMA	Setup 6SL — 55.4%	G
Ethephon	ADAMA	Quali-Pro Ethephon 2SL — 21.7%	G
Ethephon	Arysta Lifescience N.A	Ethephon 6 — 55.4%	G
Ethephon	Bayer Enviro. Science	Proxy Growth Regulatory — 21.7%	G
Ethephon	Fine Americas	Collate — 21.7%	G
Ethephon	Helena Agri-Enterprises	Helena Flash — 27%	G
Ethephon	Helena Agri-Enterprises	Helena Oskie — 27%	G
Ethephon	Helena Agri-Enterprises	Omni Brand Ethephon 6 LB — 55.4%	G
Ethephon	Innvictis Crop Care	VELOUR — 55.4%	G
Ethephon	Lawn and Garden Prod.	Florel Brand Growth Regulator — 3.9%	G
Ethephon	Loveland Products	Boll Buster — 55.4%	G
Ethephon	Nufarm Americas	Super Boll Plant Regulator — 55.4%	G
Ethephon	Nufarm Americas	Verve PGR — 21.7%	G
Ethephon	Nufarm	Nufarm Ethephon MUP — 75%	G
Ethephon	Redeagle Intl.	Ethephon 78% MUP — 77.6%	G
Ethephon	Southern Ag Insect.	Florel PGR — 3.9%	G
Ethephon	Winfield Solutions	Boll'd 6SL — 55.4%	G
Ethephon	Winfield Solutions	Boll'd 6 — 54%	G
Ethephon	Winfield Solutions	Boll'd — 55.4%	G
Ethylene	Airgas Specialty Gases	Ethylene — 98.5%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Flumetralin	Syngenta Crop Prot.	Flumetralin Tech. — 99%	G
Flumetralin	Syngenta Crop Prot.	PRIME+ EC — 15%	G
Flurprimidol	Sepro	Cutless 0.33G — 0.33%	G
Flurprimidol	Sepro	Cutless 50W — 50%	G
Flurprimidol	Sepro	Topflor — 0.38%	G
Flurprimidol	Sepro	Cutless MEC — 16%	G
Gibberellic acid	Fine Americas	Falgro 20SP — 20%	G
Gibberellic acid	Fine Americas	Falgro 2X LV — 6.18%	G
Gibberellic acid	Fine Americas	Falgro OD — 12.96%	G
Gibberellic acid	Frit Industries	Green-Sol Sul15Plus — 0.025%	G
Gibberellic acid	Nufarm Americas	GibGro 4LS — 4%	G
Gibberellic acid	Plant Synergists	VitaGib 40% Soluble Powder PGR — 40%	G
Gibberellic acid	Stoller Enterprises	N-Large Premier — 6.26%	G
Gibberellic acid	Stoller Enterprises	X-Pand — 12%	G
Gibberellic acid	Valent BioSciences	RyzUp SmartGrass PGR WSG — 40%	G
Gibberellic acid	Valent BioSciences	ProGibb 40% WSG PGR — 40%	G
Gibberellic acid	Valent BioSciences	ProGibb T&O PGR (PGR) Solution — 4%	G
Gibberellic acid	Valent BioSciences	ProGibb 4% PGR Solution — 4%	G
Gibberellic acid	Valent BioSciences	ProGibb TVO PGR — 4%	G
Gibberellic acid	Valent BioSciences	ProGibb LV PLUS PGR Solution — 5.7%	G
Gibberellin	Valent BioSciences	Release LC PGR Solution — 4%	G
Gibberellin	Fine Americas	Novagib 5L — 5%	G
Gibberellin	Valent BioSciences	ProCone PGR Solution — 4%	G
Homobrassinolide	Repar	Homobrassinolide 0.1% — 0.1%	G
Hydrogen cyanamide	Alzchem Trostberg GmbH	Dormex — 50%	R
Indole	OHP	Hormodin 2 — 0.3%	G
Indole	OHP	Hormodin 3 — 0.8%	G
Indole	OHP	Hormodin 1 — 0.1%	G
Indole-3-butyric acid	Bonide Products	Bonide Garden Rich Root & Grow Root Stimulator and Plant Starter 4-10-3 — 0.0004%	G
Indole-3-butyric acid	Bonide Products	Bonide Bontone II Rooting Powder — 0.1%	G
Indole-3-butyric acid	Fine Americas	Advocate — 20%	G
Indole-3-butyric acid	Tree Tech Microinjection Sys.	Snipper — 4%	G
Indole-3-butyric acid	Growth Technology Ltd.	Clonex Rooting Gel — 0.31%	G
Indole-3-butyric acid	Helena Agri-Enterprises	KICKSTAND PGR — 0.0135%	G
Indole-3-butyric acid	Hortus USA	Hortus IBA Water Soluble Salts (20%) — 20%	G
Indole-3-butyric acid	MAIA Products / Ag. Div.	HORMEX ROOTING POWDER #1 — 0.1%	G
Indole-3-butyric acid	Schultz	Garden Safe Brand TakeRoot Rooting Hormone — 0.1%	G
Indole-3-butyric acid	SJ Enterprises Pty.	Cyclone — 0.17%	G
Indole-3-butyric acid	Techpac	Garden Tech RootBoost Rooting Hormone — 0.1%	G
Indole-3-butyric acid	VPG	Ferti-lome Rooting Powder — 0.1%	G
Indole-3-butyric acid	VPG	Ferti-lome Root Stimulator & Plant Starter Solution — 0.0004%	G
Kinetin (plant hormone)	Frit Industries	Green-Sol 70 — 0.0175%	G
Maleic hydrazide	Macdermid Ag Solutions	Royal MH-30 Xtra — 30.3%	G
Maleic hydrazide	Macdermid Ag Solutions	Royal MH-30 — 21.7%	G
Mepiquat chloride	AgSaver	Mepit — 4.2%	G
Mepiquat chloride	Arysta Lifescience N.A.	Mepichlor 4.2% Liquid — 4.2%	G
Mepiquat chloride	Arysta Lifescience N.A.	Pix WSG — 90%	G
Mepiquat chloride	Drexel Chemical	Drexel MEP 42 — 4.2%	G
Mepiquat chloride	Drexel Chemical	Drexel Mep 6X — 23.5%	G
Mepiquat chloride	Helena Agri-Enterprises	Omni Brand Mepiquat LC — 4.2%	G
Mepiquat chloride	Innvictis Crop Care	VETO — 4.2%	G
Mepiquat chloride	Loveland Products	Mepiquat — 4.2%	G
Mepiquat chloride	Nufarm Americas	Mepex PGR — 4.2%	G
Mepiquat chloride	Winfield Solutions	Compact — 4.2%	G
Mepiquat pentaborate	BASF	Pentia Plant Regulator — 9.6%	G
Methyl alpha-D-mannopyranoside	Brandt Consolidated	Brandt GlucoPro — 12.15%	G
N6-benzyl adenine	Fine Americas	Configure — 2%	G
Napthenic soaps	Fine Americas	Refine 3.5L — 3.5%	G
Nitrapyrin	Dow Agrosciences	Instinct NXTGEN — 25.97%	G
Paclobutrazol	Cont. Solutions	Quali-Pro Pac-Low — 22.3%	G
Paclobutrazol	Davey Tree Expert	ArborLock 2SC — 22.3%	G
Paclobutrazol	Fine Americas	Piccolo — 0.4%	G
Paclobutrazol	Fine Americas	Piccolo 10 XC — 4%	G
Paclobutrazol	Greenleaf Chemical	Shortstop 2SC — 22.3%	G
Paclobutrazol	OHP	Pac-O — 0.4%	G
Paclobutrazol	Rainbow Treecare Sci. Adv.	Cambistat ROW — 22.3%	G
Paclobutrazol	Rainbow Treecare Sci. Adv.	CAMBISTAT — 22.3%	G
Paclobutrazol	Rainbow Treecare Sci. Adv.	Trimtect — 8%	G
Paclobutrazol	Sepro	Profile 2SC — 21.8%	G
Paclobutrazol	Syngenta Crop Prot.	TRIMMIT 2SC PGR — 22.3%	G
Paclobutrazol	Syngenta Crop Prot.	CLARELLE — 22.9%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Paclobutrazol	Syngenta Crop Prot.	Bonzi Ornamental Growth Regulator — 0.4%	G
Paclobutrazol	Syngenta Crop Prot.	Paclo Pro Ornamental Growth Regulator — 0.4%	G
Paclobutrazol	United Turf Alliance	ArmorTech PAC 223 — 22.3%	G
Paclobutrazol	Zhejiang Tide Cropscience	Tide Paclo 2SC — 22.3%	G
Prohexadione calcium	BASF	Apogee PGR — 27.5%	G
Prohexadione calcium	Cleary Chemicals	ANUEW TURF GROWTH REGULATOR — 27.5%	G
Prohexadione calcium	Fine Americas	Kudos 27.5 WDG — 27.5%	G
Trinexapac-ethyl	Advan	Groom PGR — 11.3%	G
Trinexapac-ethyl	Atticus	Pramaxis MEC — 11.3%	G
Trinexapac-ethyl	Cont. Solutions	Quali-Pro T-Nex — 12%	G
Trinexapac-ethyl	Loveland Products	Game Up PGR — 11.3%	G
Trinexapac-ethyl	Prime Source	Train-Pac Select — 11.3%	G
Trinexapac-ethyl	SBM Life Science	BioAdvanced Science-Based Sol. Slow Mow Lawn Cond. RTS Granules — 0.15%	G
Trinexapac-ethyl	Syngenta Crop Prot.	TRINEXAPAC-ETHYL TECHNICAL — 97%	G
Trinexapac-ethyl	Syngenta Crop Prot.	PRIMO MAXX — 11.3%	G
Trinexapac-ethyl	Syngenta Crop Prot.	PODIUM — 11.3%	G
Trinexapac-ethyl	Syngenta Crop Prot.	PALISADE EC — 12%	G
Trinexapac-ethyl	United Turf Alliance	ArmorTech PGR 113 MC — 11.3%	G
Uniconazole	Fine Americas	Concise — 0.055%	G
Uniconazole	Valent U.S.A.	Sumagic PGR — 0.055%	G
Urea, reaction prod. w/ amm. hyd.	Koch Agronomic Service	CENTURO — 14%	G
		Weed and Feed	
Atrazine	Lesco	Lesco Atrazine 0.76% + Fert. — 0.76%	G
Atrazine	Scotts	Scotts Turf Builder Bonus S Southern W&Fb 29-0-10 — 1.293%	G
Atrazine	Scotts	Scotts Turf Builder Bonus S Southern W&Ffl 29-0-10 — 1.29%	G
Atrazine	Scotts	Turf Builder Bonus S Southern W&F2 — 1.293%	G
Atrazine	Scotts	Scotts Turf Builder Annual Program Early Springs 29-0-10 — 1.293%	G
Atrazine	Scotts	Scotts Turf Builder Annual Program Falls 29-0-10 — 1.293%	G
Atrazine	Scotts	Scotts Weedex Southern — 1.44%	G
Atrazine	Scotts	Scotts Turf Builder Bonus S Southern W&Ff2 — 1.293%	G
Atrazine	Swiss Farms Prod.	Vigoro Super Green Southern W&F w/ Atrazine 29-0-4 — 1.38%	G
Atrazine	Swiss Farms Prod.	Vigoro Super Green Southern W&F 29-0-4 — 1.38%	G
Atrazine	Swiss Farms Prod.	SOUTHERN WEED & FEED 29-0-2 — 1.38%	G
Atrazine	Swiss Farms Prod.	VIGORO SOUTHERN WEED & FEED — 1.38%	G
Atrazine	Lesco	Lesco Atrazine 1.05% + Fert. 21-0-7M (701186) — 1.05%	G
Atrazine	Lesco	Lesco Atrazine 1.05% + Fert. 21-0-7M (701187) — 1.05%	G
Atrazine	Lesco	Lesco Atrazine 1.05% + Fert. — 1.05%	G
Atrazine	Lesco	Lesco Atrazine 0.92% + Fert. — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 0.92% + Fert. 15-0-15 (#HPST00108) — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 0.76% + Fert. 0-0-7 (#HPST00107) — 0.76%	G
Atrazine	Lesco	Lesco Atrazine 0.92% + Fert. 15-0-5 (#HPST00106) — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 0.92% + Fert. 20-0-20 (#HPST00105) — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 0.92% + Fert. 18-0-8 (#HPST00104) — 0.92%	G
Atrazine	Lesco	Lesco Atrazine 1.05% + Fert. 22-0-11 (#HPST00103) — 1.05%	G
Atrazine	VPG	Ferti-lome St. Augustine W&F — 0.81%	G
Atrazine	Turf Care Supply	TCS GrowStar Atrazine 1.05% + Fert. 22-0-11 — 1.05%	G
Atrazine	Turf Care Supply	TCS GrowStar Atrazine 1.05% + Fert. 18-0-5 — 1.05%	G
Atrazine	Turf Care Supply	TCS GrowStar Atrazine 1.05% + Fert. 0-0-7 — 1.05%	G
Atrazine	Sunniland	Sunniland Pro. Weed and Feed St. Augustine 16-0-8 — 0.92%	G
Barricade	Winfield Solutions	5-0-20 Fert. w/ 0.38% Barricade — 0.38%	G
Barricade	Howard Johnson's	H. J.'s Crabgrass Cont. Plus w/ 0.37% Barricade 25-0-5 — 0.37%	G
Bifenthrin	Bonide Prod.	Bonide DuraTurf Insect & Feed — 0.069%	G
Bifenthrin	Loveland Prod.	Signature Fert. w/ 0.073% Talstar LC — 0.73%	G
Dithiopyr	Scotts	Snap Pac Fert. w/ Crabgrass Prev. 30-0-4 — 0.2%	G
Dithiopyr	Swiss Farms Prod.	Vigoro Crabgrass Prev. & Lawn Fert. 30-0-4 — 0.2%	G
Dithiopyr	Loveland Prod.	Signature Dimension 0.10 + Fert. — 0.1%	G
Dithiopyr	Loveland Prod.	Signature Dimension 0.19% + Fert. — 0.19%	G
Dithiopyr	Loveland Prod.	Signature Dimension 0.15% + Fert. — 0.15%	G
Dithiopyr	Andersons	Fortify Crabgrass Prev. Plus Lawn Food 20-0-4 — 0.103%	G
Dithiopyr	Lesco	Lesco Dimension 0.19% Plus Turf & Orn. 25-0-5 — 0.19%	G
Dithiopyr	Lesco	Lesco Dimension 0.21% + Fert. 25-0-10 (701072) — 0.21%	G
Dithiopyr	Lesco	Dimension 0.15% Plus Fert — 0.15%	G
Dithiopyr	Lesco	Dimension Crabgrass Pre-emergent Plus Fert 19-0-7 — 0.15%	G
Dithiopyr	Lesco	Dimension 0.15% Plus Fert 19-0-2 — 0.15%	G
Dithiopyr	Lesco	Dimension 0.21% Plus Fert — 0.21%	G
Dithiopyr	Lesco	Dimension 0.21% Plus Fert 0-0-7 — 0.21%	G
Dithiopyr	Lesco	Lesco Dimension 0.10% + Fert. 0-0-7M — 0.1%	G
Dithiopyr	Lesco	DIMENSION 0.10% + Fert. — 0.1%	G
Dithiopyr	Lebanon Seaboard	Lebanon ProScape Fert. 16-0-8 w/ Dimension 0.19% — 0.19%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Dithiopyr	Lebanon Seaboard	Greenview Crabgrass Cont. Plus Lawn Food 26-0-4 w/ Preen — 0.19%	G
Dithiopyr	Lebanon Seaboard	Greenview Crabgrass Cont. Plus Lawn Food — 0.19%	G
Dithiopyr	VPG	Ferti-lome Crabgrass Prev. Plus Lawn Food Containing Dimension — 0.125%	G
Dithiopyr	VPG	Ferti-lome Winterizer & Weed Prev. II for Southern Grasses — 0.125%	G
Dithiopyr	Harrell's	Fert. W/ Dimension 0.125% — 0.125%	G
Dithiopyr	Harrell's	Fert. w/ Dimension .10% — 0.1%	G
Dithiopyr	Harrell's	Fert. w/Dimension 0.19% — 0.19%	G
Dithiopyr	Harrell's	Fert. w/Dimension 0.25% — 0.25%	G
Dithiopyr	Harrell's	Fert. w/Dimension 0.15% — 0.15%	G
Dithiopyr	Turf Care Supply	Landscapers Select Fert. w/ Crab-Buster Crabgrass Prev. — 0.15%	G
Dithiopyr	Turf Care Supply	TCS GrowStar Dimension 0.125% + Fert. — 0.125%	G
Dithiopyr	Turf Care Supply	TCS GrowStar Dimension 0.15% + Fert. 0-0-7 — 0.15%	G
Dithiopyr	Turf Care Supply	TCS GrowStar Dimension 0.19% + Fert. — 0.19%	G
Dithiopyr	Turf Care Supply	TCS GrowStar Dimension 0.15% + Fert. 13-0-5 — 0.15%	G
Dithiopyr	Turf Care Supply	TCS GrowStar Dimension 0.15% + Fert. 17-0-0 — 0.15%	G
Dithiopyr	Turf Care Supply	TCS GrowStar Dimension 0.15% + Fert. 18-0-3 — 0.15%	G
Dithiopyr	Howard Johnson's	H. J.'s Prevents Crabgrass Plus w/ 0.172% Dimension — 0.172%	G
Dithiopyr	Howard Johnson's	H. J.'s Prevents Crabgrass Plus w/ 0.13% Dimension 19-0-6 — 0.13%	G
Dithiopyr	Howard Johnson's	H. J.'s Prevents Crabgrass Plus w/ 0.13% Dimension 5.29-25-30 — 0.13%	G
Dithiopyr	Sunniland	Sunniland Pro. 0-0-7 Crabgrass Pre-Emergent — 0.172%	G
Dithiopyr	Ferti Technologies NC	Nutrite Pro. Turf Fert. w/ Dimension 0.22% Herb. 19-0-5 — 0.22%	G
Ferric HEDTA	SBM Life Science	Natria Lawn Weed & Disease Cont. RTS — 26.52%	G
Ferrous sulfate monohydrate	Scotts	MOSS CONT. GRANULES FOR LAWNS — 17.5%	G
Ferrous sulfate monohydrate	Scotts	Snap Pac Moss Cont. for Lawns — 17.5%	G
Imidacloprid	VPG	Ferti-lome Azalea/Evergreen Food Plus w/ Systemic — 0.2%	G
Imidacloprid	VPG	Ferti-lome Palm Tree Food w/ Systemic — 0.2%	G
Mesotrione	Scotts	Turf Builder Starter Food for New Grass + Weed Prev. — 0.08%	G
Mesotrione	Scotts	Step 1 for Seeding Starter Lawn Food w/ Weed Prev. — 0.08%	G
Metsulfuron-methyl	Scotts	Scotts Snap Pac Southern W&F2 — 0.017%	G
Metsulfuron-methyl	Scotts	Scotts Turf Builder Bonus S Southern W&F 4 — 0.022%	G
Oryzalin	Harrell's	Fert. w/Surflan 1.0% — 1%	G
Oryzalin	Harrell's	Fert. w/Surflan 0.75% — 0.75%	G
Oxadiazon	Loveland Prod.	Signature Fert. w/ 1.0% Ronstar — 1%	G
Oxadiazon	Andersons	5-0-15 Fert. w/ Ronstar Herb. — 1%	G
Oxadiazon	Andersons	Andersons Golf Products 5-5-20 Fert. + 1% Ronstar — 1%	G
Oxadiazon	Andersons	Andersons Golf Products 15-5-10 Fert. Plus 1% Ronstar — 1%	G
Oxadiazon	Lesco	Ronstar 0.95% Plus Fert — 0.95%	G
Oxadiazon	Lesco	Lesco RONSTAR 0.95% + Fert. 0-0-14M (701144) — 0.95%	G
Oxadiazon	Harrell's	Fert. w/Ronstar 0.95% — 0.95%	G
Oxadiazon	Harrell's	Fert. w/Ronstar 1.20% — 1.2%	G
Oxadiazon	Harrell's	Fert. W/ Ronstar 1.5% — 1.5%	G
Oxadiazon	Harrell's	Fert. w/Ronstar 0.75% — 0.75%	G
Oxadiazon	Turf Care Supply	TCS GrowStar Oxadiazon 1.0 Plus Turf Fert. — 1%	G
Oxadiazon	Howard Fert. & Chemical	Turf Pride AccuBlend Fert. w/ 1% Ronstar Profusion Process — 1%	G
Pendimethalin	Scotts	Scotts Turf Builder Halts Crabgrass Prev. and Lawn FoodB — 1.29%	G
Pendimethalin	Scotts	Scotts Turf Builder Essentials Halts Crabgrass Prev. w/ Lawn Food 30-0-4 — 1.29%	G
Pendimethalin	Scotts	Scotts Turf Builder Annual Program Early Spring 30-0-4 — 1.29%	G
Pendimethalin	Swiss Farms Prod.	Crabgrass Preventer w/ Fert. 29-0-3 — 1.22%	G
Pendimethalin	Swiss Farms Prod.	Vigoro Crabgrass Preventer & Lawn Fert. I — 1.22%	G
Pendimethalin	Andersons	Andersons Golf Products Turf Fert. 22-0-6 + Pre. Weed Cont. — 0.75%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% + Fert. 25-2-5 (702044) — 0.86%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% + Fert. 19-3-7 (701212) — 0.86%	G
Pendimethalin	Lesco	Lesco PRE-M 0.86% + Fert. 0-0-7 (702100) — 0.86%	G
Pendimethalin	Lesco	Lesco Pre-M 1.5% + Fert. — 1.5%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% Crabgrass Pre. + Potash 0-0-7 — 0.86%	G
Pendimethalin	Lesco	Lesco Pre-M 0.86% Plus Fert 0-0-7 Mini — 0.86%	G
Pendimethalin	Lebanon Seaboard	Lebanon Pro Brand Fert. w/ .86% Pendimethalin Pre. Weed Cont. 20-0-4 — 0.86%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 0.75% — 0.75%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 1.0% — 1%	G
Pendimethalin	Harrell's	Fert. w/ Pendimethalin 0.86 — 0.86%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% + Fert. — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% + Fert. 0-0-7M — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% + Fert. 17-0-7 — 0.03%	G
Penoxsulam	Lesco	Lesco Lockup 0.03% + Fert. 21-0-7M — 0.03%	G
Penoxsulam	Turf Care Supply	Landscapers Select Southern W&F w/ Penoxsulam — 0.04%	G
Penoxsulam	Howard Johnson's	Pennington Seed Lockup 0.03% Herb. + Fert. 15-0-5 — 0.03%	G
Penoxsulam	Central Garden & Pet	Pennington Ultragreen Southern W&F II 30-0-4 — 0.04%	G
Prodiamine	Bonide Prod.	Bonide DuraTurf Crabgrass Prev. — 0.28%	G
Prodiamine	Loveland Prod.	Signature Evade .295% Crabgrass Prev. Plus — 0.295%	G

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Common chemical name	Company	Trade names and formulations	Use classification
Prodiamine	Loveland Prod.	Signature Crabgrass Prev. w/ Barricade 0.295% Plus — 0.295%	G
Prodiamine	Loveland Prod.	Signature Evade Crabgrass Prev. .20% Plus — 0.2%	G
Prodiamine	Winfield Solutions	Groundwork Crabgrass Pre. Fert. 16-0-6 — 0.28%	G
Prodiamine	Winfield Solutions	0-0-7 Fert. w/ 0.38% Barricade — 0.38%	G
Prodiamine	Andersons	Andersons Pro. Turf Products Fert. w/ Barricade Herb. 0-0-7 — 0.426%	G
Prodiamine	Andersons	Andersons Pro. Turf Products 5-5-25 w/ Barricade Herb. — 0.426%	G
Prodiamine	Andersons	Andersons Turf Products Fert. w/ 0.426% Barricade Herb. 18-0-4 — 0.426%	G
Prodiamine	Lesco	Lesco Stonewall 0.20% + Fert. — 0.2%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% + Fert. — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% + Fert. — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% + Fert. 17-0-6 (701253) — 0.29%	G
Prodiamine	Lesco	Lesco stonewall 0.37% + Fert. 8-0-0 (701190) — 0.37%	G
Prodiamine	Lesco	Lesco Barricade 0.20% + Fert. 19-0-5 (701200) — 0.2%	G
Prodiamine	Lesco	Lesco Barricade 0.43% + Fert. 19-0-7 (701207) — 0.43%	G
Prodiamine	Lesco	Lesco Stonewall 0.43% + Fert. 8-3-23M (701193) — 0.43%	G
Prodiamine	Lesco	Lesco Barricade 0.28% + Fert. 0-0-7 (097213) — 0.28%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% + Fert. 14-0-4 (702112) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% + Fert. 15-0-0 (702113) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.37% + Fert. 19-0-6 (702114) — 0.37%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% + Fert. 0-0-7 (702061) — 0.29%	G
Prodiamine	Lesco	Lesco Stonewall 0.29% + Fert. 0-0-7M (702062) — 0.29%	G
Prodiamine	Lesco	Lesco Barricade 0.28% + Fert. 15-0-5 (701203) — 0.28%	G
Prodiamine	Lesco	Lesco Barricade 0.38% + Fert. 19-0-6 (701268) — 0.38%	G
Prodiamine	Lesco	Lesco Barricade 0.38% + Fert. 24-0-7 (701206) — 0.38%	G
Prodiamine	Lesco	Lesco Barricade 0.43% + Fert. 0-0-7 — 0.43%	G
Prodiamine	Lesco	Lesco Barricade 0.28% + Fert. — 0.28%	G
Prodiamine	Lesco	Lesco Barricade 0.20% Plus Fert — 0.2%	G
Prodiamine	Lesco	Stonewall 0.43% + Fert. — 0.43%	G
Prodiamine	Lebanon Seaboard	Lebanon ProScape Fert. 16-0-8 w/ Barricade 0.43% — 0.43%	G
Prodiamine	Gro Tec	Sta-Green Phosphorus Free Crab-Ex Plus w/ Lawn Fert. — 0.37%	G
Prodiamine	Harrell's	Fert. w/ Barricade 0.38% — 0.38%	G
Prodiamine	Harrell's	Fert. w/ Barricade 0.3% — 0.3%	G
Prodiamine	Harrell's	Fert. w/ Ronstar 0.67% — 0.67%	G
Prodiamine	Harrell's	Fert. w/ Barricade 0.21% — 0.21%	G
Prodiamine	Harrell's	Fert. w/ Barricade 0.45% — 0.45%	G
Prodiamine	Turf Care Supply	TCS GrowStar Turf Fert. + 0.37% Prodiamine 18-0-6 — 0.37%	G
Prodiamine	Turf Care Supply	TCS GrowStar Turf Fert. + 0.29% Prodiamine — 0.29%	G
Prodiamine	Turf Care Supply	TCS GrowStar Turf Fert. + 0.37% Prodiamine 0-0-7 — 0.37%	G
Prodiamine	Turf Care Supply	TCS GrowStar Turf Fert. + 0.42% Prodiamine — 0.42%	G
Prodiamine	Howard Johnson's	H. J.'s Crabgrass Cont. Plus w/ 0.29% Barricade 0-0-7 — 0.29%	G
Prodiamine	Howard Johnson's	H. J.'s Crabgrass Cont. Plus w/ 0.37% Barricade 0-0-7 — 0.37%	G
Prodiamine	Howard Johnson's	H. J.'s Crabgrass Cont. Plus w/ 0.37% Prodiamine 5-5-30 — 0.37%	G
Prodiamine	Howard Johnson's	H. J.'s Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Prodiamine	Howard Johnson's	HJE All Season Crabgrass Cont. Plus w/ Prodiamine — 0.29%	G
Prodiamine	Howard Johnson's	Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Prodiamine	Howard Johnson's	Crabgrass Cont. Plus w/ 0.37% Prodiamine — 0.37%	G
Prodiamine	Howard Johnson's	Pennington Seed Crabgrass Cont. Plus w/ 0.37% Prodiamine 17-0-3 — 0.37%	G
Prodiamine	Howard Johnson's	H. J.'s Crabgrass Cont. Plus w/ 0.37% Prodiamine 0-0-7 — 0.37%	G
Prodiamine	Central Garden & Pet	Pennington Ultragreen Crabgrass Prev. + Fert. II 30-0-4 — 0.58%	G
Prodiamine	Central Garden & Pet	Pennington Ultragreen Crabgrass Prev. + Fert. III 30-0-4 — 0.58%	G
Prodiamine	Beaty Fert. and Chemical	AGRI-AFC 5-5-20 Turf Fert. w/ 0.42% Prodiamine — 0.42%	G
Prodiamine	Beaty Fert. and Chemical	Turf Fert. w/ Prodiamine 0.37% — 0.37%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.5% — 0.5%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.3% — 0.3%	G
Sulfentrazone	Harrell's	Fert. w/ Echelon 0.375% — 0.375%	G
Trifluralin	Lebanon Seaboard	Preen Gon Weed Prev. Plus Plant Food — 1.47%	G

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GLOSSARY OF HERBICIDE MIXTURES

Product	Company	Chemical Content	Use Class
		Herbicide Mixtures for Cropland	
Parallel Plus	ADAMA	Metolachlor — 28.9% + Atrazine — 30%	R
Pramitol 5PS	ADAMA	Prometon — 5% + Sodium chlorate — 39.8% + Sodium metaborate (NaBO2) — 40.78%	G
Vise	ADAMA	Sodium salt of fomesafen — 10.3% + Metolachlor — 48.26%	G
Tailwind	ADAMA	Metolachlor — 58.52% + Metribuzin — 13.93%	G
Torment	ADAMA	Sodium salt of fomesafen — 22.05% + Imazethapyr, ammonium salt — 5.38%	G
Pummel	ADAMA	Imazethapyr — 2.77% + Metolachlor — 55.49%	G
Cavalcade PQ	Advan	Quinclorac — 32.5% + Prodiamine — 32.5%	G
Knock Out Non-Selective Weed Killer	Aero Chem.	Bromacil — 0.98% + 2,4-Dichlorophenoxyacetic acid, 2-ethylhexyl ester — 1.09%	G
Agrisel 3-Way Max Turf & Orn. Broadleaf Herb.	Agrisel USA	Mecoprop — 8.17% + Triisopropanolamine 2,4-dichlorophenoxyacetate — 47.33% + Dicamba — 2.3%	G
Cedock Herb.	Agsurf	Chlorimuron-ethyl — 10.7% + Metribuzin — 64.3%	G
Chlormet Herb.	Agsurf	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%	G
Caveat Herb.	Agsurf	Nicosulfuron — 50% + Rimsulfuron — 25%	G
T-Square Herb.	Agsurf	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%	G
FallOut Herb.	Agsurf	Tribenuron-methyl — 6.8% + Chlorimuron-ethyl — 22.7%	G
Chlormet XP Herb.	Agsurf	Chlorsulfuron — 62.5% + Metsulfuron-methyl — 12.5%	G
Crossroad	Albaugh	2,4-Dichlorophenoxyacetic acid — 34.4% + Triclopyr, triethylamine salt — 16.5%	G
Thunder Master	Albaugh	Glyphosate, isopropylamine salt — 22% + Imazethapyr — 1.8%	G
Battle Star GT	Albaugh	Sodium salt of fomesafen — 5.72% + Glyphosate, ammonium salt — 26.77%	G
Mesocore	Albaugh	Mesotrione — 13% + Clopyralid, monoethanolamine salt — 10.85%	G
RangeStar	Albaugh	3,6-Dichloro-o-anisic acid — 12.4% + 2,4-Dichlorophenoxyacetic acid — 35.7%	G
Alligare GUNSLINGER P+D Herb.	Alligare	2,4-Dichlorophenoxyacetic acid — 39.6% + Picloram, triisopropanolamine salt — 10.2%	R
Mojave 70 EG	Alligare	Diuron — 62.22% + Imazapyr — 7.78%	G
Alligare Cody Herb.	Alligare	2,4-D, amine salt — 39% + Clopyralid — 5.1%	G
Everett	Alligare	Triclopyr, butoxypropyl ester — 16.5% + 2,4-D, butoxyethoxypropyl ester — 34.4%	G
Bromacil/Diuron 40/40	Alligare	Diuron — 40% + Bromacil — 40%	G
Krovar IVM Herb.	Alligare	Diuron — 40% + Bromacil — 40%	G
Alligare Prescott Herb.	Alligare	Clopyralid — 12.1% + Triclopyr, triethylamine salt — 33%	G
SFM Extra	Alligare	Sulfometuron methyl — 56.25% + Metsulfuron-methyl — 15%	G
Alligare Triumph XTR Herb.	Alligare	Picloram — 13.24% + Fluroxypyr 1-methylheptyl ester — 10.64%	R
Alligare Cleargraze Pasture Herb.	Alligare	Fluroxypyr 1-methylheptyl ester — 15.56% + Triclopyr — 45.07%	G
Alligare Triumph RTU Herb.	Alligare	Picloram — 5.4% + 2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt — 20.9%	G
RAVINE	Altitude Crop Innovations	Atrazine — 18.6% + Mesotrione — 2.44% + Metolachlor — 19%	R
Aegis ESR	AMGI	Sodium 5-nitroguaiacolate — 0.1% + Sodium o-nitrophenolate — 0.2% + Sodium p-nitrophenolate — 0.3%	G
ImpactZ Herb.	Amvac Chem.	Atrazine — 42.6% + Topramezone — 2.85%	R
Coastal	Amvac Chem.	Imazaquin — 7.62% + Prodiamine — 17.68% + Simazine — 27.2%	G
Audit 1:1	Arysta Lifescience NA	Thifensulfuron methyl — 25% + Tribenuron-methyl — 25%	G
Audit 4:1 Herb.	Arysta Lifescience NA	Tribenuron-methyl — 10% + Thifensulfuron methyl — 40%	G
MetalliS PFX	Atticus	S-Metolachlor — 46.4% + Fomesafen — 10.2%	G
MetalliS MTZ	Atticus	S-Metolachlor — 58.2% + Metribuzin — 13.8%	G
Zaltus XLT	Atticus	Chlorimuron-ethyl — 10.3% + Flumioxazin — 30%	G
Aquesta XL	Atticus	Chlorimuron-ethyl — 7.8% + Sulfentrazone — 62.2%	G
Varisto Herb.	BASF	Bentazon, sodium salt — 43.66% + Imazamox, sodium salt — 2%	G
Distinct Herb.	BASF	Dicamba, sodium salt — 55% + Diflufenzopyr-sodium — 21.3%	G
Overdrive Herb.	BASF	Dicamba, sodium salt — 55% + Diflufenzopyr — 21.4%	G
Clearpath Herb.	BASF	Imazethapyr — 13.02% + Quinclorac — 61.98%	G
Status Herb.	BASF	Diflufenzopyr — 17.1% + Dicamba, sodium salt — 44%	G
Freehand 1.75G Herb.	BASF	dimethenamide-P — 0.75% + Pendimethalin — 1%	G
Verdict powered by Kixor Herb.	BASF	Saflufenacil — 6.24% + dimethenamide-P — 55.04%	G
Optill powered by Kixor Herb.	BASF	Saflufenacil — 17.8% + Imazethapyr — 50.2%	G
Optill PRO powered by Kixor Herb.	BASF	Imazethapyr — 50.2% + Saflufenacil — 17.8% + dimethenamide-P — 63.9%	G
Zidua PRO Powered by Kixor Herb.	BASF	Saflufenacil — 4.81% + Pyroxasulfone — 23.06% + Imazethapyr — 13.45%	G
Armezon PRO Herb.	BASF	Topramezone — 1.12% + dimethenamide-P — 56.25%	G
Huskie Herb.	Bayer Cropscience	Bromoxynil octanoate — 13.4% + Bromoxynil heptanoate — 12.9% + Pyrasulfotole Technical — 3.3%	G
Capreno Herb.	Bayer Cropscience	Tembotrione — 28.3% + Thiencarbazone-methyl — 5.6%	G
Corvus Herb.	Bayer Cropscience	Thiencarbazone-methyl — 7.6% + Isoxaflutole — 19%	R

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Product	Company	Chemical Content	Use Class
Autumn Super 51 WDG Herb.	Bayer Cropscience	Thiencarbazone-methyl — 45% + Iodosulfuron-methyl-sodium — 6%	G
Diflexx Duo	Bayer Cropscience	Tembotrione — 2.83% + Dicamba, diglycoamine salt — 19.73%	G
Osprey Xtra Herb.	Bayer Cropscience	Thiencarbazone-methyl — 1.5% + Mesosulfuron-methyl — 4.5%	G
Axiom DF Herb.	Bayer Cropscience	Flufenacet — 54.4% + Metribuzin — 13.6%	G
Celsius WG Herb.	Bayer Environ. Sci.	Iodosulfuron-methyl-sodium — 1.9% + Thiencarbazone-methyl — 8.7% + Dicamba — 57.4%	G
Tribute Total	Bayer Environ. Sci.	Thiencarbazone-methyl — 9.9% + foramsulfuron — 19.8% + Halosulfuron-methyl — 30.8%	G
Esplanade EZ	Bayer Environ. Sci.	Indaziflam — 0.089% + Diquat dibromide — 0.89% + Glyphosate, isopropylamine salt — 20.46%	G
Specticle Total	Bayer Environ. Sci.	Glyphosate, isopropylamine salt — 20.46% + Diquat dibromide — 0.89% + Indaziflam — 0.089%	G
Derigo Herb.	Bayer Environ. Sci.	foramsulfuron — 24% + Thiencarbazone-methyl — 10% + Iodosulfuron-methyl-sodium — 2.4%	G
Krovar I DF Herb.	Bayer Environ. Sci.	Bromacil — 40% + Diuron — 40%	G
Oustar Herb.	Bayer Environ. Sci.	Hexazinone — 63.2% + Sulfometuron methyl — 11.8%	G
Cimarron Max Part B	Bayer Environ. Sci.	Dicamba, dimethylamine salt — 12.4% + 2,4-Dichlorophenoxyacetic acid — 35.7%	G
Cimarron Max	Bayer Environ. Sci.	Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 35.25% + Dicamba — 12.25% + Metsulfuron-methyl — 0.75%	G
Oust Extra Herb.	Bayer Environ. Sci.	Metsulfuron-methyl — 15% + Sulfometuron methyl — 56.25%	G
Westar Herb.	Bayer Environ. Sci.	Sulfometuron methyl — 6.5% + Hexazinone — 68.6%	G
Landmark XP Herb.	Bayer Environ. Sci.	Sulfometuron methyl — 50% + Chlorsulfuron — 25%	G
Pastora Herb.	Bayer Environ. Sci.	Nicosulfuron — 56.2% + Metsulfuron-methyl — 15%	G
Perspective Herb.	Bayer Environ. Sci.	Chlorsulfuron — 15.8% + Aminocyclopyrachlor — 39.5%	G
Streamline Herb.	Bayer Environ. Sci.	Aminocyclopyrachlor — 39.5% + Metsulfuron-methyl — 12.6%	G
Cimarron + Herb.	Bayer Environ. Sci.	Metsulfuron-methyl — 48% + Chlorsulfuron — 15%	G
Lineage Clearstand Herb.	Bayer Environ. Sci.	Imazapyr — 63.2% + Metsulfuron-methyl — 9.5%	G
Viewpoint Herb.	Bayer Environ. Sci.	Metsulfuron — 7.3% + Imazapyr — 31.6% + Aminocyclopyrachlor — 22.8%	G
Esplanade Sure	Bayer Environ. Sci.	Rimsulfuron — 16.7% + Indaziflam — 24.3%	G
Plainview SC	Bayer Environ. Sci.	Indaziflam — 2% + Aminocyclopyrachlor — 6.55% + Imazapyr, isopropylamine salt — 20.43%	G
PULVERIZE Weed, Brush & Vine Killer	Messinas	Ammonium soaps of fatty acids — 3.68% + Maleic hydrazide — 0.5%	G
Pulverize Weed, Brush & Vine Killer Conc.	Messinas	Maleic hydrazide — 3% + Ammonium soaps of fatty acids — 22.11%	G
Bonide Poison Oak & Ivy Killer RTU	Bonide Products	Dicamba — 0.07% + 2,4-D, dimethylamine salt — 0.6% + Mecoprop-P — 0.14%	G
Bonide Weed Beater Lawn Weed Killer Conc.	Bonide Products	Mecoprop-P — 1.83% + Dicamba — 0.84% + 2,4-D, dimethylamine salt — 7.59%	G
Bonide Weed Beater Ultra Conc.	Bonide Products	MCPA, 2-ethylhexyl ester — 31.55% + Carfentrazone-ethyl — 0.22% + Dicamba — 1.65% + Mecoprop-P — 6.16%	G
Bonide Weed Beater Ultra RTS	Bonide Products	Dicamba — 1.65% + MCPA, 2-ethylhexyl ester — 31.55% + Carfentrazone-ethyl — 0.22% + Mecoprop-P — 6.16%	G
Bonide Weed Beater Ultra RTU	Bonide Products	Mecoprop-P — 0.066% + MCPA, 2-ethylhexyl ester — 0.337% + Dicamba — 0.018% + Carfentrazone-ethyl — 0.0023%	G
Bonide DuraTurf Crabgrass + Crabgrass & Broadleaf Weed Killer	Bonide Products	Dicamba — 0.06% + 2,4-D — 0.675% + Quinclorac — 0.346% + Dithiopyr — 0.121%	G
Bonide Chickweed Clover & Oxalis Killer	Bonide Products	Dicamba — 1.35% + 2-Methyl-4-chlorophenoxyacetic acid — 13.72% + 3,5,6-Trichloro-2-pyridinyloxyacetic acid — 1.56%	G
Bonide Poison Ivy & Brush Killer BK-32 Conc.	Bonide Products	Dicamba — 1.35% + 2-Methyl-4-chlorophenoxyacetic acid — 13.72% + 3,5,6-Trichloro-2-pyridinyloxyacetic acid — 1.56%	G
Bonide Chickweed Clover & Oxalis Killer RTU	Bonide Products	3,5,6-Trichloro-2-pyridinyloxyacetic acid — 0.084% + 2-Methyl-4-chlorophenoxyacetic acid — 0.74% + Dicamba — 0.072%	G
Bonide Ground force Veg. Killer Conc.	Bonide Products	Glyphosate, isopropylamine salt — 5.03% + Imazapyr, isopropylamine salt — 0.089%	G
Bonide KleenUp Weed and Grass Killer 365 RTU	Bonide Products	Imazapyr, isopropylamine salt — 0.018% + Glyphosate, isopropylamine salt — 1.02%	G
Bonide Prozone Weed Beater Complete	Bonide Products	Prodiamine — 0.2% + Sulfentrazone — 0.1%	G
Bonide Sedge Ender Conc.	Bonide Products	Sulfentrazone — 1.36% + Prodiamine — 2.73%	G
Sedge Ender RTS	Bonide Products	Sulfentrazone — 1.36% + Prodiamine — 2.73%	G
Botanical KleenUp Weed & Grass Killer Conc.	Bonide Products	Caprylic acid — 44% + Capric acid — 36%	G
BurnOut formula II Fast Acting Weed and Grass Killer Conc.	Bonide Products	Caprylic acid — 44% + Capric acid — 36%	G
Image Herb. Consumer Conc. South. Lawn Weed Killer for St. Augustinegrass and Centipedegrass Conc.	Central Garden & Pet	2,4-D, diethylamine salt — 1.46% + Penoxsulam — 0.14% + Dicamba, dimethylamine salt — 0.41% + Sulfentrazone — 0.14%	G
Image Herb. Consumer Conc. South. Lawn Weed Killer for St. Augustinegrass and Centipedegrass RTS	Central Garden & Pet	2,4-D, dimethylamine salt — 1.46% + Penoxsulam — 0.14% + Dicamba, dimethylamine salt — 0.41% + Sulfentrazone — 0.14%	G
Pennington Ultragreen Winterizer + W&F Fert. 22-0-14	Central Garden & Pet	Dicamba — 0.071% + 2,4-D, 2-ethylhexyl ester — 1.108% + Mecoprop-P — 0.167%	G
Image Herb. Con. Conc. Lawn Weed & Crabgrass Killer Conc.	Central Garden & Pet	Dicamba, dimethylamine salt — 0.43% + MCPA, dimethylamine salt — 4.78% + Quinclorac — 1.56%	G

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Product	Company	Chemical Content	Use Class
Image Herb. Consumer Conc. Lawn Weed & Crabgrass Killer RTS	Central Garden & Pet	Dicamba, dimethylamine salt — 0.43% + MCPA, dimethylamine salt — 4.78% + Quinclorac — 1.56%	G
Amdro Nutsedge & Crabgrass Killer Conc.	Central Garden & Pet	Sulfentrazone — 1.6% + Quinclorac — 5%	G
Amdro Nutsedge & Crabgrass Killer RTS	Central Garden & Pet	Sulfentrazone — 1.6% + Quinclorac — 5%	G
Image Herb. Consumer Conc. All-in-1 Lawn Weed Killer RTS	Central Garden & Pet	Sulfentrazone — 1.6% + Quinclorac — 5%	G
HomePlate Non-Selective Herb.	Certis USA	Caprylic acid — 44% + Capric acid — 36%	G
Eliminator Lawn Weed Killer RTU	Chemsico	2,4-D, dimethylamine salt — 0.593% + Dicamba, dimethylamine salt — 0.066% + Mecoprop-P — 0.144%	G
Martin's Eraser Max	Cont. Solutions	Glyphosate, isopropylamine salt — 43.68% + Imazapyr, isopropylamine salt — 0.78%	G
NEGATE 37WG	Cont. Solutions	Rimsulfuron — 16.67% + Metsulfuron-methyl — 20%	G
Quali-Pro 2DQ	Cont. Solutions	Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 40% + Dicamba, dimethylamine salt — 4.21% + Quinclorac — 3.3%	G
Quali-Pro 2-D	Cont. Solutions	Triclopyr — 33% + Clopyralid — 12.1%	G
Quali-Pro 3-D	Cont. Solutions	Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 8.17% + Dimethylamine 2,4-dichlorophenoxyacetate — 30.56% + Dicamba, dimethylamine salt — 2.77%	G
QUALI-PRO FAHRENHEIT	Cont. Solutions	Dicamba, sodium salt — 33% + Metsulfuron-methyl — 5%	G
Quali-Pro T/I 2.5 G	Cont. Solutions	Isoxaben — 0.5% + Trifluralin (a,a,a-trifluro-2,6-dinitro-N,N-dipropyl-p-toluidine) (Note: a = alpha) — 2%	G
FM 5050-ES Weed Zapper	Delta foremost Chem.	Bromacil — 1% + Petroleum distillate, oils, solvent, or hydrocarbons; also paraffinic hydrocarbons, aliphatic hydrocarbons, paraffinic oil — 85.45%	G
Sonic	Dow Agrosciences	Cloransulam-methyl — 7.9% + Sulfentrazone — 62.1%	G
Surveil Co-Pack	Dow Agrosciences	Flumioxazin — 51% + Cloransulam-methyl — 84%	G
Snapshot 2.5 TG	Dow Agrosciences	Isoxaben — 0.5% + Trifluralin — 2% + Isoxaben — 0.5% + Trifluralin — 2%	G
Grazon P+D	Dow Agrosciences	Picloram — 10.2% + 2,4-D — 39.6%	R
Crossbow	Dow Agrosciences	2,4-dichlorophenoxyacetic acid, butoxyethyl ester — 34.4% + Triclopyr, butoxyethyl ester — 16.5%	G
Pathway	Dow Agrosciences	Picloram — 5.4% + 2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt — 20.9% + Picloram, triisopropanolamine salt — 5.4% + 2,4-D, triisopropanolamine salt — 20.9%	G
Hornet WDG	Dow Agrosciences	Clopyralid — 60% + Flumetsulam — 18.5%	G
Keystone	Dow Agrosciences	Acetochlor — 32.6% + Atrazine — 24.4%	R
FulTime	Dow Agrosciences	Acetochlor — 24.8% + Atrazine — 16.6%	R
PastureGard	Dow Agrosciences	Fluroxypyr — 8.6% + Triclopyr, butoxyethyl ester — 25%	G
Keystone LA	Dow Agrosciences	Atrazine — 16.3% + Acetochlor — 43.4%	R
Surmount	Dow Agrosciences	Fluroxypyr — 10.64% + Picloram — 13.24%	R
Tordon 101 Mixture	Dow Agrosciences	Picloram — 10.2% + 2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt — 39.6%	R
foreFront R&P	Dow Agrosciences	2,4-Dichlorophenoxyacetic acid — 51.06% + Aminopyralid — 6.58%	G
SureStart	Dow Agrosciences	Acetochlor — 41.67% + Flumetsulam — 1.3% + Clopyralid — 4.27%	G
Capstone	Dow Agrosciences	Triclopyr, triethylamine salt — 16.22% + Aminopyralid — 2.22%	G
Milestone VM Plus	Dow Agrosciences	Triclopyr — 16.22% + Aminopyralid — 2.22%	G
GrazonNext	Dow Agrosciences	Aminopyralid — 6.58% + 2,4-D, triisopropanolammonium salt — 51.06%	G
Chaparral	Dow Agrosciences	Aminopyralid — 62.13% + Metsulfuron-methyl — 9.45%	G
Opensight	Dow Agrosciences	Aminopyralid — 62.13% + Metsulfuron-methyl — 9.45%	G
RebelEX	Dow Agrosciences	Penoxsulam — 2.95% + Cyhalofop-butyl — 21.06%	G
Grasp Xtra	Dow Agrosciences	Penoxsulam — 2.77% + Triclopyr, triethylamine salt — 23.06%	G
RebelEX CA	Dow Agrosciences	Penoxsulam — 2.95% + Cyhalofop-butyl — 21.06%	G
GrazonNext HL	Dow Agrosciences	Aminopyralid — 8.24% + 2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 41.26%	G
PasturAll HL	Dow Agrosciences	2,4-Dichlorophenoxyacetic acid — 44.45% + Aminopyralid — 2%	G
foreFront HL	Dow Agrosciences	Aminopyralid — 8.24% + 2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 41.26%	G
PastureGard HL	Dow Agrosciences	Triclopyr, butoxyethyl ester — 45.07% + Fluroxypyr — 15.56%	G
GF-2727	Dow Agrosciences	Glyphosate — 22.1% + 2,4-Dichlorophenoxyacetic acid — 24.4%	G
Enlist Duo	Dow Agrosciences	2,4-D — 24.4% + Glyphosate — 22.1%	G
Enlist Duo-State RUP Amended Section 3 Label	Dow Agrosciences	2,4-D — 24.4% + Glyphosate — 22.1%	R
Graslan L	Dow Agrosciences	Picloram — 14.44% + 2,4-D — 43.62%	R
Quelex	Dow Agrosciences	Halauxifen-methyl — 10.4% + Florasulam — 10%	G
FulTime NXT	Dow Agrosciences	Atrazine — 14.5% + Acetochlor — 29%	R
Turflon D	Dow Agrosciences	Triclopyr, butoxyethyl ester — 16.5% + 2,4-dichlorophenoxyacetic acid, butoxyethyl ester — 34.4%	G
Keystone LA NXT	Dow Agrosciences	Acetochlor — 46.3% + Atrazine — 18.3%	R
Reply LITE	Dow Agrosciences	Acetochlor — 46.3% + Atrazine — 18.3%	R
Keystone NXT	Dow Agrosciences	Atrazine — 26.9% + Acetochlor — 33.4%	R
Reply ATZ Herb.	Dow Agrosciences	Atrazine — 26.9% + Acetochlor — 33.4%	R
GF-2726 SR	Dow Agrosciences	Glyphosate — 22.1% + 2,4-Dichlorophenoxyacetic acid — 24.4%	G

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Product	Company	Chemical Content	Use Class
SureStart II	Dow Agrosciences	Flumetsulam — 1.3% + Clopyralid, monoethanolamine salt — 4.27% + Acetochlor — 41.67%	G
TriChargX	Dow Agrosciences	Flumetsulam — 1.3% + Acetochlor — 41.67% + Clopyralid — 4.27%	G
Sonic	Dow Agrosciences	Sulfentrazone — 62.1% + Cloransulam-methyl — 7.9%	G
Surveil	Dow Agrosciences	Cloransulam-methyl — 12% + Flumioxazin — 36%	G
Resicore	Dow Agrosciences	Mesotrione — 3.3% + Acetochlor — 31.3% + Clopyralid, monoethanolamine salt — 2.7%	G
GF-3565	Dow Agrosciences	Penoxsulam — 2.1% + Florpyrauxifen-benzyl — 1.3%	G
Cleantraxx	Dow Agrosciences	Oxyfluorfen — 40.31% + Penoxsulam — 0.85%	G
GameOn	Dow Agrosciences	Fluroxypyr meptyl — 4.3% + 2,4-D, Choline salt — 32% + Halauxifen-methyl — 0.21%	G
NativeKlean	Dow Agrosciences	Triisopropanolamine salt of aminopyralid — 8.24% + 2,4-Dichlorophenoxyacetic acid — 41.26%	G
TerraVue	Dow Agrosciences	Aminopyralid-potassium — 71.01% + Florpyrauxifen-benzyl — 6%	G
DuraCor	Dow Agrosciences	Aminopyralid-potassium — 8.95% + Florpyrauxifen-benzyl — 0.76%	G
Crew	Dow Agrosciences	Isoxaben — 0.5% + Dithiopyr — 0.25%	G
Confront	Dow Agrosciences	Clopyralid — 12.1% + Triclopyr, triethylamine salt — 33%	G
Drexel Simazat 4L	Drexel Chem.	Simazine — 21.41% + Atrazine — 21.03%	R
Drexel Trizmet II	Drexel Chem.	Atrazine — 33.1% + Metolachlor — 26.1%	R
Drexel Imitator + 2,4-D	Drexel Chem.	Glyphosate, isopropylamine salt — 12.9% + 2,4-Dichlorophenoxyacetic acid, isopropanolamine salt — 20.6%	G
Drexel Trizmet Lite	Drexel Chem.	Atrazine — 17% + Metolachlor — 13.2%	R
Drexel Up-Front Herb.	Drexel Chem.	Metolachlor — 46.4% + Fomesafen Sodium — 10.2%	G
Drexel Fomasate Herb.	Drexel Chem.	Fomesafen Sodium — 5.88% + Glyphosate, isopropylamine salt — 22.4%	G
Dicamba De-Amine Herb.	Drexel Chem.	Dimethylamine 2,4-dichlorophenoxyacetate — 35.7% + Dicamba, dimethylamine salt — 12.4%	G
Drexel Trizar Herb.	Drexel Chem.	Atrazine — 18.61% + Mesotrione — 2.44% + Metolachlor — 19%	R
Drexel Mes-O-Sate Herb.	Drexel Chem.	Glyphosate — 20.5% + Mesotrione — 2.05% + Metolachlor — 20.5%	G
DuPont Canopy Herb.	DuPont	Chlorimuron-ethyl — 10.7% + Metribuzin — 64.3%	G
DuPont Finesse Herb.	DuPont	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%	G
Harmony Extra Herb.	DuPont	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%	G
DuPont Basis Herb.	DuPont	Thifensulfuron methyl — 25% + Rimsulfuron — 50%	G
DuPont Steadfast Herb.	DuPont	Nicosulfuron — 50% + Rimsulfuron — 25%	G
DuPont Harmony Extra XP Herb.	DuPont	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%	G
DuPont Cinch ATZ Lite Herb.	DuPont	Atrazine — 28.1% + S-Metolachlor — 35.8%	R
DuPont Cinch ATZ Herb.	DuPont	S-Metolachlor — 26% + Atrazine — 33%	R
DuPont Canopy EX Herb.	DuPont	Chlorimuron-ethyl — 22.7% + Tribenuron-methyl — 6.8%	G
DuPont Synchrony XP Herb.	DuPont	Thifensulfuron methyl — 6.9% + Chlorimuron-ethyl — 21.5%	G
DuPont Harmony Extra Herb. (w/ TotalSol SG)	DuPont	Thifensulfuron methyl — 33.33% + Tribenuron-methyl — 16.67%	G
DuPont Harmony Extra SG Herb. (w/ TotalSol SG)	DuPont	Thifensulfuron methyl — 33.33% + Tribenuron-methyl — 16.67%	G
DuPont Finesse Grass & Broadleaf Herb.	DuPont	Flucarbazone-sodium — 46.7% + Chlorsulfuron — 25%	G
DuPont FirstShot SG Burndown Herb. (w/ TotalSol SG)	DuPont	Tribenuron-methyl — 25% + Thifensulfuron methyl — 25%	G
DuPont Envive Herb.	DuPont	Thifensulfuron methyl — 2.9% + Flumioxazin — 29.2% + Chlorimuron-ethyl — 9.2%	G
DuPont Herb. 770 SB	DuPont	Thifensulfuron methyl — 2.9% + Flumioxazin — 29.2% + Chlorimuron-ethyl — 9.2%	G
DuPont Enlite Herb.	DuPont	Chlorimuron-ethyl — 2.85% + Flumioxazin — 36.21% + Thifensulfuron methyl — 8.8%	G
DuPont Herb. 780 SB	DuPont	Chlorimuron-ethyl — 2.85% + Flumioxazin — 36.21% + Thifensulfuron methyl — 8.8%	G
DuPont Steadfast Q Herb.	DuPont	Nicosulfuron — 25.2% + Rimsulfuron — 12.5%	G
DuPont Resolve Q Herb.	DuPont	Rimsulfuron — 18.4% + Thifensulfuron methyl — 4%	G
DuPont Prequel Herb.	DuPont	Isoxaflutole — 30% + Rimsulfuron — 15%	R
DuPont Finesse Cereal and Fallow Herb.	DuPont	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%	G
DuPont Realm Q Herb.	DuPont	Rimsulfuron — 7.5% + Mesotrione — 31.25%	G
DuPont LeadOff Herb.	DuPont	Thifensulfuron methyl — 16.7% + Rimsulfuron — 16.7%	G
DuPont Basis Blend Herb.	DuPont	Rimsulfuron — 20% + Thifensulfuron methyl — 10%	G
DuPont Diligent Herb.	DuPont	Rimsulfuron — 6.31% + Flumioxazin — 25.25% + Chlorimuron-ethyl — 6.31%	G
DuPont Instigate Herb.	DuPont	Rimsulfuron — 4.17% + Mesotrione — 41.67%	G
DuPont Panoflex Herb.	DuPont	Tribenuron-methyl — 40% + Thifensulfuron methyl — 10%	G
DuPont Canopy Blend Herb.	DuPont	Chlorimuron-ethyl — 8.3% + Metribuzin — 50%	G
DuPont Herb. 800 SB	DuPont	Metribuzin — 44.6% + Chlorimuron-ethyl — 3.9% + Flumioxazin — 12.8%	G
DuPont Trivence Herb.	DuPont	Metribuzin — 44.6% + Chlorimuron-ethyl — 3.9% + Flumioxazin — 12.8%	G
DuPont Afforia Herb.	DuPont	Flumioxazin — 40.8% + Thifensulfuron methyl — 5% + Tribenuron-methyl — 5%	G
DuPont Herb. 790 SB	DuPont	Flumioxazin — 40.8% + Thifensulfuron methyl — 5% + Tribenuron-methyl — 5%	G
DuPont Breakfree NXT ATZ Herb.	DuPont	Atrazine — 26.9% + Acetochlor — 33.4%	R

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Product	Company	Chemical Content	Use Class
DuPont Breakfree NXT Lite Herb.	DuPont	Atrazine — 18.3% + Acetochlor — 46.3%	R
DuPont Sentrallas Herb.	DuPont	Fluroxypyr — 21.9% + Thifensulfuron methyl — 3%	G
DuPont Revulin Q Herb.	DuPont	Mesotrione — 36.8% + Nicosulfuron — 14.4%	G
DuPont Cansio Herb.	DuPont	Thifensulfuron methyl — 7.1% + Tribenuron-methyl — 3.6% + Metribuzin — 64.3%	G
Gemini 3.7 SC	Everris NA	Isoxaben — 15.5% + Prodiamine — 23.3%	G
OH2 Orn. Herb.	Everris NA	Oxyfluorfen — 2% + Pendimethalin — 1%	G
Gemini Granular	Everris NA	Isoxaben — 0.25% + Prodiamine — 0.4%	G
Rout Orn. Herb.	Everris NA	Oxyfluorfen — 2% + Oryzalin — 1%	G
Authority First DF Herb.	FMC	Sulfentrazone — 62.1% + Cloransulam-methyl — 7.9%	G
Echelon 4SC Herb.	FMC	Sulfentrazone — 13.6% + Prodiamine — 27.3%	G
Authority Assist Herb.	FMC	Sulfentrazone — 33.33% + Imazethapyr — 6.67%	G
Spartan Charge Herb.	FMC	Sulfentrazone — 31.77% + Carfentrazone-ethyl — 3.53%	G
Zeus Prime XC Herb.	FMC	Carfentrazone-ethyl — 3.53% + Sulfentrazone — 31.77%	G
Authority MTZ DF Herb.	FMC	Sulfentrazone — 18% + Metribuzin — 27%	G
Dismiss South Herb.	FMC	Sulfentrazone — 33.33% + Imazethapyr — 6.67%	G
Solitare Herb.	FMC	Quinclorac — 56.25% + Sulfentrazone — 18.75%	G
Broadhead Herb.	FMC	Quinclorac — 66.1% + Carfentrazone-ethyl — 3.9%	G
Dismiss NXT Herb.	FMC	Carfentrazone-ethyl — 3.53% + Sulfentrazone — 31.77%	G
Obey Herb.	FMC	Quinclorac — 13.2% + Clomazone — 13.2%	G
Blindside Herb.	FMC	Sulfentrazone — 60% + Metsulfuron-methyl — 6%	G
Authority XL Herb.	FMC	Sulfentrazone — 62.22% + Chlorimuron-ethyl — 7.78%	G
Authority Elite Herb.	FMC	Sulfentrazone — 7.55% + S-Metolachlor — 68.25%	G
Spartan Elite Herb.	FMC	Sulfentrazone — 7.55% + S-Metolachlor — 68.25%	G
Anthem ATZ Herb.	FMC	Atrazine — 42.5% + Pyroxasulfone — 5.15% + Fluthiacet-methyl — 0.15%	R
Anthem Herb.	FMC	Pyroxasulfone — 22.61% + Fluthiacet-methyl — 0.69%	G
Marvel Herb.	FMC	Fomesafen — 30.08% + Fluthiacet-methyl — 1.2%	G
Solstice Herb.	FMC	Fluthiacet-methyl — 2.2% + Mesotrione — 38.52%	G
Anthem Flex Herb.	FMC	Carfentrazone-ethyl — 2.65% + Pyroxasulfone — 37.1%	G
Anthem Maxx Herb.	FMC	Pyroxasulfone — 45.22% + Fluthiacet-methyl — 1.38%	G
Solitare WSL Herb.	FMC	Sulfentrazone — 1.6% + Quinclorac — 5%	G
Nimble Herb.	FMC	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%	G
Report Extra Herb.	FMC	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%	G
Edition Broadspec Herb.	FMC	Thifensulfuron methyl — 25% + Tribenuron-methyl — 25%	G
Edition Tank Mix Herb.	FMC	Tribenuron-methyl — 10% + Thifensulfuron methyl — 40%	G
Crusher Herb.	FMC	Thifensulfuron methyl — 25% + Rimsulfuron — 25%	G
Authority Supreme Herb.	FMC	Pyroxasulfone — 20.66% + Sulfentrazone — 20.66%	G
Authority Maxx Herb.	FMC	Sulfentrazone — 62.12% + Chlorimuron-ethyl — 3.88%	G
Harmony Extra SG Herb. (w/ Totalsol SG)	FMC	Thifensulfuron methyl — 33.33% + Tribenuron-methyl — 16.67%	G
FirstShot SG Burndown Herb. (w/ Totalsol SG)	FMC	Tribenuron-methyl — 25% + Thifensulfuron methyl — 25%	G
Finesse Cereal and Fallow Herb.	FMC	Metsulfuron-methyl — 12.5% + Chlorsulfuron — 62.5%	G
Panoflex Herb. (w/ Totalsol SG)	FMC	Thifensulfuron methyl — 10% + Tribenuron-methyl — 40%	G
Sentrallas Herb.	FMC	Thifensulfuron methyl — 3% + Fluroxypyr — 21.9%	G
T-Square Herb.	FMC	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%	G
Authority Edge Herb.	FMC	Pyroxasulfone — 14.77% + Sulfentrazone — 26.44%	G
Stanza Herb.	FMC	Flumetsulam — 18.5% + Clopyralid potassium — 60%	G
Permit + Herb.	Gowan Company	Halosulfuron-methyl — 67% + Thifensulfuron methyl — 8%	G
Gambit Herb.	Gowan Company	Prosulfuron — 29% + Halosulfuron-methyl — 50%	G
Yukon Herb.	Gowan Company	Sodium salt of 3,6-dichloro-o-anisic acid — 55% + Halosulfuron-methyl — 12.5%	G
Eliminator Weed & Grass Killer III RTU	Gro Tec	Glyphosate, isopropylamine salt — 2% + Pelargonic acid — 2%	G
KnockOut Weed & Grass Killer II RTU	Gro Tec	Glyphosate, isopropylamine salt — 2% + Pelargonic acid — 2%	G
Expert Gardener South. W&F II [18-0-18]	Gro Tec	Sulfentrazone — 0.02% + Penoxsulam — 0.02%	G
Expert Gardener W&F III [28-0-3]	Gro Tec	Mecoprop-P — 0.167% + 2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071%	G
GroundWork W&F Lawn Fert. II [28-0-4]	Gro Tec	Mecoprop — 0.167% + 2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071%	G
Expert Gardener Triple Action Lawn Care [18-0-1]	Gro Tec	Dicamba — 0.06% + 2,4-D — 0.675% + Dithiopyr — 0.121% + Quinclorac — 0.346%	G
Eliminator Total Veg. Killer Conc.	Gro Tec	Imazapyr — 0.089% + Glyphosate — 5.03%	G
Eliminator Weed & Grass Killer + Conc.	Gro Tec	Diquat dibromide — 0.73% + Glyphosate, isopropylamine salt — 18%	G
KnockOut Weed & Grass Killer Fast Acting Conc.	Gro Tec	Diquat dibromide — 0.73% + Glyphosate, isopropylamine salt — 18%	G
Tyrant Herb.	Helena Agri-Enterprises	S-Metolachlor — 58.2% + Metribuzin — 13.8%	G
Centrus	Helena Agri-Enterprises	Indaziflam — 24.3% + Rimsulfuron — 16.67%	G
On Deck	Helena Agri-Enterprises	Dicamba — 10.8% + 2,4-Dichlorophenoxyacetic acid — 24.16%	G
LATIGO	Helena Agri-Enterprises	2,4-Dichlorophenoxyacetic acid — 24.62% + Dicamba — 18.28%	G
OUTLAW	Helena Agri-Enterprises	Dicamba — 12.18% + 2,4-Dichlorophenoxyacetic acid — 24.28%	G
CROSSBOW	Helena Agri-Enterprises	Triclopyr — 16.5% + 2,4-Dichlorophenoxyacetic acid — 34.4%	G
SHOWDOWN	Helena Agri-Enterprises	Glyphosate, isopropylamine salt — 37.54% + Glyphosate, ammonium salt — 3.42%	G
Antares Prime	Helena Agri-Enterprises	Cloransulam-methyl — 3.96% + Sulfentrazone — 39.6%	G
Zone Herb.	Helm Agro US	Sulfentrazone — 62.2% + Chlorimuron — 7.8%	G

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Product	Company	Chemical Content	Use Class
Argos Ultra	Helm Agro US	Mesotrione — 4% + Metolachlor — 45%	G
Zone Assist	Helm Agro US	Imazethapyr — 6.67% + Sulfentrazone — 33.33%	G
Zone Elite	Helm Agro US	Metolachlor — 68.25% + Sulfentrazone — 7.55%	G
Fearless Xtra Herb.	Helm Agro US	Atrazine — 18.3% + Acetochlor — 46.3%	R
Extreme Packaged by Helm	Helm Agro US	Glyphosate, isopropylamine salt — 22% + Imazethapyr — 1.8%	G
Fearless Xtra 5.6L Herb.	Helm Agro US	Atrazine — 26.9% + Acetochlor — 33.4%	R
1117 Hilco-X	Hill Manufacturing	Bromacil — 0.61% + 2,4-D, isooctyl ester — 1.09%	G
VARSITY D	Innvictis Crop Care	2,4-Dichlorophenoxyacetic acid — 38.87% + Flumioxazin — 2.53%	G
VANDAL XL	Innvictis Crop Care	Sulfentrazone — 62.2% + Chlorimuron-ethyl — 7.8%	G
VILLAIN	Innvictis Crop Care	Metolachlor — 36.8% + Mesotrione — 3.68%	G
CIVILITY EXTRA	Innvictis Crop Care	Tribenuron-methyl — 25% + Thifensulfuron methyl — 50%	G
Envy Six Max	Innvictis Crop Care	Potassium salt of glyphosate — 22.99% + Glyphosate, isopropylamine salt — 30.94%	G
VICE	Innvictis Crop Care	Metolachlor — 48.26% + Sodium salt of fomesafen — 10.3%	G
VISOR ATZ	Innvictis Crop Care	Atrazine — 33.1% + Metolachlor — 26.1%	R
GALVAN	Innvictis Crop Care	Metolachlor — 57.64% + Metribuzin — 14.13%	G
Veritas D	Innvictis Crop Care	2,4-D, dimethylamine salt — 36% + Dicamba, dimethylamine salt — 12.5%	G
VANDAL IMI	Innvictis Crop Care	Sulfentrazone — 33.33% + Imazethapyr — 6.67%	G
STAVE PRO	Innvictis Crop Care	Clopyralid, monoethanolamine salt — 11.3% + Fluroxypyr 1-methylheptyl ester — 12.3%	G
VANDAL S-MOC HERB.	Innvictis Crop Care	S-Metolachlor — 68.25% + Sulfentrazone — 7.55%	G
SP 3WAY Broadleaf Herb.	J. R. Simplot Co.	Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 30.89% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 8.23% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 2.77%	G
Safergro Weedzap	JH Biotech	Clove, Crushed — 45% + Cinnamon — 45%	25(B)
Weed Zap	JH Biotech	Clove, Crushed — 45% + Cinnamon — 45%	25(B)
EcoSmart — The Safe Pesticide Brand Weed & Grass Killer	Kittrich	Sodium lauryl sulfate — 0.06% + Rosemary oil — 1%	25(B)
Green Thumb W&F 28-0-3	Knox Fert. Co.	Dicamba — 0.071% + 2,4-D, 2-ethylhexyl ester — 1.108% + Mecoprop-P — 0.167%	G
Gro Fine Fall W&F 28-0-6	Knox Fert. Co.	Dicamba — 0.071% + 2,4-D, 2-ethylhexyl ester — 1.108% + Mecoprop-P — 0.167%	G
Weed Whacker	Lawn and Garden Prod.	MCPA (and salts and esters) — 2.3% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 2.26% + 2,4-Dichlorophenoxyacetic acid — 4.55%	G
Weed Whacker Jet Spray	Lawn and Garden Prod.	2,4-D, amine salt — 0.326% + Dichlorprop-P — 0.161% + Mecoprop-P — 0.164%	G
Spurge Power	Lawn and Garden Prod.	Triclopyr, butoxyethyl ester — 0.5% + Dicamba — 3.6% + MCPA (and salts and esters) — 56.14%	G
Monterey Remuda Ext. Cont.	Lawn and Garden Prod.	Prodiamine — 7.51% + Glyphosate, isopropylamine salt — 40.15%	G
CRAB-E-RAD PLUS	Lawn and Garden Prod.	2,4-D — 6.557% + Quinclorac — 4.085% + Dicamba — 0.681%	G
Wither LVP Non-Selective Weed Killer	Lawson Prod.	Isooctyl 2,4-dichlorophenoxyacetate — 1.09% + Bromacil — 0.61%	G
Preen Lawn Weed Cont. + Crabgrass Prev.	Lebanon Seaboard	Dithiopyr — 0.16% + Mecoprop-P — 0.14% + 2,4-D — 0.64% + Dicamba — 0.06%	G
Preen Mulch w/ Ext. Cont. Weed Prev.	Lebanon Seaboard	Trifluralin — 0.0032% + Isoxaben — 0.0008%	G
Preen Mulch w/ Ext. Cont. Weed Prev.	Lebanon Seaboard	Trifluralin — 0.0032% + Isoxaben — 0.0008%	G
Preen Lawn Weed Cont.	Lebanon Seaboard	(R)-2-(2,4-Dichlorophenoxy)propionic acid — 0.31% + 2,4-Dichlorophenoxyacetic acid — 1.37% + Dicamba — 0.13%	G
Preen Ext. Cont. Weed Prevention	Lebanon Seaboard	Isoxaben — 0.375% + Trifluralin — 1.5%	G
Preen Weed Prev. + Ant, Flea & Tick Cont.	Lebanon Seaboard	Dithiopyr — 0.27% + Bifenthrin — 0.11%	G
Lesco Three-Way Selective Herb.	Lesco	Mecoprop — 8.17% + 2,4-Dichlorophenoxyacetic acid — 30.56% + Dicamba — 2.77%	G
Lesco Eliminate-D Herb.	Lesco	Dimethoxane — 2.64% + 2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 6.61% + MCPA, dimethylamine salt — 9.97%	G
Lesco Momentum 4-Score Herb. (702459)	Lesco	2,4-D, diethylamine salt — 14.99% + Sulfentrazone — 0.87% + Triclopyr — 4.01% + Fluroxypyr meptyl — 4.46%	G
Lesco Prosecutor Prolong	Lesco	Glyphosate, isopropylamine salt — 3.82% + Imazapyr, isopropylamine salt — 1.74%	G
Lesco ELIMINATE Q W&F	Lesco	Dicamba — 0.06% + 2,4-D — 0.675% + Quinclorac — 0.346%	G
Lesco Three-Way Selective Spot Weeder	Lesco	MCPP-p, DMA salt — 0.164% + 2,4-DP-p, DMA salt — 0.161% + 2,4-D, dimethylamine salt — 0.326% +	G
Lesco W&F 18-2-3M (701005)	Lesco	Dichlorprop-P — 0.143% + 2,4-D — 0.56% + Mecoprop-P — 0.145%	G
Lesco Eliminate Liquid Herb.	Lesco	Dicamba — 4.82% + MCPA — 48.99% + Triclopyr — 5.59%	G
Lesco Three-Way Ester II Herb.	Lesco	MCPA — 56.14% + Dicamba — 3.6% + Triclopyr — 5%	G
Lesco Eliminate LO Herb.	Lesco	Dicamba — 2.3% + 2,4-D — 47.33% + Mecoprop-P — 8.17%	G
Lesco Momentum FX2 Herb.	Lesco	2,4-D — 44.2% + Triclopyr — 3.86% + Fluroxypyr — 4.2%	G
Lesco Echelon 0.30% + Fert. 11-0-5 (702125)	Lesco	Prodiamine — 0.2% + Sulfentrazone — 0.1%	G
Lesco LockUp Extra 2 w/ Fert. 0-0-4M (702187)	Lesco	Penoxsulam — 0.01% + Dicamba — 0.08% + 2,4-Dichlorophenoxyacetic acid — 1.04%	G
Makaze Yield Pro	Loveland Prod.	Cytokinin (as kinetin) — 0.0088% + Glyphosate, isopropylamine salt — 41% + IBA — 0.05%	G

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Slider ATZ	Loveland Prod.	Atrazine — 35.3% + dimethenamide-P — 18.2%	R
Slider ATZ Lite	Loveland Prod.	dimethenamide-P — 24.1% + Atrazine — 29.5%	R
Matador	Loveland Prod.	Metribuzin — 6.14% + Metolachlor — 43.72% + Imazethapyr — 1.38%	G
Intimidator	Loveland Prod.	Fomesafen — 7.16% + Metribuzin — 8.05% + S-Metolachlor — 36.29%	G
Matador-S	Loveland Prod.	Metribuzin — 8.23% + Imazethapyr — 1.83% + Metolachlor — 37.08%	G
Cadence* ATZ NXT Herb.	Loveland Prod.	Acetochlor — 33.4% + Atrazine — 26.9%	R
Cadence* LA NXT Herb.	Loveland Prod.	Atrazine — 18.3% + Acetochlor — 46.3%	R
Dog Fight	Loveland Prod.	Glyphosate — 22% + Imazethapyr — 1.8%	G
Double Header Herb.	Loveland Prod.	Acetochlor — 35% + Mesotrione — 4.1%	G
PRE-Tector + EC Herb.	Loveland Prod.	Pendimethalin — 30.24% + Imazethapyr — 2.24%	G
Mec Amine-D	Loveland Prod.	Mecoprop-P — 8.17% + Dicamba — 2.77% + 2,4-D, amine salt — 30.56%	G
Weed Blast Residual Weed Cont.	Loveland Prod.	Bromacil — 4% + Diuron — 4%	G
Strategy	Loveland Prod.	Ethalfluralin — 18.2% + Clomazone — 5.6%	G
Rifle-D Herb.	Loveland Prod.	Dicamba — 12.4% + 2,4-D, amine salt — 35.7%	G
Chaser Turf Herb.	Loveland Prod.	2,4-dichlorophenoxyacetic acid, butoxyethyl ester — 34.4% + Triclopyr, butoxyethyl ester — 16.5%	G
Chaser 2 Amine	Loveland Prod.	2,4-D, amine salt — 34.2% + Triclopyr — 15.2%	G
Tailspin Herb.	Loveland Prod.	Triclopyr — 16.1% + Fluroxypyr — 5.6%	G
Prep-It Herb.	Loveland Prod.	Imazapyr — 8.36% + N-(Phosphonomethyl)glycine, isopropylamine salt — 22.13%	G
Crossbow L Herb.	Loveland Prod.	Triclopyr, butoxyethyl ester — 16.5% + 2,4-dichlorophenoxyacetic acid, butoxyethyl ester — 34.4%	G
Pramitol 5PS Pelleted Herb.	Loveland Prod.	Sodium metaborate (NaBO2) — 40.78% + Prometon — 5% + Sodium chlorate — 39.8%	G
Catamaran	Luxembourg-pamol	Phosphorous acid — 38.9% + Chlorothalonil — 16.7%	G
One Step	Momar	Isooctyl 2,4-dichlorophenoxyacetate — 1.09% + Bromacil — 0.98%	G
Confidence Xtra Herb.	Monsanto	Acetochlor — 46.3% + Atrazine — 18.3%	R
Harness Xtra Herb.	Monsanto	Acetochlor — 46.3% + Atrazine — 18.3%	R
Confidence Xtra 5.6L Herb.	Monsanto	Atrazine — 26.9% + Acetochlor — 33.4%	R
Harness Xtra 5.6L Herb.	Monsanto	Atrazine — 26.9% + Acetochlor — 33.4%	R
Degree Xtra Herb.	Monsanto	Atrazine — 14.5% + Acetochlor — 29%	R
Roundup QuikPRO Herb.	Monsanto	Glyphosate, ammonium salt — 73.3% + Diquat dibromide — 2.9%	G
TripleFLEX II Herb.	Monsanto	Clopyralid, monoethanolamine salt — 4.27% + Flumetsulam — 1.3% + Acetochlor — 41.67%	G
Roundup XTEND w/ VaporGrip Tech.	Monsanto	Dicamba, diglycoamine salt — 14.5% + Glyphosate ethanolamine salt — 29.2%	G
Warrant Ultra Herb.	Monsanto	Acetochlor — 30.2% + Fomesafen Sodium — 7.1%	G
Harness MAX Herb.	Monsanto	Acetochlor — 39.1% + Mesotrione — 3.7%	G
Rowel FX Herb.	Monsanto	Flumioxazin — 30% + Chlorimuron-ethyl — 10.3%	G
Roundup Weed & Grass Killer Conc. Plus	Monsanto	Diquat dibromide — 0.73% + Glyphosate, isopropylamine salt — 18%	G
Roundup RTU Weed & Grass Killer III	Monsanto	Pelargonic acid — 2% + Glyphosate, isopropylamine salt — 2%	G
Roundup RTU Poison Ivy + Tough Brush Killer	Monsanto	Triethylamine triclopyr — 0.1% + Glyphosate, isopropylamine salt — 1%	G
Roundup Conc. Poison Ivy + Tough Brush Killer	Monsanto	Glyphosate, isopropylamine salt — 18% + Triethylamine triclopyr — 2%	G
Roundup Conc. Ext. Cont. Weed & Grass Killer + Weed Prev.	Monsanto	Diquat dibromide — 0.73% + Glyphosate, isopropylamine salt — 18% + Imazapic-ammonium — 0.3%	G
Roundup RTU Ext. Cont. Weed & Grass Killer + Weed Prev. II	Monsanto	Glyphosate, isopropylamine salt — 1% + Pelargonic acid — 2% + Imazapic-ammonium — 0.017%	G
Roundup Conc. Max Cont. 365	Monsanto	Imazapic-ammonium — 1.6% + Glyphosate, isopropylamine salt — 18% + Diquat dibromide — 0.73%	G
Roundup RTU Max Cont. 365	Monsanto	Diquat dibromide — 0.04% + Glyphosate, isopropylamine salt — 1% + Imazapic-ammonium — 0.08%	G
Roundup RTU Weed & Grass Killer + FastAct Select	Monsanto	Diquat dibromide — 0.11% + Glyphosate, isopropylamine salt — 2%	G
Roundup Conc. Weed & Grass Killer + FastAct Select	Monsanto	Diquat dibromide — 2.25% + Glyphosate, isopropylamine salt — 41%	G
Roundup Precision Gel Weed & Grass Killer	Monsanto	Glyphosate, isopropylamine salt — 1% + Pelargonic acid — 2%	G
Roundup EasyMix Dry Conc. Weed & Grass Killer	Monsanto	Glyphosate, ammonium salt — 73.3% + Diquat dibromide — 2.9%	G
STRADA XT2 Herb.	Nichino America	Orthosulfamuron — 10% + 3,7-Dichloro-8-quinolinecarboxylic acid — 60%	G
Strada Pro	Nichino America	Halosulfuron-methyl — 11.92% + Orthosulfamuron — 42.05%	G
Patron170	Nufarm Americas	2,4-DP-p — 16.1% + 2,4-Dichlorophenoxyacetic acid — 32.1%	G
Triamine	Nufarm Americas	2,4-DP-p — 8.1% + MCPP-p, DMA salt — 8.2% + 2-4,D — 16.3%	G
Dibro 2+2	Nufarm Americas	Bromacil — 2% + Diuron — 2%	G
Tri-Power Selective Herb.	Nufarm Americas	Mecoprop-P — 7.99% + Dicamba, dimethylamine salt — 3.97% + MCPA, dimethylamine salt — 40.42%	G
Veteran 720 Herb.	Nufarm Americas	2,4-Dichlorophenoxyacetic acid — 24.58% + Dicamba — 12.82%	G
Primera Triplet SF	Nufarm Americas	Dicamba — 2.77% + 2,4-D — 30.56% + Mecoprop-P — 8.17%	G
Triplet SF Selective Herb.	Nufarm Americas	2,4-D — 30.56% + Dicamba — 2.77% + Mecoprop-P — 8.17%	G
Horsepower Selective Herb.	Nufarm Americas	MCPA — 48.99% + Triclopyr — 5.59% + Dicamba — 4.82%	G
Aquasweep	Nufarm Americas	Triclopyr — 15.2% + 2,4-Dichlorophenoxyacetic acid — 34.2%	G
Cool Power Selective Herb.	Nufarm Americas	Triclopyr — 5% + MCPA, isooctyl ester — 56.14% + Dicamba — 3.6%	G
Millennium Ultra 2	Nufarm Americas	Dicamba — 4.65% + 2,4-D — 37.32% + Clopyralid — 2.54%	G
Dibro 4 + 2	Nufarm Americas	Diuron — 4% + Bromacil — 2%	G

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Progeny Herb.	Nufarm Americas	Dicamba — 3.6% + MCPA, isooctyl ester — 51.46% + Triclopyr — 5%	G
Triplet Low Odor Premium Selective Herb.	Nufarm Americas	Dicamba — 2.3% + 2,4-D — 47.33% + Mecoprop-P — 8.17%	G
E-2 Herb.	Nufarm Americas	Fluroxypyr — 5.9% + 2,4-D — 39.53% + Dicamba — 4.1%	G
Escalade 2	Nufarm Americas	Fluroxypyr — 5.9% + 2,4-D — 39.53% + Dicamba — 4.1%	G
Change Up Selective Herb.	Nufarm Americas	Dicamba — 4.17% + MCPA, diethanolamine salt — 51.05% + Fluroxypyr — 6%	G
Razor Burn	Nufarm Americas	Diquat dibromide — 2.1% + Glyphosate, isopropylamine salt — 41%	G
ProDeuce	Nufarm Americas	Glyphosate, isopropylamine salt — 40.15% + Prodiamine — 7.51%	G
Trooper P+D Herb.	Nufarm Americas	2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt — 39.6% + Picloram — 10.2%	R
Lesco Momentum Q Herb.	Nufarm Americas	2,4-D — 13.24% + Dicamba — 1.38% + Quinclorac — 8.25%	G
Quincept Herb.	Nufarm Americas	2,4-D — 13.24% + Dicamba — 1.38% + Quinclorac — 8.25%	G
TruPower3 Selective Herb.	Nufarm Americas	Mecoprop-P — 7.74% + Dicamba — 3.2% + 2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt — 47.77%	G
Candor Herb.	Nufarm Americas	2,4-dichlorophenoxyacetic acid, butoxyethyl ester — 34.4% + Triclopyr, butoxyethyl ester — 16.5%	G
Lesco RedZone 2 Herb.	Nufarm Americas	Dicamba — 2.52% + Pyraflufen-ethyl — 0.06% + 2,4-D — 38.03% + Mecoprop-P — 6.31%	G
4-Speed XT Selective Herb.	Nufarm Americas	2,4-D — 41.92% + Dicamba — 3.46% + Pyraflufen-ethyl — 0.067% + Triclopyr — 4.81%	G
Nufarm Double O SPC Herb.	Nufarm Americas	Oxyfluorfen — 2% + Oryzalin — 1%	G
Nufarm Imazuron Herb.	Nufarm Americas	Imazapyr — 7.78% + Diuron — 62.22%	G
Spyder Extra Selective Herb.	Nufarm Americas	Sulfometuron methyl — 56.25% + Metsulfuron-methyl — 15%	G
Last Call Selective Herb.	Nufarm Americas	Dicamba — 2.7% + Fluroxypyr — 3.89% + Fenoxaprop-p-ethyl — 2.7%	G
Sure Power	Nufarm Americas	Flumioxazin — 0.22% + Fluroxypyr 1-methylheptyl ester — 3.63% + Butoxyethyl triclopyr — 3.63% + 2-Ethylhexyl (2,4-dichlorophenoxy)acetate — 36.33%	G
Lazer MC	Nufarm Limited	2-4,D — 54.18% + Dicamba — 2.32% + Mecoprop dimethylamine salt — 13.31%	G
Roughneck	Nufarm	Glyphosate, isopropylamine salt — 37.54% + Glyphosate, ammonium salt — 3.42%	G
Treaty Extra Herb.	Nufarm	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%	G
Rapport TankMix Herb.	Nufarm	Tribenuron-methyl — 10% + Thifensulfuron methyl — 40%	G
Credit Xtreme Herb.	Nufarm	Potassium salt of glyphosate — 22.99% + Glyphosate, isopropylamine salt — 30.94%	G
Cloak EX Herb.	Nufarm	Tribenuron-methyl — 6.8% + Chlorimuron-ethyl — 22.7%	G
BURNMASTER HERB.	Nufarm	2,4-Dichlorophenoxyacetic acid — 49.64% + Dicamba — 10.73%	G
Spitfire Herb.	Nufarm	Dicamba — 5.44% + 2,4-Dichlorophenoxyacetic acid — 50.31%	G
Depth Charge	Nufarm	2,4-D — 38.87% + Flumioxazin — 2.53%	G
Scorch	Nufarm	Fluroxypyr 1-methylheptyl ester — 11.27% + 2-Ethylhexyl (2,4-dichlorophenoxy)acetate — 47.51% + Dicamba — 10.43%	G
Panther Pro Herb.	Nufarm	Metribuzin — 31.83% + Flumioxazin — 7.11% + Ammonium salt of imazaquin — 6.02%	G
Weedmaster Herb.	Nufarm	Dicamba, dimethylamine salt — 12.4% + 2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 35.7%	G
Rapport BroadSpec Herb.	Nufarm	Thifensulfuron methyl — 25% + Tribenuron-methyl — 25%	G
Razor Xtreme Herb.	Nufarm	Glyphosate — 22.99% + Glyphosate, isopropylamine salt — 30.94%	G
Cloak Herb.	Nufarm	Metribuzin — 64.3% + Chlorimuron-ethyl — 10.7%	G
Biathlon Orn. Herb.	OHP	Oxyfluorfen — 2% + Prodiamine — 0.75%	G
fortress	OHP	Isoxaben — 0.5% + Dithiopyr — 0.25%	G
Fuerte	OHP	Flumioxazin — 0.125% + Prodiamine — 0.75%	G
Fireworxx	OHP	Caprylic acid — 44% + Capric acid — 36%	G
HomeFront Lawn Weed Killer RTU	Orgill	Carfentrazone-ethyl — 0.0023% + MCPA, 2-ethylhexyl ester — 0.337% + Mecoprop — 0.066% + Dicamba — 0.018%	G
HomeFront Lawn Weed Killer Conc.	Orgill	Dimethylamine (R)-2-(2-methyl-4-chlorophenoxy)propionate — 2.3% + Dimethylamine 2,4-dichlorophenoxyacetate — 4.55% + (R)-2-(2,4-Dichlorophenoxy)propanoic acid, dimethylamine salt — 2.26%	G
HomeFront Lawn Weed Killer RTS	Orgill	Dimethylamine (R)-2-(2-methyl-4-chlorophenoxy)propionate — 2.3% + Dimethylamine 2,4-dichlorophenoxyacetate — 4.55% + (R)-2-(2,4-Dichlorophenoxy)propanoic acid, dimethylamine salt — 2.26%	G
HomeFront Veg. Killer Conc.	Orgill	Imazapyr, isopropylamine salt — 0.089% + Glyphosate, isopropylamine salt — 5.03%	G
Gordon's Brush-No-More Brush Killer Conc.	PBIGordon	2,4-D, diethanolamine salt — 16.49% + Dicamba, dimethylamine salt — 1.38% + Triclopyr, triethylamine salt — 7.81%	G
Speedzone South. EW Broadleaf Herb. for Turf	PBIGordon	Dichlorprop-P — 5.19% + Carfentrazone-ethyl — 0.47% + Dicamba — 0.59% + 2,4-D, 2-ethylhexyl ester — 9.02%	G
Trimec Speed Lawn Weed Killer Conc.	PBIGordon	2,4-D, 2-ethylhexyl ester — 4.01% + Dicamba — 0.27% + Carfentrazone-ethyl — 0.16% + Mecoprop-P — 0.49%	G
Trimec Speed Lawn Weed Killer RTS	PBIGordon	2,4-D, 2-ethylhexyl ester — 4.01% + Dicamba — 0.27% + Carfentrazone-ethyl — 0.16% + Mecoprop-P — 0.49%	G

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Trimec Speed Lawn Weed Killer RTU	PBIGordon	Mecoprop-P — 0.022% + Carfentrazone-ethyl — 0.007% + Dicamba — 0.012% + 2,4-D, 2-ethylhexyl ester — 0.184%	G
Trimec Broadleaf Herb. Bentgrass formula	PBIGordon	2,4-D, dimethylamine salt — 6.12% + Dicamba, dimethylamine salt — 2.53% + MCPP-p, DMA salt — 9.92%	G
GroundWork Conc. Poison Ivy & Brush Killer	PBIGordon	MCPP-p, DMA salt — 2.92% + Dicamba, dimethylamine salt — 1.34% + 2,4-D, dimethylamine salt — 12.1%	G
GroundWork Conc. Weed Killer	PBIGordon	2,4-D, dimethylamine salt — 7.59% + Dicamba, dimethylamine salt — 0.84% + MCPP-p, DMA salt — 1.83%	G
Gordon's Trimec RTS Lawn Weed Killer	PBIGordon	MCPP-p, DMA salt — 1.34% + Dicamba, dimethylamine salt — 0.62% + 2,4-D, dimethylamine salt — 5.56%	G
Trimec Classic Broadleaf Herb.	PBIGordon	Dicamba, dimethylamine salt — 2.76% + 2,4-D, dimethylamine salt — 25.93% + MCPP-p, DMA salt — 6.93%	G
875 BrushKiller	PBIGordon	2,4-D, dimethylamine salt — 23.45% + Dicamba, dimethylamine salt — 4.24% + MCPP-p, DMA salt — 12.55%	G
Trimec South. Broadleaf Herb. for Sensitive South. Grasses	PBIGordon	MCPP-p, DMA salt — 17.37% + Dicamba, dimethylamine salt — 3.85% + 2,4-D, dimethylamine salt — 18.74%	G
Trimec 992 Broadleaf Herb.	PBIGordon	2,4-D, dimethylamine salt — 30.56% + Dicamba, dimethylamine salt — 2.77% + MCPP-p, DMA salt — 8.17%	G
Acreage Pro Large Property Lawn Weed Killer	PBIGordon	MCPP-p, DMA salt — 8.17% + Dicamba, dimethylamine salt — 2.77% + 2,4-D, dimethylamine salt — 30.56%	G
Gordon's Trimec Weed Killer Tankables	PBIGordon	Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 8.17% + Dicamba, dimethylamine salt — 2.77% + 2,4-D, dimethylamine salt — 30.56%	G
Gordon's Pasture Pro Herb.	PBIGordon	2,4-D, diethanolamine salt — 16.3% + 2,4-D, dimethylamine salt — 33.2%	G
Gordon's Pasture Pro Weed & Brush Killer Tankables	PBIGordon	2,4-D, dimethylamine salt — 33.2% + 2,4-D, diethanolamine salt — 16.3%	G
Hi-Dep Broadleaf Herb.	PBIGordon	2,4-D, dimethylamine salt — 33.2% + 2,4-D, diethanolamine salt — 16.3%	G
Super Brush Killer	PBIGordon	2,4-D, 2-ethylhexyl ester — 32.45% + Dicamba — 5.38% + 2,4-DP-p, 2-ethylhexyl ester — 15.9%	G
Super Trimec Broadleaf Herb.	PBIGordon	Dicamba — 5.38% + 2,4-D, 2-ethylhexyl ester — 32.45% + 2,4-DP-p, 2-ethylhexyl ester — 15.9%	G
Trimec Encore Broadleaf Herb.	PBIGordon	MCPP-p, DMA salt — 8.16% + MCPA, dimethylamine salt — 38.68% + Dicamba, dimethylamine salt — 3.81%	G
Brushmaster Herb.	PBIGordon	Dicamba — 3.01% + 2,4-D, 2-ethylhexyl ester — 18.85% + 2,4-DP-p, 2-ethylhexyl ester — 9.24%	G
Speed Zone Broadleaf Herb. for Turf	PBIGordon	Carfentrazone-ethyl — 0.62% + MCPP-p — 5.88% + 2,4-D, 2-ethylhexyl ester — 28.57% + Dicamba — 1.71%	G
Power Zone Broadleaf Herb. for Turf	PBIGordon	Dicamba — 2.69% + MCPP-p — 5.39% + Carfentrazone-ethyl — 0.48% + MCPA, 2-ethylhexyl ester — 41.98%	G
Speed Zone South. Broadleaf Herb. for Turf	PBIGordon	MCPP-p — 2.66% + Carfentrazone-ethyl — 0.54% + Dicamba — 0.67% + 2,4-D, 2-ethylhexyl ester — 10.49%	G
Trimec 878 S.I. Herb.	PBIGordon	Dicamba, dimethylamine salt — 4.62% + 2,4-D, dimethylamine salt — 10.86% + MCPP-p, DMA salt — 18.91%	G
Gordon's Speed Zone Lawn Weed Killer	PBIGordon	Carfentrazone-ethyl — 0.62% + MCPP-p — 5.88% + Dicamba — 1.71% + 2,4-D, 2-ethylhexyl ester — 28.57%	G
Surge Broadleaf Herb. for Turf	PBIGordon	2,4-D, dimethylamine salt — 18.79% + Dicamba, dimethylamine salt — 3.02% + Sulfentrazone — 0.67% + MCPP-p, DMA salt — 6.8%	G
Gordon's Trimec Nutsedge + Lawn Weed Killer Conc.	PBIGordon	MCPP-p, DMA salt — 2.2% + Sulfentrazone — 0.15% + Dicamba, dimethylamine salt — 0.57% + 2,4-D, dimethylamine salt — 6.1%	G
Gordon's Trimec Crabgrass + Lawn Weed Killer Conc.	PBIGordon	2,4-D, dimethylamine salt — 6.42% + Dicamba, dimethylamine salt — 0.6% + Quinclorac — 2.13%	G
Gordon's Trimec Crabgrass + Lawn Weed Killer RTS	PBIGordon	2,4-D, dimethylamine salt — 6.42% + Dicamba, dimethylamine salt — 0.6% + Quinclorac — 2.13%	G
GroundWork Conc. Crabgrass & Broadleaf Weed Killer	PBIGordon	2,4-D, dimethylamine salt — 6.42% + Dicamba, dimethylamine salt — 0.6% + Quinclorac — 2.13%	G
Gordon's Trimec Crabgrass + Lawn Weed Killer RTU	PBIGordon	Quinclorac — 0.104% + Dicamba, dimethylamine salt — 0.029% + 2,4-D, dimethylamine salt — 0.313%	G
Pronto Veg. Killer	PBIGordon	Glyphosate, isopropylamine salt — 3.82% + Imazapyr, isopropylamine salt — 1.74%	G
Gordon's Barrier Ext. Cont. Veg. Killer Conc.	PBIGordon	Imazapyr, isopropylamine salt — 1.74% + Glyphosate, isopropylamine salt — 3.82%	G
Gordon's Barrier Year-long Veg. Killer Conc.	PBIGordon	Glyphosate, isopropylamine salt — 3.82% + Imazapyr, isopropylamine salt — 1.74%	G
Q4 + Turf Herb. for Grassy & Broadleaf Weeds	PBIGordon	Quinclorac — 8.43% + Sulfentrazone — 0.69% + Dicamba, dimethylamine salt — 1.49% + 2,4-D, dimethylamine salt — 11.81%	G
Trimec 1000 Low Odor Broadleaf Herb.	PBIGordon	Dicamba, dimethylamine salt — 2.68% + 2,4-D, dimethylamine salt — 1.22% + 2,4-D, diethanolamine salt — 34.59% + MCPP-p, DMA salt — 8.17%	G
Gordon's BrushKiller for Large Property	PBIGordon	Triclopyr, triethylamine salt — 7.81% + 2,4-D, diethanolamine salt — 16.49% + Dicamba, dimethylamine salt — 1.38%	G

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Gordon's BrushKiller for Hard-To-Kill Brush	PBIGordon	Dicamba — 1.22% + 2,4-D, 2-ethylhexyl ester — 15.97% + Triclopyr, butoxyethyl ester — 8.4%	G
Gordon's Pasture Pro Brush Killer for Hard-to-Kill Brush	PBIGordon	Dicamba — 1.22% + 2,4-D, 2-ethylhexyl ester — 15.97% + Triclopyr, butoxyethyl ester — 8.4%	G
GroundWork Conc. Year-Long Veg. Cont.	PBIGordon	Glyphosate, isopropylamine salt — 0.583% + Imazapyr, isopropylamine salt — 0.266%	G
T Zone SE Broadleaf Herb. for Tough Weeds	PBIGordon	Sulfentrazone — 0.66% + Triclopyr, butoxyethyl ester — 7.72% + 2,4-D, 2-ethylhexyl ester — 29.32% + Dicamba — 2.22%	G
Avenue South Broadleaf Herb. for Turfgrass	PBIGordon	Dicamba, dimethylamine salt — 2.06% + 2,4-D, dimethylamine salt — 7.28% + Penoxsulam — 0.7% + Sulfentrazone — 0.7%	G
Gordon's Trimec Lawn Weed Killer	PBIGordon	2,4-D, dimethylamine salt — 7.59% + MCPP-p, DMA salt — 1.83% + Dicamba, dimethylamine salt — 0.84%	G
CIVITAS WEEDfree BRAND Conc.	Petro-Canada Lubricants	2,4-D, dimethylamine salt — 0.885% + Mecoprop, dimethylamine salt — 0.573% + Dicamba, dimethylamine salt — 0.109%	G
SFM Plus	Precision Cont. Tech.	Metsulfuron-methyl — 15% + Sulfometuron methyl — 56.25%	G
Dandelion Destroyer	Prime Source	MCPA, dimethylamine salt — 8.23% + 2,4-D — 30.89% + Dicamba, dimethylamine salt — 2.77%	G
Triad Select Herb.	Prime Source	2,4-D — 30.89% + Dicamba, dimethylamine salt — 2.77% + MCPA, dimethylamine salt — 8.23%	G
CrossCut Select	Prime Source	Triclopyr — 16.5% + 2,4-D, butoxyethyl ester — 34.4%	G
Triad SFZ Select	Prime Source	Sulfentrazone — 0.65% + MCPA, dimethylamine salt — 6.65% + Dicamba, dimethylamine salt — 2.88% + 2-4,D — 18.33%	G
Triad QC Select	Prime Source	Dicamba, dimethylamine salt — 1.67% + Quinclorac, Dimethylamine Salt — 9.79% + 2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 13.29%	G
Weed Out	Pro Chem	2,4-Dichlorophenoxyacetic acid, 2-ethylhexyl ester — 1.09% + Bromacil — 0.98%	G
Pro Chem Weed Out in a Can	Pro Chem	Bromacil — 0.98% + 2,4-Dichlorophenoxyacetic acid 2-ethyl-4-methylpentyl ester — 1.09%	G
Bareground Ultra	Pro Serve	Sodium chlorate — 30% + Sodium metaborate (NaBO2) — 49% + Bromacil — 1.5%	G
Monobor Chlorate	Pro Serve	Sodium chlorate — 30% + Sodium metaborate (NaBO2) — 48.5%	G
Vessel	Prokoz	Dicamba, dimethylamine salt — 2.77% + Dimethylamine (R)-2-(2-methyl-4-chlorophenoxy)propionate — 8.17% + Dimethylamine 2,4-dichlorophenoxyacetate — 30.56%	G
Doom Weed Killer Spray	QuestSpecialty	Bromacil — 0.5% + 2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 0.29%	G
Compare-N-Save Weed Killer for Lawns Conc.	Ragan and Massey	Mecoprop-P — 2.127% + Dicamba — 0.371% + 2,4-Dichlorophenoxyacetic acid — 8.658%	G
Compare-N-Save Quick Acting Weed & Grass Killer	Ragan and Massey	Glyphosate, isopropylamine salt — 18% + Diquat dibromide — 0.73%	G
RM18 Fast-Acting Weed & Grass Killer	Ragan and Massey	Glyphosate, isopropylamine salt — 18% + Diquat dibromide — 0.73%	G
RM43 Total Veg. Cont.	Ragan and Massey	Glyphosate, isopropylamine salt — 43.68% + Imazapyr, isopropylamine salt — 0.78%	G
Rainbow Weed Killer	Rainbow Tech.	Tebuthiuron — 2% + Diuron — 6%	G
Rainbow Quick-Kill Weed Killer Spray	Rainbow Tech.	2,4-Dichlorophenoxyacetic acid, lithium salt — 0.29% + Bromacil — 0.5%	G
Rainbow Johnson Grass & Weed Killer Foam	Rainbow Tech.	Glyphosate, isopropylamine salt — 0.96% + Pelargonic acid — 1%	G
Flu-Rimuron	Redeagle Intl.	Chlorimuron-ethyl — 11% + Flumioxazin — 29%	G
Regal O-O Herb.	Regal Chem.	Oxyfluorfen — 2% + Oxadiazon — 1%	G
RegalStar II	Regal Chem.	Oxadiazon — 1% + Prodiamine — 0.2%	G
Consust WDG T&O Fungicide	Regal Chem.	Chlorothalonil — 50% + Thiophanate-methyl — 16.66%	G
RiceBeaux	RiceCo.	Propanil — 35% + Thiobencarb — 31%	G
RiceOne CS	RiceCo.	Pendimethalin — 26.79% + Clomazone — 11.03%	G
Duet	RiceCo.	Bensulfuron-methyl — 0.32% + Propanil — 41.2%	G
Volta Extra	Rotam NA	Thifensulfuron methyl — 50% + Tribenuron-methyl — 25%	G
Vilify	Rotam NA	Mesotrione — 2.44% + Atrazine — 18.6% + Metolachlor — 19%	R
Evinco	Rotam NA	Metolachlor — 36.8% + Mesotrione — 3.68%	G
Sparrow	Rotam NA	Nicosulfuron — 25.2% + Rimsulfuron — 12.5%	G
Stringent	Rotam NA	Rimsulfuron — 18.4% + Thifensulfuron methyl — 4%	G
Rixa	Rotam NA	Mesotrione — 2.94% + Metolachlor — 29.4% + Atrazine — 11%	R
Equip	Rotam NA	Mesotrione — 31.25% + Rimsulfuron — 7.5%	G
BioAdv.Sci.-Based Sol. All-in-1 Rose & Flower Care RTU G I	SBM Life Sci.	Tebuconazole — 0.48% + Acephate — 1.5%	G
Natria Grass & Weed Cont. w/ Root Kill RTU	SBM Life Sci.	Maleic hydrazide — 0.5% + Potassium soaps of fatty acids — 3.68%	G
Natria Grass & Weed Cont. w/ Root Kill Conc.	SBM Life Sci.	Maleic hydrazide — 3% + Potassium salts of fatty acids — 22.11%	G
BioAdvanced Sci.-Based Sol. South. Weed Killer for Lawns RTU	SBM Life Sci.	Mecoprop-P-dimethylammonium — 0.075% + 2,4-D, dimethylamine salt — 0.311% + Dicamba, dimethylamine salt — 0.034%	G
BioAdvanced Sci.-Based Sol. Weed Killer for Lawns RTU	SBM Life Sci.	2,4-D, dimethylamine salt — 0.311% + Dicamba, dimethylamine salt — 0.034% + Mecoprop, dimethylamine salt — 0.075%	G
BioAdvanced Sci.-Based Sol. All-in-1 W&F	SBM Life Sci.	2,4-Dichlorophenoxyacetic acid — 0.818% + Quinclorac — 0.419% + Dicamba — 0.073%	G
BioAdvanced Sci.-Based Sol. Lawn-Weed Killer Conc.	SBM Life Sci.	Mecoprop dimethylamine salt — 1.83% + Dicamba, dimethylamine salt — 0.84% + 2,4-D — 7.59%	G

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BioAdvanced Sci.-Based Sol. Lawn-Weed Killer RTS	SBM Life Sci.	Mecoprop dimethylamine salt — 1.83% + Dicamba, dimethylamine salt — 0.84% + 2,4-D — 7.59%	G
BioAdvanced Sci.-Based Sol. South. Weed Killer for Lawns Conc.	SBM Life Sci.	2,4-D, dimethylamine salt — 7.59% + Mecoprop, dimethylamine salt — 1.83% + Dicamba, dimethylamine salt — 0.84%	G
BioAdvanced Sci.-Based Sol. South. Weed Killer for Lawns RTS	SBM Life Sci.	Mecoprop, dimethylamine salt — 1.83% + 2,4-D, diethylamine salt — 7.59% + Dicamba, dimethylamine salt — 0.84%	G
BioAdvanced Sci.-Based Sol. Weed Killer for Lawns Conc.	SBM Life Sci.	2,4-D, dimethylamine salt — 7.59% + Mecoprop, dimethylamine salt — 1.83% + Dicamba, dimethylamine salt — 0.84%	G
BioAdvanced Sci.-Based Sol. Weed Killer for Lawns RTS	SBM Life Sci.	Mecoprop, dimethylamine salt — 1.83% + 2,4-D, diethylamine salt — 7.59% + Dicamba, dimethylamine salt — 0.84%	G
BioAdvanced Sci.-Based Sol. All-in-1 Lawn Weed & Crabgrass Killer I Conc.	SBM Life Sci.	Dicamba, dimethylamine salt — 0.45% + 2,4-D, dimethylamine salt — 4.85% + Quinclorac — 1.61%	G
BioAdvanced Sci.-Based Sol. All-in-1 Lawn Weed & Crabgrass Killer I RTS	SBM Life Sci.	2,4-D, dimethylamine salt — 4.85% + Quinclorac — 1.61% + Dicamba, dimethylamine salt — 0.45%	G
BioAdv. Sci.-Based Sol. Season Long Weed Cont. for Lawns Conc.	SBM Life Sci.	Mecoprop-p-potassium — 1.1% + Dicamba, potassium salt — 0.52% + Isoxaben — 2.63% + 2,4-D, dimethylamine salt — 4.73%	G
BioAdv. Sci.-Based Sol. Season Long Weed Cont. for Lawns RTS	SBM Life Sci.	Dicamba, potassium salt — 0.52% + Isoxaben — 2.63% + 2,4-D, dimethylamine salt — 4.73% + Mecoprop, potassium salt — 1.1%	G
BioAdv. Sci.-Based Sol. DuraZone Conc. Weed & Grass Killer	SBM Life Sci.	Glyphosate, isopropylamine salt — 20.46% + Indaziflam — 0.089% + Diquat dibromide — 0.89%	G
BioAdv. Sci.-Based Sol. DuraZone RTU Weed & Grass Killer	SBM Life Sci.	Diquat dibromide — 0.061% + Indaziflam — 0.0061% + Glyphosate, isopropylamine salt — 1.41%	G
BioAdvanced Sci.-Based Sol. 3-in-1 W&F for South. Lawns	SBM Life Sci.	Penoxsulam — 0.041% + Dicamba — 0.088% + Indaziflam — 0.027%	G
Roundup for Lawns4		Sulfentrazone — 0.014% + Penoxsulam — 0.014% + 2,4-D — 0.146% + Dicamba — 0.041%	G
Scotts Weed Killer for South. Lawns4	Scotts	Sulfentrazone — 0.014% + Penoxsulam — 0.014% + Dicamba, dimethylamine salt — 0.041% + 2,4-D — 0.146%	G
Roundup for Lawns5	Scotts	2,4-D — 1.46% + Dicamba — 0.41% + Penoxsulam — 0.14% + Sulfentrazone — 0.14%	G
Roundup for Lawns6	Scotts	2,4-D — 1.46% + Dicamba — 0.41% + Penoxsulam — 0.14% + Sulfentrazone — 0.14%	G
Scotts Weed Killer for South. Lawns5	Scotts	2,4-D — 1.46% + Dicamba, dimethylamine salt — 0.41% + Penoxsulam — 0.14% + Sulfentrazone — 0.14%	G
Scotts Weed Killer for South. Lawns6	Scotts	Dicamba, dimethylamine salt — 0.41% + 2,4-D — 1.46% + Penoxsulam — 0.14% + Sulfentrazone — 0.14%	G
Scotts Weed Cont. for Lawns	Scotts	Mecoprop-P — 0.167% + 2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071%	G
Roundup for Lawns1	Scotts	MCPA — 0.257% + Quinclorac — 0.118% + Dicamba — 0.029% + Sulfentrazone — 0.015%	G
Scotts Weed Killer for Lawns1	Scotts	Dicamba, dimethylamine salt — 0.029% + MCPA, dimethylamine salt — 0.257% + Quinclorac — 0.118% + Sulfentrazone — 0.015%	G
Roundup for Lawns2	Scotts	Sulfentrazone — 0.22% + Dicamba — 0.43% + Quinclorac — 1.8% + MCPA — 3.85%	G
Roundup for Lawns3	Scotts	Sulfentrazone — 0.22% + Dicamba — 0.43% + Quinclorac — 1.8% + MCPA — 3.85%	G
Scotts Weed Killer for Lawns2	Scotts	Sulfentrazone — 0.22% + Quinclorac — 1.8% + MCPA, dimethylamine salt — 3.85% + Dicamba, dimethylamine salt — 0.43%	G
Scotts Weed Killer for Lawns3	Scotts	Sulfentrazone — 0.22% + Quinclorac — 1.8% + MCPA, dimethylamine salt — 3.85% + Dicamba, dimethylamine salt — 0.43%	G
Scotts Spot Weed Cont. for Lawns	Scotts	2,4-D, diethylamine salt — 0.12% + Dicamba — 0.05% + Quinclorac — 0.1% + Mecoprop-P — 0.22%	G
W&F Weed Cont. + Lawn Fert. 26-0-3	Scotts	Mecoprop-P — 0.59% + Mecoprop-P — 0.59% + 2,4-D — 1.18% + 2,4-D — 1.18%	G
Scotts Turf Builder Annual Program Spring 28-0-3	Scotts	2,4-D — 1.21% + Mecoprop-P — 0.61%	G
Scotts Turf Builder W&F3	Scotts	2,4-D — 1.21% + Mecoprop-P — 0.61%	G
Turf Builder W&F 1	Scotts	2,4-D — 1.21% + MCPP-p — 0.61%	G
Snap Pac W&F 25-0-4 (5.1 Slow Release)	Scotts	Mecoprop-P — 0.148% + 2,4-D — 0.723% + Dichlorprop-P — 0.088%	G
Nautique	Sepro	Copper triethanolamine complex — 14.9% + Copper ethylenediamine complex — 13.2%	G
Renovate MAX G	Sepro	2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 14% + Triclopyr — 4%	G
Brake F16	Sepro	Fluridone — 11.7% + Sodium salt of fomesafen — 14.61%	G
XL 2G	Setre Chem.	Oryzalin — 1% + Benefin — 1%	G
Forrest	Sharda USA	Acetochlor — 30.2% + Fomesafen Sodium — 7.1%	G
Definite	Sharda USA	Flumetsulam — 1.3% + Acetochlor — 41.67% + Clopyralid — 4.27%	G
Recite	Sharda USA	Acetochlor — 31% + Mesotrione — 3.3% + Clopyralid, monoethanolamine salt — 2.7%	G
Praxis Plus	Sharda USA	Glyphosate — 22% + Imazethapyr — 1.8%	G
Corvette	Sharda USA	Imazethapyr — 1.38% + Metribuzin — 6.14% + Metolachlor — 43.72%	G
Headwin	Sharda USA	Metolachlor — 58.52% + Metribuzin — 13.93%	G
Compensa	Sharda USA	Imazethapyr — 6.67% + Sulfentrazone — 33.33%	G
Punch	Sharda USA	Imazethapyr — 2.77% + Metolachlor — 55.49%	G

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Sharp	Sharda USA	Metolachlor — 48.28% + Sodium salt of fomesafen — 10%	G
Mazequin	Sharda USA	Quinclorac — 61.98% + Imazethapyr — 13.02%	G
Far Rreach	Sharda USA	Fluroxypyr — 12.3% + Clopyralid — 11.3%	G
Etcetra	Sharda USA	Acetochlor — 29% + Atrazine — 14.5%	R
Stalwart XTRA Herb.	SIPCAM AGRO USA	Atrazine — 33% + Metolachlor — 26.1%	R
Stalwart MTZ	SIPCAM AGRO USA	Metribuzin — 13.8% + Metolachlor — 58.2%	G
Stalwart 2W	SIPCAM AGRO USA	Metolachlor — 36.8% + Mesotrione — 3.68%	G
Stalwart 3W	SIPCAM AGRO USA	Mesotrione — 2.44% + Atrazine — 18.6% + Metolachlor — 19%	R
Whistle	SIPCAM AGRO USA	Metolachlor — 68.19% + Sulfentrazone — 7.89%	G
Trimec Lawn Weed Killer	South. Ag. Insecticides	Dicamba, dimethylamine salt — 1.29% + 2,4-D, dimethylamine salt — 3.05% + Mecoprop, dimethylamine salt — 5.3%	G
Crossbow	South. Ag. Insecticides	Triclopyr — 16.5% + 2,4-D, butoxyethyl ester — 34.4%	G
Spectracide Weed Stop for Lawns + Crabgrass Prev. G	Spectrum Group	Dithiopyr — 0.16% + Mecoprop-P — 0.14% + Dicamba — 0.06% + 2,4-D — 0.64%	G
Eliminator Lawn Weed Killer Conc.	Spectrum Group	2,4-D, dimethylamine salt — 7.59% + Dicamba, dimethylamine salt — 0.84% + Mecoprop, dimethylamine salt — 1.83%	G
Eliminator Lawn Weed Killer RTS	Spectrum Group	2,4-D, dimethylamine salt — 7.59% + Dicamba, dimethylamine salt — 0.84% + Mecoprop, dimethylamine salt — 1.83%	G
Spectracide Acre + Weed Stop for Lawns Conc.	Spectrum Group	2,4-D, dimethylamine salt — 7.59% + Dicamba, dimethylamine salt — 0.84% + Mecoprop-P — 1.83%	G
Spectracide Weed Stop for Lawns Conc.	Spectrum Group	2,4-D, dimethylamine salt — 7.59% + Dicamba, dimethylamine salt — 0.84% + Mecoprop-P — 1.83%	G
Spectracide Weed Stop for Lawns	Spectrum Group	Dicamba, dimethylamine salt — 0.066% + 2,4-D, dimethylamine salt — 0.593% + Mecoprop, dimethylamine salt — 0.144%	G
Spectracide Weed Stop for Lawns 2	Spectrum Group	Mecoprop-P — 0.144% + 2,4-D, dimethylamine salt — 0.593% + Dicamba — 0.066%	G
Spectracide Weed & Grass Foaming Edger	Spectrum Group	Dicamba — 0.04% + Fluazifop — 0.06% + Diquat dibromide — 0.18%	G
Spectracide Weed & Grass Killer w/ Ext. Cont. Conc.	Spectrum Group	Diquat dibromide — 2.3% + Fluazifop-P-butyl — 1.15% + Oxyfluorfen — 1.92% + Dicamba, dimethylamine salt — 0.77%	G
Spectracide Weed & Grass Killer w/ Ext. Cont.	Spectrum Group	Dicamba, dimethylamine salt — 0.04% + Oxyfluorfen — 0.1% + Fluazifop-P-butyl — 0.06% + Diquat dibromide — 0.12%	G
Spectracide Weed & Grass Killer w/ Ext. Cont. 2	Spectrum Group	Dicamba — 0.04% + Oxyfluorfen — 0.1% + Fluazifop-P-butyl — 0.06% + Diquat dibromide — 0.12%	G
Spectracide Weed & Grass Killer Combo Dose Refill	Spectrum Group	Diquat dibromide — 2.3% + Fluazifop-P-butyl — 1.15% + Dicamba, dimethylamine salt — 0.77%	G
Spectracide Weed & Grass Killer Conc. 2	Spectrum Group	Diquat dibromide — 2.3% + Fluazifop-P-butyl — 1.15% + Dicamba, dimethylamine salt — 0.77%	G
Spectracide Weed & Grass Killer for Large Areas Conc.	Spectrum Group	Diquat dibromide — 2.3% + Fluazifop-P-butyl — 1.15% + Dicamba, dimethylamine salt — 0.77%	G
Spectracide Weed Stop for Lawns + Crabgrass Killer Conc.	Spectrum Group	Dicamba, dimethylamine salt — 0.43% + 2,4-D, dimethylamine salt — 3.74% + Sulfentrazone — 0.22% + Quinclorac — 1.79%	G
Spectracide Weed & Grass Killer 2	Spectrum Group	Dicamba, dimethylamine salt — 0.04% + Fluazifop-P-butyl — 0.06% + Diquat dibromide — 0.12%	G
Spectracide Weed & Grass Killer 3	Spectrum Group	Dicamba, dimethylamine salt — 0.04% + Diquat dibromide — 0.12% + Fluazifop-P-butyl — 0.06%	G
Spectracide Weed & Grass Killer Combo Accushot	Spectrum Group	Dicamba, dimethylamine salt — 0.04% + Fluazifop-P-butyl — 0.06% + Diquat dibromide — 0.12%	G
Spectracide Weed & Grass Killer w/ Ext. Cont. Foaming Aerosol	Spectrum Group	Diquat dibromide — 0.12% + Fluazifop-P-butyl — 0.06% + Oxyfluorfen — 0.1% + Dicamba, dimethylamine salt — 0.04%	G
Spectracide Weed Stop for Lawns + Crabgrass Killer3	Spectrum Group	Dicamba, dimethylamine salt — 0.029% + 2,4-D, dimethylamine salt — 0.253% + Quinclorac — 0.121% + Sulfentrazone — 0.015%	G
Spectracide Weed Stop for Lawns + Crabgrass Killer4	Spectrum Group	Dicamba, dimethylamine salt — 0.029% + 2,4-D, dimethylamine salt — 0.253% + Quinclorac — 0.121% + Sulfentrazone — 0.015%	G
Spectracide Weed Stop for Lawns3	Spectrum Group	Sulfentrazone — 0.008% + 2,4-D, dimethylamine salt — 0.342% + Dicamba, dimethylamine salt — 0.032% + Mecoprop, dimethylamine salt — 0.123%	G
Spectracide Weed Stop for Lawns4	Spectrum Group	Sulfentrazone — 0.008% + Dicamba, dimethylamine salt — 0.032% + Mecoprop, dimethylamine salt — 0.123% + 2,4-D, dimethylamine salt — 0.342%	G
Spectracide Weed Stop for Lawns Conc.2	Spectrum Group	Mecoprop, dimethylamine salt — 2.73% + Dicamba, dimethylamine salt — 0.71% + 2,4-D, dimethylamine salt — 7.57% + Sulfentrazone — 0.18%	G
Sprakil SK-13 Granular Weed Killer	SSI Maxim	Diuron — 3% + Tebuthiuron — 1%	G
Sprakil SK-26 Granular Weed Killer	SSI Maxim	Tebuthiuron — 2% + Diuron — 6%	G
WEEDBLAST 4G Weed Killer	SSI Maxim	Diuron — 2% + Bromacil — 2%	G
Topsite 2.5G Herb.	SSI Maxim	Diuron — 2% + Imazapyr — 0.5%	G
Ace Weed & Grass Killer Conc.1	Swiss Farms Prod.	Dicamba — 0.67% + Diquat bromide — 2.53% + Fluazifop-P-butyl — 0.84%	G
Roundup Trimark Conc.	Swiss Farms Prod.	Diquat dibromide — 2.53% + Fluazifop-P-butyl — 0.84% + Dicamba, dimethylamine salt — 0.67%	G
Ace RTU Weed & Grass Killer5	Swiss Farms Prod.	Fluazifop-P-butyl — 0.07% + Dicamba, dimethylamine salt — 0.05% + Diquat dibromide — 0.2%	G

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Roundup Trimark RTU	Swiss Farms Prod.	Dicamba, dimethylamine salt — 0.05% + Fluazifop-P-butyl — 0.07% + Diquat dibromide — 0.2%	G
Vigoro W&F for Bahia & Mixed Lawns 28-0-3	Swiss Farms Prod.	Mecoprop-P — 0.167% + 2,4-D — 1.108% + Dicamba — 0.071%	G
All-in-1 W&F	Swiss Farms Prod.	Quinclorac — 0.346% + Dicamba — 0.06% + 2,4-D — 0.675%	G
Ace RTS W&F Conc. 20-0-0	Swiss Farms Prod.	2,4-D, dimethylamine salt — 2.29% + Mecoprop-P — 1.15% + Dichlorprop-P — 1.13%	G
Ace Lawn Weed Killer Conc.	Swiss Farms Prod.	Mecoprop-P — 5.3% + 2,4-D, dimethylamine salt — 3.05% + Dicamba, dimethylamine salt — 1.3%	G
Ace RTS Lawn Weed Killer Conc.	Swiss Farms Prod.	Mecoprop-P — 5.3% + 2,4-D, dimethylamine salt — 3.05% + Dicamba, dimethylamine salt — 1.3%	G
Ace Spot Weed Killer3	Swiss Farms Prod.	Dicamba, dimethylamine salt — 0.05% + Mecoprop-P — 0.22% + 2,4-D, dimethylamine salt — 0.12%	G
Green Light AMAZE Grass & Weed Prev.3	Swiss Farms Prod.	Benefin — 1% + Oryzalin — 1%	G
BOUNDARY 6.5EC	Syngenta Crop Prot.	S-Metolachlor — 58.2% + Metribuzin — 13.8%	G
Sequence	Syngenta Crop Prot.	S-Metolachlor — 29% + Glyphosate — 21.8%	G
PREFIX HERB.	Syngenta Crop Prot.	S-Metolachlor — 46.4% + Fomesafen — 10.2%	G
HALEX GT	Syngenta Crop Prot.	Mesotrione — 2.05% + S-Metolachlor — 20.5% + Glyphosate — 20.5%	G
ORION HERB.	Syngenta Crop Prot.	Florasulam — 0.39% + MCPA — 42.25%	G
CALLISTO XTRA	Syngenta Crop Prot.	Mesotrione — 5.36% + Atrazine — 34.3%	R
FLEXSTAR GT 3.5	Syngenta Crop Prot.	Fomesafen — 5.88% + Glyphosate, isopropylamine salt — 22.4%	G
AXIAL STAR HERB.	Syngenta Crop Prot.	Fluroxypyr — 12.4% + Pinoxaden — 4.9%	G
LEXAR EZ HERB.	Syngenta Crop Prot.	Mesotrione — 2.44% + S-Metolachlor — 19% + Atrazine — 18.61%	R
LUMAX EZ HERB.	Syngenta Crop Prot.	Atrazine — 10.15% + S-Metolachlor — 27.1% + Mesotrione — 2.71%	R
Acuron Herb.	Syngenta Crop Prot.	Mesotrione — 2.6% + Atrazine — 10.93% + S-Metolachlor — 23.4% + Bicyclopyrone — 0.65%	R
Callisto GT	Syngenta Crop Prot.	Glyphosate — 34% + Mesotrione — 3.4%	G
Acuron Flexi	Syngenta Crop Prot.	Mesotrione — 3.47% + S-Metolachlor — 31.24% + Bicyclopyrone — 0.87%	G
Talinor	Syngenta Crop Prot.	Bicyclopyrone — 3.41% + Bromoxynil octanoate — 23.16%	G
Tavium + VaporGrip Tech.	Syngenta Crop Prot.	Dicamba, diglycolamine salt — 17.7% + S-Metolachlor — 24%	R
Tavium + VaporGrip Tech. — State RUP Reg.	Syngenta Crop Prot.	Dicamba, diglycolamine salt — 17.7% + S-Metolachlor — 24%	R
Axial Bold Herb.	Syngenta Crop Prot.	Pinoxaden — 5.51% + Fenoxaprop-p-ethyl — 2.75%	G
BICEP II MAGNUM	Syngenta Crop Prot.	Atrazine — 33% + S-Metolachlor — 26.1%	R
BICEP II MAGNUM FC	Syngenta Crop Prot.	Atrazine — 33% + S-Metolachlor — 26.1%	R
MEDAL II ATZ	Syngenta Crop Prot.	S-Metolachlor — 26.1% + Atrazine — 33%	R
BICEP LITE II MAGNUM	Syngenta Crop Prot.	S-Metolachlor — 35.8% + Atrazine — 28.1%	R
BroadAxe XC Herb.	Syngenta Crop Prot.	S-Metolachlor — 68.25% + Sulfentrazone — 7.55%	G
Ledger Herb.	Tenkoz	S-Metolachlor — 58.2% + Metribuzin — 13.8%	G
Quake Herb.	Tenkoz	S-Metolachlor — 46.4% + Fomesafen Sodium — 10.2%	G
Palace Selective Herb.	Tenkoz	Mesotrione — 3.68% + S-Metolachlor — 36.8%	G
Brawl II ATZ Herb.	Tenkoz	S-Metolachlor — 26.1% + Atrazine — 33%	R
Crossbow Herb.	Tenkoz	3,5,6-Trichloropyridinyloxyacetic acid, 2-butoxyethyl ester — 16.5% + 2,4-D, butoxyethyl ester — 34.4%	G
Andersons Golf Products Goosegrass/Crabgrass Cont.	Andersons	Oxadiazon — 1.31% + Bensulide — 5.25%	G
Ortho Groundclear Weed & Grass Killer Super Conc.	Ortho Group	Fluazifop-P-butyl — 0.84% + Diquat dibromide — 2.53% + Dicamba, dimethylamine salt — 0.67%	G
Ortho Weed B Gon MAX + Crabgrass Cont. RTS	Ortho Group	2,4-D — 6.42% + Dicamba — 0.6% + Quinclorac — 2.13%	G
Ortho Weed B Gon + Crabgrass Cont. Conc.2	Ortho Group	Dicamba, dimethylamine salt — 0.6% + 2,4-D, dimethylamine salt — 6.42% + Quinclorac — 2.13%	G
Ortho Weed B Gon + Crabgrass Cont. RTS2	Ortho Group	Dicamba, dimethylamine salt — 0.6% + 2,4-D, dimethylamine salt — 6.42% + Quinclorac — 2.13%	G
Ortho Weedclear Lawn Weed Killer Conc.	Ortho Group	2,4-D, dimethylamine salt — 6.42% + Dicamba, dimethylamine salt — 0.6% + Quinclorac — 2.13%	G
Ortho Weedclear Lawn Weed Killer RTS	Ortho Group	2,4-D, dimethylamine salt — 6.42% + Dicamba, dimethylamine salt — 0.6% + Quinclorac — 2.13%	G
Ortho Weedclear Lawn Weed Killer RTU1	Ortho Group	Mecoprop-P — 0.022% + 2,4-D, 2-ethylhexyl ester — 0.184% + Carfentrazone-ethyl — 0.007% + Dicamba — 0.012%	G
Ortho Weedclear Lawn Weed Killer Conc.2	Ortho Group	Dicamba — 0.27% + Mecoprop-P — 0.49% + 2,4-D, 2-ethylhexyl ester — 4.01% + Carfentrazone-ethyl — 0.16%	G
Ortho Weedclear Lawn Weed Killer RTS3	Ortho Group	Dicamba — 0.27% + Mecoprop-P — 0.49% + 2,4-D, 2-ethylhexyl ester — 4.01% + Carfentrazone-ethyl — 0.16%	G
Ortho Weed B Gon + Crabgrass Cont. RTU2	Ortho Group	Quinclorac — 0.104% + 2,4-D, dimethylamine salt — 0.313% + Dicamba, dimethylamine salt — 0.029%	G
Ortho Weedclear Lawn Weed Killer RTU	Ortho Group	Quinclorac — 0.104% + Dicamba, dimethylamine salt — 0.029% + 2,4-D, dimethylamine salt — 0.313%	G
Ortho Weed B Gon Weed Killer For Lawns Conc.2	Ortho Group	2,4-D, dimethylamine salt — 8.658% + Dicamba — 0.371% + MCPP, DMA salt — 2.127%	G
Ortho Weed B Gon Weed Killer For Lawns RTS2	Ortho Group	MCPP, DMA salt — 2.127% + 2,4-D, dimethylamine salt — 8.658% + Dicamba — 0.371%	G
Ortho Weed B Gon Weed Killer For Lawns RTU2	Ortho Group	MCPP, DMA salt — 0.149% + Dicamba — 0.026% + 2,4-D, dimethylamine salt — 0.605%	G

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Ortho Weed B Gon Weed Killer For St Augustinegrass RTS	Ortho Group	Dicamba — 0.026% + MCPP, DMA salt — 0.149% + 2,4-D, dimethylamine salt — 0.605%	G
Ortho Groundclear Veg. Killer Conc.	Ortho Group	Glyphosate, isopropylamine salt — 5% + Imazapyr, isopropylamine salt — 0.08%	G
Ortho Groundclear Veg. Killer RTU	Ortho Group	Glyphosate, isopropylamine salt — 1% + Imazapyr, isopropylamine salt — 0.016%	G
Ortho Weed B Gon Max + Crabgrass Cont.	Ortho Group	Mecoprop-P — 0.22% + Quinclorac — 0.1% + Dicamba, dimethylamine salt — 0.05% + 2,4-D, dimethylamine salt — 0.12%	G
ORTHO Groundclear Veg. Killer RTU1	Ortho Group	Imazapyr, isopropylamine salt — 0.08% + Glyphosate, isopropylamine salt — 5%	G
Ortho Groundclear Veg. Killer Conc.2	Ortho Group	Glyphosate, isopropylamine salt — 2.97% + Imazapyr, isopropylamine salt — 0.47%	G
Ortho Groundclear Veg. Killer RTU2	Ortho Group	Imazapyr, isopropylamine salt — 0.09% + Glyphosate, isopropylamine salt — 0.56%	G
Ortho Groundclear Veg. Killer RTU3	Ortho Group	Glyphosate, isopropylamine salt — 0.14% + Imazapyr, isopropylamine salt — 0.02%	G
Ortho Groundclear Year Long Veg. Killer	Ortho Group	Imazapyr, isopropylamine salt — 0.09% + Pelargonic acid — 2%	G
Ortho Groundclear Year Long Veg. Killer1	Ortho Group	Pelargonic acid — 5% + Imazapyr, isopropylamine salt — 0.47%	G
Tigris Sulfen ELITE	Tigris	S-Metolachlor — 68.25% + Sulfentrazone — 7.55%	G
Tigris Sulfen First	Tigris	Sulfentrazone — 62.1% + Cloransulam-methyl — 7.9%	G
Barren	Total Solutions	Bromacil — 0.98% + Isooctyl 2,4-dichlorophenoxyacetate — 1.09%	G
Triple Threat	Total Solutions	2,4-D — 4.55% + MCPP — 2.29% + 2,4-DP — 2.26%	G
WEED AND BRUSH KILLER UNITED 85	United Laboratories	Bromacil — 0.98% + Isooctyl(2-ethyl-4-methylpentyl) 2,4-dichlorophenoxyacetate — 1.09%	G
ArmorTech SureZone	United Turf Alliance	Sulfentrazone — 0.43% + Dimethylamine 3,6-dichloro-o-anisate — 1.68% + Dimethylamine 2,4-dichlorophenoxyacetate — 18% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy) propanoic acid — 6.49%	G
ArmorTech Threesome	United Turf Alliance	Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 8.17% + Dimethylamine 2,4-dichlorophenoxyacetate — 30.56% + Dimethylamine 3,6-dichloro-o-anisate — 2.77%	G
AquaStrike	UPL NA	Dipotassium endothall — 28.6% + Diquat dibromide — 10.6%	G
Chinook	UPL NA	Dipotassium endothall — 13.3% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 6.5%	G
Tripzin ZC Herb.	UPL NA	Metribuzin — 11.28% + Pendimethalin — 29.75%	G
Moccasin MTZ Herb.	UPL NA	Metribuzin — 12.98% + S-Metolachlor — 38.94%	G
Coyote Herb.	UPL NA	S-Metolachlor — 36.8% + Mesotrione — 3.68%	G
InterMoc Herb.	UPL NA	S-Metolachlor — 27.3% + Glufosinate-ammonium — 11.65%	G
Surflan XL 2G	UPL NA	Benefin — 1% + Oryzalin — 1%	G
Storm Herb.	UPL NA	Bentazon — 29.2% + Acifluorfen — 13.4%	G
Valor XLT Soybean Herb.	Valent U.S.A.	Chlorimuron-ethyl — 10.3% + Flumioxazin — 30%	G
Fierce Herb.	Valent U.S.A.	Flumioxazin — 33.5% + Pyroxasulfone — 42.5%	G
Piper Herb.	Valent U.S.A.	Flumioxazin — 33.5% + Pyroxasulfone — 42.5%	G
Fierce XLT Soybean Herb.	Valent U.S.A.	Chlorimuron — 6.67% + Flumioxazin — 24.57% + Pyroxasulfone — 31.17%	G
Fierce MTZ Herb.	Valent U.S.A.	Metribuzin — 15.86% + Pyroxasulfone — 6.76% + Flumioxazin — 5.29%	G
Fierce EZ Herb.	Valent U.S.A.	Pyroxasulfone — 17.81% + Flumioxazin — 14.04%	G
Hi-Yield Crabgrass Cont.	Vol. Purch. Groups	Trifluralin (a,a,a-trifluro-2,6-dinitro-N,N-dipropyl-p-toluidine) (Note: a = alpha) — 0.67% + Benefin — 1.33%	G
Hi-Yield Killzall Quick Weed and Grass Killer	Vol. Purch. Groups	Glyphosate, isopropylamine salt — 2% + Pelargonic acid — 2%	G
Ferti-lome Weed Out Lawn Weed Killer	Vol. Purch. Groups	Dicamba, dimethylamine salt — 1.21% + Dimethylamine 2,4-dichlorophenoxyacetate — 5.88% + Dimethylamine salt of (+) -R-2-(2,4-dichlorophenoxy)propanoic acid — 5.45%	G
Ferti-lome Weed Out Broadleaf Weed Cont.	Vol. Purch. Groups	Dimethylamine 2,4-dichlorophenoxyacetate — 1.65% + Dicamba, dimethylamine salt — 0.18% + Dimethylamine 2-(2-methyl-4-chlorophenoxy)propionate — 0.4%	G
Ferti-lome Weed-Out Lawn Weed Killer RTS	Vol. Purch. Groups	Dimethylamine 3,6-dichloro-o-anisate — 0.81% + Dimethylamine 2,4-dichlorophenoxyacetate — 1.91% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 3.33%	G
Ferti-lome Weed Free Zone	Vol. Purch. Groups	2,4-D, 2-ethylhexyl ester — 10.49% + Dicamba — 0.67% + Carfentrazone-ethyl — 0.54% + Mecoprop-P — 2.66%	G
Ferti-lome Weed Free Zone RTS	Vol. Purch. Groups	2,4-D, 2-ethylhexyl ester — 10.49% + Dicamba — 0.67% + Carfentrazone-ethyl — 0.54% + Mecoprop-P — 2.66%	G
Ferti-lome Weed Free Zone RTU	Vol. Purch. Groups	Mecoprop-P — 0.066% + Carfentrazone-ethyl — 0.0023% + Dicamba — 0.018% + MCPA, 2-ethylhexyl ester — 0.337%	G
Ferti-lome Weed-Out w/ Crabgrass Killer	Vol. Purch. Groups	Dicamba, dimethylamine salt — 0.6% + Quinclorac — 2.13% + 2,4-D, dimethylamine salt — 6.42%	G
Ferti-lome Weed-Out w/ Crabgrass Killer RTS	Vol. Purch. Groups	Dicamba, dimethylamine salt — 0.6% + Quinclorac — 2.13% + 2,4-D, dimethylamine salt — 6.42%	G

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Ferti-lome Weed-Out w/ Crabgrass Killer RTU	Vol. Purch. Groups	2,4-D, dimethylamine salt — 0.313% + Quinclorac — 0.104% + Dicamba, dimethylamine salt — 0.029%	G
Hi-Yield Killzall Ext. Cont.	Vol. Purch. Groups	Prodiamine — 7.51% + Glyphosate — 40.15%	G
Ferti-Lome Weed-Out Nutsedge Cont.	Vol. Purch. Groups	Prodiamine — 2.73% + Sulfentrazone — 1.36%	G
Ferti-Lome Weed-Out Nutsedge Cont. RTS	Vol. Purch. Groups	Sulfentrazone — 1.36% + Prodiamine — 2.73%	G
Hi-Yield KILLZALL 365	Vol. Purch. Groups	Glyphosate, isopropylamine salt — 43.68% + Imazapyr, isopropylamine salt — 0.78%	G
Willowood Sulfen Met DF	Willowood	Metriben — 27% + Sulfentrazone — 18%	G
WILLOWOOD THIONIL EC	Willowood	Thiobencarb — 31% + Propanil — 35%	G
Presidual Herb.	Winfield Solutions	S-Metolachlor — 58.2% + Metribuzin — 13.8%	G
Incinerate Charged	Winfield Solutions	Atrazine — 9.94% + Atrazine — 0.21% + S-Metolachlor — 27.1% + Mesotrione — 2.71%	R
Charger MAX ATZ	Winfield Solutions	Atrazine — 33% + S-Metolachlor — 26.1%	R
Brash	Winfield Solutions	Dicamba, dimethylamine salt — 12.4% + 2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 35.7%	G
Saddle-Up	Winfield Solutions	2,4-Dichlorophenoxyacetic acid — 32.4% + Dicamba — 10.8%	G
Strike Three	Winfield Solutions	2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 30.56% + Mecoprop, dimethylamine salt — 8.17% + Dicamba, dimethylamine salt — 2.77%	G
Trisidual Herb.	Winfield Solutions	Acetochlor — 41.67% + Clopyralid — 4.27% + Flumetsulam — 1.3%	G
Crossbow	Winfield Solutions	2,4-D, butoxyethyl ester — 34.4% + Triclopyr, butoxyethyl ester — 16.5%	G
Threesidual	Winfield Solutions	Clopyralid — 4.27% + Acetochlor — 41.67% + Flumetsulam — 1.3%	G
Dimetric Charged	Winfield Solutions	Flumioxazin — 7.32% + Metribuzin — 32.77%	G
	Defoliants and Desiccants		
Adios Cotton Defoliant	Arysta Lifescience N.A.	Thidiazuron — 12% + Diuron — 6%	G
Ginstar EC Cotton Defoliant	Bayer Cropscience	Thidiazuron — 12% + Diuron — 6%	G
Display Cotton Harvest Aid	FMC	Carfentrazone-ethyl — 18.04% + Fluthiacet-methyl — 4.75%	G
CottonQuik Cotton Harvest Aid/Defoliant	Nufarm Americas	Urea — 58.6% + Ethephon — 18.3%	G
CutOut Cotton Defoliant	Nufarm Americas	Thidiazuron — 12% + Diuron — 6%	G
Terminate Cotton Harvest	Nufarm Americas	Ethephon — 51.8% + Cyclanilide — 3.2%	G
	Fumigants		
Black Flag Dry Flea & Tick Fogger	Chemsico	Tetramethrin — 0.2% + Cypermethrin — 1.5% + Piperonyl butoxide — 0.5% + Pyriproxyfen — 0.167%	G
MBC Conc.	Hendrix and Dail	Methyl bromide (NO INERT USE) — 98% + Chloropicrin — 2%	R
MBC-33 Pre-Plant Fumigant	TriEst Ag Group	Methyl bromide — 67% + Chloropicrin — 32.8%	R
Pic Clor 60	TriEst Ag Group	Chloropicrin — 59.6% + 1,3-Dichloropropene — 39%	R
Pic Clor 60 EC	TriEst Ag Group	Chloropicrin — 56.6% + 1,3-Dichloropropene — 37.1%	R
Pic-Clor 80	TriEst Ag Group	Chloropicrin — 79.8% + 1,3-Dichloropropene — 19.5%	R
Sanafoam Vaporooter II	Douglas Prod. & Pack.	Dichlobenil — 50% + Metam-sodium — 30%	R
Terr-O-Gas 67	Great Lakes Chem.	Methyl bromide — 67% + Chloropicrin — 33%	R
Terr-O-Gas 75	Great Lakes Chem.	Methyl bromide — 75% + Chloropicrin — 25%	R
Terr-O-Gas 98	Great Lakes Chem.	Methyl bromide — 98% + Chloropicrin — 2%	R
Tri-Brom 50	TriEst Ag Group	Methyl bromide — 50% + Chloropicrin — 49.7%	R
Tri-Brom 67	TriEst Ag Group	Methyl bromide — 67% + Chloropicrin — 33%	R
Tri-Brom 80	TriEst Ag Group	Methyl bromide w/ chloropicrin — 80% + Chloropicrin — 19.9%	R
Tri-Brom 98	TriEst Ag Group	Methyl bromide — 98% + Chloropicrin — 2%	R
Tri-Brom 98	TriEst Ag Group	Methyl bromide — 98% + Chloropicrin — 2%	R
	Plant Growth Regulators		
Advantigro	Wilbur-Ellis Company	Gibberellic acid — 0.005% + Indolebutyric acid — 0.005% + Cytokinin (as kinetin) — 0.009%	G
Aquashade	Aquashade	Acid Blue 9 — 12.6% + Acid Yellow 23 — 1.04%	G
Ascend PRO	Winfield Solutions	Cytokinin (as kinetin) — 0.09% + Indole-3-butyric acid — 0.045% + Gibberellin A4 mixt. w/ Gibberellin A7 — 0.03%	G
Ascend SL	Winfield Solutions	Cytokinin (as kinetin) — 0.09% + Gibberellic acid — 0.03% + Indole-3-butyric acid — 0.045%	G
Ascend WSG	Winfield Solutions	Indole-3-butyric acid — 0.37% + Gibberellic acid — 0.25% + Cytokinin (as kinetin) — 0.76%	G
Bastion	Rosen's	Gibberellic acid — 0.005% + Indole-3-butyric acid — 0.005% + Cytokinin (as kinetin) — 0.009%	G
Consensus	Loveland Prod.	Salicylic acid — 0.04% + IBA — 0.02% + Chitosan — 1%	G
Crest	Fine Americas	Cytokinin (as kinetin) — 0.01% + Indole-3-butyric acid — 0.005% + Gibberellic acid — 0.005%	G
Cytoplex HMS	Miller Chem. & Fert.	Cytokinin (as kinetin) — 0.01% + Indole-3-butyric acid — 0.005% + Gibberellic acid — 0.004%	G
Dip'N Grow	Dip'n Grow	Indole-3-butyric acid — 1% + 1-Naphthaleneacetic acid — 0.5%	G
Edgeless Conc.	Sepro	Trinexapac-ethyl — 5% + Flurprimidol — 13.26%	G
Fascination PGR Solution	Valent BioSci.	Gibberellin — 1.8% + N-(Phenylmethyl)-1H-purin-6-amine — 1.8%	G
Finish 6 Pro Harvest Aid for Cotton	Bayer Cropscience	Ethephon — 52.6% + Cyclanilide — 3.3%	G

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Fortified Stimulate Yield Enhancer Plus	Stoller Enterprises	Gibberellic acid — 0.005% + Cytokinin (as kinetin) — 0.009% + Indole-3-butyric acid — 0.005% + Indole-3-acetic acid — 0.005%	G
Fresco	Fine Americas	Gibberellin A4 mixt. w/ Gibberellin A7 — 1.8% + Benzyladenine — 1.8%	G
Gin Out PGR	Nufarm Americas	Kinetin (plant hormone) — 0.0025% + Mepiquat chloride — 4.2%	G
Green-Sol 48	Frit Industries	Kinetin (plant hormone) — 0.01% + Gibberellic acid — 0.02%	G
Hone	Fine Americas	Cytokinin (as kinetin) — 0.01% + Indole-3-butyric acid — 0.005% + Gibberellic acid — 0.005%	G
Intensify	Conklin	Gibberellic acid — 0.7% + Indole-3-butyric acid — 0.64%	G
Legacy Turf Growth Regulator	Sepro	Flurprimidol — 13.26% + Trinexapac-ethyl — 5%	G
Musketeer	Sepro	Trinexapac-ethyl — 1.4% + Paclobutrazol — 5.6% + Flurprimidol — 5.6%	G
Pacer	Rosen's	Gibberellic acid — 0.005% + Indole-3-butyric acid — 0.005% + Cytokinin (as kinetin) — 0.009%	G
Potenza	Loveland Prod.	Kinetin (plant hormone) — 0.003% + Indolebutyric acid — 0.064% + Mepiquat chloride — 4.2%	G
Radiate	Loveland Prod.	IBA — 0.85% + Cytokinin (as kinetin) — 0.15%	G
Receptor	Helena Agri-Enterprises	Gibberellic acid — 0.0026% + Indole — 0.0042% + Kinetin (plant hormone) — 0.0084%	G
Stance Plant Regulator	Bayer Cropscience	Cyclanilide — 2.1% + Mepiquat chloride — 8.4%	G
Stimulate Yield Enhancer Plus	Stoller Enterprises	Cytokinin (as kinetin) — 0.009% + Gibberellic acid — 0.005% + Indole-3-butyric acid — 0.005%	G
Treble	Rosen's	Gibberellic acid — 0.005% + Indole-3-butyric acid — 0.005% + Cytokinin (as kinetin) — 0.009%	G
Triad	Rosen's	Gibberellic acid — 0.005% + Indole-3-butyric acid — 0.005% + Cytokinin (as kinetin) — 0.009%	G
Trizon ST	Rosen's	Cytokinin (as kinetin) — 0.1% + Indole-3-butyric acid — 0.05% + Gibberellic acid — 0.05%	G
Typy PGR Solution	Nufarm Americas	Benzyladenine — 1.8% + Gibberellin A4 mixt. w/ Gibberellin A7 — 1.8%	G
Vigeo PGR	Vivid Life Sci.	Cytokinin (as kinetin) — 0.01% + Gibberellin A3 — 0.004% + Indolebutyric acid — 0.005%	G
		Weed and Feed	
Rio	Arysta Lifescience NA	Cytokinin (as kinetin) — 0.0085% + Gibberellic acid — 0.0033% + Indole-3-acetic acid — 0.0033%	G
Bonide Liquid W&F 20-0-0 RTS	Bonide Products	2,4-Dichlorophenoxyacetic acid — 2.26% + Propionic acid — 1.17%	G
Bonide DuraTurf W&F	Bonide Products	2,4-Dichlorophenoxyacetic acid — 0.182% + 2-Methyl-4-chlorophenoxyacetic acid — 0.359% + Dicamba — 0.09% + Isooctyl 2,4-dichlorophenoxyacetate — 1.346%	G
Pennington Ultragreen W&F 30-0-4	Central Garden & Pet	2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071% + Mecoprop-P — 0.167%	G
Pennington Ultragreen W&F II 30-0-4	Central Garden & Pet	2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071% + Mecoprop-P — 0.167%	G
Image Herb. Consumer Conc. All-in-1 Lawn Weed Killer Conc.	Central Garden & Pet	Quinclorac — 5% + Sulfentrazone — 1.6%	G
Jobe's Essentials W&F Lawn Fert.	Easy Gardener Prod.	Clove, Crushed — 3% + Eugenol — 2.5%	25(B)
American Way W&F	Gro Green	(R)-2-(2,4-Dichlorophenoxy)propanoic acid, dimethylamine salt — 0.179% + Dimethylamine (R)-2-(2-methyl-4-chlorophenoxy)propionate — 0.182% + Dimethylamine 2,4-dichlorophenoxyacetate — 0.7%	G
GroundWork South. W&F Lawn Fert. 20-0-5	Gro Tec	Penoxsulam — 0.02% + Penoxsulam — 0.02% + Penoxsulam — 0.02% + Penoxsulam — 0.02% + Sulfentrazone — 0.02% + Sulfentrazone — 0.02% + Sulfentrazone — 0.02% + Sulfentrazone — 0.02%	G
Expert Gardener Lawn Weed Control II [0-0-]	Gro Tec	2,4-D, 2-ethylhexyl ester — 1.108% + 2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071% + Dicamba — 0.071% + Mecoprop — 0.167% + Mecoprop-P — 0.167%	G
Expert Gardener Liquid W&F 15-0-0	Gro Tec	2,4-Dichlorophenoxyacetic acid, dimethylamine salt — 3.25% + Mecoprop, dimethylamine salt — 1.63% + Propionic acid, 2-(2,4-dichlorophenoxy)- — 1.61%	G
Sta-Green Phosphorus Free W&F	Gro Tec	2,4-D — 1.108% + 2,4-D, 2-ethylhexyl ester — 1.108% + 2,4-D, 2-ethylhexyl ester — 1.108% + 2,4-D, 2-ethylhexyl ester — 1.108% + 2,4-D, 2-ethylhexyl ester — 1.108% + 2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071% + Dicamba — 0.071% + Dicamba — 0.071% + Dicamba — 0.071% + Dicamba — 0.071% + Mecoprop — 0.167% + Mecoprop — 0.167% + Mecoprop-P — 0.167% + Mecoprop-P — 0.167% + Mecoprop-P — 0.167%	G
StaGreen 3Xtreme Action Lawn Care [18-0-1]	Gro Tec	2,4-D — 0.675% + Dicamba — 0.06% + Dithiopyr — 0.121% + Quinclorac — 0.346%	G
Green Charm Weed and Feed w/ Triamine 10-6-4	Gro Tec	2,4-D — 0.313% + 2,4-D — 0.15% + Dichlorprop-P — 0.155%	G
Fert. w/ Team Pro 0.86%	Harrell's	Benefin — 0.43% + Trifluralin — 0.43%	G

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Product	Company	Chemical Content	Use Class
Fert. w/ Starteem #2	Harrell's	Benefin — 0.25% + Oxadiazon — 0.75% + Trifluralin — 0.25%	G
Fert. w/ StarTeem #3	Harrell's	Benefin — 0.25% + Oxadiazon — 1% + Trifluralin — 0.25%	G
Howard Johnson's W&F contains Surge Broadleaf Herb. 16-0-4	Howard Johnson's Ent.	2,4-D, 2-ethylhexyl ester — 1.153% + Dicamba — 0.073% + Mecoprop-P — 0.174% + Sulfentrazone — 0.034%	G
HJE All Season W&F w/ Triamine	Howard Johnson's Ent.	2,4-Dichlorophenoxyacetic acid — 0.313% + Dichlorprop-P — 0.155% + Mecoprop-P — 0.157%	G
HJE W&F w/ Lazer	Howard Johnson's Ent.	2,4-D, diethylamine salt — 0.664% + 2,4-D, dimethylamine salt — 0.664% + Dicamba — 0.028% + Dicamba — 0.028% + Mecoprop — 0.163% + Mecoprop-P — 0.163%	G
Pennington Seed Echelon 0.3% Granular Herb. on Fert.	Howard Johnson's Ent.	Prodiamine — 0.2% + Sulfentrazone — 0.1%	G
Gro-Fine Economy W&F 11-0-7	Knox Fert.	2,4-D, 2-ethylhexyl ester — 1.108% + 2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071% + Dicamba, dimethylamine salt — 0.071% + Mecoprop-P — 0.167% + Mecoprop-P — 0.167%	G
Green Thumb 3 in 1 W&F	Knox Fert.	2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071% + Dithiopyr — 0.16% + Mecoprop-P — 0.167%	G
Greenview Fairway Formula Spring Fert. W&F & Crabgrass Prev. 24-0-6	Lebanon Seaboard	2,4-D — 0.64% + Dicamba — 0.06% + Dithiopyr — 0.16% + Mecoprop-P — 0.14%	G
Greenview W&F w/ Preen 27-0-4	Lebanon Seaboard	2,4-D, 2-ethylhexyl ester — 1.108% + 2,4-D, 2-ethylhexyl ester — 1.108% + 2,4-Dichlorophenoxyacetic acid — 1.108% + Dicamba — 0.071% + Dicamba — 0.071% + Dicamba — 0.071% + Mecoprop-P — 0.167% + Mecoprop-P — 0.167% + Mecoprop-P — 0.167%	G
Preen One Lawncare	Lebanon Seaboard	2,4-Dichlorophenoxyacetic acid — 1.108% + Dicamba — 0.071% + Dithiopyr — 0.16% + Mecoprop-P — 0.167%	G
Lesco Eliminate Q W&F 17-0-3M (702200)	Lesco	2,4-D — 0.675% + Dicamba — 0.06% + Quinclorac — 0.346%	G
Lesco W&F Plus Fert.	Lesco	2,4-D — 0.56% + 2,4-D — 0.56% + Dichlorprop-P — 0.143% + Dichlorprop-P — 0.143% + Mecoprop-P — 0.145% + Mecoprop-P — 0.145%	G
Lesco Momentum Force 21-0-11E W&F	Lesco	2,4-Dichlorophenoxyacetic acid — 0.162% + 2,4-Dichlorophenoxyacetic acid — 0.162% + 2,4-Dichlorophenoxyacetic acid isooctyl ester — 1.196% + 2,4-Dichlorophenoxyacetic acid isooctyl ester — 1.196% + Dicamba — 0.08% + Dicamba — 0.08% + Mecoprop-P — 0.319% + Mecoprop-P — 0.319%	G
Lesco Echelon 0.30% Plus Fert.	Lesco	Prodiamine — 0.2% + Sulfentrazone — 0.1%	G
Lesco Lockup Extra 2 w/ Fert. 0-0-7M (#701145)	Lesco	2,4-D — 1.04% + 2,4-D — 1.04% + Dicamba — 0.08% + Dicamba — 0.08% + Penoxsulam — 0.01% + Penoxsulam — 0.01%	G
Gordon's Pasture Pro Plus One-Step W&F 15-0-0	PBIGordon	2,4-D, diethanolamine salt — 1.26% + 2,4-D, diethanolamine salt — 1.26% + 2,4-D, dimethylamine salt — 2.57% + 2,4-D, dimethylamine salt — 2.57%	G
Gordon's Liquid W&F 2 15-0-0	PBIGordon	2,4-D, dimethylamine salt — 4.51% + MCPP-p, DMA salt — 2.33%	G
BioAdvanced Sci.-Based Sol. All-in-1 Lawn Weed & Crabgrass Killer I RTU	SBM Life Sci.	2,4-D, dimethylamine salt — 0.313% + Dicamba, dimethylamine salt — 0.029% + Quinclorac — 0.104%	G
Liquid Turf Builder w/ Plus 2 Weed Control 25-0-2	Scotts	2,4-D, dimethylamine salt — 2.29% + Dichlorprop — 1.13% + Mecoprop-P — 1.15% + 2,4-D — 1.21% + 2,4-D — 1.21% + 2,4-D — 1.21% + 2,4-D — 1.21% + Mecoprop-P — 0.61% + Mecoprop-P — 0.61% + Mecoprop-P — 0.61%	G
Scotts Turf Builder Triple Action 16-0-1	Scotts	2,4-D — 0.69% + MCPP-p — 0.345% + Pendimethalin — 0.81%	G
Scotts Turf Builder South. Triple Action 1 29-0-10	Scotts	Atrazine — 1.352% + Atrazine — 1.352% + Bifenthrin — 0.139% + Bifenthrin — 0.13%	G
Scotts Turf Builder W&F B 28-0-3	Scotts	2,4-D, dimethylamine salt — 0.723% + Dichlorprop-P — 0.088% + Mecoprop-P — 0.148%	G
Spectracide W&F 20-0-0	Spectrum Group	2,4-D — 3.25% + 2,4-D, dimethylamine salt — 3.25% + 2,4-D, dimethylamine salt — 3.25% + Dichlorprop-P — 1.61% + Dichlorprop-P — 1.61% + Dichlorprop-P — 1.61% + Mecoprop, dimethylamine salt — 1.63% + Mecoprop, dimethylamine salt — 1.63% + Mecoprop-P — 1.63%	G
Sunniland Professional 20-0-6 W&F	Sunniland	2,4-Dichlorophenoxyacetic acid — 0.55% + Dicamba — 0.05% + Propionic acid, 2-(2,4-dichlorophenoxy)- — 0.12%	G
Vigoro W&F 28-0-3	Swiss Farms Prod.	2,4-D — 1.108% + Dicamba — 0.071% + Mecoprop-P — 0.167%	G
Weed & Feed 29-0-3	Swiss Farms Prod.	2,4-D — 1.18% + 2,4-D — 1.18% + 2,4-D — 1.18% + 2,4-D — 1.18% + Mecoprop-P — 0.59% + Mecoprop-P — 0.59% + Mecoprop-P — 0.59% + Mecoprop-P — 0.59%	G
Andersons Pro. Turf Products 22-0-4 w/ Trimec Herb.	Andersons	2,4-Dichlorophenoxyacetic acid ethyl ester — 0.55% + Dicamba — 0.05% + Mecoprop — 0.12%	G
Andersons Pro. Turf Prod. Fert. w/ Surge Broadleaf Herb. (16-0-9)	Andersons	2,4-D, 2-ethylhexyl ester — 1.153% + Dicamba — 0.073% + Mecoprop-P — 0.174% + Sulfentrazone — 0.034%	G
Fortify W&F 22-0-3	Andersons	Dimethylamine (R)-2-(2-methyl-4-chlorophenoxy)propionate — 0.145% + Dimethylamine 2,4-dichlorophenoxyacetate — 0.56% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy) propanoic acid — 0.143%	G
Andersons Pro. Turf Products Fert. 16-0-8 w/ Escalade Herb.	Andersons	1-Methylheptyl ((4-amino-3,5-dichloro-6-fluoro-2-pyridinyl)oxy) acetate — 0.206% + Dicamba — 0.0717% + Isooctyl 2,4-dichlorophenoxyacetate — 0.865%	G

Product	Company	Chemical Content	Use Class
Landscapers Select Lazer W&F	Turf Care Supply	Dicamba — 0.042% + Dicamba — 0.042% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy)propanoic acid — 0.99% + Dimethylamine salt of (+)-R-2-(2,4-dichlorophenoxy) propanoic acid — 0.99% + Mecoprop — 0.24% + Mecoprop — 0.24%	G
Ferti-lome Centipede W&F	VPG	Dicamba, dimethylamine salt — 0.07% + Dicamba, dimethylamine salt — 0.07% + Dimethylamine 2-(2-methyl-4-chlorophenoxy) propionate — 0.29% + Dimethylamine 2-(2-methyl-4-chlorophenoxy)propionate — 0.29% + Dimethylamine 2,4-dichlorophenoxyacetate — 0.17% + Dimethylamine 2,4-dichlorophenoxyacetate — 0.17%	G
Hi-Yield W&F	VPG	Dicamba, dimethylamine salt — 0.08% + Dimethylamine 2-(2-methyl-4-chlorophenoxy)propionate — 0.32% + Dimethylamine 2,4-dichlorophenoxyacetate — 0.18%	G
Ferti-lome Weed Free Zone Plus Lawn Fert.	VPG	2,4-D, 2-ethylhexyl ester — 1.153% + Dicamba — 0.073% + Mecoprop-P — 0.174% + Sulfentrazone — 0.034%	G
Ferti-lome Weed-Out Pro Turf	VPG	2,4-D, 2-ethylhexyl ester — 1.108% + Dicamba — 0.071% + Dithiopyr — 0.16% + Mecoprop-P — 0.167%	G
Groundwork W&F 23-0-7	Winfield Solutions	2,4-D — 0.55% + Dicamba — 0.05% + Propionic acid, 2-(2-methyl-4-chlorophenoxy)- — 0.12%	G

ADJUVANTS FOR HERBICIDES

Surfactants

The surfactant concentrations recommended in the guidelines are based on the use of surfactants that are 85% (+10%) active. All numbers have been rounded off to the nearest whole number in the following list of adjuvants currently registered. If a surfactant is used with a lower level of activity, proportionally more should be used to obtain the desired concentration. The surfactant market provides a variety of trade names with great differences in levels of active ingredients.

Because of the confusion that frequently occurs concerning the purchase of a suitable surfactant, the following suggestions are provided:

1. Purchase a surfactant specifically manufactured and marketed for use in agriculture; use only nonionic surfactants sold specifically for use with herbicides and cleared for use under Public Law 518.

2. Purchase on the basis of percentage active ingredient. It is less profitable, for example, to purchase a product with 20% active ingredient at $4 per gallon than it is to purchase a product with 80% active ingredient at $10 per gallon.

3. Do not consider isopropyl alcohol or water as active ingredients. Many products on the market are deceptive because they may include isopropyl alcohol (isopropanol) as a "functioning agent" or some other nondescript term to imply that the alcohol is an active ingredient. If the label on the container does not specifically state the percentage active ingredient (% surfactant) in the container, ask the dealer for this information.

4. Do not purchase products manufactured for household use to use with herbicides. Many of the surfactants present in household detergents and related products are excellent surfactants per se, but they may be present in low concentrations, in mixtures, or in combination with other products that interact with herbicides to reduce the level of weed control obtained.

5. Be wary of claims that a surfactant may cost much more but can be used at concentrations much lower than with conventional surfactants. Evidence does not exist that there is any one particular surfactant being marketed that is so effective that the amount normally needed for adequate control can be greatly reduced as compared to other suitable surfactants that are available. Premium prices may be paid for surfactants marketed in this manner with a poor return on the investment.

6. In deciding on the most economical surfactant to purchase for use with herbicides, ignore the following claims: (1) the surfactant contains a silicone or some other agent that will help keep the spray equipment clean; (2) the surfactant increases water penetration into the soil; or (3) use of the surfactant will increase root penetration and nutrient uptake by the crop. Often these claims have not been verified. The use of such claims may imply that the product being offered will cost more than surfactants being offered by reputable agricultural outlets.

7. There are no "miracle" surfactants. There are many good surfactants on the market, but there are none that justify greatly increased prices. There are none that are so highly effective that the use rate can be reduced below that recommended for specific herbicides in these weed control guidelines.

8. Some companies recommend the use of certain adjuvants with their products. Consult labels for approved adjuvants.

Oil + Surfactants and/or Emulsifiers

Several poorly defined terms characterize this group of adjuvant mixtures. The suggested addition of a crop oil concentrate (COC) refers to products that contain 80 to 85% petroleum or vegetable oil plus 15 to 20% surfactant and emulsifiers. Use of blends, other than emulsifiable oils, containing more than 85% oil has not been evaluated adequately for use with herbicides.

The term "emulsifiable oil" generally refers to products that contain about 98% oil and 1 to 2% emulsifiers. The terms "nonphytotoxic oils" and "phytobland oils" also have been used for this group of adjuvants. Generally, crop oil concentrates are being used in place of emulsifiable oils in herbicide spray mixtures.

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Registered Adjuvants

Brand name	Manufacturer	% Active agent
APSA-80 All Purpose Spray Adjuvant Conc.	Access Business Group, Intl.	20.00
Salt Solutions by Ultima Salt Start Up	Advantis Technologies	73.00
Salt Solutions by Ultima Stabilizer	Advantis Technologies	98.5
Salt Solutions by Ultima pH Down	Advantis Technologies	95.00
Salt Solutions by Ultima Weekly Shock Oxidizer	Advantis Technologies	43.30
Salt Solutions by Ultima Monthly Salt Maintenance	Advantis Technologies	77.00
Salt Solutions by Ultima Weekly Salt Pool Refresh	Advantis Technologies	24.00
Assist Polymer Based Adjuvant	Ag Source.	99.97
TOPSIDE	AgXplore Intl.	74.75
CONTAIN	AgXplore Intl.	100.00
NZONE MAX	AgXplore Intl.	41.25
NZONE GL	AgXplore Intl.	33.00
SYNURGIZE	AgXplore Intl.	45.50
COMBUST	AgXplore Intl.	72.00
NZONE	AgXplore Intl.	33.00
TYRANT	AgXplore Intl.	100.00
TRIPLE PLAY	AgXplore Intl.	100.00
PHUSE	AgXplore Intl.	80.00
PURGE	AgXplore Intl.	100.00
StikIT	AgXplore Intl.	32.00
Peerless	AgXplore Intl.	100.00
LandLock	AgXplore Intl.	100.00
Jagge	AgXplore Intl.	100.00
Jette	AgXplore Intl.	80.00
Spredde 90/10	AgXplore Intl.	90.00
Alligare Surface	Alligare	100.00
Basal Oil Blue	Alligare	100.00
Alligare PATTERN	Alligare	30.00
Alligare Anti-Foamer	Alligare	10.00
Alligare MSO	Alligare	100.00
Alligare MVO Plus	Alligare	99.00
Alligare OSS/NIS	Alligare	99.00
Alligare Water Conditioner	Alligare	100.00
Alligare Surface	Alligare	100.00
Alligare De-Foamer	Alligare	10.00
Alligare forestry Oil	Alligare	100.00
Alligare Performance Wetter	Alligare	100.00
Alligare Water Conditioner SU	Alligare	50.00
Alligare 90	Alligare	100.00
Alligare Drift Cont.	Alligare	35.25
Alligare Crop Oil Conc.	Alligare	83.00
Alligare MSO 1	Alligare	100.00
Alligare Water Conditioner 1	Alligare	100.00
Alligare Trace	Alligare	100.00
Alligare 7	Alligare	100.00
Alligare MVO Plus 1	Alligare	100.00
Alligare BupHr	Alligare	100.00
AB Brand Aquatic Non-Ionic Surfactant	Applied Biochemists	100.00
Amp Activator	Applied Biochemists	85.00
Shocktrine	Applied Biochemists	44.70
Pool Breeze Pool Care System Optishock	Arch Chem.	44.70
HTH Spa Brom-Start	Arch Chem.	99.00
Chlorine-Free Baquacil Total Alkalinity Increaser	Arch Chem.	100.00
Brilliance for Spas Oxidizing Tablets	Arch Chem.	32.25
Brilliance for Spas pH Decreaser	Arch Chem.	92.00
Poolife Exclusive Pool Care Collection pH + Balancer	Arch Chem.	99.00
Pool Breeze Pool Care System pH Decreaser	Arch Chem.	92.00
Baquacil pH Decreaser	Arch Chem.	92.00
Brilliance for Spas pH Increaser	Arch Chem.	98.00
HTH Stabilizer	Arch Chem.	98.50
HTH Spa pH Decreaser	Arch Chem.	91.00
HTH pH Increaser	Arch Chem.	99.00
HTH Spa pH Increaser	Arch Chem.	98.00
HTH Stabilizer &Conditioner	Arch Chem.	98.50
HTH pH Decreaser	Arch Chem.	92.00
HTH Alkalinity Increaser	Arch Chem.	100.00
90 Years of HTH Perfect Pools Pre-Measured Water Soluble Pods Alkalinity Up	Arch Chem.	100.00
90 Years of HTH Perfect Pools Pre-Measured Water Soluble Pods pH Up	Arch Chem.	99.00
90 Years of HTH Perfect Pools Pre-Measured Water Soluble Pods pH Down	Arch Chem.	95.00
90 Years of HTH Perfect Pools Pre-Measured Open & Pour Pouch	Arch Chem.	95.00

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Brand name	Manufacturer	% Active agent
90 Years of HTH Perfect Pools Pre-Measured Water Soluble Pods	Arch Chem.	98.50
Pool Breeze Pool Care System Non-Chlorine Oxidizer	Arch Chem.	44.70
Poolife Exclusive Pool Care Collection Non-Chlorine Oxidizer	Arch Chem.	44.70
Pool Breeze Pool Care System pH Increaser	Arch Chem.	98.00
Pool Breeze Pool Care System Total Alkalinity Increaser	Arch Chem.	100.00
Pool Breeze Pool Care System Stabilizer & Conditioner	Arch Chem.	98.50
Brilliance for Spas Oxidizer	Arch Chem.	44.70
90 Years of HTH Perfect Pools pH Down	Arch Chem.	92.00
90 Years of HTH Perfect Pools pH Up	Arch Chem.	99.00
90 Years of HTH Perfect Pools Alkalinity Up	Arch Chem.	100.00
90 Years of HTH Perfect Pools Stabilizer	Arch Chem.	98.50
Baqua Spa pH Decreaser	Arch Chem.	92.00
Baqua Spa pH Increaser	Arch Chem.	98.00
Chlorine-Free Baquacil Total Alkalinity Increaser	Arch Chem.	100.00
Poolife Exclusive Pool Care Collection Stabilizer & Conditioner Balancer	Arch Chem.	98.50
Poolife Exclusive Pool Care Collection pH + Balancer	Arch Chem.	99.00
Poolife Exclusive Pool Care Collection pH Minus Balancer	Arch Chem.	92.00
Brilliance for Spas Total Alkalinity Increaser	Arch Chem.	100.00
Brilliance for Spas Start Up	Arch Chem.	99.00
Brilliance for Spas pH True	Arch Chem.	45.80
Poolife Exclusive Pool Care Collection Alkalinity + Balancer	Arch Chem.	100.00
Pulsar Sunscreen 20 Stabilizer	Arch Chem.	98.50
HTH Salt Pool Care pH Decreaser	Arch Chem.	95.00
HTH Salt Pool Care Stabilizer	Arch Chem.	98.50
Baqua Spa Total Alkalinity Increaser	Arch Chem.	100.00
Baquacil pH Increaser	Arch Chem.	99.00
HTH Salt Pool Care Non-Chlorine Shock Oxidizer	Arch Chem.	43.30
Poolife Pods Alkalinity Plus	Arch Chem.	100.00
Poolife Pods Non Chlorine Oxidizer	Arch Chem.	38.00
Poolife Pods pH Minus	Arch Chem.	95.00
Poolife Pods pH Plus	Arch Chem.	99.00
Poolife Pods Stabilizer & Conditioner	Arch Chem.	98.50
HTH Pre-Measured Water Soluble Pods Alkalinity Up	Arch Chem.	100.00
HTH Pre-Measured Water Soluble Pods pH Down	Arch Chem.	95.00
HTH Pre-Measured Water Soluble Pods pH Up	Arch Chem.	99.00
HTH Pre-Measured Water Soluble Pods Stabilizer	Arch Chem.	98.50
HTH Spa Non-Chlorine Shock Oxidizer	Arch Chem.	32.20
HTH SPA Brom Start	Arch Chem.	99.00
Hook	Atlantic-Pacific Ag.	17.60
Shake Down	BASF	10.00
Perafoam	Best Sanitizers,	15.18
Spa Selection Non-Chlorine Shock Oxidizer	Bluegrass Water Products	44.70
Spa Selection pH Decreaser	Bluegrass Water Products	91.00
Spa Selection pH Increaser	Bluegrass Water Products	98.00
Spa Selections Brom Start	Bluegrass Water Products	99.00
Bonide Turbo Spreader Sticker Conc.	Bonide Products	80.00
Brandt Ultra 90	Brandt Consolidated	90.00
Brandt Topcoat	Brandt Consolidated	100.00
Brandt Indicate 5	Brandt Consolidated	80.00
Poly Film — R	Brewer Intl.	100.00
Poly Cont. 2	Brewer Intl.	30.00
Cide-Kick II	Brewer Intl.	100.00
Brewer TA-39	Brewer Intl.	100.00
MSO Surfactant	Brewer Intl.	100.00
90-10 Surfactant	Brewer Intl.	90.00
Silenergy	Brewer Intl.	99.00
Brewer Defoamer	Brewer Intl.	10.00
Polyan	Brewer Intl.	35.00
Orchex 796	Calumet Refining	100.00
AMS 4 XL	Chem-nut	40.25
CNI Agri-Oil	Chem-nut	100.00
CNI 80-20	Chem-nut	80.00
CNI Defoamer	Chem-nut	10.00
Swift	Chem-nut	97.90
Coact-XE2	Chem-nut	34.25
DC-4	Chem-nut	99.00
ANCHOR	Chem-nut	30.00
Chemtrol Deposition Aid Drift Retardant	Chemorse	1.00
Conquer Spray Adjuvant	Chemorse	92.50
Phin Dark Green Pods Non-Chlorine Shock Oxidizer for Pools	Connected Yard	38.25
Phin Dark Green Striped Pods Non-Chlorine Shock Oxidizer for Hot Tubs	Connected Yard	38.25
pHin Yellow Striped Pods pH Down for Hot Tubs	Connected Yard	95.00

Brand name	Manufacturer	% Active agent
pHin Orange Striped Pods pH Up for Hot Tubs	Connected Yard	99.00
pHin Orange Pods pH Up for Pools	Connected Yard	99.00
pHin Yellow Pods pH Down for Pools	Connected Yard	95.00
CropSmart Lock-In	CropSmart,	100.00
AirLink Deposition Aid — Drift Reduction Agent	CropSmart,	99.70
DRP-955 Drift Retardant and Penetrator	Davidon,	5.20
Decco 313 Buffer Conc.	Decco US Post-Harvest	24.00
Diamulse C	Diacon Technologies	100.00
Drexel AMS-Xtra	Drexel Chem.	0.50
Drexel Beanoil	Drexel Chem.	100.00
Pilot's Choice AMS 34 Turbo	Drexel Chem.	34.50
Drexel Sequestra	Drexel Chem.	100.00
Drexel Hot Mes	Drexel Chem.	100.00
Drexel MES-100	Drexel Chem.	100.00
Drexel AMS-ALL	Drexel Chem.	40.25
Drexel AMS-Supreme	Drexel Chem.	34.00
Drexel AMS-Xtra	Drexel Chem.	34.00
Drexel Holzit	Drexel Chem.	100.00
Drexel Hum-AC 820	Drexel Chem.	80.00
Drexel Lox	Drexel Chem.	100.00
Drexel Lox Plus	Drexel Chem.	45.20
Drexel Pas-800	Drexel Chem.	80.00
Drexel Peptoil	Drexel Chem.	100.00
Drexel Primary	Drexel Chem.	100.00
Drexel Sir-Factant	Drexel Chem.	80.00
Drexel Special 80	Drexel Chem.	80.00
Drexel Surf-AC 820	Drexel Chem.	80.00
Drexel Surf-AC 910	Drexel Chem.	90.00
Drexel Vegetoil	Drexel Chem.	100.00
Drexel AMS-Supreme	Drexel Chem.	2.50
DuPont TPQ89 Adjuvant	DuPont	22.00
Boost 3201	Ecolab	16.90
Liquid K	Ecolab	1.40
Liquid K	Ecolab	15.40
Liquid K	Ecolab	2.98
Exspor Activator Conc.	Ecolab	10.80
Aqua Balance Muriatic Acid	Ecolab	31.45
Aqua Balance Dechlor Reducing Agent	Ecolab	100.00
Aqua Balance Total Alkalinity	Ecolab	100.00
Aqua Balance pH Plus	Ecolab	100.00
Aqua Balance SPF-3050	Ecolab	98.00
Aqua Balance Pool Conditioner	Ecolab	98.00
Boost 3201 SM	Ecolab	16.90
BREAK-THRU	Evonik	100.00
BREAK-THRU T&O	Evonik	100.00
Audible 90 MS	Exacto	90.00
Audible 80 MS	Exacto	80.00
Scrimmage MS	Exacto	90.00
Motion MS	Exacto	100.00
Handoff MS	Exacto	95.00
Yardage MS	Exacto	80.00
Completion MS	Exacto	45.00
Reverse	Exacto	10.00
Back Field	Exacto	90.00
Offside MS	Exacto	92.00
Act360	FBN Inputs	95.00
Crosslock	FBN Inputs	100.00
Nueve	FBN Inputs	90.00
Quadraxx	FBN Inputs	100.00
FBN Pureblend MSO	FBN Inputs	100.00
FBN Crop Oil Conc.	FBN Inputs	83.00
FBN AMS Pro	FBN Inputs	40.25
FBN HighSurf MSO	FBN Inputs	60.00
FBN 80/20 Surfactant	FBN Inputs	80.00
FBN AMS 34L	FBN Inputs	34.50
FBS Harmony	FBSci.	40.00
TPQ89 Compatibility Agent	FMC	20.00
Oxy-Brite	Glb Pool & Spa	43.30
Rendezvous Spa Specialties pH Up	Glb Pool & Spa	99.00
GLB pH Up	Glb Pool & Spa	99.00
Rendezvous Spa Specialties Spa Increase	Glb Pool & Spa	28.56
GLB Alkalinity Up	Glb Pool & Spa	100.00
Rendezvous Spa Specialties Alkalinity Up	Glb Pool & Spa	95.00

Brand name	Manufacturer	% Active agent
GLB Stabilizer	Glb Pool & Spa	98.50
Rendezvous Spa Specialties pH Magic	Glb Pool & Spa	2.00
Rendezvous Spa Specialties pH Magic	Glb Pool & Spa	98.00
Rendezvous Spa Specialties Broma-Start	Glb Pool & Spa	99.00
Rendezvous Spa Specialties pH Down	Glb Pool & Spa	95.00
Rendezvous Spa Specialties Spa Decrease	Glb Pool & Spa	35.00
GLB pH Down	Glb Pool & Spa	95.00
Rendezvous Spa Specialties ACTIVATE	Glb Pool & Spa	32.20
Harrell's SprayMAX Activator	Harrell's	90.00
Harrell's SprayMAX Crop Oil Conc.	Harrell's	60.00
Harrell's SprayMAX Defoamer	Harrell's	20.00
Harrell's SprayMAX Herb. Activator	Harrell's	100.00
Harrell's SprayMAX Methylated Seed Oil	Harrell's	100.00
Harrell's SprayMAX Nonionic Penetrant Plus	Harrell's	100.00
Harrell's SprayMAX Nonionic Penetrant	Harrell's	80.00
Harrell's SprayMAX Nonionic Spreader Sticker	Harrell's	32.50
Harrell's SprayMAX pH Buffer	Harrell's	40.00
Harrell's SprayMAX Siloxane Surfactant	Harrell's	99.00
StrikeZone LC	Helena Agri-Enterprises	95.00
Hel-Fire	Helena Agri-Enterprises	90.00
Oculus	Helena Agri-Enterprises	48.00
Zaar	Helena Agri-Enterprises	100.00
Oculus Maxx	Helena Agri-Enterprises	40.00
Foambuster 10	Helena Agri-Enterprises	10.00
Dyne-A-Pak	Helena Agri-Enterprises	84.30
Fire-Zone	Helena Agri-Enterprises	100.00
Clasp	Helena Agri-Enterprises	1.00
Justified	Helena Agri-Enterprises	100.00
Smoke	Helena Agri-Enterprises	56.40
CROP OIL CONCENTRATE	Helena Agri-Enterprises	85.00
COHERE	Helena Agri-Enterprises	90.00
INDUCE	Helena Agri-Enterprises	90.00
REQUEST	Helena Agri-Enterprises	50.00
ACCUZONE DC	Helena Agri-Enterprises	100.00
PREMIUM MSO	Helena Agri-Enterprises	100.00
AGRI-DEX	Helena Agri-Enterprises	99.00
NUTRASYST	Helena Agri-Enterprises	5.00
NUTRASYST CONCENTRATE	Helena Agri-Enterprises	20.00
FOAMBUSTER MAX	Helena Agri-Enterprises	30.00
KINETIC HV	Helena Agri-Enterprises	99.00
DYNE-AMIC	Helena Agri-Enterprises	99.00
AD-SPRAY 80	Helena Agri-Enterprises	80.00
POINTBLANK WM	Helena Agri-Enterprises	35.25
BLENDEX VHC	Helena Agri-Enterprises	90.00
GROUND ZERO	Helena Agri-Enterprises	100.00
OPTIMA	Helena Agri-Enterprises	90.00
KINETIC	Helena Agri-Enterprises	99.00
INTERACTIVE	Helena Agri-Enterprises	43.00
GROUNDED	Helena Agri-Enterprises	99.00
ALIGN	Helena Agri-Enterprises	35.00
STRIKEZONE MXD	Helena Agri-Enterprises	100.00
ACCUQUEST WM	Helena Agri-Enterprises	35.00
QUEST	Helena Agri-Enterprises	50.00
PENETRATOR PLUS	Helena Agri-Enterprises	99.00
TRAVERSE D	Innvictis Crop Care	33.55
IVC 5150	Innvictis Crop Care	80.00
IVC DEFOAMER	Innvictis Crop Care	10.00
VENTURI	Innvictis Crop Care	98.64
CLEARVIEW	Innvictis Crop Care	30.00
REVAMP	Innvictis Crop Care	44.00
VANTAGE	Innvictis Crop Care	100.00
INVADE	Innvictis Crop Care	100.00
INVADE RST	Innvictis Crop Care	100.00
NAVIGATOR	Innvictis Crop Care	99.20
NAVIGATOR HC	Innvictis Crop Care	100.00
TRAVERSE	Innvictis Crop Care	80.00
V-DRIFT	Innvictis Crop Care	1.00
VELOMAX	Innvictis Crop Care	99.00
VERIFACT	Innvictis Crop Care	95.00
VIXEN AC-L	Innvictis Crop Care	42.00
VERIMAX AMS	Innvictis Crop Care	36.00
VIXEN D	Innvictis Crop Care	100.00

Brand name	Manufacturer	% Active agent
VOYAGER 80-20	Innvictis Crop Care	80.00
VOYAGER 90-10	Innvictis Crop Care	90.00
ENVELOP	Innvictis Crop Care	80.00
INVADE XTRA	Innvictis Crop Care	76.00
VELOMAX DRT	Innvictis Crop Care	99.70
Jacuzzi Bromine Booster c/o Clearon	Jacuzzi Hot Tubs	99.00
Jacuzzi Alkalinity Up c/o Clearon	Jacuzzi Hot Tubs	100.00
Jacuzzi Spa Shock Oxidizer c/o Clearon	Jacuzzi Hot Tubs	80.00
Jacuzzi pH Up c/o Clearon	Jacuzzi Hot Tubs	100.00
Jacuzzi pH/ Alkalinity Down c/o Clearon	Jacuzzi Hot Tubs	95.00
Muriatic Acid	Kik Intl.	31.45
Pro Guard Muriatic Acid	KIK Pool Additives	31.45
Aqua Guard Muriatic Acid 1	KIK Pool Additives	31.45
Pro Side Muriatic Acid	KIK Pool Additives	31.45
Kem-Tek Pool & Spa Care Muriatic Acid	KIK Pool Additives	31.45
Pool Essentials Muriatic Acid	KIK Pool Additives	31.45
Kem-Tek Pool & Spa Care Contractor Strength Muriatic Acid 1	KIK Pool Additives	31.45
Aqua Chem Balanced for Clean Pools Muriatic Acid	KIK Pool Additives	31.45
BioGuard Muriatic Acid Contractor Strength	KIK Pool Additives	31.45
Aqua Guard Muriatic Acid	KIK Pool Additives	29.00
Pro Guard Muriatic Acid Contractor Strength	KIK Pool Additives	31.45
Kem-Tek Pool & Spa Care Contractor Strength Muriatic Acid	KIK Pool Additives	29.00
Kem-Tek Pool & Spa Care Swimming Pool Muriatic Acid	KIK Pool Additives	14.50
Aqua Guard Non-Chlorine Shock Oxidizer	KIK Pool Additives	75.00
Kem-Tek Pool & Spa Care Spa Non-Chlorine Shock Oxidizer	KIK Pool Additives	75.00
Aqua Guard pH Down	KIK Pool Additives	95.00
Kem-Tek Pool & Spa Care pH Minus	KIK Pool Additives	95.00
HDX pH Minus	KIK Pool Additives	95.00
Aqua Guard pH Up	KIK Pool Additives	100.00
Kem-Tek Pool & Spa Care Spa pH Minus	KIK Pool Additives	10.00
Kem-Tek Pool & Spa Care Stabilizer Conditioner	KIK Pool Additives	99.00
HDX Stabilizer Conditioner	KIK Pool Additives	99.00
Aqua Guard Stabilizer Conditioner	KIK Pool Additives	99.00
Kem-Tek Pool & Spa Care pH Plus	KIK Pool Additives	100.00
Kem-Tek Pool & Spa Care Spa pH Plus	KIK Pool Additives	100.00
HDX pH Plus	KIK Pool Additives	100.00
Kem-Tek Pool & Spa Care Alkalinity Booster	KIK Pool Additives	100.00
HDX Alkalinity Booster	KIK Pool Additives	100.00
Aqua Guard Alkalinity Booster	KIK Pool Additives	100.00
WARRAW	Kop-Coat Protection Products	31.43
RAWWAR	Kop-Coat Protection Products	31.43
FastRate	Land View, d/b/a Power-Line Products	51.00
HERB. HELPER	Lawn and Garden Prod.	100.00
Leisure Time Renew Tabs	Leisure Time Chem.	32.25
Leisure Time Spa Down	Leisure Time Chem.	95.00
Leisure Time pH Balance Plus	Leisure Time Chem.	98.00
Leisure Time Sodium Bromide	Leisure Time Chem.	99.00
Leisure Time Liquid Spa Down	Leisure Time Chem.	35.00
Leisure Time pH Balance	Leisure Time Chem.	7.10
Leisure Time Liquid Spa Up	Leisure Time Chem.	28.56
Leisure Time Alkalinity Increaser	Leisure Time Chem.	100.00
Leisure Time Spa Up	Leisure Time Chem.	100.00
Leisure Time pH Balance Plus	Leisure Time Chem.	2.00
Leisure Time Renew	Leisure Time Chem.	32.20
Leisure Time pH Balance	Leisure Time Chem.	38.70
LescoFlo Ultra Superior Non-ionic Wetting Agent for T & O (084570)	Lesco	100.00
Lesco Wet PLUS (069383)	Lesco	87.60
Lesco Rain-ject (091130)	Lesco	23.00
Lesco Spreader-Sticker (019255)	Lesco	89.40
Lesco HAWKEYE Nonionic Organosilicone Surfactant (069404)	Lesco	99.00
Lesco Methylated Seed Oil (702297)	Lesco	100.00
Lesco ENCASE Anti-Transpirant (702293)	Lesco	100.00
Lesco Hume	Lesco	97.50
Lesco Recede Antifoam	Lesco	10.00
Lesco 90/10 Nonionic Surfactant	Lesco	0.90
Lesco Conform	Lesco	19.00
Lesco 90/10 Nonionic Surfactant	Lesco	90.00
Lesco Conform	Lesco	20.00
EQUINOX Stabilizer-15	Lonza	15.00
Emulsifier Blend	Loveland Prod.	100.00
Choice Trio	Loveland Prod.	55.70
Strike force	Loveland Prod.	88.00

Brand name	Manufacturer	% Active agent
Leaf Life Slingshot	Loveland Prod.	50.00
Hi-Wett	Loveland Prod.	100.00
Flame Spray Adjuvant	Loveland Prod.	55.60
Foliar Nutrient 3	Loveland Prod.	100.00
Water Conditioner + Surfactant	Loveland Prod.	52.70
BlendMaster	Loveland Prod.	50.00
COMP-AIDE	Loveland Prod.	65.00
Leaf Life Organic Water Conditioner	Loveland Prod.	34.00
Tuff Trax	Loveland Prod.	100.00
Hy-Stop	Loveland Prod.	8.00
Aqufact	Loveland Prod.	91.00
Ultra Pro	Loveland Prod.	38.00
Surfate	Loveland Prod.	50.00
Bark Oil Blue LT	Loveland Prod.	100.00
Penetron	Loveland Prod.	47.00
Loveland Bark Oil	Loveland Prod.	100.00
Herbimax	Loveland Prod.	99.32
Bond Max	Loveland Prod.	57.50
Spreader 90	Loveland Prod.	90.00
Gunsmoke	Loveland Prod.	80.00
Activator 90	Loveland Prod.	90.00
LI 700	Loveland Prod.	80.00
Phase	Loveland Prod.	100.00
Choice Weather Master	Loveland Prod.	50.00
Tactic	Loveland Prod.	63.40
Reign	Loveland Prod.	1.00
Actamaster Spray Adjuvant	Loveland Prod.	34.00
Attach	Loveland Prod.	100.00
MSO Conc.	Loveland Prod.	100.00
Liberate	Loveland Prod.	100.00
MSO Conc. w/ Leci-Tech	Loveland Prod.	100.00
Weather Gard Complete	Loveland Prod.	100.00
Widespread Max	Loveland Prod.	100.00
Vader	Loveland Prod.	90.00
Scanner	Loveland Prod.	80.00
E-Z Mix	Loveland Prod.	65.00
Phase II	Loveland Prod.	80.00
Timberland 90 Low Foam Non-Ionic Spreader	Loveland Prod.	90.00
Timbersurf 90 Non-Ionic Spreader	Loveland Prod.	90.00
Actamaster Soluble Crystal Spray Adjuvant	Loveland Prod.	99.00
Amigo	Loveland Prod.	93.00
Freeway	Loveland Prod.	100.00
Flame	Loveland Prod.	52.70
Reign LC	Loveland Prod.	30.00
Compadre	Loveland Prod.	100.00
Maximizer Crop Oil Conc.	Loveland Prod.	83.00
Maximizer Crop Oil Conc.	Loveland Prod.	16.30
Unfoamer	Loveland Prod.	12.50
Franchise	Loveland Prod.	100.00
Amaze Gold	Loveland Prod.	34.00
Infuse	Loveland Prod.	99.00
Clean Field Crop Oil Conc.	Mid America Distributing	100.00
Exit	Miller Chem. & Fert.	100.00
Foam Fighter	Miller Chem. & Fert.	10.00
Mist Cont.	Miller Chem. & Fert.	2.00
Nu Film IR	Miller Chem. & Fert.	96.00
Spray Aide	Miller Chem. & Fert.	75.00
Nu Film P	Miller Chem. & Fert.	100.00
Nu Film 17	Miller Chem. & Fert.	100.00
Terafirm	Mitchell Products	65.00
TriCure AD	Mitchell Products	100.00
TriCure Granular	Mitchell Products	10.00
TriCure AD Soil Surfactant Pellets	Mitchell Products	75.00
Mon 51817	Monsanto	50.00
MON-10, Water Conditioning Agent	Monsanto	50.00
Monty's NanoBoost	Monty's Plant Food	9.50
NALCO 60625	Nalco Company	15.00
Azure Natural Balance	Nava Water Products	61.30
NAVA pH Decreaser	Nava Water Products	95.00
NAVA Alkalinity Booster	Nava Water Products	100.00
NAVA pH Increaser	Nava Water Products	100.00
NAVA Stabilizer & Conditioner	Nava Water Products	99.00

Brand name	Manufacturer	% Active agent
Star + Stabilizer & Conditioner	Nava Water Products	98.00
Star + pH Minus	Nava Water Products	92.00
Star + Oxidizing Shock & Swim	Nava Water Products	45.00
Star + Total Alkalinity Increaser	Nava Water Products	100.00
Star + pH Plus	Nava Water Products	100.00
Member's Mark Quality Guaranteed Alkalinity Booster	Nava Water Products	100.00
Clearcil Chlorine Free P.E.T. Tab	Nava Water Products	26.30
Clearcil Chlorine Free P.E.T. Tab	Nava Water Products	35.00
Clearcil Chlorine Free ClearOx 30	Nava Water Products	30.00
Spa Alkalinity Increaser Pods	NC Brands L.P.	100.00
Spa Oxidizing Shock Pods	NC Brands L.P.	38.00
Green To Clean	NC Brands L.P.	90.00
Green Aid	NC Brands L.P.	90.00
Green Gone	NC Brands L.P.	90.00
Yellow Out	NC Brands L.P.	90.00
Instant Pool Water Conditioner	NC Brands L.P.	35.00
Spa Alkalinity Increaser	NC Brands L.P.	100.00
Spa Oxidizing Shock	NC Brands L.P.	38.00
Spa pH Decreaser	NC Brands L.P.	91.00
Spa pH Increaser	NC Brands L.P.	100.00
SeaKlear Chlorine-Free Shock Oxidizer	NC Brands L.P.	45.20
SeaKlear Shock Oxidizer Pods for Spas	NC Brands L.P.	36.20
SeaKlear Balanced Shock Oxidizer for Spas	NC Brands L.P.	80.00
Spa pH Increaser Pods	NC Brands L.P.	100.00
Spa pH Decreaser Pods	NC Brands L.P.	91.00
Klean Up	NC Brands L.P.	90.00
PoolProof	Nisus	47.60
SpaProof	Nisus	47.60
NOVITA MSO	Novita Solutions	100.00
NOVITA CROP OIL CONCENTRATE	Novita Solutions	83.00
NOVITA 90	Novita Solutions	100.00
AMS-A Plus	Novita Solutions	40.25
Drift Cont.	Novita Solutions	35.25
FoamNoMore	Novita Solutions	10.00
Liquid AMS	Novita Solutions	34.50
MSO XTRA	Novita Solutions	100.00
MVO XTRA	Novita Solutions	99.00
Novita 700	Novita Solutions	80.00
Water Conditioner	Novita Solutions	100.00
Profoam Platinum	NPD Products	60.00
OII-YS	O2YS	8.00
CitriSan	O2YS	100.00
Suffusion Granules	OHP	22.00
Suffusion Liquid	OHP	100.00
Suffusion Tablets	OHP	100.00
Avian-2	Organisan	12.00
Enhancer-1	Organisan	12.00
Enhancer-2	Organisan	12.00
Avian-1	Organisan	12.00
LAKOTA	Oro Agri	8.15
ORO-NIS	Oro Agri	85.00
ORO-RZ	Oro Agri	29.40
ORO-HSMOC	Oro Agri	74.90
OROBOOST	Oro Agri	13.58
WETCIT	Oro Agri	8.15
LEAFLOCK SPREADER STICKER	PBIGordon	80.00
HRS	PeroxyChem	25.50
Peradigm	PeroxyChem	86.00
Civitas Harmonizer c/o Keller & Heckman, LLP	Petro-Canada Lubricants	100.00
Simplyx	Precision Laboratories	100.00
Transport LpH	Precision Laboratories	100.00
Border Xtra 8L	Precision Laboratories	100.00
Protyx	Precision Laboratories	100.00
Speed	Precision Laboratories	100.00
Direct	Precision Laboratories	100.00
Import	Precision Laboratories	100.00
Gundown Max	Precision Laboratories	100.00
Exchange	Precision Laboratories	100.00
Transport Ultra	Precision Laboratories	80.00
Kixyt	Precision Laboratories	100.00
Border AQ	Precision Laboratories	45.00
Avianis DC	Precision Laboratories	99.80

Brand name	Manufacturer	% Active agent
Exchange	Precision Laboratories	60.00
Exchange	Precision Laboratories	37.60
Gundown Max	Precision Laboratories	10.00
Import	Precision Laboratories	76.00
Border Xtra 8L	Precision Laboratories	37.12
Protyx	Precision Laboratories	96.50
Speed	Precision Laboratories	99.00
Direct	Precision Laboratories	30.00
Transport Ultra	Precision Laboratories	80.00
Kixyt	Precision Laboratories	98.00
Simplyx	Precision Laboratories	100.00
Transport LpH	Precision Laboratories	100.00
Volare DC	Precision Laboratories	100.00
New Balance	Precision Laboratories	40.00
Knockdown	Precision Laboratories	10.00
Pilot's Choice Gravity X3 DRA	Precision Laboratories	100.00
Avor	Precision Laboratories	90.00
Drop-Point	Precision Laboratories	99.20
Extreme COC	Precision Laboratories	100.00
Maximum NIS 90	Precision Laboratories	100.00
Superior MSO	Precision Laboratories	100.00
SurFast	Precision Laboratories	100.00
Pilot's Choice 3 Way Anti-Drift-R-D	Precision Laboratories	100.00
Pilot's Choice Anti-Drift	Precision Laboratories	30.00
Pilot's Choice Defoamer	Precision Laboratories	30.00
Pilot's Choice COC	Precision Laboratories	83.00
Pilot's Choice MSO	Precision Laboratories	100.00
Pilot's Choice NIS 90	Precision Laboratories	100.00
MSO Ultra	Precision Laboratories	90.00
Intact	Precision Laboratories	43.18
ProSolutions Defoamer	Pro Solutions	10.00
ProSolutions 90/10 Surfactant	Pro Solutions	90.00
ProSolutions 80/20 Surfactant	Pro Solutions	80.00
Purely Hydro	PURELY ORGANIC PRODUCTS	2.00
Alkalinity Up	Quantum Biochemical	100.00
Quantum Stabilizer	Quantum Biochemical	98.50
Quantum pH Down	Quantum Biochemical	95.00
pH Up	Quantum Biochemical	99.00
Quantum Biochemical QB-Brite	Quantum Biochemical	43.30
FARMWORKS 80/20 SURFACTANT	Ragan and Massey	80.00
Farm General Defoamer	Ragan and Massey	11.00
FarmWorks Defoamer	Ragan and Massey	11.00
Farm General 80/20 Surfactant	Ragan and Massey	80.00
RRSI forestry Oil	Red River Specialties	99.00
RRSI Sunset	Red River Specialties	100.00
RRSI Pacer	Red River Specialties	83.00
Elite Supreme	Red River Specialties	99.00
Elite Champion	Red River Specialties	92.00
Elite Radiant	Red River Specialties	100.00
Elite Marvel	Red River Specialties	100.00
Elite Velocity	Red River Specialties	99.00
Elite Secure Ultra	Red River Specialties	35.00
Elite Divine	Red River Specialties	80.00
RRSI Enhance	Red River Specialties	100.00
RRSI Defoamer	Red River Specialties	100.00
RRSI IVM Marking Dye	Red River Specialties	100.00
Red River Basal Oil	Red River Specialties	100.00
RRSI SUNRISE	Red River Specialties	100.00
ELITE PREMIER BLUE	Red River Specialties	100.00
ELITE VIGOR	Red River Specialties	100.00
ELITE SPLENDOR	Red River Specialties	100.00
RRSI NIS	Red River Specialties	100.00
Fieldgoal	Red Zone Technologies	34.70
High Load MSO	Red Zone Technologies	99.00
Kristol	Red Zone Technologies	43.26
Pentrol	Red Zone Technologies	100.00
Resilience	Red Zone Technologies	100.00
Vincero 90	Red Zone Technologies	90.00
StongSide	Red Zone Technologies	90.00
ZoneCoverage	Red Zone Technologies	100.00
X-Celerate	Royal Oil	18.50
Herb. Booster	Royal-Grow Products	9.50

Brand name	Manufacturer	% Active agent
Plex Mate Surfactant	Sanco Industries,	80.00
Surfactant for Herb.	South. Ag. Insecticides	80.00
Home and Garden Spreader Sticker	South. Ag. Insecticides	100.00
Herbi-Oil S83-17 Spray Adjuvant	South. Ag. Insecticides	83.00
STERILEX ULTRA ACTIVATOR SOLUTION	Sterilex	16.90
STERILEX ULTRA-KLEEN SOLUTION 2	Sterilex	16.90
Ultra Soft Metal Activator	Sterilex	16.90
Natur'l Oil	Stoller Enterprises	93.00
Sundance Spas Spa Shock Oxidizer	Sundance Spas	80.00
Sundance Spas pH Up	Sundance Spas	100.00
Sundance Spas pH/Alkalinity Down	Sundance Spas	95.00
Sundance Spas Alkalinity Up	Sundance Spas	100.00
BioAmp AA	Suterra	0.56
CoAct+	Syngenta Crop Prot.	29.90
Adigor Adjuvant	Syngenta Crop Prot.	48.80
Desikote	Taminco US	18.00
Tank Max CA	Target Specialty Products	47.00
Poly Max	Target Specialty Products	25.00
Hydrate Plus NF	Texas Refinery	18.50
Crossfire	Triangle Chem.	83.00
Line Drive	Triangle Chem.	100.00
Correct pH	Triangle Chem.	80.00
Silicone	Triangle Chem.	99.00
D-W Surfactant 90	Triangle Chem.	90.00
D-W Surfactant	Triangle Chem.	80.00
Deliver	Triangle Chem.	1.00
MSO Plus	Triangle Chem.	99.00
Vise	Triangle Chem.	96.00
MSO 100	Triangle Chem.	100.00
Blue Marker Dye	Triangle Chem.	100.00
TriCard WC-12	Triangle Chem.	49.30
SURTEC	US AG	90.00
Hi-Yield Spreader Sticker	Vol. Purch. Groups	90.00
Chem 8020	VRC Technologies,	80.00
AquaZone pH Minus	W. W. Adcock	95.00
AquaZone pH Plus	W. W. Adcock	100.00
AquaZone Oxidizing Shock & Swim	W. W. Adcock	45.00
AquaZone Alkalinity Increase	W. W. Adcock	100.00
AquaZone Stabilizer	W. W. Adcock	100.00
Drop pH	WaterGuru	24.00
Crosshair	Wilbur-Ellis Company	100.00
In-Place	Wilbur-Ellis Company	100.00
Bronc Triple	Wilbur-Ellis Company	33.60
Embrece-EA	Wilbur-Ellis Company	78.92
Stability	Wilbur-Ellis Company	45.30
Diligence-EA	Wilbur-Ellis Company	58.30
Guidance-EA	Wilbur-Ellis Company	58.30
Cynder	Wilbur-Ellis Company	56.40
Efficax	Wilbur-Ellis Company	94.79
Serenity Plus	Wilbur-Ellis Company	34.70
Serenity Cubed	Wilbur-Ellis Company	34.70
Iconic (WF)	Winfield Solutions	0.00
Citrum (US)	Winfield Solutions	38.00
Iconic (US)	Winfield Solutions	100.00
13064 (US)	Winfield Solutions	98.00
Mystic HC	Winfield Solutions	0.00
ProMark	Winfield Solutions	38.00
16098	Winfield Solutions	100.00
Class Act Ridion	Winfield Solutions	34.75
Between	Winfield Solutions	100.00
OnTarget	Winfield Solutions	43.30
Fast Break	Winfield Solutions	10.00
AG 14039	Winfield Solutions	100.00
Droplex Xtra	Winfield Solutions	95.00
Aquicare Pellets	Winfield Solutions	75.00
StrikeLock	Winfield Solutions	100.00
Heat Wave	Winfield Solutions	100.00
Gulfstream Free	Winfield Solutions	99.25
Purus	Winfield Solutions	100.00
AMS/2000	Winfield Solutions	100.00
Speedway	Winfield Solutions	100.00
Airforce	Winfield Solutions	100.00

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Brand name	Manufacturer	% Active agent
Double X	Winfield Solutions	100.00
Dynamark U.V.	Winfield Solutions	100.00
Aquicare	Winfield Solutions	100.00
Corral Poly	Winfield Solutions	30.00
Destiny HC	Winfield Solutions	92.00
Inergy	Winfield Solutions	100.00
Interlock	Winfield Solutions	100.00
Level 7	Winfield Solutions	65.00
Noble	Winfield Solutions	100.00
PowerLock	Winfield Solutions	95.00
Preference	Winfield Solutions	89.50
Prime Oil	Winfield Solutions	98.47
Rush	Winfield Solutions	31.62
Silkin	Winfield Solutions	99.00
Superb HC	Winfield Solutions	92.00
Top Surf	Winfield Solutions	80.00
Transfix	Winfield Solutions	96.00
Inergy	Winfield Solutions	100.00
Aqua-King Plus	Winfield Solutions	95.00
Activate Plus	Winfield Solutions	90.00
Aduro	Winfield Solutions	80.00
Alliance	Winfield Solutions	50.00
Class Act Flex	Winfield Solutions	60.45
Class Act NG	Winfield Solutions	50.50
Complete Compatibility	Winfield Solutions	60.00
Complex	Winfield Solutions	23.03
Droplex	Winfield Solutions	100.00
Turbulence	Winfield Solutions	100.00
Breeze	Winfield Solutions	65.00
Gulfstream	Winfield Solutions	95.50
Atmos	Winfield Solutions	92.00
Masterlock	Winfield Solutions	100.00
Wick	Winfield Solutions	33.00
AirCover	Winfield Solutions	100.00
Airtech	Winfield Solutions	60.45
Chemsurf 90	Winfield Solutions	90.00
Exuro	Winfield Solutions	100.00
Iconic	Winfield Solutions	100.00
Succeed Ultra	Winfield Solutions	100.00
ValCheck	Winfield Solutions	34.75
Permeate	Winfield Solutions	100.00
AccuDrop	Winfield Solutions	98.00
MicroSolve Soft Metal Activator Solution	Zep	16.90
MicroSolve Activator Solution	Zep	16.90

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