EPA REGISTRATION NUMBER 524-454-Vol.1

ATTACHED NOTIFICATION

25 TO: [redacted] FILE ROOM

FROM: REG. SUPPORT BR.

NO NEW LABEL _____

EPA REG. NO. 524-454

NEW LABEL ATTACHED _____

COMPANY NAME_____

NEW CSF ATTACHED _____

****

_____ THIS IS AN ADDITIONAL BRAND NAME

_____ THIS IS A CSF PERMITTED UNDER PR NOTICE 88-6

_____ THIS IS A LABEL CHANGE PERMITTED UNDER PR NOTICE 88-6

****

_____ THIS WAS SENT TO SIG FOR CODING AND/OR MICROFICHING

_____ FILE IN JACKET

Please read Instructions on reverse before completing form.

Form Approved. OMB No. 2070-0060. Approval expires 11-30-93

(A) EPA

United States Environmental Protection Agency
Office of Pesticide Programs (H7505C)
Washington, DC 20460

Application for Pesticide:

[ ] Registration
[ ] Amendment
[X] Other

OPP Identifier Number: 156974

Section I

1. Company/Product Number: 524-454
2. EPA Product Manager: Robert J. Taylor
3. Proposed Classification: [X] None [ ] Restricted
4. Company/Product (Name): MON-52249 RT Herbicide
   PM#: 25
5. Name and Address of Applicant *(Include ZIP Code)*:
   Monsanto Company
   700 14th Street, N.W., Suite 1100
   Washington, D.C. 20005
   [ ] *Check if this is a new address*
6. **Expedited Review.** In accordance with FIFRA Section 3(c)(3)(b)(i), my product is similar or identical in composition and labeling to:
   EPA Reg. No. _____
   Product Name _____

Section II

[ ] Amendment - Explain below
[ ] Resubmission in response to Agency letter dated _____
[X] Notification - Explain below.
[ ] Final printed labels in response to Agency letter dated _____
[ ] "Me Too" Application.
[ ] Other - explain below.

Explanation: Use additional page(s) if necessary. (For section I and Section II.)

Notification of additional brand name: Roundup RT Herbicide.

Section III

1. **Material This Product Will Be Packaged In:**

Child-Resistant Packaging	Unit Packaging	Water Soluble Packaging	2. Type of Container
[ ] Yes*	[ ] Yes	[ ] Yes	[ ] Metal
[X] No	[X] No	[X] No	[X] Plastic
			[ ] Glass
			[ ] Paper
			[ ] Other (Specify) _____
	If "Yes," Unit Package wgt. ____ No. per container ____	If "Yes," Package wgt. ____ No. per container ____	

* ***Certification must be submitted.***

3. Location of Net Contents Information: [ ] Label [X] Container
4. Size(s) of Retail Container: 100 gal, bulk.
5. Location of Label Directions: [X] On Label [X] On Labeling accompanying product
6. Manner In Which Label Is Affixed To Product: [ ] Lithograph [ ] Paper glued [ ] Stenciled [X] Other (vinyl glued)

Section IV

1. Contact Point *(Complete items directly below for identification of individual to be contacted, if necessary, to process this application.)*

Name	Title	Telephone No. (Include Area Code)
Dr. Russell P. Schneider	Agricultural Regulation Director	(202) 783-2460

Certification

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law.

6. Date Application Received (Stamped)

2. Signature: Sheila A. Schuette
3. Title: Senior Registration Specialist
4. Typed Name: Dr. Sheila A. Schuette
5. Date: September 4, 1992

EPA Form 8570-1 (Rev/12-90) Previous editions are obsolete. White: EPA File Copy (original) Yellow: Applicant Copy

PAPERWORK REDUCTION ACT NOTICE and INSTRUCTIONS

PAPERWORK REDUCTION ACT NOTICE: Public reporting burden for this collection of information is estimated to average 0.85 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

INSTRUCTIONS: This form is to be used for all applications for new registration, end use reregistration, amendment, resubmission, to applications for notifications, final printed labeling, reregistration, etc. In order to process an application for a new registration submitted on this form, the following material must accompany the application:

1. Certification with Respect to Citation of Data (EPA Form 8570-29). [If not exempted by 40 CFR 152.81 (b) (4)];
2. Confidential Statement of Formula (EPA Form 8570-4);
3. Formulator's Exemption Statement (EPA Form 8570-27);
4. Five copies of draft labeling;
5. Three copies of any data submitted;
6. Authorization letter where applicable;
7. Matrices where applicable.

Submission of Labeling - Labeling should first be submitted in the form of draft labels with all applications for new registration. Such draft labels may be in the form of typed label text on 8.5 x 11 inch paper or a mockup of the proposed label. If prepared as a mockup, it should be constructed in such a way as to facilitate storage in an 8.5 x 11 inch file. Mockup labels significantly smaller than 8.5 x 11 inches should be mounted on 8.5 x 11 inch paper for submission.
Submission of Data - Data submitted in support of this application must be submitted in accordance with PR Notice 86-5.

SPECIFIC INSTRUCTIONS: Please read the instructions listed below before completing this application. First determine the type of registration action, listed in Block A, for which you are submitting this application. For applications submitted in connection with New Registration actions, Sections I, III, and IV must be completed by the applicant. For applications submitted in connection with amended registration actions, resubmissions, notifications, reregistrations, etc., Sections I, II, and IV must be completed by the applicant.
Block A - Check the appropriate action for which you are submitting this form.

SECTION I - This section must be completed, as applicable, for all registration actions.

1. **Company/Product Number** - Insert your **Company Number**, if one has been assigned by EPA. This number may have been assigned to you as a basic registrant, a distributor, or as an establishment. If your product is registered, insert the **Product Number**.
2. **EPA Product Manager** - If known, fill in the name and PM number of the EPA Product Manager.
3. **Proposed Classification** - Specify the proposed classification of this product.
4. **Product Name** - Enter the complete product name of this pesticide as it will appear on the label. The name must be specific to this product only. Duplication of names is not permitted among products of the same company. Do not include any brand name or company line designations.
5. **Name and Address of Applicant** - The name of the firm or person and address shown in your application is the person or firm to whom the registration will be issued. If you are acting in behalf of another party, you must submit authorization from that party to act for them in registration matters. An applicant not residing in the United States must have an authorized agent residing in the United States to act for them in all registration matters. The name and complete mailing address of such an agent must accompany this application.
6. **Expedited Review** - FIFRA section 3 (c) 3 (B) provides for expedited review of applications for registration, or amendments to existing registrations, that are similar or identical to other pesticide products that are currently registered with the EPA. In order for your application to be eligible for expedited review, you must provide us with the EPA Registration Number and product name of the product you believe is similar to or identical to your product. The product must be similar or identical in both formulation and labeled uses.

SECTION II - This section must be completed for all applications submitted to amend the registration only of a currently registered product (Amendment), for a resubmission in response to an Agency letter, for notifications to the Agency, for the submission of final printed labeling, for reregistration and for any other action that pertains to a specific EPA-registered product. This section is not to be used for a new application for registration.

1. **Subject of submission** - Check the applicable block and provide the Agency letter date if appropriate. Provide a brief explanation of the purpose(s) for the submission, such as "the addition of a site, pest or crop (specify)"; "amend the Confidential Statement of Formula by..."; "reregistration submission"; general label revision of use directions." Attach a separate page if additional space is needed.

SECTION III (Packaging and Container Information) - This Section must be completed for all applications submitted in connection with new registration or applicable amendments.

1. **Type of Packaging** - Check the appropriate block if your product will be packaged in the indicated packaging types. Indicate the size of the individual packets and number per retail container.
2. **Type of Retail Container** - Indicate type of container in which product will be marketed.
3. **Location of Net Contents** - Specify the net contents of all retail containers for your product.
4. **Size(s) of Retail Container** - Specify the net contents of all retail containers for your product.
5. **Location of Use Directions** - Indicate the location of the use directions for your product.
6. **Manner in which label is affixed to product** - Indicate the method product label is attached to retail container.

3

SECTION IV (Contact Point) - This Section must be completed for all applications for Registration actions, i.e., new products registration, resubmission, "me-too," reregistration, etc.

1-5. Self-explanatory.
6. EPA Use Only.

★U.S.GPO:1992-0-619-157/41065

Roundup® RT

HERBICIDE REDUCED TILLAGE

by Monsanto

NOTIFICATION
LABEL NOT REVIEWED
PER PR NOTICE 83-6
DATE 09-10-90

For control of annual and perennial weeds in reduced tillage systems.

Carefully follow detailed instructions in attached label booklet

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

Read the entire label before using this product.

Use only according to label instructions.

Read "LIMIT OF WARRANTY AND LIABILITY", which appears in the label booklet, before buying or using. If terms are not acceptable return at once unopened.

The contents of this container may not be REFORMULATED, nor, except in accordance with the Monsanto Repackaging Agreement, REPACKAGED.

PRECAUTIONARY STATEMENTS

Hazards to Humans And Domestic Animals

Keep out of reach of children.

WARNING!

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.

HARMFUL IF INHALED.

Do not get in eyes or inhale dust or spray mist.

Wear goggles, face shield or safety glasses.

Wash thoroughly with soap and water after handling.

Remove contaminated clothing and wash before reuse.

FIRST AID: IF IN EYES, Hold eyelids open and flush with a steady gentle stream of water for 15 minutes. Get medical attention.

IF SWALLOWED, Drink promptly a large quantity of milk, egg white, or gelatin solution, or if these are not available large quantities of water. Avoid alcohol.

IF INHALED, Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

In case of an emergency involving this product,
Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

DISPOSAL:

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Emptied container retains vapor and product residue. Observe all labeled saleguards until container is cleaned, reconditioned or destroyed.

Triple rinse empty container. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

(See label booklet for Complete Directions for Use.)

ACTIVE INGREDIENT:

*Glyphosate, N-(phosphonomethyl)glycine in the form of its isopropylamine salt	41.3%
INERT INGREDIENTS:	58.7%
	100.0%

*Contains 480 grams per litre or 4 pounds per U.S. gallon of the active ingredient, glyphosate, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

Product protected by U.S. Patent No. 4,405,531. Other patents pending. No license granted under any non-U.S. patent.

Roundup® is a registered trademark of Monsanto Company.

EPA Reg. No. 524-454

©MONSANTO COMPANY 1992

Monsanto®

In case of an emergency involving this product,
Call Collect, day or night, (314) 694-4000

LOT NO. PACKER NET gal

EPA Est. 524-LA-1

MONSANTO COMPANY • AGRICULTURAL PRODUCTS • ST. LOUIS, MISSOURI 63167 U.S.A.

898.15-000.03/53L

raphers • AUGUST 31, 1992

Monsanto

Monsanto Company
Suite 1100
700 14th Street, N.W.
Washington, D.C. 20005

September 4, 1992

Office of Pesticide Programs - H7504C
Document Processing Desk
U.S. Environmental Protection Agency
Room 226A, Crystal Mall #2
1921 Jefferson Davis Highway
Arlington, Virginia 22202

Attention: Mr. Robert J. Taylor
Product Manager (25)

Subject: **MON-52249 RT Herbicide (EPA Reg. No. 524-454)**
Addition of Brand Name / Submission of Amended Labels

Dear Sir:

As provided by 40 CFR 152.46, Monsanto is notifying the Agency that the following brand name will be added to EPA Reg. No. 524-454, effective September 14, 1992:

Roundup® RT Herbicide

Five (5) copies of the container label are enclosed for your files. This label is identical to that approved by the Agency on July 13, 1992, with the following minor changes:

1. The brand name has been changed from MON-52249 RT to Roundup RT.

2. The amount of the active ingredient, glyphosate in the form of its isopropylamine salt, has been corrected to 41.3%. The amount of inert ingredients has been corrected to 58.7%. These values were provided in the original submission and were approved by the Agency on June 4, 1992. Incorrect values (41.0% and 59.0%, respectively) were inadvertently placed on the sample label approved by the Agency on July 13, 1992.

5

TELEPHONE: (202) 783-2460 FACSIMILE: (202) 783-2468

If you have any questions regarding this notification, please contact Dr. Russ Schneider or me.

Sincerely,

Sheila A. Schuette

Sheila A. Schuette, Ph.D.
Senior Registration Specialist
(314) 694-7248

ATTACHED NOTIFICATION

TO: 25 ~~PM~~ File Room

FROM: REG. SUPPORT BR.

NO NEW LABEL _____

EPA REG. NO. 524-454

NEW LABEL ATTACHED _____

COMPANY NAME _____

NEW CSF ATTACHED _____

****

_____ THIS IS AN ADDITIONAL BRAND NAME

_____ THIS IS A CSF PERMITTED UNDER PR NOTICE 88-6

_____ THIS IS A LABEL CHANGE PERMITTED UNDER PR NOTICE 88-6

****

_____ THIS WAS SENT TO SIG FOR CODING AND/OR MICROFICHING

_____ FILE IN JACKET

7

Please read Instructions on reverse before completing form.

Form Approved. OMB No. 2070-0060. Approval expires 11-30-93

(A) EPA

United States Environmental Protection Agency
Office of Pesticide Programs (H7505C)
Washington, DC 20460

Application for Pesticide:

[ ] Registration
[ ] Amendment
[X] Other

OPP Identifier Number: 156972

Section I

1. Company/Product Number: 524-454
2. EPA Product Manager: Robert J. Taylor
3. Proposed Classification: [X] None [ ] Restricted
4. Company/Product (Name): MON-52249 Herbicide
   PM#: 25
5. Name and Address of Applicant *(Include ZIP Code)*:
   Monsanto Company
   700 14th Street, N.W., Suite 1100
   Washington, D.C. 20005
   [ ] *Check if this is a new address*
6. **Expedited Review.** In accordance with FIFRA Section 3(c)(3)(b)(i), my product is similar or identical in composition and labeling to:
   EPA Reg. No. ____
   Product Name ____

Section II

[ ] Amendment - Explain below
[ ] Resubmission in response to Agency letter dated ____
[X] Notification - Explain below.
[ ] Final printed labels in response to Agency letter dated ____
[ ] "Me Too" Application.
[ ] Other - explain below.

Explanation: Use additional page(s) if necessary. (For section I and Section II.)

Notification of an additional brand name: MON-65080 Herbicide

Section III

1. **Material This Product Will Be Packaged In:**

Child-Resistant Packaging	Unit Packaging	Water Soluble Packaging	2. Type of Container
[ ] Yes* [X] No	[ ] Yes [X] No	[ ] Yes [X] No	[ ] Metal [X] Plastic [ ] Glass [ ] Paper [ ] Other (Specify) ____
* *Certification must be submitted.*	If "Yes," Unit Package wgt. ____ No. per container ____	If "Yes," Package wgt. ____ No. per container ____	

3. Location of Net Contents Information: [ ] Label [X] Container
4. Size(s) of Retail Container: Various
5. Location of Label Directions: [X] On Label [X] On Labeling accompanying product
6. Manner In Which Label Is Affixed To Product: [ ] Lithograph [ ] Paper glued [ ] Stenciled [X] Other (vinyl glued)

Section IV

1. Contact Point *(Complete items directly below for identification of individual to be contacted, if necessary, to process this application.)*

Name	Title	Telephone No. (Include Area Code)
Dr. Russell P. Schneider	Agricultural Regulation Director	(202) 783-2460

Certification

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law.

6. Date Application Received (Stamped): 8

2. Signature: Sheila A. Schuette
3. Title: Senior Registration Specialist
4. Typed Name: Sheila A. Schuette, Ph.D.
5. Date: September 1, 1992

PAPERWORK REDUCTION ACT NOTICE and INSTRUCTIONS

PAPERWORK REDUCTION ACT NOTICE: Public reporting burden for this collection of information is estimated to average 0.85 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

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5. Three copies of any data submitted;
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Block A - Check the appropriate action for which you are submitting this form.

SECTION I - This section must be completed, as applicable, for all registration actions.

1. **Company/Product Number** - Insert your **Company Number**, if one has been assigned by EPA. This number may have been assigned to you as a basic registrant, a distributor, or as an establishment. If your product is registered, insert the **Product Number**.
2. **EPA Product Manager** - If known, fill in the name and PM number of the EPA Product Manager.
3. **Proposed Classification** - Specify the proposed classification of this product.
4. **Product Name** - Enter the complete product name of this pesticide as it will appear on the label. The name must be specific to this product only. Duplication of names is not permitted among products of the same company. Do not include any brand name or company line designations.
5. **Name and Address of Applicant** - The name of the firm or person and address shown in your application is the person or firm to whom the registration will be issued. If you are acting in behalf of another party, you must submit authorization from that party to act for them in registration matters. An applicant not residing in the United States must have an authorized agent residing in the United States to act for them in all registration matters. The name and complete mailing address of such an agent must accompany this application.
6. **Expedited Review** - FIFRA section 3 (c) 3 (B) provides for expedited review of applications for registration, or amendments to existing registrations, that are similar or identical to other pesticide products that are currently registered with the EPA. In order for your application to be eligible for expedited review, you must provide us with the EPA Registration Number and product name of the product you believe is similar to or identical to your product. The product must be similar or identical in both formulation and labeled uses.

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1. **Subject of submission** - Check the applicable block and provide the Agency letter date if appropriate. Provide a brief explanation of the purpose(s) for the submission, such as "the addition of a site, pest or crop (specify)"; "amend the Confidential Statement of Formula by..."; "reregistration submission"; general label revision of use directions." Attach a separate page if additional space is needed.

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2. **Type of Retail Container** - Indicate type of container in which product will be marketed.
3. **Location of Net Contents** - Specify the net contents of all retail containers for your product.
4. **Size(s) of Retail Container** - Specify the net contents of all retail containers for your product.
5. **Location of Use Directions** - Indicate the location of the use directions for your product.
6. **Manner in which label is affixed to product** - Indicate the method product label is attached to retail container.

SECTION IV (Contact Point) - This Section must be completed for all applications for Registration actions, i.e., new products registration, resubmission, "me-too," reregistration, etc.

1-5. Self-explanatory.
6. EPA Use Only.

EPA Form 8570-1 (Rev. 12-90) - Previous editions are obsolete. White - EPA File Copy (original) Yellow - Applicant copy
★U.S.GPO:1992-0-619-157/41065

MON 65080

HERBICIDE

by Monsanto

For control of annual and perennial weeds in reduced tillage systems.

Carefully follow detailed instructions in attached label booklet

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

Read the entire label before using this product.

Use only according to label instructions.

Read "LIMIT OF WARRANTY AND LIABILITY", which appears in the label booklet, before buying or using. If terms are not acceptable return at once unopened.

The contents of this container may not be REFORMULATED, nor, except in accordance with the Monsanto Repackaging Agreement, REPACKAGED.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Keep out of reach of children.

WARNING!

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.

HARMFUL IF INHALED.

Do not get in eyes or inhale dust or spray mist.

Wear goggles, face shield or safety glasses.

Wash thoroughly with soap and water after handling.

Remove contaminated clothing and wash before reuse.

FIRST AID: IF IN EYES, Hold eyelids open and flush with a steady gentle stream of water for 15 minutes. Get medical attention.

IF SWALLOWED, Drink promptly a large quantity of milk, egg white, or gelatin solution, or if these are not available large quantities of water. Avoid alcohol.

IF INHALED, Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

DISPOSAL:

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Triple rinse empty container. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

(See label booklet for Complete Directions for Use.)

ACTIVE INGREDIENT:

*Glyphosate, N-(phosphonomethyl)glycine in the form of its isopropylamine salt	41.3%
INERT INGREDIENTS:	58.7%
	100.0%

*Contains 480 grams per litre or 4 pounds per U.S. gallon of the active ingredient, glyphosate, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

Product protected by U.S. Patent No. 4,405,531. Other patents pending. No license granted under any non-U.S. patent.

EPA Reg. No. 524-454

©MONSANTO COMPANY 1992

Monsanto

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000

LOT NO. PACKER NET gal

EPA Est. 33270-IA-1

MONSANTO COMPANY • AGRICULTURAL PRODUCTS • ST. LOUIS, MISSOURI 63167 U.S.A.

898.15-000.03/53US

Monsanto

Monsanto Company
Suite 1100
700 14th Street, N.W.
Washington, D.C. 20005

September 1, 1992

Office of Pesticide Programs - H7504C
Document Processing Desk
U.S. Environmental Protection Agency
Room 226A, Crystal Mall #2
1921 Jefferson Davis Highway
Arlington, Virginia 22202

Attention: Mr. Robert J. Taylor
Product Manager (25)

Subject: **MON-52249 Herbicide (EPA Reg. No. 524-454)**
Notification of an Additional Brand Name:
MON-65080 Herbicide

Dear Sir:

Monsanto is notifying the Agency of an additional brand name for MON-52249 herbicide under 40 CFR 152.46. The new name, MON-65080 herbicide, will be used internally by Monsanto to distinguish product that contains [redacted] from product that does not. The alternate formulation with blue dye was approved by the Agency on July 13, 1992.

Five (5) copies of the container label are enclosed for your records.

If you have any questions regarding this notification, please contact Dr. Russ Schneider or me.

Sincerely,

Sheila A. Schuette

Sheila A. Schuette, Ph.D.
Senior Registration Specialist
(314) 694-7248

Inert ingredient information may be entitled to confidential treatment

11

TELEPHONE: (202) 783-2460 FACSIMILE: (202) 783-2468

Mon 52249

HERBICIDE BY **Monsanto**

NOT REVIEWED
In Accordance with PR Notice 82-2.
Based on Draft Labeling Dated 6/4/92

Carefully follow detailed instructions in label booklet.
AVOID CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

Read the entire label before using this product.
Use only according to label instructions.
Read "LIMIT OF WARRANTY AND LIABILITY" before buying or using. If terms are not acceptable, return at once unopened.

REFORMULATION OR REPACKAGING IS PROHIBITED.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Keep out of reach of children.

WARNING!

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.
HARMFUL IF INHALED.
Do not get in eyes or inhale dust or spray mist. Wear goggles, face shield or safety glasses. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

FIRST AID: IF IN EYES, hold eyes open and flush with a steady gentle stream of water for 15 minutes. Get medical attention.

IF SWALLOWED, drink promptly a large quantity of milk, egg white, or gelatin solution or if these are not available, large quantities of water. Avoid alcohol.

IF INHALED, remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied only in stainless steel, aluminum, fiberglass, plastic and plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product reacts with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

DISPOSAL:
Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is destroyed.

Do not reuse emptied container. Triple rinse and then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

(See label booklet for Complete Directions for Use)

ACTIVE INGREDIENTS:

*Glyphosate, N-(phosphonomethyl) glycine, in the form of its isopropylamine salt	41.3%
INERT INGREDIENTS:	58.7%
	100.0%

*Contains 480 grams per litre or 4 pounds per U.S. gallon of the active ingredient, glyphosate, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

LIMIT OF WARRANTY AND LIABILITY

This Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the Complete Directions for Use label booklet ("Directions") when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this Company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

Buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this Company, including, but not limited to incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather, weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied, as well as weather conditions which are outside the application ranges set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF THE LIABILITY OF THIS COMPANY OR ANY OTHER SELLER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE) SHALL BE THE PURCHASE PRICE PAID BY THE USER OR BUYER FOR THE QUANTITY OF THIS PRODUCT INVOLVED, OR, AT THE ELECTION OF THIS COMPANY OR ANY OTHER SELLER, THE REPLACEMENT OF SUCH QUANTITY, OR, IF NOT ACQUIRED BY PURCHASE, REPLACEMENT OF SUCH QUANTITY. IN NO EVENT SHALL THIS COMPANY OR ANY OTHER SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES.

Buyer and all users are deemed to have accepted the terms of this LIMIT OF WARRANTY AND LIABILITY which may not be varied by any verbal or written agreement.

Product protected by U.S. Patent No. 4,405,531. Other patents pending. No license granted under any non-U.S. patent(s).

EPA Reg. No. 524-454
© MONSANTO COMPANY 1992

MONSANTO COMPANY
AGRICULTURAL PRODUCTS
ST. LOUIS, MISSOURI 63167 USA

TWO 2.5 GAL. UNITS

EPA Est. 524-LA-1 MAP-3372.01/53L

Please read instructions on reverse before completing form.

Form Approved. OMB No. 2070-0060. Approval expires 11-30-93

(A) EPA

United States Environmental Protection Agency
Office of Pesticide Programs (H7505C)
Washington, DC 20460

Application for Pesticide:

[ ] Registration
[ ] Amendment
[X] Other

OPP Identifier Number: 156967

Section I

1. Company/Product Number: 524-454
2. EPA Product Manager: Robert J. Taylor
   PM#: 25
3. Proposed Classification: [X] None [ ] Restricted
4. Company/Product (Name): MON-52249 Herbicide
5. Name and Address of Applicant *(Include ZIP Code)*:
   Monsanto Company
   700 14th Street, N.W., Suite 1100
   Washington, D.C. 20005
   [ ] *Check if this is a new address*
6. **Expedited Review.** In accordance with FIFRA Section 3(c)(3)(b)(i), my product is similar or identical in composition and labeling to:
   EPA Reg. No. ____
   Product Name ____

Section II

[ ] Amendment - Explain below
[ ] Resubmission in response to Agency letter dated ____
[ ] Notification - Explain below.
[X] Final printed labels in response to Agency letter dated ____
[ ] "Me Too" Application.
[ ] Other - explain below.

Explanation: Use additional page(s) if necessary. (For section I and Section II.)

Submission of final printed labels

Section III

1. **Material This Product Will Be Packaged In:**

Child-Resistant Packaging	Unit Packaging	Water Soluble Packaging	2. Type of Container
[ ] Yes*	[ ] Yes	[ ] Yes	[ ] Metal
[X] No	[X] No	[X] No	[X] Plastic
	If "Yes," Unit Package wgt. / No. per container	If "Yes," Package wgt. / No. per container	[ ] Glass
			[ ] Paper
			[ ] Other (Specify) ____

* ***Certification must be submitted.***

3. Location of Net Contents Information: [ ] Label [X] Container
4. Size(s) of Retail Container: 2.5 gal, mini-bulk
5. Location of Label Directions: [X] On Label [X] On Labeling accompanying product
6. Manner In Which Label Is Affixed To Product: [ ] Lithograph [ ] Paper glued [ ] Stenciled [X] Other (vinyl glued)

Section IV

1. Contact Point *(Complete items directly below for identification of individual to be contacted, if necessary, to process this application.)*

Name	Title	Telephone No. (Include Area Code)
Dr. Russell P. Schneider	Agricultural Regulation Director	(202) 783-2460

Certification

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law.

6. Date Application Received (Stamped)

2. Signature: Sheila A. Schuette
3. Title: Senior Registration Specialist
4. Typed Name: Sheila A. Schuette, Ph.D.
5. Date: August 31, 1992

PAPERWORK REDUCTION ACT NOTICE and INSTRUCTIONS

PAPERWORK REDUCTION ACT NOTICE: Public reporting burden for this collection of information is estimated to average 0.85 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

INSTRUCTIONS: This form is to be used for all applications for new registration, end use reregistration, amendment, resubmission, to applications for notifications, final printed labeling, reregistration, etc. In order to process an application for a new registration submitted on this form, the following material must accompany the application:

1. Certification with Respect to Citation of Data (EPA Form 8570-29). [If not exempted by 40 CFR 152.81 (b) (4)];
2. Confidential Statement of Formula (EPA Form 8570-4);
3. Formulator's Exemption Statement (EPA Form 8570-27);
4. Five copies of draft labeling;
5. Three copies of any data submitted;
6. Authorization letter where applicable;
7. Matrices where applicable.

Submission of Labeling - Labeling should first be submitted in the form of draft labels with all applications for new registration. Such draft labels may be in the form of typed label text on 8.5 x 11 inch paper or a mockup of the proposed label. If prepared as a mockup, it should be constructed in such a way as to facilitate storage in an 8.5 x 11 inch file. Mockup labels significantly smaller than 8.5 x 11 inches should be mounted on 8.5 x 11 inch paper for submission.
Submission of Data - Data submitted in support of this application must be submitted in accordance with PR Notice 86-5.

SPECIFIC INSTRUCTIONS: Please read the instructions listed below before completing this application. First determine the type of registration action, listed in Block A, for which you are submitting this application. For applications submitted in connection with New Registration actions, Sections I, III, and IV must be completed by the applicant. For applications submitted in connection with amended registration actions, resubmissions, notifications, reregistrations, etc., Sections I, II, and IV must be completed by the applicant.
Block A - Check the appropriate action for which you are submitting this form.

SECTION I - This section must be completed, as applicable, for all registration actions.

1. **Company/Product Number** - Insert your **Company Number**, if one has been assigned by EPA. This number may have been assigned to you as a basic registrant, a distributor, or as an establishment. If your product is registered, insert the **Product Number**.
2. **EPA Product Manager** - If known, fill in the name and PM number of the EPA Product Manager.
3. **Proposed Classification** - Specify the proposed classification of this product.
4. **Product Name** - Enter the complete product name of this pesticide as it will appear on the label. The name must be specific to this product only. Duplication of names is not permitted among products of the same company. Do not include any brand name or company line designations.
5. **Name and Address of Applicant** - The name of the firm or person and address shown in your application is the person or firm to whom the registration will be issued. If you are acting in behalf of another party, you must submit authorization from that party to act for them in registration matters. An applicant not residing in the United States must have an authorized agent residing in the United States to act for them in all registration matters. The name and complete mailing address of such an agent must accompany this application.
6. **Expedited Review** - FIFRA section 3 (c) 3 (B) provides for expedited review of applications for registration, or amendments to existing registrations, that are similar or identical to other pesticide products that are currently registered with the EPA. In order for your application to be eligible for expedited review, you must provide us with the EPA Registration Number and product name of the product you believe is similar to or identical to your product. The product must be similar or identical in both formulation and labeled uses.

SECTION II - This section must be completed for all applications submitted to amend the registration only of a currently registered product (Amendment), for a resubmission in response to an Agency letter, for notifications to the Agency, for the submission of final printed labeling, for reregistration and for any other action that pertains to a specific EPA-registered product. This section is not to be used for a new application for registration.

1. **Subject of submission** - Check the applicable block and provide the Agency letter date if appropriate. Provide a brief explanation of the purpose(s) for the submission, such as "the addition of a site, pest or crop (specify)"; "amend the Confidential Statement of Formula by..."; "reregistration submission"; general label revision of use directions." Attach a separate page if additional space is needed.

SECTION III (Packaging and Container Information) - This Section must be completed for all applications submitted in connection with new registration or applicable amendments.

1. **Type of Packaging** - Check the appropriate block if your product will be packaged in the indicated packaging types. Indicate the size of the individual packets and number per retail container.
2. **Type of Retail Container** - Indicate type of container in which product will be marketed.
3. **Location of Net Contents** - Specify the net contents of all retail containers for your product.
4. **Size(s) of Retail Container** - Specify the net contents of all retail containers for your product.
5. **Location of Use Directions** - Indicate the location of the use directions for your product.
6. **Manner in which label is affixed to product** - Indicate the method product label is attached to retail container.

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SECTION IV (Contact Point) - This Section must be completed for all applications for Registration actions, i.e., new products registration, resubmission, "me-too," reregistration, etc.

1-5. Self-explanatory.
6. EPA Use Only.

August 31, 1992

★U.S.GPO:1992-0-619-157/41085

Monsanto

Monsanto Company
Suite 1100
700 14th Street, N.W.
Washington, D.C. 20005

August 31, 1992

Office of Pesticide Programs - H7504C
Document Processing Desk
U.S. Environmental Protection Agency
Room 226A, Crystal Mall #2
1921 Jefferson Davis Highway
Arlington, Virginia 22202

Attention: Mr. Robert J. Taylor
Product Manager (25)

Subject: **MON-52249 Herbicide (EPA Reg. No. 524-454)**
Submission of Final Printed Labels

Dear Sir:

Monsanto is submitting final printed labels of a MON-52249 herbicide container label for your files. This label was approved by the Agency on June 4, 1992.

Enclosed are five (5) copies of the label (version MAP-3372.01/53L).

If you have any questions regarding this submission, please contact Dr. Russ Schneider or me.

Sincerely,

Sheila A. Schuette

Sheila A. Schuette, Ph.D.
Senior Registration Specialist
(314) 694-7248

cc: R.P. Schneider
D.M. Fee-White

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TELEPHONE: (202) 783-2460 FACSIMILE: (202) 783-2468

AUG 31 1992

Dr. Sheila A. Schuette
Monsanto Company
700 14th Street NW. Suite 1100
Washington, DC 20005

Dear Dr. Schuette:

Subject: MON 52249 Herbicide (Amend Precautionary Statements and First Aid Instructions)
EPA Registration No. 524-454
Your Application Dated July 2, 1992

The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable. Please submit five (5) copies of your final printed labeling incorporating these changes before you release the product for shipment. A stamped copy of labeling is enclosed for your records.

Sincerely yours,

Robert J. Taylor
Product Manager (25)
Fungicide-Herbicide Branch
Registration Division (H7505C)

CONCURRENCES

SYMBOL	H7505C	WP50:Taylor:WP25-4:KEVRIG:08/26/92:09/24/92						
SURNAME	56094:I							
DATE	UKWalker 8/31/92							16

EPA Form 1320-1 (12-70) OFFICIAL FILE COPY

Monsanto

Monsanto Company
Suite 1100
700 14th Street, N.W.
Washington, D.C. 20005

July 2, 1992

Office of Pesticide Programs - H7504C
Document Processing Desk
U.S. Environmental Protection Agency
Room 226A, Crystal Mall #2
1921 Jefferson Davis Highway
Arlington, Virginia 22202

Attention: Mr. Robert J. Taylor
Product Manager (25)

Subject: **MON-52249 Herbicide (EPA Reg. No. 524-454)**
Request to Amend Precautionary Statements
and First Aid Instructions

Dear Sir:

MON-52249 herbicide (EPA Reg. No. 524-454) was approved by the Agency on June 4, 1992, with precautionary statements that appear to be based on the proposed statements that were published in the Federal Register in 1984 (49 FR 37981-2). At this time, Monsanto would like to amend several of these statements to more accurately reflect the acute toxicity data available for the formulation.

The acute toxicity data for MON-52249 herbicide can be found in MRIDs 42035502 - 42035507 and are as follows:

	Category	MRID
Oral	IV	42035502
Dermal	IV	42035503
Eye	II	42035505
Skin	IV	42035506
Inhalation	III	42035504

In addition, the acute toxicity data (MRID 42035507) demonstrate that MON-52249 is not a dermal sensitizer.

Monsanto requests that the following specific changes be made to the precautionary language and first aid instructions:

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TELEPHONE: (202) 783-2460 FACSIMILE: (202) 783-2468

1. Monsanto believes that the statement "Harmful if inhaled" should be changed to "Harmful if inhaled or swallowed". Our experience has shown that gastrointestinal tract irritation is likely to occur when similar formulations are ingested, and we believe that users should be informed of the potential hazard.

2. The statement "Do not get in eyes or inhale dust or spray mist" should be divided into two separate statements:

   "Do not get in eyes or on clothing"
   "Avoid breathing vapor or spray mist"

   The first statement is appropriate since the toxicity classification for acute eye irritation is Category II. (We also suggest that this statement should be expanded to warn against getting the material on clothing.) However, the inhalation toxicity is classified as Category III, and the recommendation should therefore be to "avoid" rather than "do not". In addition, this is a liquid formulation and we believe that the term "dust" should be changed to "vapor".

3. The statement "Wear goggles, face shield or safety glasses" should be changed to recommend the appropriate type of eye protection for the intended use. At this time, MON-52249 will be used for commercial and industrial uses only and the option for safety glasses should be removed. The statement should be changed to read:

   "Wear goggles or face shield".

4. The statement "If in eyes, hold eyelids open and flush with plenty of water" should be changed to "If in eyes, immediately hold eyelids open and flush with plenty of water for at least 15 minutes". We believe that the word "immediately" is required to prevent any postponement of the treatment. In addition, we think that the amount of time should be specified to ensure that adequate amounts of water are used.

5. In the first aid statement for inhalation, we believe that the word "victim" should be changed to "individual". The word "victim" is used for those formulations rated in Category I or II. As mentioned earlier, the rating for the inhalation toxicity of this formulation is Category III and, according to the proposed 1984 rules, the statement of practical treatment for formulations in this category should be determined on an individual basis. Since the potential for injury by inhalation exposure is lower, we believe that the language should be less severe.

6. Monsanto believes that the phrase "this product will cause gastrointestinal tract irritation" should be included in the first aid statement for ingestion for the reasons given in item number 1 above. We also believe that the recommendation to drink gelatin solution or egg whites should be changed to water or milk. Egg whites and gelatin are antiquated remedies and medical

personnel rarely recommend these materials since their dilution capabilities are minimal. Our medical staff believe that water should be recommended as the primary diluent as it will provide more effective results, since it is readily available and can be ingested in large enough quantities to provide the desired dilution. Finally we believe that anyone who has ingested any pesticide product should seek medical attention.

Five (5) copies of the proposed label language for the precautionary statements and first aid instructions are enclosed for Agency review and approval. An Application for Pesticide Amendment and Certification with Respect to Citation of Data are also enclosed.

If you have any questions regarding this submission, please contact Dr. Russ Schneider or me.

Sincerely,

Sheila A. Schuette

Sheila A. Schuette, Ph.D.
Senior Registration Specialist
(314) 694-7248

cc: R.P. Schneider
D.P. Ward
D.M. Fee-White

MON-52249 HERBICIDE

EPA Reg. No. 524-454

AMENDED PRECAUTIONARY STATEMENTS

AND FIRST AID INSTRUCTIONS

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.
HARMFUL IF INHALED OR SWALLOWED.
Do not get in eyes or on clothing.
Avoid breathing vapor or spray mist.
Wear goggles or face shield.
Wash thoroughly with soap and water after handling.
Remove contaminated clothing and wash before reuse.

IF IN EYES, immediately hold eyelids open and flush with plenty of water for at least 15 minutes.

IF INHALED, remove individual to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

IF SWALLOWED, this product will cause gastrointestinal tract irritation. Immediately dilute by swallowing water or milk. Avoid alcohol. Get medical attention.

ACCEPTED
AUG 31 1992
Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 524-454

Please read Instructions on reverse before completing form.

Form Approved. OMB No. 2070-0060. Approval expires 11-30-93

(A) EPA

United States Environmental Protection Agency
Office of Pesticide Programs (H7505C)
Washington, DC 20460

Application for Pesticide:

[ ] Registration
[X] Amendment
[ ] Other

OPP Identifier Number: 156925

Section I

1. Company/Product Number: 524-454
2. EPA Product Manager: Robert J. Taylor
3. Proposed Classification: [X] None [ ] Restricted
4. Company/Product (Name): MON-52249 Herbicide
   PM#: 25
5. Name and Address of Applicant *(Include ZIP Code)*:
   Monsanto Company
   700 14th Street, N.W., Suite 1100
   Washington, D.C. 20005
   [ ] *Check if this is a new address*
6. **Expedited Review.** In accordance with FIFRA Section 3(c)(3)(b)(i), my product is similar or identical in composition and labeling to:
   EPA Reg. No. _____
   Product Name _____

Section II

[X] Amendment - Explain below
[ ] Resubmission in response to Agency letter dated _____
[ ] Notification - Explain below.
[ ] Final printed labels in response to Agency letter dated _____
[ ] "Me Too" Application.
[ ] Other - explain below.

Explanation: Use additional page(s) if necessary. (For section I and Section II.)

AMENDED precautionary statements and first aid instructions.

Section III

1. **Material This Product Will Be Packaged In:**

Child-Resistant Packaging	Unit Packaging	Water Soluble Packaging	2. Type of Container
[ ] Yes*	[ ] Yes	[ ] Yes	[ ] Metal
[X] No	[X] No	[X] No	[X] Plastic
	If "Yes," Unit Package wgt. / No. per container	If "Yes," Package wgt. / No. per container	[ ] Glass
			[ ] Paper
			[ ] Other (Specify) _____

* *Certification must be submitted.*

3. Location of Net Contents Information: [ ] Label [X] Container
4. Size(s) of Retail Container: 100 gallon
5. Location of Label Directions: [X] On Label [X] On Labeling accompanying product
6. Manner In Which Label Is Affixed To Product: [ ] Lithograph [ ] Paper glued [ ] Stenciled [X] Other (vinyl glued)

Section IV

1. Contact Point *(Complete items directly below for identification of individual to be contacted, if necessary, to process this application.)*

Name	Title	Telephone No. (Include Area Code)
Dr. Russell P. Schneider	Agricultural Regulation Director	202-783-2460

Certification

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law.

2. Signature: Sheila A. Schuette
3. Title: Senior Registration Specialist
4. Typed Name: Sheila A. Schuette, Ph.D.
5. Date: July 2, 1992
6. Date Application Received (Stamped)

EPA Form 8570-1 (Rev. 12-90) Previous editions are obsolete. (White - EPA File Copy (original); Yellow - Applicant copy)

PAPERWORK REDUCTION ACT NOTICE and INSTRUCTIONS

PAPERWORK REDUCTION ACT NOTICE: Public reporting burden for this collection of information is estimated to average 0.85 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

INSTRUCTIONS: This form is to be used for all applications for new registration, end use reregistration, amendment, resubmission, to applications for notifications, final printed labeling, reregistration, etc. In order to process an application for a new registration submitted on this form, the following material must accompany the application:

1. Certification with Respect to Citation of Data (EPA Form 8570-29). [If not exempted by 40 CFR 152.81 (b) (4)];
2. Confidential Statement of Formula (EPA Form 8570-4);
3. Formulator's Exemption Statement (EPA Form 8570-27);
4. Five copies of draft labeling;
5. Three copies of any data submitted;
6. Authorization letter where applicable;
7. Matrices where applicable.

Submission of Labeling - Labeling should first be submitted in the form of draft labels with all applications for new registration. Such draft labels may be in the form of typed label text on 8.5 x 11 inch paper or a mockup of the proposed label. If prepared as a mockup, it should be constructed in such a way as to facilitate storage in an 8.5 x 11 inch file. Mockup labels significantly smaller than 8.5 x 11 inches should be mounted on 8.5 x 11 inch paper for submission.
Submission of Data - Data submitted in support of this application must be submitted in accordance with PR Notice 86-5.

SPECIFIC INSTRUCTIONS: Please read the instructions listed below before completing this application. First determine the type of registration action, listed in Block A, for which you are submitting this application. For applications submitted in connection with New Registration actions, Sections I, III, and IV must be completed by the applicant. For applications submitted in connection with amended registration actions, resubmissions, notifications, reregistrations, etc., Sections I, II, and IV must be completed by the applicant.
Block A - Check the appropriate action for which you are submitting this form.

SECTION I - This section must be completed, as applicable, for all registration actions.

1. **Company/Product Number** - Insert your **Company Number**, if one has been assigned by EPA. This number may have been assigned to you as a basic registrant, a distributor, or as an establishment. If your product is registered, insert the **Product Number**.
2. **EPA Product Manager** - If known, fill in the name and PM number of the EPA Product Manager.
3. **Proposed Classification** - Specify the proposed classification of this product.
4. **Product Name** - Enter the complete product name of this pesticide as it will appear on the label. The name must be specific to this product only. Duplication of names is not permitted among products of the same company. Do not include any brand name or company line designations.
5. **Name and Address of Applicant** - The name of the firm or person and address shown in your application is the person or firm to whom the registration will be issued. If you are acting in behalf of another party, you must submit authorization from that party to act for them in registration matters. An applicant not residing in the United States must have an authorized agent residing in the United States to act for them in all registration matters. The name and complete mailing address of such an agent must accompany this application.
6. **Expedited Review** - FIFRA section 3 (c) 3 (B) provides for expedited review of applications for registration, or amendments to existing registrations, that are similar or identical to other pesticide products that are currently registered with the EPA. In order for your application to be eligible for expedited review, you must provide us with the EPA Registration Number and product name of the product you believe is similar to or identical to your product. The product must be similar or identical in both formulation and labeled uses.

SECTION II - This section must be completed for all applications submitted to amend the registration only of a currently registered product (Amendment); for a resubmission in response to an Agency letter, for notifications to the Agency, for the submission of final printed labeling, for reregistration and for any other action that pertains to a <u>specific EPA-registered product</u>. This section is <u>not to be</u> used for a new application for registration.

1. **Subject of submission** - Check the applicable block and provide the Agency letter date if appropriate. Provide a brief explanation of the purpose(s) for the submission, such as "the addition of a site, pest or crop (specify)"; "amend the Confidential Statement of Formula by..."; "reregistration submission"; general label revision of use directions." Attach a separate page if additional space is needed.

SECTION III (Packaging and Container Information) - This Section must be completed for all applications submitted in connection with new registration or applicable amendments.

1. **Type of Packaging** - Check the appropriate block if your product will be packaged in the indicated packaging types. Indicate the size of the individual packets and number per retail container.
2. **Type of Retail Container** - Indicate type of container in which product will be marketed.
3. **Location of Net Contents** - Specify the net contents of all retail containers for your product.
4. **Size(s) of Retail Container** - Specify the net contents of all retail containers for your product.
5. **Location of Use Directions** - Indicate the location of the use directions for your product.
6. **Manner in which label is affixed to product** - Indicate the method product label is attached to retail container.

SECTION IV (Contact Point) - This Section must be completed for all applications for Registration actions, i.e., new products registration, resubmission, "me-too," reregistration, etc.

1-5. Self-explanatory.
6. EPA Use Only.

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*U.S.GPO:1992-0-619-157/41085

United States Environmental Protection Agency
Washington, DC 20460

EPA

Certification with Respect to Citation of Data

Form Approved
OMB No. 2070-0060
Approval expires 9-30-90

Applicant's Name and Address	EPA File Symbol/Registration Number
Monsanto Company 700 14th Street, N.W. Suite 1100 Washington, D.C. 20005	524-454
	Product Name MON-52249 Herbicide
	Date of Application July 2, 1992

1. This application is supported by all data submitted or cited in the application. In addition, if cite-all options are indicated, this application is supported by all data in the Agency's files that concern the properties or effects of this product or of any other product that is identical or substantially similar, and that is one of the types of data that would be required to be submitted if this application sought the initial registration of a product of identical or similar composition and intended uses under the data requirements in effect on the date of approval of this application.

2. I certify that, for each study cited in support of this application for registration that is an exclusive use study, I am the original data submitter, or have obtained the written permission of the original data submitter to cite that study.

3. I certify that, for each study cited in support of this application for registration that is not an exclusive use study:

I am the original data submitter; or I have obtained the written permission of the original data submitter to cite that study; or

I have notified in writing the companies who have submitted data I have cited to support this application and have offered to: (a) Pay compensation for those data in accordance with section 3(c)(1)(D) and 3(c)(2)(D) of the Federal Insecticide, Fungicide and Rodenticide Act; and (b) Commence negotiations to determine which data are subject to the compensation requirement of FIFRA and the amount and terms of compensation due, if any. The companies I have notified are: *(Check one)*

☐ All companies listed on the Pesticide Data Submitters List for all active ingredients contained in my product (cite-all method or cite-all option under Selective Method). *(Also sign the General Offer to Pay Statement below.)*

☐ Those companies who have submittted the studies which I have cited (Selective method).

Signature	Name and Title	Date
Sheila A. Schuette	Sheila A. Schuette, Ph.D. Sr. Registration Specialist	July 2, 1992

General Offer to Pay: I hereby offer and agree to pay compensation to other persons, with regard to the approval of this application, to the extent required by FIFRA sec. 3(c)(1)(D) and 3(c)(2)(D).

Signature	Name and Title	Date

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EPA Form 8570-29 (7-86)

Paperwork Reduction Act Notice

Public reporting burden for this collection of information is estimated to 1.0 hours per response, including time for reviewing instructions, certifying the existence of the appropriate data, and completing and mailing this form. Send comments regarding the burden estimate or any other aspect of this certification process including suggestions for reducing the burden to:

Chief, Information Policy Branch, PM-223
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

and to

Office of Management and Budget
Paperwork Reduction Project (2070-0060)
Washington, DC 20503

SUBMISSION REVIEW RECORD

G

1. REGISTRATION NUMBER	CYCLE	2. DATE RECEIVED (MO / DAY / YR)
524-454		07 / 08 / 92

3. 3(c)(1) PUBLICATION NECESSARY	4. PETITION NO.	5. RECEIVED PM TEAM (MO / DAY / YR)
☐ YES ☐ NO		07 / 16 / 92

6. METHOD OF SUPPORT	7. PRODUCT MANAGER	NO.	8. PROJECTED RETURN (MO / DAY / YR)
☐ 2A ☐ 2B ☐ 2C			

9. DATE PULLED	10. DATE PUBLISHED	11. ACTION TYPE	CODE	12. OUTGOING DATE (MO / DAY / YR)
8/18/92		Amend PL & Fact Sheet statements 300		

REV SEQ.	REVIEW TYPE CODE	REVIEW TYPE	REVIEWER CODE (Initials)	SIGNATURE OF REVIEWER	COMMENT CODE	DATE REVIEW COMPLETED MO	DAY	YR
	A	REVIEWABILITY TEAM						
	B	PRODUCT MANAGER TEAM EFFICACY REVIEW						
	C	PRODUCT MANAGER TEAM HUMAN SAFETY REVIEW						
	D	PRODUCT MANAGER TEAM ENVIRONMENTAL SAFETY REVIEW						
	E	PRODUCT MANAGER TEAM RESUBMISSION REVIEW						
	F	PRODUCT MANAGER		VKW	NAC	08	18	92
	G	INTERAGENCY REFERRAL						
	H	COST-BENEFIT REVIEW						
	I	PUBLIC COMMENTS REVIEW						
	J	EEE BRANCH INSECTICIDE EFFICACY						
	K	EEE BRANCH HERBICIDE EFFICACY						
	L	EEE BRANCH FUNGICIDE EFFICACY						
	M	EEE BRANCH RODENTICIDE EFFICACY						
	N	EEE BRANCH DISINFECTANT EFFICACY						
	O	CHEMISTRY BRANCH RESIDUE CHEMISTRY						
	P	EEE BRANCH ENVIRONMENTAL CHEMISTRY						
	Q	TOXICOLOGY BRANCH HUMAN SAFETY						
	R	EEE BRANCH ENVIRONMENTAL SAFETY						
	S							
	T							

PRODUCT MANAGER SIGNATURE	TYPE OF RESPONSE	CODE

EPA Form 8570-13 (3-75)

Monsanto

Monsanto Company
Suite 1100
700 14th Street, N.W.
Washington, D.C. 20005

June 24, 1992

Office of Pesticide Programs - H7504C
Document Processing Desk
U.S. Environmental Protection Agency
Room 226A, Crystal Mall #2
1921 Jefferson Davis Highway
Arlington, Virginia 22202

Attention: Mr. Robert J. Taylor
Product Manager (25)

Subject: **MON-52249 Herbicide (EPA Reg. No. 524-454)**
Request for Alternate Formulation / Submission of Alternate CSF
Request for Additional Brand Name and Use Instructions
Notification of Additional Inert Ingredient Supplier

Dear Sir:

Monsanto is submitting for Agency review and approval an additional brand name request and an amended label text for MON-52249. The additional brand name will be MON-52249 RT Herbicide. Monsanto is also requesting the approval of an alternate formulation, in which a small amount of [redacted]. This product will be selectively marketed in agricultural areas that practice reduced or limited tillage for moisture and soil conservation, and is intended to replace Roundup RT herbicide (EPA Reg. No. 524-308), effective September 1, 1992. Finally, Monsanto is notifying the Agency of an additional supplier for [redacted] surfactant.

The following items are enclosed:

1. Five (5) copies of an amended label text for MON-52249 RT herbicide. The label text is extracted directly from the approved text in the current MON-52249 herbicide label booklet, with the exception that certain weed species, crops and uses have been removed since they are not appropriate for the area of intended use. In addition, certain county restrictions have been specified. The precautionary language is identical to the language required by the Agency on June 4, 1992. All uses are supported by the 158 data list for MON-52249, which can be found in MRID 42035500.

Inert ingredient information may be entitled to confidential treatment

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TELEPHONE: (202) 783-2460 FACSIMILE: (202) 783-2468

2. Five (5) copies of the proposed container label. This product will be sold in 100 gallon shuttles only. The precautionary language is identical to that required by the Agency on June 4, 1992; the new wetlands statement has also been incorporated into the label.

3. A revised Confidential Statement of Formula (CSF). This alternate formulation contains [redacted] is also listed as an additional supplier of [redacted] surfactant on this revised CSF.

4. A letter from [redacted] allowing Monsanto access to their data on [redacted] which is supplied to Monsanto under the trade name [redacted]

An Application for Pesticide Amendment and Certification with Respect to Citation of Data are also enclosed.

Monsanto requests that the Agency approve and stamp the amended booklet and container labels and approve the alternate formulation for MON-52249 RT. Monsanto further requests that these approvals be granted by August 1, 1992. This approval date is required in order to allow time for the receipt of state registrations and printing of labels to meet the September 1, 1992 deadline for the transition of Roundup RT. If you have any questions regarding this submission, please contact Dr. Russ Schneider or me.

Sincerely,

Sheila A. Schuette

Sheila A. Schuette, Ph.D.
Senior Registration Specialist
(314) 694-7248

cc: R.P. Schneider
D.P. Ward
D.M. Fee-White

Inert ingredient information may be entitled to confidential treatment

Please read Instructions on reverse before completing form.

Form Approved. OMB No. 2070-0060. Approval expires 11-30-93

(A) EPA

United States Environmental Protection Agency
Office of Pesticide Programs (H7505C)
Washington, DC 20460

Application for Pesticide:

[ ] Registration
[X] Amendment
[ ] Other

OPP Identifier Number: 156920

Section I

1. Company/Product Number: 524-454
2. EPA Product Manager: Robert J. Taylor
3. Proposed Classification: [X] None [ ] Restricted
4. Company/Product (Name): MON-52249 Herbicide
   PM#: 25
5. Name and Address of Applicant *(Include ZIP Code)*:
   Monsanto Company
   700 14th Street, N.W. Suite 1100
   Washington, D.C. 20005
   [ ] *Check if this is a new address*
6. **Expedited Review.** In accordance with FIFRA Section 3(c)(3)(b)(i), my product is similar or identical in composition and labeling to:
   EPA Reg. No. ____
   Product Name ____

Section II

[X] Amendment - Explain below
[ ] Resubmission in response to Agency letter dated ____
[X] Notification - Explain below.
[ ] Final printed labels in response to Agency letter dated ____
[ ] "Me Too" Application.
[ ] Other - explain below.

Explanation: Use additional page(s) if necessary. (For section I and Section II.)

Request for alternate formulation/submission of alternate CSF
Request for additional brand name and amended use instructions
Notification of additional inert ingredient supplier

Section III

1. **Material This Product Will Be Packaged In:**

Child-Resistant Packaging	Unit Packaging	Water Soluble Packaging	2. Type of Container
[ ] Yes*	[ ] Yes	[ ] Yes	[ ] Metal
[X] No	[X] No	[X] No	[X] Plastic
	If "Yes," Unit Package wgt. / No. per container	If "Yes," Package wgt. / No. per container	[ ] Glass
			[ ] Paper
			[ ] Other (Specify) ____

* ***Certification must be submitted.***

3. Location of Net Contents Information: [ ] Label [X] Container
4. Size(s) of Retail Container: 2.5gal, 30gal, 100gal
5. Location of Label Directions: [X] On Label [X] On Labeling accompanying product
6. Manner In Which Label Is Affixed To Product: [ ] Lithograph [ ] Paper glued [ ] Stenciled [X] Other (vinyl glued)

Section IV

1. Contact Point *(Complete items directly below for identification of individual to be contacted, if necessary, to process this application.)*

Name	Title	Telephone No. (Include Area Code)
Russell P. Schneider, Ph.D.	Agricultural Regulation Director	202-783-2460

Certification

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law.

2. Signature: Sheila A. Schuette
3. Title: Senior Registration Specialist
4. Typed Name: Sheila A. Schuette, Ph.D.
5. Date: June 24, 1992
6. Date Application Received (Stamped): 28

PAPERWORK REDUCTION ACT NOTICE and INSTRUCTIONS

PAPERWORK REDUCTION ACT NOTICE: Public reporting burden for this collection of information is estimated to average 0.85 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

INSTRUCTIONS: This form is to be used for all applications for new registration, end use reregistration, amendment, resubmission, to applications for notifications, final printed labeling, reregistration, etc. In order to process an application for a new registration submitted on this form, the following material must accompany the application:

1. Certification with Respect to Citation of Data (EPA Form 8570-29). [If not exempted by 40 CFR 152.81 (b) (4)];
2. Confidential Statement of Formula (EPA Form 8570-4);
3. Formulator's Exemption Statement (EPA Form 8570-27);;
4. Five copies of draft labeling;
5. Three copies of any data submitted;
6. Authorization letter where applicable;
7. Matrices where applicable.

Submission of Labeling - Labeling should first be submitted in the form of draft labels with all applications for new registration. Such draft labels may be in the form of typed label text on 8.5 x 11 inch paper or a mockup of the proposed label. If prepared as a mockup, it should be constructed in such a way as to facilitate storage in an 8.5 x 11 inch file. Mockup labels significantly smaller than 8.5 x 11 inches should be mounted on 8.5 x 11 inch paper for submission.
Submission of Data - Data submitted in support of this application must be submitted in accordance with PR Notice 86-5.

SPECIFIC INSTRUCTIONS: Please read the instructions listed below before completing this application. First determine the type of registration action, listed in Block A, for which you are submitting this application. For applications submitted in connection with New Registration actions, Sections I, III, and IV must be completed by the applicant. For applications submitted in connection with amended registration actions, resubmissions, notifications, reregistrations, etc., Sections I, II, and IV must be completed by the applicant.
Block A - Check the appropriate action for which you are submitting this form.

SECTION I - This section must be completed, as applicable, for all registration actions.

1. **Company/Product Number** - Insert your **Company Number**, if one has been assigned by EPA. This number may have been assigned to you as a basic registrant, a distributor, or as an establishment. If your product is registered, insert the **Product Number**.
2. **EPA Product Manager** - If known, fill in the name and PM number of the EPA Product Manager.
3. **Proposed Classification** - Specify the proposed classification of this product.
4. **Product Name** - Enter the complete product name of this pesticide as it will appear on the label. The name must be specific to this product only. Duplication of names is not permitted among products of the same company. Do not include any brand name or company line designations.
5. **Name and Address of Applicant** - The name of the firm or person and address shown in your application is the person or firm to whom the registration will be issued. If you are acting in behalf of another party, you must submit authorization from that party to act for them in registration matters. An applicant not residing in the United States must have an authorized agent residing in the United States to act for them in all registration matters. The name and complete mailing address of such an agent must accompany this application.
6. **Expedited Review** - FIFRA section 3 (c) 3 (B) provides for expedited review of applications for registration, or amendments to existing registrations, that are similar or identical to other pesticide products that are currently registered with the EPA. In order for your application to be eligible for expedited review, you must provide us with the EPA Registration Number and product name of the product you believe is similar to or identical to your product. The product must be similar or identical in both formulation and labeled uses.

SECTION II - This section must be completed for all applications submitted to amend the registration only of a currently registered product (Amendment), for a resubmission in response to an Agency letter, for notifications to the Agency, for the submission of final printed labeling, for reregistration and for any other action that pertains to a specific EPA-registered product. This section is not to be used for a new application for registration.

1. **Subject of submission** - Check the applicable block and provide the Agency letter date if appropriate. Provide a brief explanation of the purpose(s) for the submission, such as "the addition of a site, pest or crop (specify)"; "amend the Confidential Statement of Formula by..."; "reregistration submission"; general label revision of use directions." Attach a separate page if additional space is needed.

SECTION III (Packaging and Container Information) - This Section must be completed for all applications submitted in connection with new registration or applicable amendments.

1. **Type of Packaging** - Check the appropriate block if your product will be packaged in the indicated packaging types. Indicate the size of the individual packets and number per retail container.
2. **Type of Retail Container** - Indicate type of container in which product will be marketed.
3. **Location of Net Contents** - Specify the net contents of all retail containers for your product.
4. **Size(s) of Retail Container** - Specify the net contents of all retail containers for your product.
5. **Location of Use Directions** - Indicate the location of the use directions for your product.
6. **Manner in which label is affixed to product** - Indicate the method product label is attached to retail container.

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SECTION IV (Contact Point) - This Section must be completed for all applications for Registration actions, i.e., new products registration, resubmission, "me-too," reregistration, etc.

1-5. Self-explanatory.
6. EPA Use Only.

★U.S.GPO:1992-0-619-157/41065

United States Environmental Protection Agency
Washington, DC 20460

EPA

Certification with Respect to Citation of Data

Form Approved
OMB No. 2070-0060
Approval expires 9-30-90

Applicant's Name and Address	EPA File Symbol/Registration Number
Monsanto Company 700 14th Street, N.W. Suite 1100 Washington, D.C. 20005	524-454
	Product Name MON-52249 Herbicide
	Date of Application June 24, 1992

1. This application is supported by all data submitted or cited in the application. In addition, if cite-all options are indicated, this application is supported by all data in the Agency's files that concern the properties or effects of this product or of any other product that is identical or substantially similar, and that is one of the types of data that would be required to be submitted if this application sought the initial registration of a product of identical or similar composition and intended uses under the data requirements in effect on the date of approval of this application.

2. I certify that, for each study cited in support of this application for registration that is an exclusive use study, I am the original data submitter, or have obtained the written permission of the original data submitter to cite that study.

3. I certify that, for each study cited in support of this application for registration that is not an exclusive use study:

I am the original data submitter, or I have obtained the written permission of the original data submitter to cite that study; or

I have notified in writing the companies who have submitted data I have cited to support this application and have offered to: (a) Pay compensation for those data in accordance with section 3(c)(1)(D) and 3(c)(2)(D) of the Federal Insecticide, Fungicide and Rodenticide Act; and (b) Commence negotiations to determine which data are subject to the compensation requirement of FIFRA and the amount and terms of compensation due, if any. The companies I have notified are: *(Check one)*

☐ All companies listed on the Pesticide Data Submitters List for all active ingredients contained in my product (cite-all method or cite-all option under Selective Method). *(Also sign the General Offer to Pay Statement below.)*

☐ Those companies who have submittted the studies which I have cited (Selective method).

Signature	Name and Title	Date
Sheila A. Schuette	Sheila A. Schuette, Ph.D. Sr. Registration Specialist	June 24, 1992

General Offer to Pay: I hereby offer and agree to pay compensation to other persons, with regard to the approval of this application, to the extent required by FIFRA sec. 3(c)(1)(D) and 3(c)(2)(D).

Signature	Name and Title	Date

EPA Form 8570-29 (7-86)

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Paperwork Reduction Act Notice

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U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

and to

Office of Management and Budget
Paperwork Reduction Project (2070-0060)
Washington, DC 20503

MON 52249 RT

Jacket

HERBICIDE

REDUCED TILLAGE

Shuttle™ 100

by Monsanto

For control of annual and perennial weeds in reduced tillage systems.

Carefully follow detailed instructions in attached label booklet

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

Read the entire label before using this product.

Use only according to label instructions.

Read "LIMIT OF WARRANTY AND LIABILITY", which appears in the label booklet, before buying or using. If terms are not acceptable return at once unopened.

The contents of this container may not be REFORMULATED, nor, except in accordance with the Monsanto Repackaging Agreement, REPACKAGED.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Keep out of reach of children.

WARNING!

CAUSES EYE IRRITATION.
HARMFUL IF SWALLOWED OR INHALED.
MAY CAUSE SKIN IRRITATION.

Do not get in eyes, on skin or on clothing.

Avoid breathing vapor or spray mist.

Wash thoroughly with soap and water after handling.

FIRST AID: IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention.

IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing. Wash clothing before reuse.

IF SWALLOWED, this product will cause gastrointestinal tract irritation. Immediately dilute by swallowing water or milk. Get medical attention.

IF INHALED, remove individual to fresh air. Get medical attention if breathing difficulty develops.

In case of emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Do not apply directly to water or wetland (swamps, bogs, marshes or potholes). Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied only in stainless steel, aluminum, fiberglass, plastic and plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

INSERT (A)
*SEE ATTACHED

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, seed or feed by storage or disposal.

DISPOSAL:

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Do not reuse container. Return emptied container per the Monsanto container return program. If not returned, triple rinse container, then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

(See label booklet for Complete Directions for Use.)

ACTIVE INGREDIENT:

*Glyphosate, N-(phosphonomethyl) glycine in the form of its isopropylamine salt	41.0%
INERT INGREDIENTS:	59.0%
	100.0%

*Contains 480 grams per litre or 4 pounds of the active ingredient, glyphosate, in the form if its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

This product protected by U.S. Patent No. ~~[illegible]~~ 4,405,531 ~~and No. 4,940,658~~. Other patents pending. No license granted under any non-U.S. patent(s).

• Registered trademark of Monsanto Company

EPA Reg. No. ~~524-308-R~~ 524-454

© MONSANTO COMPANY ~~1991~~ 1992

In case of emergency involving this product, Call Collect, day or night, (314) 694-4000.

MONSANTO COMPANY
AGRICULTURAL PRODUCTS
ST. LOUIS, MISSOURI 63167 U.S.A.

A-000.20

INSERT (B)
* SEE ATTACHED

PLACE
Complete Directions For Use
Booklet
HERE

ACCEPTED
JUL 13 1992
Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 524-454

NET CONTENTS
100 GAL.

EPA Est. 37507-MT-1

Keep out of reach of children.

WARNING!

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.
HARMFUL IF INHALED.

Do not get in eyes or inhale dust or spray mist.

Wear goggles, face shield or safety glasses.

Wash thoroughly with soap and water after handling.

Remove contaminated clothing and wash before reuse.

FIRST AID: IF IN EYES, Hold eyes open and flush with a steady gentle stream of water for 15 minutes. Get medical attention.

IF SWALLOWED, Drink promptly a large quantity of milk, egg white, or gelatin solution, or if these are not available large quantities of water. Avoid alcohol.

IF INHALED, Remove victim to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. Get medical attention.

A

INSERT

Do not apply directly to water, to areas where surface water is present or in intertidal areas below the mean highwater mark. Do not contaminate water when disposing of equipment washwaters.

B

INSERT

MON 52249 RT
REDUCED TILLAGE HERBICIDE

By Monsanto
Shuttle™
100

Jacket

For control of annual and perennial weeds in Colorado, Idaho, Kansas*, Minnesota*, Montana, Nebraska*, North Dakota, Oregon*, South Dakota, Utah, Washington* and Wyoming.

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

EPA Reg. No. 524-454

Complete Directions for Use

Roundup® is a registered trademark of Monsanto Company.

Shuttle™ is a trademark of Monsanto Company.

1992-1 XXX.XX-XXX.XX/XX

For control of annual and perennial weeds in Colorado, Idaho, Kansas*, Minnesota*, Montana, Nebraska*, North Dakota, Oregon*, South Dakota, Utah, Washington*, and Wyoming.

***COUNTY RESTRICTIONS**

This product can only be used in certain counties in Kansas, Minnesota, Nebraska, Oregon, and Washington. See the following sections for county use restrictions for these states.

In **KANSAS** and **NEBRASKA**, this product can be used in all counties **EXCLUDING** those listed below:

KANSAS

ACCEPTED
JUL 13 1992
Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 524-454

Allen
Anderson
Atchinson
Bourbon
Brown
Cherokee
Coffey
Crawford
Doniphan
Douglas
Franklin
Jackson

5/5/92 35

Jefferson
Johnson

Labette
Leavenworth
Linn
Miami
Montgomery
Neosho
Osage
Riley
Shawnee
Wilson
Woodson
Wyandotte

NEBRASKA

Antelope
Boone
Burt
Butler
Cass
Cedar
Colfax
Cuming
Dakota
Dixon
Dodge
Douglas
Gage
Hamilton
Jefferson
Johnson
Knox
Lancaster
Madison

Merrick
Nance
Nemaha
Otoe
Pawnee
Pierce
Platte
Polk
Richardson
Saline
Sarpy
Saunders
Seward
Stanton
Thurston
Washington
Wayne
York

In **MINNESOTA, OREGON** and **WASHINGTON,** this product can be used **ONLY** in those counties listed below:

MINNESOTA

Becker
Beltrami
Clay
Clearwater
Douglas
Grant
Hubbard
Kittson
Lake of the Woods
Mahnomen
Marshall
Norman
Ottertail
Pennington
Polk
Red Lake
Roseau
Wadena
Wilkin

OREGON

Baker
Crook
Deschutes
Gilliam
Grant
Harney
Hood River
Jefferson
Malheur
Morrow
Sherman
Umatilla
Union
Wallowa
Wasco
Wheeler

WASHINGTON

Adams
Asotin
Benton
Chelan
Columbia
Douglas
Ferry
Franklin
Garfield
Grant
Kittitus
Klickitat

37

Lincoln
Okanagan
Pend Oreille
Spokane
Stevens
Walla Walla
Whitman
Yakima

Read the entire label before using this product.

Use only according to label instructions.

Read "LIMIT OF WARRANTY AND LIABILITY" before buying or using. If terms are not acceptable, return at once unopened.

REFORMULATION IS PROHIBITED.

SEE INDIVIDUAL CONTAINER LABEL FOR REPACKAGING LIMITATIONS.

LIMIT OF WARRANTY AND LIABILITY

This Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the Complete Directions for Use label booklet ("Directions") when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this Company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

Buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this Company, including, but not limited to, incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather, weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied, as well as weather conditions which are outside the application ranges set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF THE LIABILITY OF THIS COMPANY OR ANY OTHER SELLER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE) SHALL BE THE PURCHASE PRICE PAID BY THE USER OR BUYER FOR THE QUANTITY OF THIS PRODUCT INVOLVED, OR, AT THE ELECTION OF THIS COMPANY OR ANY OTHER SELLER, THE REPLACEMENT OF SUCH QUANTITY, OR, IF NOT ACQUIRED BY PURCHASE,

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REPLACEMENT OF SUCH QUANTITY. IN NO EVENT SHALL THIS COMPANY OR ANY OTHER SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES.

Buyer and all users are deemed to have accepted the terms of this LIMIT OF WARRANTY AND LIABILITY which may not be varied by any verbal or written agreement.

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Keep out of reach of children.

WARNING!

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.
HARMFUL IF INHALED.

Do not get in eyes or inhale dust or spray mist.

Wear goggles, face shield or safety glasses.

Wash thoroughly with soap and water after handling.

Remove contaminated clothing and wash before reuse.

FIRST AID: IF IN EYES, Hold eyes open and flush with a steady gentle stream of water for 15 minutes. Get medical attention.

IF SWALLOWED, Drink promptly a large quantity of milk, egg white, or gelatin solution, or if these are not available large quantities of water. Avoid alcohol.

IF INHALED, Remove victim to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. Get medical attention.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present or in intertidal areas below the mean highwater mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

ACTIVE INGREDIENT:

*Glyphosate, N-(phosphonomethyl) glycine, in the form of its isopropylamine salt	41.3%
INERT INGREDIENTS:	58.7%
	100.0%

* Contains 480 grams per litre or 4 pounds per U.S. gallon of the active ingredient glyphosate, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

See container label for STORAGE AND DISPOSAL instructions.

GENERAL INFORMATION

DO NOT APPLY THIS PRODUCT USING AERIAL SPRAY EQUIPMENT EXCEPT UNDER CONDITIONS AS SPECIFIED WITHIN THIS LABEL.

This product, a water soluble liquid, mixes readily with water to be applied as a foliar spray for the control or destruction of most herbaceous plants. It may be applied through most standard industrial or field-type sprayers after dilution and thorough mixing with water in accordance with label instructions.

This product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days but on most perennial weeds may not occur for 7 days or more. Extremely cool or cloudy weather following treatment may slow activity of this product and delay visual effects of control. Visible effects are a gradual wilting and yellowing of the plant which advances to complete browning of aboveground growth and deterioration of underground plant parts.

Unless otherwise specified on this label, delay application until vegetation has emerged and reached the stages described for control of such vegetation under the "WEEDS CONTROLLED" section of this label. Unemerged plants arising from unattached underground rhizomes or root stocks of perennials will not be affected by the herbicide and will continue to grow. For this reason, best control of most perennial weeds is obtained when treatment is made at late growth stages approaching maturity.

Always use the higher rate of this product per acre within the recommended range when (1) weed growth is heavy or dense, or (2) weeds are growing in an undisturbed (noncultivated) area.

Do not treat weeds under poor growing conditions such as drought stress, disease or insect damage, as reduced weed control may result. Reduced control may also occur when treating weeds heavily covered with dust.

This product is recommended for control of emerged weeds prior to establishment of labeled crops. Large amounts of green or decaying vegetation left standing or incorporated into the seedbed may enhance the development of disease in newly planted crops. This may result in poor emergence and/or stands, especially under cool and/or wet conditions.

Spraying early to control young weeds before dense stands develop or light cultivation to assist weed decay will favor preparation of suitable seedbeds.

In reduced tillage and no-till systems, ensure good seed to soil contact and proper seeding depth.

Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed, or cut, and have not been allowed to regrow to the recommended stage for treatment.

Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Heavy rainfall or irrigation within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required.

This product does not provide residual weed control. For subsequent residual weed control, follow a label-approved herbicide program. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of mixtures of this product with herbicides or other materials that are not expressly recommended in this labeling. Mixing this product with herbicides or other materials not recommended on this label may result in reduced performance.

For best results, spray coverage should be uniform and complete. Do not spray weed foliage to the point of runoff.

Keep people and pets off treated areas until spray solution has dried to prevent transfer of this product onto desirable vegetation.

ATTENTION: AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Do not allow the herbicide solution to mist, drip, drift, or splash onto desirable vegetation since minute quantities of this herbicide can cause severe damage or destruction to the crop, plants, or other areas on which treatment was not intended. The likelihood of injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. AVOID APPLYING AT EXCESSIVE SPEED OR PRESSURE.

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals, crops, or other unintended consequences. Keep container closed to prevent spills and contamination.

MIXING, ADDITIVES AND APPLICATION INSTRUCTIONS

APPLY THESE SPRAY SOLUTIONS IN PROPERLY MAINTAINED AND CALIBRATED EQUIPMENT CAPABLE OF DELIVERING DESIRED VOLUMES. DO NOT APPLY WHEN WIND OR OTHER CONDITIONS FAVOR DRIFT. HAND GUN APPLICATIONS SHOULD BE PROPERLY DIRECTED TO AVOID SPRAYING DESIRABLE PLANTS. NOTE: REDUCED RESULTS MAY OCCUR IF WATER CONTAINING SOIL IS USED, SUCH AS WATER FROM PONDS AND UNLINED DITCHES.

MIXING

This product mixes readily with water. Mix spray solutions of this product as follows: Fill the mixing or spray tank with the required amount of water. Add the recommended amount of this product (see "DIRECTIONS FOR USE" and "WEEDS CONTROLLED" sections of this label) near the end of the filling process and mix well. Remove hose from tank immediately after filling to avoid siphoning back into the carrier source. During mixing and application, foaming of the spray solution may occur. To prevent or minimize foam, avoid the use of mechanical agitators, terminate by-pass and return lines at the bottom of the tank and, if needed, use an approved anti-foam or defoaming agent.

TANK MIXTURES

Always predetermine the compatibility of labeled tank mixtures of this herbicide with water carrier by mixing small proportional quantities in advance.

Mix labeled tank mixtures of this product with water as follows:

1. Place a 20 to 35 mesh screen or wetting basket over filling port.

2. Through the screen, fill the sprayer tank one-half full with water and start agitation.

3. If a wettable powder is used, make a slurry with the water carrier, and add it SLOWLY through the screen into the tank. Continue agitation.

4. If a flowable formulation is used, premix one part flowable with one part water. Add diluted mixture SLOWLY through the screen into the tank. Continue agitation.

5. If an emulsifiable concentrate formulation is used, premix one part emulsifiable concentrate with two parts water. Add diluted mixture slowly through the screen into the tank. Continue agitation.

6. Continue filling the sprayer tank with water and add the required amount of this product near the end of the filling process.

7. Where nonionic surfactant is recommended, add this to the spray tank before completing the filling process.

8. Add individual formulations to the spray tank as follows: wettable powder, flowable, emulsifiable concentrate, drift control additive, water soluble liquid followed by surfactant.

Maintain good agitation at all times until the contents of the tank are sprayed. If the spray mixture is allowed to settle, thorough agitation is required to resuspend the mixture before spraying is resumed.

Keep by-pass line on or near bottom of tank to minimize foaming. Screen size in nozzle or line strainers should be no finer than 50 mesh. Carefully select proper nozzle to avoid spraying a fine mist. For best results with conventional ground application equipment, use flat fan nozzles.

Clean sprayer and parts immediately after using this product by thoroughly flushing with water.

ADDITIVES

SURFACTANTS

Nonionic surfactants which have at least 70 percent active ingredient and are labeled for use with herbicides may be used. Do not reduce rates of this herbicide when adding surfactant. When adding additional surfactant or when label instructions require the use of additional surfactant, use 0.5 percent surfactant concentration (2 quarts per 100 gallons of spray solution). Read and carefully observe surfactant cautionary statements and other information appearing on the surfactant label.

AMMONIUM SULFATE

The addition of 1 to 2 percent dry ammonium sulfate by weight (or liquid equivalent), may increase the performance of this product in tank mixtures on annual weeds. Add 8.5 to 17 pounds of dry ammonium sulfate per 100 gallons of spray solution. The improvement in performance may be apparent where environmental stress is a concern. Use the higher rate of ammonium sulfate with this product when treating large or dense populations of annual weeds. Low-quality ammonium sulfate may contain material that will not readily dissolve which could result in nozzle-tip plugging. To determine quality, perform a jar test by adding 1/3 cup of ammonium sulfate to 1 gallon of water and agitate for 1 minute. If undissolved sediment is observed, predissolve the dry additive in water and filter prior to addition to the spray tank. If ammonium sulfate is added directly to the spray tank, add slowly with agitation. Adding too quickly may clog outlet lines. Ensure that ammonium sulfate is completely dissolved in the spray tank before adding herbicides. Thoroughly rinse the spray system with clean water after use to reduce corrosion. Observe all precautionary statements on the ammonium sulfate product labels.

NOTE: The use of ammonium sulfate as an additive does not preclude the need for additional surfactant. Do not use herbicide rates lower than recommended in this label.

APPLICATION EQUIPMENT AND TECHNIQUES

Do not apply this product through any type of irrigation system.

This product may be applied using either aerial, conventional ground or hooded spray equipment. Use extreme care to avoid misting or drifting of herbicide solution onto foliage, green stems or fruit of desirable crops, trees, or plants during both growing and dormant periods, since even very small quantities of spray can cause severe plant injury.

GROUND APPLICATION: Apply recommended rates of this product in 3 to 10 gallons of water per acre as a broadcast spray. For optimum spray distribution and coverage, use flat fan or low-volume nozzles. When using flood nozzles, space them no more than 40 inches apart and ensure double overlap of spray pattern. Refer to the manufacturer's recommendations for correct pressure and nozzle height above the target canopy. Avoid pressure and nozzles which produce fine droplets or mist.

Use appropriate marking devices to ensure uniform spray coverage and best results from the herbicide.

AERIAL APPLICATION: Apply the recommended rates of this product in 3 to 5 gallons of water per acre as a broadcast spray. DO NOT APPLY DURING INVERSION CONDITIONS, WHEN WINDS ARE GUSTY, OR UNDER ANY OTHER CONDITION WHICH FAVORS DRIFT. DRIFT MAY CAUSE DAMAGE TO ANY VEGETATION CONTACTED TO WHICH TREATMENT WAS NOT INTENDED. TO

PREVENT INJURY TO ADJACENT DESIRABLE VEGETATION, APPROPRIATE BUFFER ZONES MUST BE MAINTAINED.

Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations which dispense spray as fine spray droplets. Do not angle nozzles forward into the airstream and do not increase spray volume by increasing nozzle pressure.

SPRAYER CLEANUP

CLEAN THE ENTIRE SPRAYER AFTER APPLICATION OF THIS PRODUCT. Failure to clean the sprayer thoroughly may result in injury to desirable crops which are subsequently sprayed. First, add clean water to the tank and thoroughly rinse the entire sprayer system. Secondly, fill the tank with water and ammonia. Add 1 quart of household ammonia per 25 gallons of water. Pump enough solution through the hoses, boom and nozzles to fill these parts completely. Then fill the tank, close and leave for 24 hours before draining and rinsing thoroughly with water.

Application or use of other agricultural chemicals with the equipment used for this product may result in injury to desirable vegetation.

Thoroughly wash aircraft, especially landing gear, after each day of spraying to remove residues of this product accumulated during spraying or from spills. PROLONGED EXPOSURE OF THIS PRODUCT TO UNCOATED STEEL SURFACES MAY RESULT IN CORROSION AND POSSIBLE FAILURE OF THE PART. LANDING GEAR ARE MOST SUSCEPTIBLE. The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion.

WEEDS CONTROLLED

This herbicide controls many annual and perennial grasses and broadleaf weeds.

ANNUAL WEEDS

- Add a nonionic surfactant at a rate of 0.5 percent by total spray volume.
- Apply to actively growing grass and broadleaf weeds.
- Allow at least 3 days after treatment before tillage.
- For maximum agronomic benefit, apply when weeds are 6 inches or less in height.
- To prevent seed production, applications should be made prior to seedhead formation.
- This product does not provide residual control; therefore, delay application until maximum weed emergence. Repeat treatments may be necessary to control later germinating weeds.

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- Do not use these rates for weeds that have been mowed, grazed or cut, unless weed regrowth has occurred and weeds are vigorously growing.

- Refer to the "TANK MIXTURES" portion of this section for control of additional broadleaf weeds.

RECOMMENDED RATES AND WEEDS CONTROLLED

ANNUAL WEED SPECIES	MAXIMUM HEIGHT/ GROWTH STAGE	RATE PER ACRE** (FLUID OUNCES)
Foxtail *Setaria spp.*	12"	8 oz.
Barnyardgrass *Echinochloa crus-galli*	6"	12 oz.
Bluegrass, annual *Poa annua*		
Brome, downy* *Bromus tectorum*		
Chickweed, jagged *Holosteum umbellatum*		
Mustard, blue *Chorispora tenella*		
Mustard, tansy *Descurainia pinnata*		
Mustard, tumble *Sisymbrium altissimum*		
Mustard, wild *Sinapis arvensis*		
Barley *Hordeum vulgare*	12"	12 oz.
Rye *Secale cereale*		
Sandbur, field *Cenchrus spp.*		
Shattercane *Sorghum bicolor*		
Stinkgrass *Eragrostis cilianensis*		

Wheat *Triticum aestivum*	18"	12 oz.
Morningglory *Ipomoea spp.*	3"	16 oz.
Bluegrass, bulbous *Poa bulbosa*	6"	16 oz.
Cheat *Bromus secalinus*		
Chickweed, mouseear *Cerastium vulgatum*		
Corn, volunteer *Zea mays*		
Groundsel, common *Senecio vulgaris*		
Goatgrass, jointed *Aegilops cylindrica*		
Horseweed/Marestail *Conyza canadensis*		
Pennycress, field; Fanweed *Thlaspi arvense*		
Rocket, London *Sisymbrium irio*		
Ryegrass, Italian *Lolium multiflorum*		
Shepherdspurse *Capsella bursa-pastoris*		
Spurge, annual *Euphorbia spp.*		
Buttercup *Ranunculus spp.*	12"	16 oz.
Cocklebur *Xanthium strumarium*		
Crabgrass *Digitaria spp.*		
Dwarfdandelion *Krigia cespitosa*		
Falseflax, smallseed *Camelina microcarpa*		

Johnsongrass, seedling *Sorghum halepense*		
Lambsquarters, common *Chenopodium album*		
Oats, wild *Avena fatua*		
Panicum, fall *Panicum dichotomiflorum*		
Panicum, Texas *Panicum texanum*		
Pigweed, redroot *Amaranthus retroflexus*		
Pigweed, smooth *Amaranthus hybridus*		
Witchgrass *Panicum capillare*		
Pusley, Florida *Richardia scabra*	12"	32 oz.
Filaree *Erodium spp.*	12"	48 oz.

* For control in no-till systems, use 16 fluid ounces per acre.

** For those rates less than 32 fluid ounces per acre, this product at rates up to 32 fluid ounces per acre may be used where heavy weed densities exist.

FALLOW AND REDUCED TILLAGE SYSTEMS

Use this product in fallow and reduced tillage systems for control of annual weeds prior to emergence of crops listed in this label. Refer to the "WEEDS CONTROLLED" section of this label for specific rates and instructions. This product may be applied using ground or aerial spray equipment. See the "APPLICATION EQUIPMENT AND TECHNIQUES" section of this label for instructions.

TANK MIXTURES

MON-52249 RT plus BANVEL™ plus NONIONIC SURFACTANT

MON-52249 RT plus 2,4-D plus NONIONIC SURFACTANT

The addition of Banvel in a mixture with this product may provide short-term residual control of selected weed species. Some crop injury may occur if Banvel is applied within 45 days of planting. Refer to the Banvel and 2,4-D labels for cropping restrictions and other use instructions.

These recommended tank mixtures may be applied using ground or aerial spray equipment. Refer to the "WEEDS CONTROLLED" section of this label for specific rates and instructions.

This product plus Banvel or 2,4-D will control the annual grasses and broadleaf weeds previously listed for this product alone at the indicated heights (except 8 fluid ounces per acre applications), plus the following broadleaf weeds. For those weeds previously listed at 8 fluid ounces of this product alone per acre, use 12 fluid ounces in these tank mixtures.

NOTE: Refer to the specific product labels for crop rotation restrictions and cautionary statements of all products used in tank mixtures. Some crop injury may occur if Banvel is applied within 45 days of planting. The addition of Banvel in a mixture with this product may provide short-term residual control of selected weed species.

Apply 12 to 16 fluid ounces of this product plus 0.25 pound a.i. of Banvel, or 0.5 pound a.i. of 2,4-D plus 0.5 percent nonionic surfactant by total spray volume per acre to control dense populations of the following annual broadleaf weeds when less than 6 inches in height:

Kochia*
Kochia scoparia

Lambsquarters
Chenopodium album

Lettuce, prickly
Lactuca serriola

Pigweed, Redroot
Amaranthus retroflexus

Thistle, Russian
Salsola kali

*Controlled with Banvel tank mixture only.

This product plus atrazine or Bladex plus nonionic surfactant tank mixture provides postemergence control of listed annual weeds in fallow and reduced tillage systems. In addition, this tank mixture will provide soil residual control of weeds listed on the atrazine and Bladex label.

For use only in Colorado, Kansas, Nebraska, Oklahoma, Oregon, South Dakota, and Washington.

ANNUAL WEEDS CONTROLLED

Barnyardgrass
Echinochloa crus-galli

Brome, downy
Bromus tectorum

Foxtail, green
Setaria viridis

Kochia*
Kochia scoparia

Lambsquarters
Chenopodium album

Lettuce, prickly
Lactuca serriola

Mustard, tansy
Descurainia pinnata

Pigweed
Amaranthus spp.

Sandbur, field
Cenchrus spp.

Stinkgrass
Eragrostis cilianensis

Thistle, Russian
Salsola kali

Wheat
Triticium aestivum

Witchgrass
Panicum capillare

*For improved control of kochia, add 4 fluid ounces per acre (0.125 pound a.i. per acre) of Banvel to the above tank mixture.

Apply 12 fluid ounces of this product with 1 pound or less of the active ingredient atrazine per acre or 16 fluid ounces of this product with 2 pounds or less of the active ingredient atrazine per acre, or 20 fluid ounces of this product with 1 to 3 pounds of the active ingredient atrazine per acre, plus 0.5 percent nonionic surfactant by total spray volume. Apply 16 fluid ounces of this product with 2.4 to 4 pounds of the active ingredient cyanazine in Bladex per acre plus 0.5 percent nonionic surfactant. Barnyardgrass will be suppressed at 20 fluid ounces per acre and will require up to 26 fluid ounces per acre for control. In Oregon and Washington, do not exceed 1 pound of the active ingredient atrazine per acre.

The addition of 2 percent dry ammonium sulfate by weight (or liquid equivalent) or 17 pounds per 100 gallons of water is recommended to increase the performance of this product plus atrazine or Bladex plus nonionic surfactant tank mixtures.

Consult the atrazine or Bladex labels (90 DF, 4L, 80W) for use rates, soil type, planting, cropping and other restrictions, as well as other precautionary statements and use according to the most restrictive label.

These tank mixtures may be applied with ground or aerial equipment. See the "APPLICATION EQUIPMENT AND TECHNIQUES" section for instructions.

For ground application, apply in 3 to 10 gallons of water per acre.

For aerial application, apply in 3 to 5 gallons of water per acre.

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™Banvel is a trademark of Sandoz, Inc.

POSTHARVEST APPLICATIONS

This product will provide control of existing weeds following grain harvest. Weeds should be allowed to regrow after damage incurred during harvest operations, and to recover from environmental stress, before application of this product. Weeds should be treated prior to the heading stage of annual grasses, if possible, and before broadleaf weeds exceed 24 inches in height. Nonionic surfactant should be added at 0.5 percent by total spray volume. Use of ammonium sulfate is recommended and may improve performance on annual weeds.

Apply 12 fluid ounces of this product per acre plus nonionic surfactant to control downy brome, green foxtail, stinkgrass and volunteer wheat.

To control kochia, lambsquarters, mustard, pigweed and Russian thistle, apply 16 fluid ounces of this product plus 0.25 pounds a.i. of Banvel or 0.5 pounds a.i. of 2,4-D plus nonionic surfactant per acre.

Apply 20 fluid ounces of this product per acre plus nonionic surfactant to control barnyardgrass, sandbur, sunflower, and witchgrass. The addition of 0.25 pound a.i. of Banvel or 0.5 pound a.i. of 2,4-D plus nonionic surfactant to 20 fluid ounces of this product will control prickly lettuce.

ECOFARMING SYSTEMS

The Ecofarming System consists of the following rotation: winter wheat, corn/sorghum, ecofallow.

Use the following tank mixtures for control of emerged annual weeds before planting corn or sorghum in the Ecofarming System.

MON 52249 RT at 16 to 20 fluid ounces per acre
plus
2,4-D at 0.375 to 0.5 pound a.i. per acre
plus
ATRAZINE at 0.75 to 1 pound a.i. per acre
plus
LASSO® at 2.5 to 3 quarts per acre

Add a nonionic surfactant at 0.5 percent by total spray volume.

The above tank mixture should be applied in 28-0-0 or 32-0-0 liquid fertilizer carrier at 20 to 30 gallons per acre. The liquid fertilizer may be diluted with water to achieve the proper carrier volume.

WEEDS CONTROLLED — The following weeds, up to a maximum height of 4 inches, will be controlled:

Brome, downy
Bromus tectorum

Cheat
Bromus secalinus

Foxtail, green
Setaria viridis

Foxtail, yellow
Setaria lutescens

Kochia*
Kochia scoparia

Lettuce, prickly
Lactuca serriola

Pigweed, redroot
Amaranthus retroflexus

Thistle, Russian
Salsola kali

Wheat, volunteer
Triticum aestivum

*For improved control of kochia, add 4 fluid ounces per acre (0.125 pound a.i. per acre) of Banvel to the above tank mixture.

Risk of crop injury from 2,4-D or Banvel can be reduced by applying this treatment 7 to 14 days before planting.

Refer to the label booklet for Lasso herbicide for preemergence weed control achieved by this tank mixture.

Refer to the specific product labels for crop rotation restrictions and cautionary statements for all products used in these tank mixtures.

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AID TO TILLAGE

This product used in conjunction with preplant and conventional fallow tillage practices will provide control of downy brome, volunteer wheat, tansy mustard and foxtail.

Apply 8 fluid ounces per acre of this product plus 0.5 percent nonionic surfactant by total spray volume as a broadcast spray in 3 to 10 gallons of water per acre.

For ground application, apply in 3 to 10 gallons of water per acre. For aerial applications, apply in 3 to 5 gallons of water per acre. Do not mix with residual herbicides.

Application of this product should be made when weeds are actively growing and before weeds are greater than 6 inches tall. Application must be followed by conventional tillage practices before regrowth of the treated plants occurs. Allow at least one day after application before tillage. Tillage must occur no later than 15 days following application.

This product does not provide residual weed control. Repeat treatments may be necessary to control subsequent germinating weeds.

Do not treat weeds under poor growing conditions such as drought stress, or disease or insect damage as reduced weed control may result. Reduced results also may occur when treating weeds heavily covered with dust, or when straw canopy covers the weeds.

PERENNIAL WEEDS

Apply this product as follows to control or destroy most perennial weeds:

NOTE: If weeds have been mowed or tilled, do not treat until plants have resumed active growth and have reached the recommended stages of growth. Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. Repeat treatments must be made prior to crop emergence.

The addition of 1 to 2 percent dry ammonium sulfate by weight or 8.5 to 17 pounds per 100 gallons of water may increase the performance of this herbicide on perennial weeds. The improvement in performance may be apparent where environmental stress is a concern. Refer to the "MIXING, ADDITIVES AND APPLICATION INSTRUCTIONS" section of this label.

When applied as recommended under the conditions described, this product will CONTROL the following perennial weeds:

Alfalfa
Medicago sativa

Johnsongrass
Sorghum halepense

Nightshade, silverleaf
Solanum elaeagnifolium

Quackgrass
Agropyron repens

Ryegrass, perennial
Lolium perenne

Spurge, leafy*
Euphorbia esula

Thistle, Canada
Cirsium arvense

*Partial Control

Johnsongrass/Ryegrass, perennial—Apply 1 to 3 quarts of this product per acre. In annual cropping systems, apply 1 to 2 quarts of this product per acre. Apply 1 quart of this product plus 0.5 percent nonionic surfactant by total spray volume in 5 to 10 gallons of water per acre. Use 2 quarts of this product when applying 10 to 40 gallons of water per acre. In noncrop or areas where annual tillage (no-till) is not performed, apply 2 to 3 quarts of this product in 10 to 40 gallons of water per acre. For best results, apply to actively growing plants when most have reached the boot-to-head stage of growth. Allow 7 or more days after application before tillage. Do not tank-mix with residual herbicides when using the 1 quart per acre rate.

For burndown of contacted vegetation, apply 1 pint per acre plus 0.5 percent nonionic surfactant in 5 to 10 gallons of water per acre before the plants reach a height of 12 inches. For this use, allow at least 3 days after treatment before tillage.

Quackgrass—In Annual Cropping Systems, or in Pastures and Sods Followed by Deep Tillage: Apply 1 to 2 quarts of this product per acre. For the one quart rate, apply 0.5 percent nonionic surfactant by total spray volume in 5 to 10 gallons of water per acre. For the 2 quart rate, apply in 10 to 40 gallons of water per acre. Do not tank-mix with residual herbicides when using the 1 quart rate. Spray when quackgrass is 6 to 8 inches tall and actively growing. Do not till between harvest and fall applications or in the fall or spring prior to spring application. Allow 3 or more days after application before tillage. In pastures or sods, for best results, use a moldboard plow.

Quackgrass—Pasture or Sod or Other Noncrop Areas Where Deep Tillage is Not Planned Following Application: Apply 2 to 3 quarts in 10 to 40 gallons of water per acre. Spray when the quackgrass is greater than 8 inches tall and actively growing. Do not till between harvest and fall application or in the fall or spring prior to spring application. Allow 3 or more days after application before tillage.

Spurge, leafy—For suppression, apply 16 fluid ounces of this product plus 0.5 pound a.i. of 2,4-D per acre plus 0.5 percent nonionic surfactant by total spray volume in 3 to 10 gallons of

water per acre in the late summer or fall. Apply when plants are actively growing. If mowing has occurred prior to treatment, apply when most of the plants are 12 inches tall. Allow 7 or more days after application before tillage.

Thistle, Canada—Apply 2 to 3 quarts of this product per acre. Apply to actively growing thistles when most are at or beyond the bud stage of growth. After harvest, mowing or tillage in the late summer or fall, allow at least 4 weeks for initiation of active growth and rosette development prior to the application of this product. Fall treatments must be applied before a killing frost. Allow 3 or more days after application before tillage.

For suppression of Canada thistle, apply 1 quart per acre of this product plus 0.5 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre in the late summer or fall after harvest, mowing or tillage. Allow rosette regrowth to a minimum of 6 inches in diameter before treating. Applications can be made as long as leaves are still green and plants are actively growing at the time of application. Allow 3 or more days after application before tillage.

Other perennials listed on this label—Apply 3 to 5 quarts of this product per acre. Apply when actively growing and when most have reached early head or early bud stage of growth. Allow 7 or more days after application before tillage.

See "DIRECTIONS FOR USE" and "MIXING, ADDITIVES, AND APPLICATION INSTRUCTIONS" sections of this pamphlet for labeled uses and specific application instructions.

TANK MIXTURES

When applied as directed under the conditions described, this product plus Banvel or 2,4-D will SUPPRESS or CONTROL the following perennial broadleaf weed:

Bindweed, field
Convolvulus arvensis

For suppression, apply 16 fluid ounces of this product plus 0.5 lb a.i. of 2,4-D or 0.25 lb a.i. of Banvel, plus 0.5 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre for ground applications and 3 to 5 gallons of water per acre for aerial applications. Applications should be delayed until maximum emergence has occurred and when vines are between 6 to 18 inches in length. These tank mixtures may be applied using aerial application equipment in fallow and reduced tillage systems only.

For control, apply 2 quarts of this product plus 0.5 pound a.i. of Banvel in 3 to 20 gallons of water per acre. At these rates, apply using ground application equipment only.

CROPPING SYSTEMS

This product controls annual and perennial weeds listed on this label, prior to the emergence of the crops listed below.

See "GENERAL INFORMATION" and "APPLICATION EQUIPMENT AND TECHNIQUES" sections of this label for essential product performance information.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. Except as otherwise specified on this label, repeat treatments must be made before the crop emerges, in accordance with the instructions of this label.

Except as otherwise specified in a crop section of this label, the combined total of all treatments must not exceed 8 quarts per acre of this product per year.

Do not plant subsequent crops other than those on this label for 30 days following application.

Do not harvest or feed treated vegetation for 8 weeks following application. Following spot treatment or selective equipment use, allow 14 days before grazing domestic livestock or harvesting forage grasses and legumes.

ALFALFA*
BARLEY*
BEANS (All)
BEETS (Red, Sugar)
CARROT
CORN (All)*
COTTON*
FORAGE GRASSES*
FORAGE LEGUMES*
LENTILS
OATS*
ONION
PEAS (All)
POTATO (Irish, sweet)
RADISH
SORGHUM (Milo)*
SOYBEANS*
WHEAT*

*Spot treatments may be applied in these crops.

Spot Treatment (Only those crops with "*" can be spot treated)—Applications in growing crops must be made prior to heading of small grains and milo, initial pod set in soybeans, silking of corn, boll opening on cotton.

For dilution and rates of application using boom or hand-held equipment, see "MIXING, ADDITIVES AND APPLICATION INSTRUCTIONS" and "WEEDS CONTROLLED" sections of this label.

NOTE: FOR FORAGE GRASSES AND FORAGE LEGUMES, NO MORE THAN ONE-TENTH OF ANY ACRE SHOULD BE TREATED AT ONE TIME. FOR ALL OTHER CROPS, DO NOT TREAT MORE THAN 10 PERCENT OF THE TOTAL FIELD AREA TO BE HARVESTED.

THE CROP RECEIVING SPRAY IN TREATED AREA WILL BE KILLED. TAKE CARE TO AVOID DRIFT OR SPRAY OUTSIDE TARGET AREA FOR THE SAME REASON.

Selective Equipment—This product may be applied through recirculating sprayers, shielded applicators, or wiper applicators in cotton and soybeans. Shielded and wiper applicators may also be used in tree crops and grapes. Wiper applicators may be used in rutabagas, forage grasses and forage legumes, including pasture sites and sorghum milo.

Allow at least the following time intervals between application and harvest:

Cotton, Soybeans .....7 days

Apples, Avocado, Cherry,
Grapes, Pear .....14 days

Stone Fruit .....17 days

Sorghum (milo)* .....40 days

* Do not use roller applicators. Do not feed or graze treated milo fodder. Do not ensile treated vegetation.

ASPARAGUS

When applied as directed for "CROPPING SYSTEMS" under the conditions described, this product controls weeds listed on this label in asparagus.

For specific rates of applications and instructions for control of various annual and perennial weeds, see the "WEEDS CONTROLLED" section of this label.

Prior to Crop Emergence—Apply this product prior to crop emergence for the control of emerged labeled annual and perennial weeds. DO NOT APPLY WITHIN A WEEK BEFORE THE FIRST SPEARS EMERGE.

Spot Treatment—Apply this product immediately after cutting, but prior to the emergence of new spears. Do not treat more than 10 percent of the total field area to be harvested. Do not harvest within 5 days of treatment.

Postharvest—Apply this product after the last harvest and all spears have been removed. If spears are allowed to regrow, delay application until ferns have developed. Delayed treatments should be applied as directed or shielded spray in order to avoid contact

of the spray with ferns, stems or spears. Direct contact of the spray with the asparagus may result in serious crop injury.

NOTE: Select and use recommended types of spray equipment for postemergence postharvest applications. A directed spray is any application where the spray pattern is aligned in such a way as to avoid direct contact of the spray with the crop. A shielded spray is any application where a physical barrier is positioned and maintained between the spray and the crop to prevent contact of spray with the crop.

TREE AND VINE CROPS

For use only in Idaho, Utah and Washington.

This product is recommended for weed control in established groves, vineyards, or orchards, or for site preparation prior to transplanting crops listed in this section. Applications may be made with boom equipment, shielded sprayers, hand-held and high-volume wands, lances, or orchard guns, except as directed in this section. See the "APPLICATION EQUIPMENT AND TECHNIQUES" section of this label for specific information on use of equipment.

When applying this product, refer to the "WEEDS CONTROLLED" section of this label and to specific recommendations in this section for rates to be used.

NOTE

Repeat treatments may be necessary to control weeds originating from underground parts of untreated weeds or from seeds. This product does not provide residual weed control. For subsequent weed control, use repeated applications of this product. Do not apply more than 10.6 quarts of this product per acre per year.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF HERBICIDE SOLUTION, SPRAY, DRIFT, OR MIST WITH FOLIAGE OR GREEN BARK OF TRUNK, BRANCHES, SUCKERS, FRUIT, OR OTHER PARTS OF TREES OR VINES. CONTACT OF THIS PRODUCT WITH OTHER THAN MATURED BROWN BARK CAN RESULT IN SERIOUS CROP DAMAGE.

AVOID PAINTING OUT STUMPS WITH THIS PRODUCT AS INJURY RESULTING FROM ROOT GRAFTING MAY OCCUR IN ADJACENT TREES.

Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed or cut and have not been allowed to regrow to the recommended stage for treatment.

For specific rates of applications and instructions, see the "WEEDS CONTROLLED" section of this label, and to specific recommendations which follow.

STRIPS

FOR ANNUAL AND PERENNIAL WEEDS IN STRIPS
OF TREE AND VINE CROPS

TANK MIXTURES WITH RESIDUAL HERBICIDES

When applied as a tank mixture, this product provides control of the emerged annual weeds and control or suppression of emerged perennial weeds listed in this label. The following residual herbicides will provide preemergence control of those weeds listed in the individual product labels.

MON 52249 RT plus GOAL™ 1.6E

MON 52249 RT plus KARMEX™ DF

MON 52249 RT plus SIMAZINE, PRINCEP CALIBER™ 90

MON 52249 RT plus SIMAZINE 4L

MON 52249 RT plus SIMAZINE 80W

MON 52249 RT plus SOLICAM™ 80DF

MON 52249 RT plus SURFLAN™ AS

MON 52249 RT plus SURFLAN 75W

MON 52249 RT plus SIMAZINE (80W, or 4L, or PRINCEP CALIBER 90) plus SURFLAN (AS or 75W)

MON 52249 RT plus GOAL (1.6E) plus SURFLAN (AS or 75W)

MON 52249 RT plus GOAL (1.6E) plus SIMAZINE (80W, or 4L, or PRINCEP CALIBER 90)

MON 52249 RT plus GOAL (1.6E) plus SURFLAN (AS or 75W) plus SIMAZINE (80W, 4L, or PRINCEP CALIBER 90)

When tank-mixing with residual herbicides, add an agriculturally approved nonionic surfactant at 0.5 percent by volume of spray solution.

Refer to the individual product labels for specific crops, rates, geographical restrictions and precautionary statements.

Read and carefully observe the label claims, cautionary statements, rates and all other information on the labels of all products.

™Goal is a trademark of Rohm and Haas Company.

™Princep and Caliber are trademarks of Ciba-Geigy Corporation.

™Karmex is a trademark of E.I. du Pont de Nemours and Company.

™Solicam is a trademark of Sandoz, Inc.

™Surflan is a trademark of Elanco Products Company.

RECOMMENDED RATES

Annual Weeds - Apply 1 to 5 quarts per acre of this product in these tank mixtures. Use rates at the higher end of the recommended range when weeds are stressed, growing in dense populations or are greater than 12 inches tall.

Perennial Weeds - Apply 1 to 5 quarts per acre of this product in these tank mixtures to control or suppress perennial weeds. Follow the recommendations in the "WEEDS CONTROLLED" section of this label for stage of growth and application rates for specific perennial weeds.

■ MON 52249 RT plus GOAL plus SIMAZINE/SURFLAN ■

This product plus low rates of Goal in three-way or four-way mixtures with simazine and/or Surflan will provide postemergence control of the weeds listed below.

Refer to the individual simazine and Surflan labels for preemergence rates, weeds controlled, precautionary statements and other important information.

Apply these tank mixtures in 3 to 20 gallons of water. Add 0.5 percent nonionic surfactant by total spray volume to the spray solution.

Apply 1 to 5 quarts per acre of this product plus 4 to 48 ounces per acre of Goal plus labeled rates of simazine and/or Surflan to control the following weeds:

Barley, wild
Hordeum leporinum
Bluegrass, annual
Poa annua
Cheeseweed, common
Malva spp.
Chickweed, common
Stellaria media
Filaree*
Erodium spp.
Fleabane, flaxleaf
Conyza bonariensis
Groundsel, common
Senecio vulgaris
Horseweed/Marestail
Conyza canadensis
Nettle, stinging
Urtica dioica
Pineappleweed

Matricaria matricariodes
Rocket, London
Sisymbrium irio
Shepherdspurse
Capsella bursa-pastoris
Sowthistle, annual
Sonchus oleraceus

*Use a minimum of 1.5 quarts of this product in these mixtures.

PERENNIAL GRASS SUPPRESSION
ORCHARD FLOORS

When applied as directed, this product will suppress vegetative growth as indicated below.

Apply 6 to 8 fluid ounces of this product per acre to suppress (chemically mow) perennial grass covers between tree rows in orchards.

For tall (coarse) fescue, fine fescue, orchardgrass or quackgrass covers use 8 fluid ounces per acre. For best suppression of these species add ammonium sulfate at 1.7 pounds per 10 gallons of spray solution.

For Kentucky bluegrass covers, use 6 fluid ounces per acre without ammonium sulfate.

Apply treatments in 20 gallons of water per acre to actively growing grass covers. Additional nonionic may be added at a rate of 0.5 percent of the total spray volume.

For best results, mow orchards in the spring and apply the appropriate rate of this product 3 to 4 days later. Do not treat grass covers under poor growing conditions such as drought stress, disease or insect damage as poor suppression may result.

Low rates will not adequately suppress broadleaf weeds such as dandelion or plantain. If broadleaf weeds make up more than 10 percent of the ground cover, mix this product with 1 quart of 2,4-D per acre which is labeled for orchard use.

TREE CROPS

Pome Fruit*: apple, pear.

Stone Fruit**: apricots, cherries, nectarines, peaches, plums/prunes.

For cherries, any application equipment listed in this section may be used in all states.

Any application equipment listed in this section may be used in apricots, nectarines, peaches, and plums/prunes.

For peaches, remove suckers and low hanging limbs at least 10 days prior to application. Avoid applications near trees with recent pruning wounds or other mechanical injury. Apply only near trees which have been planted in the orchard for 2 or more years. EXTREME CARE MUST BE TAKEN TO ENSURE NO PART OF THE PEACH TREE IS CONTACTED.

NOTE:

* Allow a minimum of 14 days between last application and harvest.

** Allow a minimum of 17 days between last application and harvest.

VINE CROPS

Grapes:* Any variety of table, wine, or raisin grape may be treated with any equipment listed in this section.

* Applications should not be made when green shoots, canes, or foliage are in the spray zone.

* Allow a minimum of 14 days between last application and harvest.

FARMSTEAD USES

See "GENERAL INFORMATION" and "MIXING, ADDITIVES AND APPLICATION INSTRUCTIONS" sections of this label for essential product performance information and the following sections for specific recommended uses.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF SPRAY WITH FOLIAGE OF DESIRABLE TURFGRASSES, TREES, SHRUBS, OR OTHER DESIRABLE VEGETATION SINCE SEVERE DAMAGE OR DESTRUCTION MAY RESULT.

NOTE: If spraying areas adjacent to desirable plants, use a shield made of cardboard, sheet metal or plyboard while spraying to help prevent spray from contacting foliage of desirable plants.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seeds.

This product does not provide residual weed control. For subsequent weed control, follow a label-approved herbicide program.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

FARMSTEAD WEED CONTROL

When applied as directed under the conditions described, this product controls undesirable vegetation listed on this label around farmstead building foundations, along and in fences, shelterbelts, ditch banks, dry ditches and for general nonselective farmstead weed control.

For specific rates of application and instructions for control of various annual and perennial weeds, see the "WEEDS CONTROLLED" section of this label.

FARM DITCHES

This product will suppress perennial grasses along farm ditches. Apply this product at a rate of 6 to 8 fluid ounces per acre. Use 8 fluid ounces per acre when treating tall (coarse) fescue, fine fescue, orchardgrass or quackgrass covers. For best suppression of these species, add ammonimum sulfate at a rate of 1.7 pounds per 10 gallons of spray solution. Use 6 fluid ounces per acre without ammonium sulfate when treating Kentucky bluegrass.

Apply treatments in 10 to 20 gallons of spray solution per acre to actively growing perennial grass covers. For best spray distribution and coverage, use flat fan nozzles.

Add a nonionic surfactant at a rate of 0.5 percent of the spray solution.

Where broadleaf weed control or suppression is desired, tank mix this product with an appropriate, labeled broadleaf weed herbicide.

Product is protected by
U.S. Patent No. 4,405,531.
Other patents pending.

No license granted under any non-U.S. patent(s).

EPA Reg. No. 524-454

1992-1 XXX.XX-XXX.XX/XX

In case of an emergency involving this product,
Call Collect, day or night, (314) 694-4000.

©MONSANTO COMPANY 1992

MONSANTO COMPANY
AGRICULTURAL PRODUCTS
ST. LOUIS, MISSOURI, 63167 U.S.A.

SUBMISSION REVIEW RECORD	1. REGISTRATION NUMBER	CYCLE	2. DATE RECEIVED
G	524 - 454		MO 06 DAY 26 YR 92

3. JCID PUBLICATION NECESSARY	4. PETITION NO.	5. RECEIVED PM TEAM
☐ YES ☐ NO		MO DAY YR

6. METHOD OF SUPPORT	7. PRODUCT MANAGER	NO.	8. PROJECTED RETURN
☐ 2A ☐ 2B ☐ 2C			MO DAY YR

9. DATE PULLED	10. DATE PUBLISHED	11. ACTION TYPE	CODE	12. OUTGOING DATE
7/16/92		alternate formula 345		MO DAY YR

REV SEQ.	REVIEW TYPE CODE	REVIEW TYPE	REVIEWER CODE (Initials)	SIGNATURE OF REVIEWER	COMMENT CODE	DATE REVIEW COMPLETED MO	DAY	YR
	A	REVIEWABILITY TEAM						
	B	PRODUCT MANAGER TEAM EFFICACY REVIEW						
	C	PRODUCT MANAGER TEAM HUMAN SAFETY REVIEW						
	D	PRODUCT MANAGER TEAM ENVIRONMENTAL SAFETY REVIEW						
	E	PRODUCT MANAGER TEAM RESUBMISSION REVIEW						
	F	PRODUCT MANAGER		VIEW	NAC	09	06	92
	G	INTERAGENCY REFERRAL						
	H	COST-BENEFIT REVIEW						
	I	PUBLIC COMMENTS REVIEW						
	J	EEE BRANCH INSECTICIDE EFFICACY						
	K	EEE BRANCH HERBICIDE EFFICACY						
	L	EEE BRANCH FUNGICIDE EFFICACY						
	M	EEE BRANCH RODENTICIDE EFFICACY						
	N	EEE BRANCH DISINFECTANT EFFICACY						
	O	CHEMISTRY BRANCH RESIDUE CHEMISTRY						
	P	EEE BRANCH ENVIRONMENTAL CHEMISTRY						
	Q	TOXICOLOGY BRANCH HUMAN SAFETY						
	R	EEE BRANCH ENVIRONMENTAL SAFETY						
	S							
	T							

PRODUCT MANAGER SIGNATURE	TYPE OF RESPONSE	CODE

EPA Form 8570-13 (3-75)

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SUBMISSION REVIEW RECORD G	1. REGISTRATION NUMBER	CYCLE	2. DATE RECEIVED
	524-454		MO 06 DAY 26 YR 92

3. JCIO PUBLICATION NECESSARY	4. PETITION NO.	5. RECEIVED PM TEAM
☐ YES ☐ NO		MO DAY YR

6. METHOD OF SUPPORT	7. PRODUCT MANAGER	NO.	8. PROJECTED RETURN
☐ 2A ☐ 2B ☐ 2C			MO DAY YR

9. DATE PULLED	10. DATE PUBLISHED	11. ACTION TYPE	CODE	12. OUTGOING DATE
7/6/92		New Brand Name - MON 51249 Herbicide RT "v use dinegbam 3CS		MO DAY YR

REV SEQ.	REVIEW TYPE CODE	REVIEW TYPE	REVIEWER CODE (Initials)	SIGNATURE OF REVIEWER	COMMENT CODE	DATE REVIEW COMPLETED MO	DAY	YR
	A	REVIEWABILITY TEAM						
	B	PRODUCT MANAGER TEAM EFFICACY REVIEW						
	C	PRODUCT MANAGER TEAM HUMAN SAFETY REVIEW						
	D	PRODUCT MANAGER TEAM ENVIRONMENTAL SAFETY REVIEW						
	E	PRODUCT MANAGER TEAM RESUBMISSION REVIEW						
	F	PRODUCT MANAGER		VKW	NAC ~~[illegible]~~	07	06	92
	G	INTERAGENCY REFERRAL						
	H	COST-BENEFIT REVIEW						
	I	PUBLIC COMMENTS REVIEW						
	J	EEE BRANCH INSECTICIDE EFFICACY						
	K	EEE BRANCH HERBICIDE EFFICACY						
	L	EEE BRANCH FUNGICIDE EFFICACY						
	M	EEE BRANCH RODENTICIDE EFFICACY						
	N	EEE BRANCH DISINFECTANT EFFICACY						
	O	CHEMISTRY BRANCH RESIDUE CHEMISTRY						
	P	EEE BRANCH ENVIRONMENTAL CHEMISTRY						
	Q	TOXICOLOGY BRANCH HUMAN SAFETY						
	R	EEE BRANCH ENVIRONMENTAL SAFETY						
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	T							

PRODUCT MANAGER SIGNATURE	TYPE OF RESPONSE	CODE

EPA Form 8570-13 (3-75)

524-454

MON-52249 Herbicide

Monsanto Company
700 14th Street NW., Suite 1100
Washington, DC 20005

JUN - 4 1992

This product is conditionally registered in accordance with FIFRA section 3(c)(7)(A) provided that you:

1. Submit/cite all data or other material required for registration/reregistration of your product under FIFRA section 3(c)(5) or FIFRA section 4 when the Agency requires all registrants of similar products to submit such data.

2. Make the labeling changes listed below before you release the product for shipment:

a. Add the phrase "EPA Registration No. 524-454."

b. The precautionary statement must include:

> Causes substantial but temporary eye injury. Harmful if inhaled. Do not get in eyes or inhale dust or spray mist. Wear goggles, face shield or safety glasses. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

56086:I:WP50:Taylor:WP25-4:KEVRIC:05/29/92:06/28/92:DD

66

c. The statement of practical treatment must include:

If In Eyes	Hold eyes open and flush with a steady gentle stream of water for 15 minutes. Get medical attention.
If Swallowed	Drink promptly a large quantity of milk, egg white, or gelatin solution, or if these are not available large quantities of water. Avoid alcohol.
If Inhaled	Remove victim to fresh air. If not breathing give artificial respiration, preferably mouth to mouth. Get medical attention.

3. Submit five (5) copies of your final printed labeling before you release the product for shipment. Refer to the A-79 enclosure for a further description of final printed labeling.

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA section 6(e). Your release for shipment of the product constitutes acceptance of these conditions.

A stamped copy of the label is enclosed for your records.

Robert J. Taylor
Product Manager (25)
Fungicide-Herbicide Branch
Registration Division (H7505C)

Enclosures

SUBMISSION REVIEW RECORD

G

1. REGISTRATION NUMBER	CYCLE	2. DATE RECEIVED (MO / DAY / YR)
524 - 445		

3. ICID PUBLICATION NECESSARY	4. PETITION NO.	5. RECEIVED PM TEAM (MO / DAY / YR)
☐ YES ☐ NO		

6. METHOD OF SUPPORT	7. PRODUCT MANAGER	NO.	8. PROJECTED RETURN (MO / DAY / YR)
☐ 2A ☐ 2B ☐ 2C			

9. DATE PULLED	10. DATE PUBLISHED	11. ACTION TYPE	CODE	12. OUTGOING DATE (MO / DAY / YR)
5/27/92		New formulation of glyphosate		

REV SEQ.	REVIEW TYPE CODE	REVIEW TYPE	REVIEWER CODE (Initials)	SIGNATURE OF REVIEWER	COMMENT CODE	DATE REVIEW COMPLETED (MO / DAY / YR)
	A	REVIEWABILITY TEAM				
	B	PRODUCT MANAGER TEAM EFFICACY REVIEW				
	C	PRODUCT MANAGER TEAM HUMAN SAFETY REVIEW				
	D	PRODUCT MANAGER TEAM ENVIRONMENTAL SAFETY REVIEW				
	E	PRODUCT MANAGER TEAM RESUBMISSION REVIEW				
	F	PRODUCT MANAGER		VICW	MAC	05 27 92
	G	INTERAGENCY REFERRAL		Labeloh - see pL		
	H	COST-BENEFIT REVIEW		review for comments		
	I	PUBLIC COMMENTS REVIEW				
	J	EEE BRANCH INSECTICIDE EFFICACY				
	K	EEE BRANCH HERBICIDE EFFICACY				
	L	EEE BRANCH FUNGICIDE EFFICACY				
	M	EEE BRANCH RODENTICIDE EFFICACY				
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	O	CHEMISTRY BRANCH RESIDUE CHEMISTRY				
	P	EEE BRANCH ENVIRONMENTAL CHEMISTRY				
	Q	TOXICOLOGY BRANCH HUMAN SAFETY				
	R	EEE BRANCH ENVIRONMENTAL SAFETY				
	S					
	T					

PRODUCT MANAGER SIGNATURE	TYPE OF RESPONSE	CODE

EPA Form 8370-13 (3-75)

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Jacket

MEMORANDUM:

Subject: EPA File Symbol/EPA Reg. No.:524-ULU

From: Lucy D. Markarian, Biologist 5/14/92
Precautionary Review Section
Registration Support Branch
Registration Division (H7505C)

To: Robert J. Taylor, PM 25
Fungicide-Herbicide Branch
Registration Division (H7505C)

Thru: Thomas C. Ellwanger, Section Head 5/19/92
Precautionary Review Section
Registration Support Branch
Registration Division (H7505C)

Applicant: Monsanto Agricultural Company
800 N. Lindbergh Blvd.
St. Louis, Missouri 63167

FORMULATION FROM LABEL:

Active Ingredient(s):	% by wt.
Glyphosate: N-(phosphonomethyl) glycine	41.3 %
Inert Ingredient(s):	
.....	58.7 %
Total:	100%

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BACKGROUND

The representatives of The Monsanto Agricultural Company, Dr.s Hastings,Schneider and Schuette and Ms Kirk, met with Dr. Ellwanger and L. Markarian of PRS at Monsanto's request to discuss two tests that had been submitted in support of the registration of Mon-52249 Herbicide under EPA 524-ULU. These tests were considered supplementary data at the review of march 1992, and the review stated that the inhalation test could be upgraded if the data that was missing from the report could be submitted , but a new eye irritation study was necessary.

Monsanto had replied, in writing, presenting their point of view about both tests as well as supplying the missing data. The reply was studied prior to the meeting by PRS. The conclusions reached were presented at the meeting and some of the points discussed.

After the study of the supplied missing data, it was concluded that there really was not enough respirable particles to the test model to have a true effect at the alveolar level. What was being observed was the effect of the product at other areas where the particles were being deposited. The MMAD values did not reveal this, because normally half of the particles are expected to be under the MMAD value. With MMAD at 3.2, 2.2, and 3.0 , respectively for exposure groups I, II, and III, the respirable percentage of the particles would be expected to be adequate. This was not the case upon examination of the distribution. In fact less than five percent in the case of the highest and the lowest concentrations were truly respirable. Under 10 % of the middle level was respirable.

The decision to upgrade the data and accept it was made by considering:

1- The difficulty in generating the test atmosphere from such a viscous material

2- That a good effort was made to generate an acceptable test atmosphere

3- The toxicity of the test material, with the exception of eye irritation, was in category IV

The upgraded inhalation test is considered core minimum data in toxicity category III.

The eye study still has some areas that are not fully agreed upon by the representatives of the Registrant and PRS. Whether ulceration of the cornea is tantamount to opacity remained unresolved. PRS does acknowledge the possibility of small corneal ulcerations without stromal involvement. PRS contends that with three quarters of the corneal epithelium missing, the chances of

the base layer of the epithelium staying intact, with the absence of stromal involvement was pretty remote. This was based on the observation that the ulceration did not heal by day 7, as evidenced by staining. As the cornea heals downward from the epithelium into the stroma, the question " could a superficial ulceration of the corneal epithelium last this long without stromal involvement" was asked. This question is still unanswered. The participants of the meeting were not present at any of the observations; therefore all discussion is, in essence, theoretical. What remain are the results presented as recorded by the laboratory. These indicate that whatever the lesion was, it had healed sufficiently by day 10, so that the eye did not stain. The absence of staining at that interval does not necessarily mean that all has healed. PRS was concerned about the results primarily because the product contains a good percentage of surfactant. Surfactants are known to cause extensive eye damage. What was agreed upon was that the end result was the same.

Also discussed was the use of terminology used by the performing laboratory: the reported necrosis that disappeared within 24 hrs. Monsanto acknowledged that this was not proper. It was suggested that whatever is observed be reported as seen. Rather than calling the sloughing of the conjunctival epithelium necrosis, a superficial lesion could just be called sloughing. This would be sign of healing epithelium. As any kind of death of tissue is necrosis, the term used is not altogether incorrect, but suggests in depth injury which was not present in the conjunctiva.

PRS recommends the conservative grading of all observations. The eye, if the lesion is superficial, will heal without significantly changing the toxicity category even if small areas of dense opacity or ulceration are observed at the beginning of the test and graded with higher degrees of opacity. If the readings are done with adequate light and some magnification, as recommended by the guidelines, they will be accurate. It is recommended that the instruments and the source of light for evaluating the eyes be included in the report.

Upon reviewing all the data again, as well as the arguments presented by Monsanto, PRS has made the decision to upgrade the presented eye irritation study to core minimum data and accept it as support for the registration in toxicity category II.

It is stressed that a good description of what was done, the methodology, the instrumentation, and all of what was truly observed in any test is very valuable to the reviewer. Clear descriptions are most important in making correct decisions. Correct decisions, in turn, prevent the necessity of extensive correspondence, possible time consuming meetings, but above all delays in registration.

LABELING

The signal word is WARNING based on the eye irritation test.

The precautionary statement must include:

Causes substantial but temporary eye injury. Harmful if inhaled. Do not get in eyes or inhale dust or spray mist. Wear goggles, face shield or safety glasses. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

The statement of practical treatment must include:

If in Eyes	Hold eyes open and flush with a steady gentle stream of water for 15 minutes. Get medical attention.
If swallowed	Drink promptly a large quantity of milk, egg white, or gelatin solution, or if these are not available large quantities of water. Avoid alcohol.
If inhaled	Remove victim to fresh air. If not breathing give artificial respiration, preferably mouth to mouth. Get medical attention

[redacted]

Tox Chem No 471AAB Current Date:5/14/92

Laboratories:Bio/Dynamics, Inc., Mettlers Road, East Millstone, NJ 08875-2360
Monsanto Company, Environmental Health Laboratory,
645 S.Newstead Ave., St. Louis, Missouri 63110

STUDY	MATERIAL	MRID No	RESULTS	TOX CAT	CORE GRADE
Oral Toxicity Limit test (rats) Bio/Dynamics 6053-91 8/15/91	MON-52249 Lot RUD-9104-3089-F	420355-02	LD_{50}>5000 mg/kg	IV	Guideline
Dermal Toxicity Limit Test (rats) Bio/Dynamics 6054-91 8/15/91	" " "	420355-03	LD_{50}>5000 mg/kg	IV	minimum
Inhalation Toxicity LD_{50} study (rats) Monsanto ML-91-136/EHL 91044 8/28/92	" " "	420355-04		III Upgraded	Minimum 5/14/92
Eye Irritation in Rabbits Bio/Dynamics 6023-91 8/15/92	" " "	420355-05		II Upgraded	Minimum 5/14/92
Dermal Irritation in Rabbits Bio/Dynamics 6055-91 8/15/91	" " "	420355-06	PII 0.8 minimally irritating	IV	Guideline
Dermal Sensitization in Guinea Pigs Bio/Dynamics	" "	420255-07	not sensitizer	NA	Guideline

SPOUT PANEL

PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals

WARNING! CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY. HARMFUL IF SWALLOWED OR INHALED.
Do not get in eyes or on clothing. Wear goggles or a face shield. Avoid breathing vapor or spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.
FIRST AID: IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attentnion.
IF SWALLOWED, this product will cause gastrointestinal irritation. Immediately dilute by swallowing water or milk. Get medical attention.
IF INHALED, remove victim to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. Get medical attention.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards
Do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical and Chemical Hazards
Spray solutions of this product should be mixed, stored and applied only in stainless steel, aluminum, fiberglass, plastic and plastic-lined steel containers.

(Continued on opposite side panel)

FRONT PANEL

MON 52249

HERBICIDE BY Monsanto

Keep out of reach of children.
WARNING! Read precautions on side panel.

Read the entire label before using this product.
Use only according to label instructions.
Read "LIMIT OF WARRANTY AND LIABILITY before buying or using, booklet, before buying or using. If terms are not acceptable, return at once unopened.

ACTIVE INGREDIENTS:

*Glyphosate, N-(phosphonomethyl)glycine	41.3%
INERT INGREDIENTS.....	58.7%
	100.0%

*Contains 480 grams per litre or 4 pounds per U.S. gallon of the active ingredient, glyphosate, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid glyphosate.

REFORMULATION OR REPACKAGING IS PROHIBITED.

* Registered trademark of Monsanto Company

NET 2.5 GALLONS

HANDLE SIDE PANEL

(Continued from opposite side panel)

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT INGALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SRPAY TANKS. This product reacts with such containersand tanks to produce hydrogen gas which may from a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

DIRECTIONS FOR USE
It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.
DISPOSAL:
Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Empty container retains vapor and product residue. Observe all labeled safeguards until container is destroyed.

Do not reuse emptied container. Triple rinse and then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

(See label booklet for Complete Directions for Use)

ACCEPTED
JUN - 4 1992
Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 524-454

BACK PANEL

LIMIT OF WARRANTY AND LIABILITY

This Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the Complete Directions for Use label booklet ("Directions") when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE, OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this Company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

Buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this Company, including, but not limited to, incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather, weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied, as well as weather conditions which are outside the application ranges set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF THE LIABILITY OF THIS COMPANY OR ANY OTHER SELLER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE) SHALL BE THE PURCHASE PRICE PAID BY THE USER OR BUYER FOR THE QUANTITY OF THIS PRODUCT INVOLVED, OR, AT THE ELECTION OF THIS COMPANY OR ANY OTHER SELLER, THE REPLACEMENT OF SUCH QUANTITY, OR IF NOT ACQUIRED BY PURCHASE, REPLACEMENT OF SUCH QUANTITY. IN NO EVENT SHALL THIS COMPANY OR ANY OTHER SELLER BE LIABLE FOR ANY INCIDENTAL CONSEQUENTIAL OR SPECIAL DAMAGES.

Buyer and all users are deemed to have accepted the terms of this LIMIT OF WARRANTY AND LIABILITY which may not be varied by any verbal or written agreement.

Product protected by U.S. Pat. No. 4,405,531. Other patents pending

MONSANTO COMPANY
AGRICULTURAL PRODUCT
ST. LOUIS, MISSOURI 63167 U.S.A.

EPA Reg. No. 524-XXX

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EPA Est. 524-XX X

MAP 3594L

Copy for Jacket

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MON 52249

Herbicide by Monsanto

Complete Directions for Use

EPA Reg. No. 524-XXX

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

This product has been approved for use in California except as stated otherwise on pages XXX.

199X-1

Read each of these sections of this label for essential product performance information.

USE THESE CONVENIENT SECTION MARKERS.

GENERAL INFORMATION

MIXING, ADDITIVES, AND APPLICATION INSTRUCTIONS

WEEDS CONTROLLED

NONCROP USES

CROPPING SYSTEMS

MINIMUM TILLAGE

TREE AND VINE CROPS

Read the entire label before using this product.

Use only according to label instructions.

Read ''LIMIT OF WARRANTY AND LIABILITY'' before buying or using. If terms are not acceptable, return at once unopened.

REFORMULATION IS PROHIBITED. SEE INDIVIDUAL CONTAINER LABEL FOR REPACKAGING LIMITATIONS.

LIMIT OF WARRANTY AND LIABILITY

(Not applicable to consumer applications applied by the homeowner for noncommercial purposes as permitted by the supplemental labeling for one-quart containers.)

This Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the Complete Directions for Use label booklet (''Directions'') when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this Company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

Buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this Company, including, but not limited to, incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather, weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied, as well as weather conditions which are outside the application ranges set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF THE LIABILITY OF THIS COMPANY OR ANY OTHER SELLER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE) SHALL BE THE PURCHASE PRICE PAID BY THE USER OR BUYER FOR THE QUANTITY OF THIS PRODUCT INVOLVED, OR, AT THE ELECTION OF THIS COMPANY OR ANY OTHER SELLER, THE REPLACEMENT OF SUCH QUANTITY, OR, IF NOT ACQUIRED BY PURCHASE, REPLACEMENT OF SUCH QUANTITY. IN NO EVENT SHALL THIS COMPANY OR ANY OTHER SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES.

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(INDEX PAGES)
PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Keep out of reach of children.

WARNING!

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.
HARMFUL IF SWALLOWED OR INHALED.

Do not get in eyes or on clothing.

Wear goggles or a face shield.

Avoid breathing vapor or spray mist.

Wash thoroughly with soap and water after handling.

Remove contaminated clothing and wash before reuse.

FIRST AID: IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention.

IF SWALLOWED, this product will cause gastrointestinal irritation. Immediately dilute by swallowing water or milk. Get medical attention.

IF INHALED, remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present or in intertidal areas below the mean highwater mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or

plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

ACTIVE INGREDIENT:
*Glyphosate, N-(phosphonomethyl) glycine, in the form of its isopropylamine salt.....41.3%
INERT INGREDIENTS:.....58.7%
100.0%

*Contains 480 grams per litre or 4 pounds per U.S. gallon of the active ingredient glyphosate, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

See container label for STORAGE AND DISPOSAL instructions.

GENERAL INFORMATION

DO NOT APPLY THIS PRODUCT USING AERIAL SPRAY EQUIPMENT EXCEPT UNDER CONDITIONS AS SPECIFIED WITHIN THIS LABEL.

This product, a water soluble liquid, mixes readily with water to be applied as a foliar spray for the control or destruction of most herbaceous plants. It may be applied through most standard

industrial or field-type sprayers after dilution and thorough mixing with water in accordance with label instructions.

This product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days, but on most perennial weeds may not occur for 7 days or more. Extremely cool or cloudy weather following treatment may slow activity of this product and delay visual effects of control. Visible effects are a gradual wilting and yellowing of the plant which advances to complete browning of aboveground growth and deterioration of underground plant parts.

Unless otherwise specified on this label, delay application until vegetation has emerged and reached the stages described for control of such vegetation under the ''Weeds Controlled'' section of this label. Unemerged plants arising from unattached underground rhizomes or root stocks of perennials will not be affected by the herbicide and will continue to grow. For this reason, best control of most perennial weeds is obtained when treatment is made at late growth stages approaching maturity.

Always use the higher rate of this product per acre within the recommended range when (1) weed growth is heavy or dense, or (2) weeds are growing in an undisturbed (noncultivated) area.

Do not treat weeds under poor growing conditions such as drought stress, disease or insect damage, as reduced weed control may result. Reduced results may also occur when treating weeds heavily covered with dust.

Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed, or cut, and have not been allowed to regrow to the recommended stage for treatment.

Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Heavy rainfall or irrigation within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required.

This product does not provide residual weed control. For subsequent residual weed control, follow a label-approved herbicide program. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of mixtures of this product with herbicides or other materials that are not expressly recommended in this labeling. Mixing this product with herbicides or other materials not recommended on this label may result in reduced performance.

For best results, spray coverage should be uniform and complete. Do not spray weed foliage to the point of runoff.

Keep people and pets off treated areas until spray solution has dried.

DOMESTIC ANIMALS: This product is considered to be relatively nontoxic to dogs and other domestic animals; however, ingestion of this product or large amounts of freshly sprayed vegetation may result in temporary gastrointestinal irritation (vomiting, diarrhea, colic, etc.). If such symptoms are observed, provide the animal with plenty of fluids to prevent dehydration. Call a veterinarian if symptoms persist for more than 24 hours.

ATTENTION

AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Do not allow the herbicide solution to mist, drip, drift, or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants, or other areas on which treatment was not intended. The likelihood of injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. AVOID APPLYING AT EXCESSIVE SPEED OR PRESSURE.

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences. Keep container closed to prevent spills and contamination.

MIXING, ADDITIVES AND APPLICATION INSTRUCTIONS

APPLY THESE SPRAY SOLUTIONS IN PROPERLY MAINTAINED AND CALIBRATED EQUIPMENT CAPABLE OF DELIVERING DESIRED VOLUMES. DO NOT APPLY WHEN WIND OR OTHER CONDITIONS FAVOR DRIFT. HAND GUN APPLICATIONS SHOULD BE PROPERLY DIRECTED TO AVOID SPRAYING DESIRABLE PLANTS. NOTE: REDUCED RESULTS MAY OCCUR IF WATER CONTAINING SOIL IS USED, SUCH AS WATER FROM PONDS AND UNLINED DITCHES.

MIXING

This product mixes readily with water. Mix spray solutions of this product as follows: Fill the mixing or spray tank with the required amount of water. Add the recommended amount of this product (see the ''Directions for Use'' and ''Weeds Controlled'' sections of this label) near the end of the filling process and mix well. Remove hose from tank immediately after filling to avoid siphoning back into the carrier source. During mixing and application, foaming of the spray solution may occur. To prevent or minimize foam, avoid the use of mechanical agitators, terminate by-pass and return lines at the bottom of the tank and, if needed, use an approved anti-foam or defoaming agent.

TANK MIXTURES

Always predetermine the compatibility of labeled tank mixtures of this product with water carrier by mixing small proportional quantities in advance.

Mix labeled tank mixtures of this product with water as follows:

1. Place a 20 to 35 mesh screen or wetting basket over filling port.

2. Through the screen, fill the sprayer tank one-half full with water and start agitation.

3. If a wettable powder is used, make a slurry with the water carrier, and add it SLOWLY through the screen into the tank. Continue agitation.

4. If a flowable formulation is used, premix one part flowable with one part water. Add diluted mixture SLOWLY through the screen into the tank. Continue agitation.

5. If an emulsifiable concentrate formulation is used, premix one part emulsifiable concentrate with two parts water. Add diluted mixture slowly through the screen into the tank. Continue agitation.

6. Continue filling the sprayer tank with water and add the required amount of this product near the end of the filling process.

7. Where nonionic surfactant is recommended, add this to the spray tank before completing the filling process.

8. Add individual formulations to the spray tank as follows: wettable powder, flowable, emulsifiable concentrate, drift control additive, water soluble liquid followed by surfactant.

Maintain good agitation at all times until the contents of the tank

are sprayed. If the spray mixture is allowed to settle, thorough agitation is required to resuspend the mixture before spraying is resumed.

Keep by-pass line on or near bottom of tank to minimize foaming. Screen size in nozzle or line strainers should be no finer than 50 mesh. Carefully select proper nozzle to avoid spraying a fine mist. For best results with conventional ground applications equipment, use flat fan nozzles.

Clean sprayer and parts immediately after using this product by thoroughly flushing with water.

ADDITIVES

SURFACTANTS

Nonionic surfactants which are labeled for use with herbicides may be used. Do not reduce rates of this product when adding surfactant. When adding additional surfactant use 0.5 percent surfactant concentration (2 quarts per 100 gallons of spray solution) when using surfactants which contain at least 70 percent active ingredient or a 1 percent surfactant concentration (4 quarts per 100 gallons of spray solution) for those surfactants containing less than 70 percent active ingredient. Read and carefully observe surfactant cautionary statements and other information appearing on the surfactant label.

AMMONIUM SULFATE

The addition of 1 to 2 percent dry ammonium sulfate by weight or 8.5 to 17 pounds per 100 gallons of water may increase the performance of this product, and this product plus 2,4-D, Banvel™ or residual herbicide tank mixtures on annual and perennial weeds. The improvement in performance may be apparent where environmental stress is a concern. Low quality ammonium sulfate may contain material that will not readily dissolve which could result in nozzle tip plugging. To determine quality, perform a jar test by adding 1/3 cup of ammonium sulfate to 1 gallon of water and agitate for 1 minute. If undissolved sediment is observed, predissolve the ammonium sulfate in water and filter prior to addition to the spray tank. If ammonium sulfate is added directly to the spray tank, add slowly with agitation. Adding too quickly may clog outlet line. Ensure that ammonium sulfate is completely dissolved in the spray tank before adding herbicides or surfactant. Thoroughly rinse the spray system with clean water after use to reduce corrosion.

NOTE: The use of ammonium sulfate as an additive does not preclude the need for additional surfactant. Do not use herbicide rates

lower than recommended in this label.

Banvel™ is a trademark of Sandoz, Inc.

COLORANTS OR DYES

Agriculturally approved colorants or marking dyes may be added to this product. Colorants or dyes used in spray solutions of this product may reduce performance, especially at lower rates or dilutions. Use colorants or dyes according to the manufacturer's recommendations.

APPLICATION EQUIPMENT AND TECHNIQUES

Do not apply this product through any type of irrigation system.

This product may be applied with the following application equipment:

Aerial -- Fixed Wing and Helicopter

Broadcast Spray

Controlled Droplet Applicator (CDA) -- Hand-held or boom-mounted applicators which produce a spray consisting of a narrow range of droplet sizes.

Hand-Held and High-Volume Spray Equipment -- Knapsack and backpack sprayers, pump-up pressure sprayers, handguns, handwands, lances and other hand-held spray equipment used to direct the spray onto weed foliage and vehicle-mounted high-volume spray equipment for spray-to-wet applications.

Selective equipment -- Recirculating sprayers, shielded sprayers and wiper applicators.

See the appropriate part of this section for specific rates of application and instructions.

AERIAL EQUIPMENT

Use the recommended rates of this herbicide in 3 to 15 gallons of water per acre unless otherwise specified on this label. See the ''Weeds Controlled'' section of this label for specific rates. Unless otherwise specified, do not exceed one quart per acre. **(Aerial applications of this product may be made in annual cropping conventional tillage systems, fallow and reduced tillage systems, preharvest, silvicultural sites, and rights-of-way. Refer to the individual use area sections of this label for recommended**

volumes and application rates.) FOR AERIAL APPLICATION IN CALIFORNIA, REFER TO THE FEDERAL SUPPLEMENTAL LABEL FOR AERIAL APPLICATIONS IN THAT STATE FOR SPECIFIC INSTRUCTIONS, RESTRICTIONS AND REQUIREMENTS.

This product plus Oust tank mixtures may not be applied by air in California.

Avoid direct application to any body of water.

AVOID DRIFT--DO NOT APPLY DURING INVERSION CONDITIONS, WHEN WINDS ARE GUSTY, OR UNDER ANY OTHER CONDITION WHICH FAVORS DRIFT. DRIFT MAY CAUSE DAMAGE TO ANY VEGETATION CONTACTED TO WHICH TREATMENT IS NOT INTENDED. TO PREVENT INJURY TO ADJACENT DESIRABLE VEGETATION, APPROPRIATE BUFFER ZONES MUST BE MAINTAINED.

Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations which dispense spray as fine spray droplets. Do not angle nozzles forward into the airstream and do not increase spray volume by increasing nozzle pressure.

Drift control additives may be used. When a drift control additive is used, read and carefully observe the cautionary statements and all other information appearing on the additive label.

Ensure uniform application -- To avoid streaked, uneven or overlapped application, use appropriate marking devices.

Thoroughly wash aircraft, especially landing gear, after each day of spraying to remove residues of this product accumulated during spraying or from spills. PROLONGED EXPOSURE OF THIS PRODUCT TO UNCOATED STEEL SURFACES MAY RESULT IN CORROSION AND POSSIBLE FAILURE OF THE PART. LANDING GEAR ARE MOST SUSCEPTIBLE. The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion.

■ BROADCAST EQUIPMENT ■

For control of annual or perennial weeds listed on this label using broadcast equipment -- Use the recommended rates of this product in 3 to 40 gallons of water per acre as a broadcast spray unless otherwise specified on this label. See the ''Weeds Controlled'' section of this label for specific rates. As density of weeds increases, spray volume should be increased within the recommended range to ensure complete coverage. Carefully select proper nozzle to avoid spraying a fine mist. For best results with ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

■ CONTROLLED DROPLET ■

APPLICATION (CDA)

The rate of this product applied per acre by vehicle-mounted CDA equipment must not be less than the amount recommended in this label when applied by conventional broadcast equipment. For vehicle-mounted CDA equipment, apply 3 to 15 gallons of water per acre.

For the control of labeled annual weeds with hand-held CDA units, apply a 20 percent solution of this product at a flow rate of 2 fluid ounces per minute and a walking speed of 1.5 MPH (1 quart per acre). For the control of labeled perennial weeds, apply a 20 to 40 percent solution of this product at a flow rate of 2 fluid ounces per minute and a walking speed of 0.75 MPH (2 to 4 quarts per acre).

Controlled droplet application equipment produces a spray pattern which is not easily visible. Extreme care must be exercised to avoid spray or drift contacting the foliage or any other green tissue of desirable vegetation, as damage or destruction may result.

■ HAND-HELD and HIGH-VOLUME EQUIPMENT ■

Use coarse sprays only.

Mix this product in clean water and apply to foliage of vegetation to be controlled. For applications made on a spray-to-wet basis, spray coverage should be uniform and complete. Do not spray to the point of runoff.

For control of annual weeds listed on this label, apply a 0.5 percent solution of this product plus nonionic surfactant to weeds less than 6 inches in height or runner length. Apply prior to seedhead formation in grass or bud formation in broadleaf weeds. Allow three or more days before tillage or mowing.

For annual weeds over 6 inches tall, or when not using additional surfactant, or unless otherwise specified, use a 1 percent solution. For best results, use a 2 percent solution on harder-to-control perennials, such as bermudagrass, dock, field bindweed, hemp dogbane, milkweed and Canada thistle.

Less than complete coverage of weeds may result from the use of spray equipment designed for motorized spot treatments. Where less than complete coverage of annual weeds occurs, use a 5 percent solution. Do not reduce recommended concentrations of this product when adding surfactant.

Prepare the desired volume of spray solution by mixing the amount

of this product in water as shown in the following table:

Spray Solution

DESIRED VOLUME	AMOUNT OF MON 52249				
	1/2%	1%	1 1/2%	2%	5%
1 gallon	2/3 oz	1-1/3 oz	2 oz	2-2/3 oz	6⅓ oz
25 gallons	1 pt	1 qt	1½ qt	2 qt	5 qt
100 gallons	2 qt	1 gal	1½ gal	2 gal	5 gal

2 tablespoons = 1 fluid ounce

For use in knapsack sprayers, it is suggested that the proper amount of this product be mixed with water in a larger container. Fill sprayer with the mixed solution.

For hand-held WIPER APPLICATORS, see the ''Selective Equipment'' section and for hand-held CONTROLLED DROPLET APPLICATORS, see the ''Controlled Droplet Application (CDA)'' section of this label.

■ SELECTIVE EQUIPMENT ■

This product may be applied through a recirculating spray system, a shielded applicator, or a wiper applicator after dilution and thorough mixing with water to listed weeds growing in any noncrop site specified on this label and only when specifically recommended in cropping systems.

A recirculating spray system directs the spray solution onto weeds growing above desirable vegetation, while spray solution not intercepted by weeds is collected and returned to the spray tank for reuse.

A shielded applicator directs the herbicide solution onto weeds while shielding desirable vegetation from the herbicide.

A wiper applicator applies the herbicide solution onto weeds by rubbing the weed with an absorbent material containing the herbicide solution.

AVOID CONTACT WITH DESIRABLE VEGETATION.

Contact of the herbicide solution with the desirable vegetation may result in damage or destruction. Applicators used above desired vegetation should be adjusted so that the lowest spray stream or wiper contact point is at least two inches above the desirable vegetation. Droplets, mist, foam, or splatter of the herbicide solution settling on desirable vegetation may result in

discoloration, stunting, or destruction.

Applications made above the crops should be made when the weeds are a minimum of 6 inches above the desirable vegetation. Better results may be obtained when more of the weed is exposed to the herbicide solution. Weeds not contacted by the herbicide solution will not be affected. This may occur in dense clumps, severe - infestations, or when the height of the weeds varies so that not all weeds are contacted. In these instances, repeat treatment may be necessary.

See the ''Weeds Controlled'' section of this label for recommended stage of growth for specific weeds.

NOTE

- Maintain equipment in good operating condition. Avoid leakage or dripping onto desirable vegetation.
- Adjust height of applicator to insure adequate contact with weeds.
- Keep nozzle tips and wiping surfaces clean.
- Keep spray patterns aligned into recovery chamber of the recirculating sprayer.
- Keep shields on shielded applicators adjusted to protect desirable vegetation.
- Maintain recommended roller RPM on roller applicators while in use.
- Keep wiper material at proper degree of saturation with herbicide solution.
- DO NOT use wiper equipment when weeds are wet.
- DO NOT operate equipment at ground speeds greater than 5 mph. Weed control may be affected by speed of application equipment. As weed density increases, reduce equipment ground speed to ensure good coverage of weeds.
- Be aware that, on sloping ground, the herbicide solution may migrate, causing dripping on the lower end and drying on the upper end of a wiper applicator.
- Variation in equipment design may affect weed control. With wiper applicators, the wiping material and its orientation must allow delivery of sufficient quantities of the recommended herbicide solution directly to the weed.

- Care must be taken with all types of wipers to ensure that the absorbent material does not become oversaturated, causing the herbicide to drip on desirable vegetation.

- Mix only the amount of solution to be used during a one-day period, as reduced activity may result from use of leftover solutions. With all equipment, drain and clean sprayer and wiper parts immediately after using this product by thoroughly flushing with water.

RECIRCULATING SPRAYERS

Recirculating sprayer calibration is made on the basis of ground speed and delivery volume. Two procedures can be used to calibrate: (1) determine the discharge being delivered per minute, then operate at the designated ground speed, or (2) select the desired ground speed and then adjust the sprayer to deliver the recommended volume per minute (this may require nozzle changes). Use the appropriate table below.

Do not operate at nozzle pressure above 20 PSI.

Table 1. Use this table when calibrating box or row-type recirculating sprayers. Box or row-type sprayer calibration is based on the total discharge collected per row. Use only straight stream or 15° fan-type nozzles.

*VOLUME PER MINUTE PER ROW

MPH	Fluid Ounces
2	26 to 35
3	38 to 51
4	51 to 68
5	65 to 86

*NOTE: Be certain the amount collected is for all spray streams treating one row.

Table 2. Use this table when calibrating broadcast type recirculating sprayers. Broadcast recirculating sprayer calibration is based on the discharge collected per minute from one nozzle on a 20-inch spacing.

VOLUME PER MINUTE PER NOZZLE

MPH	Fluid Ounces
2	7 to 9
3	10 to 13
4	13 to 18
5	16 to 22

When applied as recommended under the conditions described for recirculating sprayers, this product will control the following weeds growing a minimum of 6 inches above desirable vegetation.

Perennial Broadleaf Weeds -- To SUPPRESS the following weeds, mix in a ratio of 4 quarts of this product in 20 gallons of water and apply as directed.

Dogbane, hemp
Apocynum cannabinum

Milkweed
Asclepias syriaca

Perennial Grasses and Annual Broadleaf Weeds -- To control the following weeds, mix in a ratio of 3 quarts of this product in 20 gallons of water and apply as directed:

Cocklebur
Xanthium strumarium

Johnsongrass
Sorghum halepense

Pigweed, redroot
Amaranthus retroflexus

Sunflower
Helianthus annuus

Annual Grasses -- To control the following weeds, mix in a ratio of 2 quarts of this product in 20 gallons of water and apply as directed:

Corn
Zea mays

Shattercane
Sorghum bicolor

SHIELDED APPLICATORS

When applied as directed under conditions described for shielded

applicators, this product will control those weeds listed in the ''Weeds Controlled'' section of this label.

Shielded applicators which apply the herbicide solution as a spray band should be calibrated on a broadcast equivalent rate and volume basis. To determine these:

Band width in inches / Row width in inches	X	Herbicide Broadcast RATE per acre	=	Herbicide Band RATE per acre

Band width in inches / Row width in inches	X	Herbicide VOLUME of solution per acre	=	Herbicide VOLUME of solution per acre

Use nozzles that provide uniform coverage within the treated area. EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT WITH DESIRABLE VEGETATION.

For specific rates of application and instructions for control of various annual and perennial weeds, see the ''Weeds Controlled'' section of this label.

WIPER APPLICATORS

Wiper applicators include either roller or wick devices which physically wipe appropriate concentrations or amounts of this product directly onto the weed. Equipment must be designed, maintained, and operated to prevent the herbicide solution from contacting desirable vegetation. Operate this equipment at ground speeds no greater than 5 mph. Performance may be improved by reducing speed in areas of heavy weed infestations to ensure adequate wiper saturation. Better results may be obtained if two applications are made in opposite directions.

Do not add surfactant to the herbicide solution.

For Roller Applicators -- Mix 1 gallon of this product in enough water to prepare 10 gallons of herbicide solution (10 percent solution). Apply this solution to perennial weeds or annual broadleaf weeds listed in this ''Wiper Applicators'' section.

Mix 1 gallon of this product in enough water to provide 20 gallons of herbicide solution (5 percent solution). Apply this solution to annual grasses listed in this ''Wiper Applicators'' section.

Roller speed should be maintained at 40 to 60 RPM.

For Wick or Wiper Applicators -- Mix 1 gallon of this product in 2 gallons of water to prepare a 33 percent solution. Apply this solution to weeds listed in this ''Wiper Applicators'' section.

In severe infestations, reduce equipment ground speed to ensure that adequate amounts of this product are wiped on the weeds. A second treatment in the opposite direction may be beneficial.

Do not permit herbicide solution to contact desirable vegetation.

When applied as recommended under the conditions described for ''Wiper Applicators'', this product CONTROLS the following weeds:

ANNUAL GRASSES

Corn
Zea mays

Panicum, Texas
Panicum texanum

Rye, common
Secale cereale

Shattercane
Sorghum bicolor

ANNUAL BROADLEAVES

Sicklepod
Cassia obtusifolia

Spanishneedles
Bidens bipinnata

Starbur, bristly
Acanthospermum hispidum

When applied as recommended under the conditions described for ''Wiper Applicators'', this product SUPPRESSES the following weeds:

ANNUAL BROADLEAVES

Beggarweed, Florida
Desmodium tortuosum

Dogfennel
Eupatorium capilliflorium

Pigweed, redroot

Amaranthus retroflexus

Ragweed, common
Ambrosia artemisiifolia

Ragweed, giant
Ambrosia trifida

Sunflower
Helianthus annuus

Thistle, musk
Carduus nutans

Velvetleaf
Abutilon theophrasti

PERENNIAL GRASSES

Bermudagrass
Cynodon dactylon

Guineagrass
Panicum maximum

Johnsongrass
Sorghum halepense

Smutgrass
Sporobolus poiretii

Vaseygrass
Paspalum urvillei

PERENNIAL BROADLEAVES

Dogbane, hemp
Apocynum cannabinum

Milkweed
Ascelepias syriaca

Nightshade, silverleaf
Solanum elaeagnifolium

Thistle, Canada
Cirsium arvense

WEEDS CONTROLLED

This herbicide controls many annual and perennial grasses and broadleaf weeds.

ANNUAL WEEDS

- Apply to actively growing grass and broadleaf weeds.
- Allow at least 3 days after treatment before tillage.
- For maximum agronomic benefit, apply when weeds are 6 inches or less in height.
- To prevent seed production, applications should be made prior to seedhead formation.
- This product does not provide residual control; therefore, delay application until maximum weed emergence. Repeat treatments may be necessary to control later germinating weeds.

LOW-VOLUME BROADCAST APPLICATION
(LOW-RATE TECHNOLOGY)

When applied as directed under the conditions described, this product will control the weeds listed below when:

1. Water carrier volumes of 3 to 10 gallons per acre for ground applications and 3 to 5 gallons per acre for aerial applications are recommended. (See the ''Aerial Application'' section of this label for approved sites.)
2. A nonionic surfactant is added at 0.5 to 1 percent by total spray volume. Use 0.5 percent surfactant concentration when using surfactants which contain at least 70 percent active ingredient or a 1 percent surfactant concentration for those surfactants containing less than 70 percent active ingredient.

NOTE

- The addition of 2 percent dry ammonium sulfate by weight or 17 pounds per 100 gallons of water may increase the performance of this product on annual weeds. The improvement in performance may be apparent where environmental stress is a concern. Refer to the ''Mixing, Additives and Application Instructions'' section of this label.
- Do not tank-mix with soil residual herbicides when using these rates unless otherwise specified.
- For weeds that have been mowed, grazed, or cut, allow regrowth

to occur prior to treatment.

- Refer to the ''Tank Mixtures'' portion of this section for control of additional broadleaf weeds.

WEED SPECIES	MAXIMUM HEIGHT/LENGTH	RATE PER ACRE** (Fluid Ounces)
Foxtail *Setaria spp.*	12"	8 oz.
Barnyardgrass *Echinochloa crus-galli*	6" (0 to 4" (4 to 6"	12 oz. 16 oz.[1]) 24 oz.[1])
Bluegrass, annual *Poa annua*		
Brome, downy* *Bromus tectorum*		
Mustard, blue *Chorispora tenella*		
Mustard, tansy *Descurainia pinnata*		
Mustard, tumble *Sisymbrium altissimum*		
Mustard, wild *Sinapis arvensis*		
Spurry, umbrella *Holosteum umbellatum*		
Barley *Hordeum vulgare*	12"	
Rye *Secale cereale*		
Sandbur, field *Cenchrus spp.*		
Shattercane *Sorghum bicolor*		

Stinkgrass *Eragrostis cilianensis*		
Wheat *Triticum aestivum*	18"	
Morningglory *Ipomea spp.*	2"	16 oz.
Sicklepod *Cassia obtusifolia*		
Bluegrass, bulbous *Poa bulbosa*	6"	
Cheat *Bromus secalinus*		
Chickweed, common *Stellaria media*		
Chickweed, mouseear *Cerastium vulgatum*		
Corn *Zea mays*		
Goatgrass, jointed *Aegilops cylindrica*		
Groundsel, common *Senecio vulgaris*		
Horseweed/Marestail *Conyza canadensis*		
Lambsquarters, common *Chenopodium album*		
Pennycress, field *Fanweed* *Thlaspi arvense*		
Rocket, London *Sisymbrium irio*		
Ryegrass, Italian		

Lolium multiflorum

Shepherdspurse
Capsella bursa-pastoris

Spurge, annual
Euphorbia spp.

Buttercup 12"
Ranunculus spp.

Cocklebur
Xanthium strumarium

Crabgrass
Digitaria spp.

Dwarfdandelion
Krigia cespitosa

Falseflax, smallseed
Camelina microcarpa

Foxtail, Carolina
Alopecurus carolinianus

Johnsongrass, seedling
Sorghum halepense

Oats, wild
Avena fatua

Panicum, fall
Panicum dichotomiflorum

Panicum, Texas
Panicum texanum

Pigweed, redroot
Amaranthus retroflexus

Pigweed, smooth
Amaranthus hybridus

Witchgrass
Panicum capillare

Sicklepod 3 to 4" 24 oz
Cassia obtusifolia

Signalgrass, broadleaf *Brachiaria platyphylla*	4"	
Horseweed/Marestail *Conyza canadensis*	7 to 12"	
Lambsquarters, common *Chenopodium album*		
Spurge, annual *Euphorbia spp.*		
Rice, red *Oryza sativa*	4"	32 oz.
Teaweed *Sida spinosa*		
Sprangletop *Leptochloa spp.*	6"	
Geranium, Carolina *Geranium carolinianum*	12"	
Goosegrass *Eleusine indica*		
Primrose, cutleaf evening *Oenothera laciniate*		
Pusley, Florida *Richardia scabra*		
Sicklepod *Cassia obtusifolia*	5 to 12"	
Spanishneedles *Bidens bipinnata*		
Filaree *Erodium spp.*	12"	48 oz.
Sprangletop *Leptochloa spp.*		

[1]Use these rates to control barnyardgrass in Alabama, Arkansas, Mississippi, Missouri, Louisiana and Texas for preplant treatments.

Lettuce, prickly (6")
Lactuca serriola

Marestail/Horseweed (6")
Conyza canadensis

Morningglory (6")
Ipomea spp.

Pigweed, redroot (12")
Amaranthus retroflexus

Pigweed, smooth (12")
Amaranthus hybridus

Thistle, Russian (12")
Salsola kali

*Controlled with Banvel tank mixture only.

Apply 16 fluid ounces of this product plus 0.5 pound a.i. of 2,4-D, plus 0.5 to 1 percent nonionic surfactant by total spray volume per acre to control the following annual broadleaf weeds when less than 6 inches in height.

Ragweed, common
Ambrosia artemisiifolia

Ragweed, giant
Ambrosia trifida

Smartweed, Pennsylvania
Polygonum pensylvanicum

Velvetleaf
Abutilon theophrasti

HIGH-VOLUME BROADCAST APPLICATIONS

When applied as directed under the conditions described, this product will control the weeds listed below when water carrier volumes are 10 to 40 gallons per acre for ground applications.

Apply 1 to 1.5 quarts of this product per acre plus 0.5 to 1 percent nonionic surfactant by total spray volume. Use 1 quart per acre if weeds are less than 6 inches tall and 1.5 quarts per acre if weeds are over 6 inches tall. If weeds have been mowed, grazed, or cut, allow adequate time for new growth to recommended stages prior to treatment. These rates will also provide control of weeds listed in the ''Low-Volume Broadcast Application'' section.

WEED SPECIES

Balsamapple*
Momordica charantia

Bassia, fivehook
Bassia hyssopifolia

Brome
Bromus spp.

Fiddleneck
Amsinckia spp.

Flaxleaf Fleabane
Conyza bonariensis

Fleabane
Erigeron spp.

Kochia
Kochia scoparia

Lettuce, prickly
Lactuca serriola

Panicum
Panicum spp.

Ragweed, common
Ambrosia artemisiifolia

Ragweed, giant
Ambrosia trifida

Smartweed, Pennsylvania
Polygonum pensylvanicum

Sowthistle, annual
Sonchus cleraceus

Sunflower
Helianthus annuus

Thistle, Russian
Salsola kali

Velvetleaf
Abutilon theophrasti

*Apply with hand-held equipment only.

PERENNIAL WEEDS

Apply this product as follows to control or destroy most perennial weeds:

NOTE: If weeds have been mowed or tilled, do not treat until plants have resumed active growth and have reached the recommended stages.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. Repeat treatments must be made prior to crop emergence.

The addition of 1 to 2 percent dry ammonium sulfate by weight or 8.5 to 17 pounds per 100 gallons of water may increase the performance of this product on perennial weeds. The improvement in performance may be apparent where environmental stress is a concern. Refer to the ''Mixing, Additives and Application Instructions'' section of this label.

When applied as recommended under the conditions described, this product WILL CONTROL the following PERENNIAL WEEDS:

Alfalfa
Medicago sativa

Alligatorweed*
Alternanthera philoxeroides

Artichoke, Jerusalem
Helianthus tuberosus

Bahiagrass
Paspalum notatum

Bentgrass
Agrostis spp.

Bermudagrass
Cynodon dactylon

Bermudagrass, water (knotgrass)
Paspalum distichum

Bindweed, field
Convolvulus arvensis

Bluegrass, Kentucky
Poa spp.

Blueweed, Texas
Helianthus ciliaris

Brackenfern
Pteridium aquilinum

Bromegrass, smooth
Bromus inermis

Bursage, woollyleaf
Franseria tomentosa

Canarygrass, reed
Phalaris arundinacea

Cattail
Typha spp.

Clover, red
Trifolium pratense

Clover, white
Trifolium repens

Cogongrass
Imperata cylindrica

Dallisgrass
Paspalum dilatatum

Dandelion
Taraxacum officinale

Dock, curly
Rumex crispus

Dogbane, hemp
Apocynum cannabinum

Fescues
Festuca spp.

Fescue, tall
Festuca arundinacea

Guineagrass
Pancium maximum

Horsenettle
Solanum carolinense

Horseradish
Armoracia rusticana

Johnsongrass
Sorghum halepense

Kikuyugrass
Pennisetum clandestinum

Knapweed
Centaurea repens

Lantana
Lantana camara

Milkweed
Asclepias spp.

Muhly, wirestem
Muhlenbergia frondonsa

Mullein, common
Verbascum thapsus

Napiergrass
Pennisetum purpureum

Nightshade, silverleaf
Solanum elaeagnifolium

Nutsedge, purple, yellow
Cyperus rotundus
Cyperus esculentus

Orchardgrass
Dactylis glomerata

Pampas
Cortaderia jubata

Paragrass
Brachiaria mutica

Phragmites*
Phragmites spp.

Quackgrass
Agropyron repens

Redvine*
Brunnichia ovata

Reed, giant
Arundo donax

Ryegrass, perennial
Lolium perenne

Smartweed, swamp
Polygonum coccineum

Spurge, leafy*
Euphorbia esula

Sweet potato, wild*
Ipomoea pandurata

Thistle, Canada
Cirsium arvense

Timothy
Phleum pratense

Torpedograss*
Panicum repens

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

Wheatgrass, western
Agropyron smithii

*Partial Control

This product is not registered in California for use on water bermudagrass, redvine and trumpetcreeper.

See ''Directions for Use'' and ''Mixing, Additives and Application Instructions'' sections of this label for labeled uses and specific application instructions.

Alfalfa--Apply 1 quart of this product per acre plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Make application after the last hay cutting in the fall. Allow alfalfa to regrow to a height of 6 to 8 inches or more prior to treatment. Applications should be

followed with deep tillage at least 7 days after treatment, but before soil freeze-up.

Alligatorweed--Apply 4 quarts of this product per acre or apply a 1½ percent solution with hand-held equipment to provide partial control. Apply when most of the plants are in bloom. Repeat applications will be required to maintain such control.

Bentgrass--For suppression in grass seed production areas. For ground applications only, apply 1.5 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 20 gallons of water per acre. Ensure entire crown area has resumed growth prior to a fall application. Bentgrass should be actively growing and have at least 3 inches of growth. Tillage prior to treatment should be avoided. Tillage 7 to 10 days after application is recommended for best results. Failure to use tillage after treatment may result in unacceptable control.

Bermudagrass--For control, apply 5 quarts of this product per acre and, for partial control, apply 3 quarts per acre. Treat when bermudagrass is actively growing and seedheads are present. Retreatment may be necessary to maintain control. Allow 7 or more days after application before tillage.

Bermudagrass, water (knotgrass)--Apply 1.5 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 5 to 10 gallons of water per acre. Apply when water bermudagrass is actively growing and 12 to 18 inches in length. Allow 7 or more days before tilling, flushing or flooding the field.

Fall applications only - Apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 5 to 10 gallons of water per acre. Fallow fields should be tilled prior to application. Apply prior to frost on water bermudagrass that is actively growing and 12 to 18 inches in length. Allow 7 or more days before tillage.

Bindweed, field--For control, apply 4 to 5 quarts of this product per acre west of the Mississippi River and 3 to 4 quarts east of the Mississippi River. Apply when the weeds are actively growing and are at or beyond full bloom. Do not treat when weed is under drought stress as good soil moisture is necessary for active growth. For best results, apply in late summer or fall. Fall treatments must be applied before a killing frost. Allow 7 or more days after application before tillage.

Also for control, apply 2 quarts of this product plus 0.5 pound a.i. of Banvel in 10 to 20 gallons of water per acre. At these rates, apply using ground application only.

The following tank mixtures with 2,4-D may be applied using aerial

application equipment (except in California) in fallow and reduced tillage systems only.

For suppression on irrigated agricultural land apply 1 to 2 quarts of this product plus 1 pound a.i. of 2,4-D in 10 to 20 gallons of water per acre with ground equipment only. Applications should be made following harvest or on fall fallow ground when the bindweed is actively growing and the majority of runners are 12 inches or more in length. The use of at least one irrigation will promote active bindweed growth.

For suppression, apply 16 fluid ounces of this product plus 0.5 pound a.i. of 2,4-D plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre for ground applications and 3 to 5 gallons of water per acre for aerial applications. Applications should be delayed until maximum emergence has occurred and when vines are between 6 to 18 inches in length.

In California only, apply 1 to 5 quarts of this product per acre. Actual rate needed for suppression or control will vary within this range depending on local conditions. Also, for more specific use recommendations for California refer to the following paragraph:

> For suppression on irrigated land where annual tillage is performed, apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Apply to actively growing bindweed that has reached a length of 12 inches or greater. Allow maximum weed emergence and runner growth. Do not treat when weed is under drought stress as good soil moisture is necessary for active growth. Allow 3 or more days after application before tillage.

Bluegrass, Kentucky / Bromegrass, smooth / Orchardgrass--Apply 2 quarts of this product in 10 to 40 gallons of water per acre when the grasses are actively growing and most plants have reached boot-to-early seedhead stage of development. For partial control in pasture or hay crop renovation, apply 1 to 1½ quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Apply to actively growing plants when most have reached 4 to 12 inches in height. Allow 7 or more days after application before tillage.

Orchardgrass (sods going to no-till corn)--Apply 1 to 1.5 quarts of this product per acre plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Apply to orchardgrass that is a minimum of 12 inches tall for spring applications and 6 inches tall for fall applications. Allow at least three days following application before planting. A sequential application of 3.75 to 4.5 quarts of Lariat® herbicide, or equivalent, will be necessary for optimum results. Lariat should

* For control in no-till systems, use 16 fluid ounces per acre.

** For those rates less than 32 fluid ounces per acre, this product at rates up to 32 fluid ounces per acre may be used where heavy weed densities exist.

TANK MIXTURES

MON 52249 plus BANVEL plus NONIONIC SURFACTANT

MON 52249 plus 2,4-D plus NONIONIC SURFACTANT

DO NOT APPLY BANVEL OR 2,4-D TANK MIXTURES BY AIR IN CALIFORNIA.

These tank mixtures are recommended for use in fallow and reduced tillage areas only. Follow use directions as given in the ''Low-Volume Broadcast Application'' section.

This product plus Banvel or 2,4-D will control the annual grasses and broadleaf weeds previously listed for this product alone at the indicated heights (except 8 fluid ounces per acre applications), plus the following broadleaf weeds. For those weeds previously listed at 8 fluid ounces of this product alone per acre, use 12 fluid ounces in these tank mixtures.

NOTE: Refer to the specific product labels for crop rotation restrictions and cautionary statements of all products used in tank mixtures. Some crop injury may occur if Banvel is applied within 45 days of planting. The addition of Banvel in a mixture with this product may provide short-term residual control of selected weed species.

Apply 12 to 16 fluid ounces of this product plus 0.25 lb. a.i. of Banvel or 0.5 pound a.i. of 2,4-D, plus 0.5 to 1 percent nonionic surfactant by total spray volume per acre to control dense populations of the following annual broadleaf weeds when less than the height indicated:

Cocklebur (12")
Xanthium strumarium

Kochia* (6")
Kochia scoparia

Lambsquarters (12")
Chenopodium album

be applied within 3 to 10 days following spring applications to prevent annual weed growth.

Lariat is not registered for use in California.

®Lariat is a registered trademark of Monsanto Company.

Blueweed, Texas--Apply 4 to 5 quarts of this product per acre west of the Mississippi River and 3 to 4 quarts per acre east of the Mississippi River. Apply when weed is actively growing and is at or beyond full bloom. Do not treat when weed is under drought stress as good soil moisture is necessary for active growth. New leaf development indicates active growth. For best results, apply in late summer or fall. Fall treatments must be applied before a killing frost. Allow 7 or more days after application before tillage.

Brackenfern--Apply 3 to 4 quarts of this product per acre as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment. Apply to fully expanded fronds which are at least 18 inches long.

Bursage, woollyleaf--For control, apply 2 quarts of this product plus 1 pint of Banvel per acre. For partial control, apply 1 quart of this product plus 1 pint of Banvel per acre. Add 0.5 to 1 percent nonionic surfactant by total spray volume and apply 3 to 20 gallons of water per acre. Apply when plants are producing new active growth which has been initiated by moisture for at least 2 weeks and when plants are at or beyond flowering.

Canarygrass, reed/Timothy / Wheatgrass, western--Apply 2 to 3 quarts of this product per acre. For best results, apply to actively growing plants when most have reached the boot-to-head stage of growth. Allow 7 or more days after application before tillage.

Cogongrass--Apply 3 to 5 quarts of this product plus 0.5 to 1 percent nonionic surfactant in 10 to 40 gallons of water per acre. Apply when Cogongrass is at least 18 inches tall and actively growing in late summer or fall. Allow 7 or more days after application before tillage or mowing. Due to uneven stages of growth and the dense nature of vegetation preventing good spray coverage, repeat treatments may be necessary to maintain control.

Dandelion/Dock, curly--Apply 3 to 5 quarts of this product per acre when plants are actively growing and most have reached the early bud stage of growth. Allow 7 or more days after application before tillage.

Also for control, apply 16 fluid ounces of this product plus 0.5 pounds a.i. 2,4-D plus 0.5 to 1 percent nonionic surfactant by

total spray volume in 3 to 10 gallons of water per acre.

Dogbane, hemp--Apply 4 quarts of this product per acre. Apply when actively growing and when most weeds have reached the late bud to flower stage of growth. Following crop harvest or mowing, allow weeds to regrow to a mature stage prior to treatment. For best results, apply in late summer or fall. Allow 7 or more days after application before tillage.

For suppression, apply 16 fluid ounces of this product plus 0.5 pound a.i. of 2,4-D plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre for ground applications and 3 to 5 gallons of water per acre for aerial applications. Delay applications until maximum emergence of dogbane has occurred.

Fescue, tall--Apply 3 quarts of this product in 10 to 40 gallons of water per acre to actively growing plants when most have reached boot-to-early seedhead stage of development.

Fall applications only--Apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Apply to fescue in the fall when actively growing and plants have 6 to 12 inches of new growth. Allow 7 or more days after application before tillage. A sequential application of 1 pint per acre of this product plus nonionic surfactant will improve long-term control and control seedlings germinating after fall treatments or the following spring.

Guineagrass--Apply 3 quarts of this product per acre or use a 1 percent solution with hand-held equipment. Apply to actively growing guineagrass when most has reached at least the 7-leaf stage of growth. Ensure thorough coverage when using hand-held equipment. Allow 7 or more days after application before tillage.

Johnsongrass/Ryegrass, perennial--Apply 1 to 3 quarts of this product per acre. In annual cropping systems apply 1 to 2 quarts of this product per acre. Apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Use 2 quarts of this product when applying 10 to 40 gallons of water per acre. In noncrop or areas where annual tillage (no-till), is not performed, apply 2 to 3 quarts of this product in 10 to 40 gallons of water per acre. For best results, apply to actively growing plants when most have reached the boot-to-head stage of growth or in the fall prior to frost. Allow 7 or more days after application before tillage. Do not tank-mix with residual herbicides when using the 1 quart per acre rate.

For burndown of Johnsongrass, apply 1 pint per acre plus 0.5 to 1

percent nonionic surfactant in 3 to 10 gallons of water per acre before the plants reach a height of 12 inches. For this use, allow at least 3 days after treatment before tillage.

Spot Treatment (partial control or suppression)--Apply a 1 percent solution of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume when johnsongrass is 12 to 18 inches in height. Coverage should be uniform and complete.

Kikuyugrass--Apply 2 to 3 quarts of this product per acre. Spray when most kikuyugrass is at least 8 inches in height (3 or 4-leaf stage of growth) and actively growing. Allow 3 or more days after application before tillage.

Knapweed/Horseradish--Apply 4 quarts of this product per acre. Apply when actively growing and when most weeds have reached the late bud to flower stage of growth. Following crop harvest or mowing, allow weeds to regrow to a mature stage prior to treatment. For best results, apply in late summer or fall. Allow 7 or more days after application before tillage.

Lantana--Apply this product as a 1 to 1½ percent solution using hand-held equipment only. Apply to actively growing lantana at or beyond the bloom stage of growth. Use the higher application rate for plants that have reached the woody stage of growth. Allow 7 or more days after application before tillage.

Milkweed, common--Apply 3 quarts of this product per acre. Apply when actively growing and most of the milkweed has reached the late bud to flower stage of growth. Following small grain harvest or mowing, allow milkweed to regrow to a mature stage prior to treatment. Allow 7 or more days after application before tillage.

Muhly, wirestem--Apply 1 to 2 quarts of this product per acre. Use 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Use 2 quarts of this product when applying 10 to 40 gallons of water per acre or in pasture, sod, or noncrop areas. Spray when the wirestem muhly is 8 inches or more in height and actively growing. Do not till between harvest and fall applications or in the fall or spring prior to spring applications. Allow 3 or more days after application before tillage. This product will not provide residual control of wirestem muhly from seeds which germinate after application of this product. Do not tank mix with residual herbicides when using the 1 quart per acre rate.

Nightshade, silverleaf--For control, apply 2 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Applications should be made when at least 60 percent of the plants have berries. Fall treatments must be applied before a killing frost. Allow 7 or more days after

application before tillage. Do not treat when weed is under drought stress as good soil moisture is necessary for active growth.

Nutsedge: purple, yellow--Apply 3 quarts of this product per acre as a broadcast spray, or apply a 2 percent solution from hand-held equipment to control existing nutsedge plants and immature nutlets attached to treated plants. Treat when plants are in flower or when new nutlets can be found at rhizome tips. Nutlets which have not germinated will not be controlled and may germinate following treatment. Repeat treatments will be required for long-term control of ungerminated tubers.

Sequential applications of 1 to 2 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre will provide control. Make applications when a majority of the plants are in the 3 to 5 leaf stage (less than 6 inches tall). Repeat this application, as necessary, when newly emerging plants reach the 3 to 5 leaf stage. Subsequent applications will be necessary for long-term control.

For suppression to partial control of existing plants, apply 1 pint to 2 quarts of this product per acre, plus 0.5 to 1 percent nonionic surfactant in 3 to 40 gallons of water per acre. Treat when plants have 3 to 5 leaves and most are less than 6 inches tall. Repeat treatments will be required to control subsequent emerging plants or regrowth of existing plants. Wait 7 days after treatment before tillage or mowing.

Pampas--Apply this product as a 1½ to 2 percent solution using hand-held equipment. Apply to plants that are actively growing at or beyond the boot stage of growth. Thorough coverage is necessary for best control.

Phragmites--For partial control of phragmites in Florida and the counties of other states bordering the Gulf of Mexico, apply 5 quarts per acre as a broadcast spray or apply a 2 percent solution from hand-held equipment. In other areas of the U.S., apply 3 quarts per acre as a broadcast spray or apply a 1 percent solution from hand-held equipment for partial control. For best results, treat during late summer or fall months or when plants are actively growing and in full bloom. Treatment before or after this stage may lead to reduced control. Due to the dense nature of the vegetation, which may prevent good spray coverage or uneven stages of growth, repeat treatments may be necessary to maintain control. Visual control symptoms will be slow to develop.

Quackgrass—In Annual Cropping Systems, or in Pastures and Sods Followed by Deep Tillage: Apply 1 to 2 quarts of this product per acre. For the one quart rate, apply 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. For the 2 quart rate, apply in 10 to 40 gallons of water per

acre. Do not tank mix with residual herbicides when using the 1 quart rate. Spray when quackgrass is 6 to 8 inches in height and actively growing. Do not till between harvest and fall applications or in fall or spring prior to spring application. Allow 3 or more days after application before tillage. In pastures or sods, for best results use a moldboard plow.

Quackgrass—Pasture or Sod or Other Noncrop Areas Where Deep Tillage is Not Planned Following Application: Apply 2 to 3 quarts in 10 to 40 gallons of water per acre. Spray when the quackgrass is greater than 8 inches tall and actively growing. Do not till between harvest and fall application or in fall or spring prior to spring application. Allow 3 or more days after application before tillage.

Redvine--For suppression, apply 24 fluid ounces of this product per acre at each of two applications 7 to 14 days apart or a single application of 2 quarts per acre. Apply recommended rates in 5 to 10 gallons of water per acre plus 0.5 to 1 percent nonionic surfactant by total volume. Apply to actively growing plants in late September or early October, which are at least 18 inches tall and have been growing 45 to 60 days since the last tillage operation. Make applications at least one week before a killing frost.

Reed, giant—For control of giant reed, apply a 2 percent solution of this product when plants are actively growing. Best results are obtained when applications are made in late summer to fall.

Smartweed, swamp--Apply 3 to 5 quarts of this product per acre when plants are actively growing and most have reached the early bud stage of growth. Allow 7 or more days after application before tillage.

Also for control, apply 16 fluid ounces of this product plus 0.5 pound active ingredient of 2,4-D plus 0.5 to 1 percent nonionic surfactant by total volume in 3 to 10 gallons of water per acre in the late summer or fall. Apply when plants are actively growing and most have reached the early bud stage of growth. Allow 7 or more days after application before tillage.

Spurge, leafy--For suppression, apply 16 fluid ounces of this product plus 0.5 pound active ingredient 2,4-D plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre in the late summer or fall. Apply when plants are actively growing. If mowing has occurred prior to treatment, apply when most of the plants are 12 inches tall. Allow 7 or more days after application before tillage.

Sweet Potato, wild—Apply this product as a 2 percent solution using hand-held equipment. Apply to actively growing weeds that are at or beyond the bloom stage of growth. Repeat applications will be

required. Allow the plant to reach the recommended stage of growth before retreatment. Allow 7 or more days before tillage.

Thistle, Canada—Apply 2 to 3 quarts of this product per acre. Apply to actively growing thistles when most are at or beyond the bud stage of growth. After harvest, mowing or tillage in the late summer or fall, allow at least 4 weeks for initiation of active growth and rosette development prior to the application of this product. Fall treatments must be applied before a killing frost. Allow 3 or more days after application before tillage.

For suppression of Canada thistle, apply 1 quart per acre of this product, or 1 pint of this product plus 0.5 pound a.i. 2,4-D per acre, plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre in the late summer or fall after harvest, mowing or tillage. Allow rosette regrowth to a minimum of 6 inches in diameter before treating. Applications can be made as long as leaves are still green and plants are actively growing at the time of application. Allow 3 or more days after application before tillage.

Torpedograss—Apply 4 to 5 quarts of this product per acre to provide partial control of torpedograss. Apply to actively growing torpedograss when most plants are at or beyond the seedhead stage of growth. Repeat applications will be required to maintain control. Fall treatments must be applied before frost. Allow 7 or more days after application before tillage.

Trumpetcreeper--For control, apply 2 quarts of this product per acre in 5 to 10 gallons of water per acre. Apply to actively growing plants in late September or October, which are at least 18 inches tall and have been growing 45 to 60 days since the last tillage operation. Make applications at least 1 week before a killing frost.

Other perennials listed on this label—Apply 3 to 5 quarts of this product per acre. Apply when actively growing and most have reached early head or early bud stage of growth. Allow 7 or more days after application before tillage.

WOODY BRUSH AND TREES

When applied as recommended under the conditions described, this product CONTROLS or PARTIALLY CONTROLS the following woody brush, plants and trees:

Alder
Alnus spp.

Ash*
Fraxinus spp.

Aspen, quaking
Populus tremuloides

Bearmat (Bearclover)
Chamaebatia foliolosa

Birch
Betula spp.

Blackberry
Rubus spp.

Broom:
French
Cytisus monspessulanus

Scotch
Cytisus scoparius

Buckwheat, California*
Eriogonum fasciculatum

Cascara*
Rhamnus purshiana

Catsclaw*
Acacia greggi

Ceanothus*
Ceanothus spp.

Chamise
Adenostoma fasciculatum

Cherry:

Bitter
Prunus emarginata

Black
Prunus serotina

Pin
Prunus pensylvanica

Coyote brush
Baccharis consanguinea

Creeper, Virginia*
Parthenocissus quinquefolia

Dewberry
Rubus trivialis

Elderberry
Sambucus spp.

Elm*
Ulmus spp.

Eucalyptus, Bluegum
Eucalyptus glotulus

Hasardia*
Haplopappus squamosus

Hawthorn
Crataegus spp.

Hazel
Corylus spp.

Honeysuckle
Lonicera spp.

Kudzu
Pueraria lobata

Locust, black*
Robinia pseudoacacia

Madrone
Arbutus menziesii

Manzanita
Arctostaphylos spp.

Maple:

Red**
Acer rubrum

Sugar
Acer saccharum

Vine*
Acer circinatum

Monkey Flower*
Mimulus guttatus

Oak:

Black*
Quercus velutina

Northern Pin
Quercus palustris

Post
Quercus stellata

Red
Quercus rubra

Southern Red
Quercus falcata

White*
Quercus alba

Persimmon*
Diospyros spp.

Poison Ivy
Rhus radicans

Poison Oak
Rhus toxicodendron

Poplar*, yellow
Liriodendron tulipifera

Raspberry
Rubus spp.

Rose, multiflora
Rosa multiflora

Russian-olive**
Elaeagnus angustifolia

Sage, black
Salvia mellifera

Sagebrush, California
Artemisia californica

Salmonberry
Rubus spectabilis

Sassafras
Sassafras aibidum

Sourwood
Oxydendrum arboreum

Sumac:
Poison*
Rhus vernix

Smooth*
Rhus glabra

Winged*
Rhus copallina

Sweetgum
Liquidambar styraciflua

Swordfern*
Polystichum munitum

Tallowtree, Chinese
Sapium sebiferum

Tan Oak
Lithocarpus densiflorus

Thimbleberry
Rubus parviflorus

Tobacco, tree*
Nicotiana glauca

Trumpetcreeper
Campsis radicans

Willow
Salix spp.

* Partial control
** See below for control or partial control instructions.
*** This product is not registered in California for use on Russian-olive.

NOTE: If brush has been mowed or tilled or trees have been cut, do not treat until regrowth has reached the recommended stages of growth.

Apply this product when plants are actively growing and, unless otherwise directed, after full leaf expansion. Use the higher rate for larger plants and/or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage of

growth. Best results are obtained when application is made in late summer or fall after fruit formation.

In arid areas, best results are obtained when application is made in the spring to early summer when brush species are at high moisture content and are flowering.

Ensure thorough coverage when using hand-held equipment. Symptoms may not appear prior to frost or senescence with fall treatments.

Allow 7 or more days after application before tillage, mowing or removal. Repeat treatments may be necessary to control plants regenerating from underground parts or seed. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Reduced performance may result if fall treatments are made following a frost.

See ''Directions for Use'', and ''Mixing, Additives, and Application Instructions'' sections of this label for labeled uses and specific application instructions.

Apply this product as follows to control or partially control the following woody brush and trees.

Alder/Dewberry/Honeysuckle/Post Oak/Raspberry–For control, apply 3 to 4 quarts per acre of this product as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment.

Aspen, quaking/Cherry: bitter, black, pin/Hawthorn /Oak, southern red/Sweetgum/Trumpetcreeper– For control, apply 2 to 3 quarts of this product per acre as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment.

Birch/Elderberry/Hazel/Salmonberry/ Thimbleberry–For control, apply 2 quarts per acre of this product as a broadcast spray or as a 1 percent solution with hand-held equipment.

Blackberry–For control, apply 3 to 4 quarts per acre of this product as a broadcast spray, or 1 to 1½ percent solution with hand-held equipment. Make application after plants have reached full leaf maturity. Best results are obtained when applications are made in late summer or fall. After berries have set or dropped in late fall, blackberry can be controlled by applying a 3/4 percent solution of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume with hand-held equipment. For control of blackberries after leaf drop and until killing frost or as long as stems are green, apply 3 to 4 quarts of this product in 10 to 40 gallons of water per acre.

Broom: French, Scotch–For control, apply a 1½ to 2 percent solution with hand-held equipment.

Buckwheat, California/Hasardia/Monkey Flower/ Tobacco, tree—For partial control of these species, apply a 1 to 2 percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.

Catsclaw—For partial control, apply as a 1 to 1½ percent solution with hand-held equipment.

Coyote Brush—For control, apply a 1½ to 2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Eucalyptus/Bluegum—For control of eucalyptus resprouts, apply a 2 percent solution of this product with hand-held equipment when resprouts are 6 to 12 feet tall. Ensure complete coverage. Apply when plants are growing actively. Avoid application to drought-stressed plants.

Kudzu—For control, apply 4 quarts of this product per acre as a broadcast spray or as a 2 percent solution with hand-held equipment. Repeat applications will be required to maintain control.

Madrone resprouts—For suppression or partial control, apply a 2 percent solution of this product to resprouts less than 3 to 6 feet tall. Best results are obtained with spring/early summer treatments.

Maple, red**—For control, apply as a 1 to 1½ percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed. For partial control, apply 2 to 4 quarts of this product per acre as a broadcast spray.

Maple, sugar/Oak, northern pin/Oak red—For control, apply as a 1 to 1½ percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Poison Ivy/Poison Oak—For control, apply 4 to 5 quarts of this product per acre as a broadcast spray or as a 2 percent solution with hand-held equipment. Repeat applications may be required to maintain control. Fall treatments must be applied before leaves lose green color.

Rose, multiflora—For control, apply 2 quarts of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment. Treatments should be made prior to leaf deterioration by leaf-feeding insects.

Sage, black/Sagebrush, California/Chamise/Tallowtree, Chinese—For control of these species, apply a 1 percent solution of this

product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.

Tan oak resprouts—For suppression or partial control, apply a 2 percent solution of this product to resprouts less than 3 to 6 feet tall. Best results are obtained with fall applications.

Willow—For control, apply 3 quarts of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment.

Other Woody Brush and Trees listed on this label—For partial control, apply 2 to 4 quarts of this product per acre as a broadcast spray or as a 1 to 2 percent solution with hand-held equipment.

NONCROP USES

See ''General Information'' and ''Mixing, Additives and Application Instructions'' sections of this label for essential product performance information and the following ''Noncrop'' sections for specific recommended uses.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF SPRAY WITH FOLIAGE OF DESIRABLE TURFGRASSES, TREES, SHRUBS, OR OTHER DESIRABLE VEGETATION SINCE SEVERE DAMAGE OR DESTRUCTION MAY RESULT.

NOTE: If spraying areas adjacent to desirable plants,use a shield made of cardboard, sheet metal or plyboard while spraying to help prevent spray from contacting foliage of desirable plants.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seeds.

This product does not provide residual weed control. For subsequent weed control, follow a label-approved herbicide program.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

INDUSTRIAL, RECREATIONAL AND PUBLIC AREAS

When applied as directed for ''Noncrop Uses'', under conditions described, this product controls annual and perennial weeds listed on this label growing in areas such as airports, ditch banks, dry ditches, dry canals, fencerows, golf courses, highways, industrial plant sites, lumber yards, parking areas, parks, petroleum tank farms and pumping installations, pipelines, power and telephone rights-of-way, railroads, roadsides, schools, storage areas, other public areas and similar industrial or noncrop areas.

For specific rates of application and instructions for control of various annual and perennial weeds and woody brush and trees, see the ''Weeds Controlled'' section of this label.

This product may be applied with recirculating sprayers, shielded applicators, or wiper applicators in any noncrop site specified on this label. See the ''Selective Equipment part of ''Application Equipment and Techniques'' section of this label for information on proper use and calibration of this equipment.

■ **TANK MIXTURES FOR** ■

MON 52249 plus OUST™

Use on industrial sites including airports, industrial plants, lumberyards, petroleum tank farms, pumping stations, pipelines, railroads, roadsides, storage areas or other similar sites where bare ground is desired.

This tank mixture may also be used as a site preparation treatment for sites to be planted to jack pine, loblolly pine, red pine, slash pine and Virginia pine.

When applied as directed for ''Noncrop Uses'' under the conditions described, this product plus Oust provides control of annual weeds listed in the ''Weeds Controlled'' section of the label for this product and Oust, and control or partial control of the perennial weeds listed below.

Apply 1 to 2 quarts of this product with 2 to 4 ounces of Oust in 10 to 40 gallons of spray solution per acre as a broadcast spray to actively growing weeds.

This mixture may be applied by aerial equipment in site prep operations. When applied by air, use the recommended rates in 5 to 15 gallons of spray solution per acre.

This product plus Oust tank mixtures may not be applied by air in California.

For control of annual weeds, use the lower rates of these products.

For control of the listed perennial weeds, use the higher rates of both products. For partial control, use the lower rates.

Bahiagrass
Paspalum notatum

Bermudagrass*
Cynodon dactylon

Broomsedge
Andropogon virginicus

Dock, curly
Rumex crispus

Dogfennel
Eupatorium capilliforium

Fescue, tall
Festuca arundinacea

Johnsongrass**
Sorghum halepense

Poorjoe**
Diodia teres

Quackgrass
Agropyron repens

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

Vervain, blue
Verbena hastata

*Suppression at the higher rates only.

**Control at the lower rates.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

™Oust is a trademark of E. I. du Pont de Nemours and Company.

TANK MIXTURES
NONCROP SITES

When applied as a tank mixture, this product provides control of the emerged annual weeds and partial control of the emerged perennial weeds listed in this label. When applied as a tank mixture, the following residual herbicides will provide preemergence control of the weeds listed in the individual product labels.

MON 52249 plus DIURON

MON 52249 plus KROVAR™ I

MON 52249 plus KROVAR II

MON 52249 plus RONSTAR™ 50WP

MON 52249 plus SIMAZINE,

PRINCEP™ CALIBER™ 90

- MON 52249 plus SIMAZINE 4L
- MON 52249 plus SIMAZINE 80W
- MON 52249 plus SURFLAN™ 75W
- MON 52249 plus SURFLAN AS

When tank mixing with residual herbicides, add an agriculturally approved nonionic surfactant at 0.5 to 1 percent by volume of spray solution. See the ''Mixing, Additives and Application Instructions'' section of this label before preparing these tank mixtures.

Read and carefully observe the label claims, cautionary statements, recommended use rates and all other information on the labels of all products used in these tank mixtures. Use according to the most restrictive label directions for each product in the mixture.

CONTROL OF EMERGED WEEDS

Annual Weeds—Apply 1 quart per acre of this product in these tank mixtures when weeds are less than 6 inches tall and 1½ quarts per acre when weeds are more than 6 inches tall.

Perennial Weeds—For partial control of perennial weeds using these tank mixtures, apply 2 to 5 quarts per acre of this product. Follow the recommendations in the ''Weeds Controlled'' section of this label for stage of growth and rate of application for specific perennial weeds.

PREEMERGENCE WEED CONTROL

For preemergence weed control, refer to the individual product labels for specific noncrop sites, rates, carrier volumes and precautionary statements.

Mix only the quantity of spray solution which can be used during the same day. Do not allow these tank mixtures to stand overnight as this may result in reduced weed control.

APPLY THESE TANK MIXTURES THROUGH CONVENTIONAL BROADCAST EQUIPMENT ONLY.

™Princep and Caliber are trademarks of Ciba-Geigy Corporation.

™Krovar is a trademark of E.I. du Pont de Nemours and Company.

™Ronstar is a trademark of Rhone-Poulenc, Inc.

™Surflan is a trademark of Elanco Products Company.

FARMSTEAD WEED CONTROL

When applied as directed for ''Noncrop Uses'', under conditions described, this product controls undesirable vegetation listed on this label around farmstead building foundations, along and in fences, shelterbelts, and for general nonselective farmstead weed control.

For specific rates of application and instructions for control of various annual and perennial weeds, see the 'Weeds Controlled'' section of this label.

ORNAMENTALS

THIS PRODUCT IS NOT RECOMMENDED FOR USE AS AN OVER-THE-TOP BROADCAST SPRAY IN ORNAMENTALS.

When applied as instructed for the conditions described for "Noncrop Uses", this product controls undesirable vegetation listed on this label prior to planting ornamentals, within and around greenhouses and shadehouses, and as a postdirected spray around established ornamentals.

For specific rates of application and instructions for control of various annual and perennial weeds, see the ''Weeds Controlled'' section of this label.

Where repeat applications are necessary, do not exceed 10.6 quarts of this product per acre per year.

Site Preparation—Following preplant applications of this product, any ornamental species may be planted. Precautions should be taken to protect nontarget plants during site preparation applications.

Greenhouse/Shadehouse Use—This product may be used to control weeds listed on this label which are growing in greenhouses. Desirable vegetation must not be present during application and air circulation fans must be turned off.

Postdirected Spray—Use as a postdirected spray around established woody ornamentals species such as those listed below. Care must be exercised to avoid contact of spray, drift or mist with foliage of or green bark of established ornamental species.

Arborvitae
Thuja spp.

Azalea
Rhododendron spp.

Boxwood
Buxus spp.

Crabapple
Malus spp.

Euonymus
Euonymus spp.

Fir
Abies spp.
Pseudotsuga spp.

Jojoba
Simmondsia chinensis

Hollies
Ilex spp.

Lilac
Syringa spp.

Magnolia
Magnolia spp.

Maple
Acer spp.

Oak
Quercus spp.

Privet
Ligustrum spp.

Pine
Pinus spp.

Spruce
Picea spp.

Yew
Taxus spp.

RIGHTS-OF-WAY
and CHRISTMAS TREES

NOTE: NOT RECOMMENDED FOR USE AS AN OVER-THE-TOP BROADCAST SPRAY IN SILVICULTURAL NURSERIES, OR CHRISTMAS TREE PLANTATIONS.

When applied as directed for ''Noncrop Uses'' under conditions described, this product controls undesirable vegetation listed on this label. This product also suppresses or controls undesirable vegetation listed on this label when applied at recommended rates for release of established coniferous species listed on this label.

For specific rates of application and instructions for control of various brush, annual and perennial weeds, see the ''Weeds Controlled'' section of this label. For specific rates of application for release of listed coniferous species, see the ''Conifer Release'' part of this section of the label.

Where repeat applications are necessary, do not exceed 10.6 quarts of this product per acre per year.

Aerial Application—This product may be applied using aerial spray equipment for silvicultural site preparation, conifer release and rights-of-way treatments. See the ''Application Equipment and Techniques'' part of the ''Mixing, Additives and Application Instructions'' section of this label for information on how to apply this product by air.

DO NOT APPLY THIS PRODUCT BY AIR TO RIGHTS-OF-WAY SITES IN THE STATE OF CALIFORNIA.

In order to reduce the aerial application drift hazard to aquatic sites*, to nontarget sites, or any site containing desirable vegetation, always maintain appropriate buffer zones. A buffer zone of the following minimum distances should be maintained:

- Helicopters using a Microfoil™ boom, a Thru-Valve™ boom (TVB-45), or equivalent drift control systems, should maintain at least a 50-foot buffer zone.
- When using other aerial equipment:

1. Maintain at least a 75-foot buffer zone for applications using 2 quarts or less per acre of this product.
2. Maintain at least a 125-foot buffer zone for applications using more than 2 quarts per acre of this product.
3. Maintain at least a 400-foot buffer zone for applications on rights-of-way when applied from 75 feet or more above ground level.

These distances should be increased if conditions favoring drift exist.

* Aquatic sites include all lakes, ponds, and streams used for significant domestic purposes or angling.

"Microfoil is a trademark of Union Carbide Agricultural Products, Inc.

"Thru-Valve is a trademark of Waldrum Specialties, Inc.

SITE PREPARATION

Following preplant applications of this product, any silvicultural species may be planted.

POSTDIRECTED SPRAY

In established silvicultural sites, use as a spray on the foliage of undesirable vegetation. Care must be exercised to avoid contact of spray, drift or mist with foliage or green bark of desirable species.

CONIFER RELEASE

For release, apply only where conifers have been established for more than one year. Vegetation should not be disturbed prior to treatment or until visual symptoms appear after treatment. Symptoms of treatment are slow to appear, especially in woody species treated in late fall. Injury may occur to conifers treated for release, especially where spray patterns overlap or the higher rates are applied or when applications are made during periods of active conifer growth. **Do not use additional surfactant with conifer release applications.**

Applications must be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in spring. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Use the following rates for conifer release to control or partially control the weeds listed in the ''Weeds Controlled'' section of this label.

For release of the following conifer species:

Douglas fir
Pseudotsuga menziesii

Fir
Abies spp.

Hemlock
Tsuga spp.

Pines*
Pinus spp.

Spruce
Picea spp.

* Includes all species except eastern white pine, loblolly pine or slash pine.

Apply 1½ to 2 quarts of this product per acre except in Washington and Oregon, west of the crest of the Cascade Mountains. For spring treatments west of the crest of the Cascade Mountains, apply 1 quart of this product per acre before conifer bud swell for control of annual weeds. For fall treatments in Washington and Oregon, west of the crest of the Cascade Mountains, apply 1 to 1½ quarts of this product per acre before any major leaf drop of deciduous species.

For release of western hemlock, apply 1 quart of this product per acre.

For release of the following conifer species:

Loblolly pine
Pinus taeda

Eastern white pine
Pinus strobus

Slash pine
Pinus elliottii

Late Season Application—Apply 1½ to 2 quarts of this product in a minimum of 5 gallons of spray solution per acre during early autumn. Applications made prior to September 1 or when conditions are conducive to rapid growth of conifers will create the potential for increased injury in the form of tip and/or needle burn. Injury may decrease with later applications. Some autumn colors are acceptable at time of application. Apply prior to frost or leaf drop of undesirable plants. Applications made according to label directions will release loblolly pine, eastern white pine and slash pine by reducing competition from the following species:

Ash
Fraxinus spp.

Cherry:
Black

Prunus serotina

Pin
Prunus pensylvanica

Elm
Ulmus spp.

Hawthorn
Crataegus spp.

Locust, black
Robina pseudoacacia

Maple, red
Acer rubra

Oak:
Black
Quercus velutina

Post
Quercus stellata

Southern Red
Quercus falcata

White
Quercus alba

Persimmon
Diospyros spp.

Poplar, yellow
Liriodendron tulipfera

Sassafras
Sassafras albidum

Sourwood
Oxydendrum arboreum

Sumac:
Poison
Rhus vernix

Smooth
Rhus glabra

Winged
Rhus copallina

Sweetgum
Liquidambar styraciflua

Apply only to those sites where woody brush and trees listed in this label constitute the majority of the undesirable species.

MON 52249 plus Oust Tank Mixtures for Conifer Release from Herbaceous Weeds

To release **loblolly pines** from herbaceous weeds, tank mixtures of this product with Oust will provide control of annual weeds listed in the ''Weeds Controlled'' section of this and the Oust label, and partial control of the perennial weeds listed below.

Apply 16 to 24 fluid ounces of this product with 2 to 4 ounces of Oust in 10 to 30 gallons of spray solution per acre. Make application to actively growing weeds as a broadcast spray over the top of the young loblolly pines.

This product plus Oust tank mixtures may not be applied by air in California.

This tank mixture may be applied using aerial equipment. When applying by air, use the recommended rate in 5 to 15 gallons of spray solution per acre.

For control of annual weeds below 12 inches in height (or runner length on annual vines), use the low rates of both products. Use the higher rates of both products when annual weeds are in more advanced stages of growth and approaching flower or seed formation.

Use the higher rates of both products for partial control of the following perennial weeds. Use the lower rates for suppression of growth.

Bahiagrass
Paspalum notatum

Broomsedge
Andropogon virginicus

Dock, curly
Rumex crispus

Dogfennel
Eupatorium capilliforium

Fescue, tall
Festuca arundinacea

Johnsongrass**
Sorghum halepense

Poorjoe**
Diodia teres

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

Vervain, blue
Verbena hastata

*Suppression at the higher rates only.

**Control at the higher rates.

Pine damage may occur or can be accentuated if treatment takes place when young trees are under stress from drought, flood water, insects or disease.

Read and observe the cautionary statements and all other information appearing on the label of all herbicides used.

NOTE TO USER

This product must not be used in areas where adverse impact on Federally designated endangered/threatened plant or aquatic species is likely.

Prior to making applications, the user of this product must determine that no such species are located in or immediately adjacent to the area to be treated.

CUT STUMP TREATMENTS

Woody vegetation may be controlled by treating freshly cut stumps of trees and resprouts with this product. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut vegetation close to the soil surface. Apply a 50 to 100 percent solution of this product to the freshly cut surface immediately after cutting. Delays in application may result in reduced performance. For best results, applications should be made during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will CONTROL, PARTIALLY CONTROL or SUPPRESS many types of woody brush and tree species, some of which are listed below:

Alder
Alnus spp.

Eucalyptus/Bluegum
Eucalyptus glotulus

Madrone
Arbutus menziesii

Oak
Quercus spp.

Reed, giant
Arundo donax

Saltcedar
Tamarisk spp.

Sweetgum
Liquidambar styraciflua

Tan Oak
Lithocarpus densiflorus

INJECTION AND FRILL APPLICATIONS

Woody vegetation may be controlled by injection or frill application of this product. Apply this product using suitable equipment which must penetrate into the living tissue. Apply the equivalent of 1 ml of this product per each 2 to 3 inches of trunk diameter (DBH). This is best achieved by applying 50 to 100 percent concentration of this material either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying diluted material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frill or cut areas in species that exude sap freely after frills or cutting. In species such as this, make frill or cut at an oblique angle so as to produce a cupping effect and use undiluted material. For best results, application should be made during periods of active growth and after full leaf expansion.

This treatment WILL CONTROL the following woody species:

Oak
Quercus spp.

Poplar

Populus spp.

Sweetgum
Liquidambar styraciflua

Sycamore
Platanus occidentalis

This treatment WILL SUPPRESS the following woody species:

Black gum
Nyssa sylvatica

Dogwood
Cornus spp.

Hickory
Carya spp.

Maple, red
Acer rubrum

TURFGRASSES AND GRASSES FOR SEED PRODUCTION

PREPLANT AND RENOVATION

When applied as directed for ''Noncrop Uses'', under conditions described, this product controls most existing vegetation prior to the planting or renovation of either turfgrasses or grass seed production areas.

For specific rates of application and instructions for control of various annual and perennial weeds, and woody brush and trees, see the ''Weeds Controlled'' section of this label.

For maximum control of existing vegetation, delay planting to determine if any regrowth from escaped underground plant parts occurs. Where repeat treatments are necessary, sufficient regrowth must be attained prior to application. For warm-season grasses, such as bermudagrass, summer or fall applications provide best control.

DO NOT DISTURB SOIL OR UNDERGROUND PLANT PARTS BEFORE TREATMENT. Tillage or renovation techniques such as vertical mowing, coring or slicing should be delayed for 7 days after application to allow proper translocation into underground plant parts.

TURFGRASSES

Where existing vegetation is growing in a field or unmowed situation, apply this product to actively growing weeds at the stages of growth given in the ''Weeds Controlled'' section of this label.

Where existing vegetation is growing under mowed turfgrass management, apply this product after omitting at least one regular mowing to allow sufficient growth for good interception of the spray.

Desirable turfgrasses may be planted following the above procedures.

GRASSES FOR SEED PRODUCTION

Apply this product to actively growing weeds at the stages of growth given in the ''Weeds Controlled'' section of this label prior to planting or renovation of turf or forage grass areas grown for seed production.

DO NOT feed or graze treated areas within 8 weeks after application.

ANNUAL WEED CONTROL IN DORMANT BERMUDAGRASS AND BAHIAGRASS TURF

When applied as directed for ''Noncrop Uses'' under the conditions described, this product will provide control or suppression of many winter annual weeds and tall fescue for effective release of dormant bermudagrass and bahiagrass turf. Refer to the rate table for Roundup alone under the ''Release of Bermudagrass and Bahiagrass'' section of this label for recommended rates and volumes on the species to be suppressed or controlled. Treat only when turf is dormant and prior to spring greenup. Spot treatments or broadcast applications of this product in excess of 16 fluid ounces per acre may result in injury or delayed greenup in highly maintained turfgrass areas; i.e., golf courses, lawns, etc. DO NOT APPLY TANK MIXTURES of this product plus Oust in highly maintained turfgrass areas.

RELEASE OF BERMUDAGRASS OR BAHIAGRASS

NOTE: Use only in areas where bermudagrass or bahiagrass are desirable ground covers and where some temporary injury or discoloration can be tolerated. Use tank mixtures of this product plus Oust only on railroads, highways, utility plant sites, or other right-of-way areas.

When applied as directed for ''Noncrop Uses'' under the conditions described, this product will provide control or suppression of many winter annual weeds and tall fescue for effective release of dormant bermudagrass or bahiagrass. This product may be tank-mixed with Oust as recommended for residual control. Make applications to dormant bermudagrass or bahiagrass. Tank mixtures of this product plus Oust may delay greenup. To avoid delays in greenup and minimize injury, do not add more than 1 ounce per acre of Oust on bermudagrass or more than ½ ounce per acre on bahiagrass, or treat when these grasses are in a semi-dormant condition.

For best results on winter annuals, treat when plants are in an early growth stage (below 6 inches in height) after most have germinated. For best results on tall fescue, treat when fescue is in or beyond the 4 to 6-leaf stage.

WEEDS CONTROLLED

Rate recommendations for control or suppression of winter annuals and tall fescue are listed below:

Apply the recommended rates of this product alone or as a tank mixture in 10 to 25 gallons of water, plus 0.5 to 1 percent nonionic surfactant by total spray volume per acre.

For the best recommendation for the mixture of weeds within your geographic areas, contact your Monsanto sales representative.

WEEDS CONTROLLED OR SUPPRESSED WITH MON 52249 ALONE*

NOTE: C = Control
S = Supression

	MON 52249 FLUID OZ/ACRE					
WEED SPECIES	8	12	16	24	32	64
Barley, little *Hordeum pusilium*	S	C	C	C	C	C
Bedstraw, catchweed *Galium aparine*	S	C	C	C	C	C
Bluegrass, annual *Poa annua*	S	C	C	C	C	C

Chervil *Chaerophyllum tainturieri*	S	C	C	C	C	C
Chickweed, common *Stellaria media*	S	C	C	C	C	C
Clover, crimson *Trifolium incarnatum*	•	S	S	C	C	C
Clover, large hop *Trifolium campestre*	•	S	S	C	C	C
Fescue, tall *Festuca arundinaceae*	•	•	•	•	S	S
Geranium, Carolina *Geranium carolinianum*	•	•	S	S	C	C
Henbit *Lamium amplexicaule*	•	S	C	C	C	C
Ryegrass **Italian** *Lolium multiflorum*	•	•	S	C	C	C
Speedwell, corn *Veronica arvensis*	S	C	C	C	C	C
Vetch, common *Vicia sativa*	•	•	S	C	C	C

* These rates apply only to sites where an established competitive turf is present.

WEEDS CONTROLLED OR SUPPRESSED
WITH MON 52249 PLUS OUST*

NOTE: C = Control
S = Suppression

	MON 52249 + OUST							
WEED SPECIES / MON 52249 (FL. OZ/A) + OUST (OZ/A)	+ ¼	8 + ¼	12 + ½	12 + ¼	16 + ½	16 + 1	12 + 1	5
Barley, little *Hordeum pusilium*	C	C	C	C	C	C	C	

Bedstraw, catchweed *Galium aparine*	C	C	C	C	C	C	C
Bluegrass, annual *Poa annua*	S	C	C	C	C	C	C
Chervil *Chaerophyllum tainturieri*	C	C	C	C	C	C	C
Chickweed, common *Stellaria media*	S	C	C	C	C	C	C
Clover, crimson *Trifolium incarnatum*	S	S	S	S	C	C	C
Clover, large hop *Trifolium campestre*	•	•	S	S	S	C	C
Fescue, tall *Festuca arundinaceae*	•	•	•	•	•	S	S
Geranium, Carolina *Geranium carolinianum*	•	S	S	C	C	C	C
Henbit *Lamium amplexicaule*	•	S	C	C	C	C	C
Ryegrass, Italian *Lolium multiflorum*	•	S	S	C	C	C	C
Speedwell, corn *Veronica arvensis*	S	C	C	C	C	C	C
Vetch, common *Vicia sativa*	C	C	C	C	C	C	C

* These rates or mixtures of rates apply only to sites where an established competitive turf is present.

RELEASE OF ACTIVELY GROWING BERMUDAGRASS

When applied as directed, this product will aid in the release of bermudagrass by providing control of annual species listed in the ''Weeds Controlled'' section of this and the Oust label, and suppression or partial control of certain perennial weeds.

For control or suppression of those annual species listed on this label, use 1 to 3 pints of this product as a broadcast spray in 10 to 25 gallons of spray solution per acre. Use the lower rate when

treating annual weeds less than 6 inches in height (or length of runner in annual vines). Use the higher rate as plant size increases or as they approach flower or seedhead formation.

Use the higher rate of this product for partial control of the following perennial species. Use the lower rates for suppression of growth. For best results, see the ''Weeds Controlled'' section of this label for proper stage of growth.

Bahiagrass
Paspalum notatum

Bluestem, silver
Andropogon saccharoides

Fescue, tall
Festuca arundinacea

Johnsongrass**
Sorghum halepense

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

*Suppression at higher rates only.

**Control at the higher rates.

This product may be tank-mixed with Oust. If tank-mixed, use no more than 1 to 2 pints per acre of this product with 1 to 2 ounces of Oust per acre.

Use the lower rates of both mixtures to control annual weeds less than 6 inches in height (or runner length in annual vines) that are listed in the ''Weeds Controlled'' section of this booklet and the Oust label. Use the higher rates as annual weeds increase in size and approach the flower or seedhead stages.

Use the higher rates of this product to provide partial control of the following perennial weeds. Use the lower rates for suppression of growth.

Bahiagrass
Paspalum notatum

Bluestem, silver
Andropogon saccharoides

Broomsedge
Andropogon virginicus

Dock, curly
Rumex crispus

Dogfennel
Eupatorium capilliforium

Fescue, tall
Festuca arundinacea

Johnsongrass*
Sorghum halepense

Poorjoe**
Diodia teres

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

Vervain, blue
Verbena hastata

*Suppression at higher rates only.

**Control at the higher rates.

Use only on well-established bermudagrass. Bermudagrass injury may result from the treatment but regrowth will occur under moist conditions. Repeat applications in the same season are not recommended, since severe injury may result.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

COOL SEASON TURF
GROWTH REGULATION

When applied as directed, this product will suppress growth and seedhead development of listed turf species in industrial sites.

This product is recommended for management of coarse turf on roadside rights-of-way or other industrial areas. Do not use on high-quality turf or other areas where some turf color changes cannot be tolerated. Slight turf discoloration may occur but turf

will regreen and regrow under moist conditions as effects of this product wear off.

Apply 4 to 6 fluid ounces of this product per acre alone or in a recommended tank mixture. Spray volumes of 10 to 40 gallons per acre are recommended.

When using this product, mix 2 quarts of a nonionic surfactant per 100 gallons of spray solution.

This product can be used for growth and seedhead suppression of:

Tall Fescue
Smooth Brome

For best results, apply this product in a recommended tank mixture to actively growing turfgrasses after greenup in the spring of the year. For suppression of seedheads, applications must be made before boot-to-seedhead stage of development. Applications made from seedhead emergence until maturity may result in turf discoloration or injury.

After mowing or removal of seedheads, this product in a recommended tank mixture may also be used to suppress the growth of certain turfgrasses. Allow turf to recover from stress caused by heat, drought, or mowing before making applications. Applications made to turf under stress may increase the potential for discoloration or injury.

ANNUAL GRASSES

For growth suppression of some annual grasses such as annual ryegrass, wild barley and wild oats, apply 3 to 4 fluid ounces of this product in 10 to 40 gallons of spray solution per acre. Applications should be made when annual grasses are actively growing and before the seedheads are in the boot stage of development. Treatments made after seedhead emergence may cause injury to the desired grasses.

TANK MIXTURES

For the following tank mixtures, consult each product label for weeds controlled and the correct stage of application. Do not treat turf under stress.

Tank mixtures plus 2,4-D Amine

For additional weed control benefits, up to 1 pound a.i. per acre of 2,4-D amine may be added to the following tank mixtures. Consult the label for 2,4-D amine for weeds controlled.

TALL FESCUE

MON 52249 plus Telar™

For suppression of tall fescue growth and seedheads, and control or partial control of some annual weeds, apply this tank mixture after greenup and prior to boot-to-seedhead stage of development. Use up to ½ ounce of Telar per acre.

This tank mixture can also be applied after mowing or removal of tall fescue seedheads for turf growth suppression. Make only one of the above applications per growing season.

MON 52249 plus Oust™

For suppression of tall fescue growth and seedheads, and control or partial control of some annual weeds, apply this tank mixture after greenup and prior to boot-to-seedhead stage of development. Use up to 1/4 ounce of Oust per acre.

MON 52249 plus Escort™

This tank mixture can be applied after mowing or removal of tall fescue seedheads for turf growth suppression and control or partial control of some annual weeds. Use up to 1/3 ounce of Escort per acre.

SMOOTH BROME

MON 52249 plus Oust

For suppression of smooth brome growth and seedheads and control or partial control of some annual weeds, apply this tank mixture after greenup and prior to boot-to-seedhead stage of development. Use up to 1/4 ounce of Oust per acre.

™Escort and Telar are trademarks of E. I. du Pont de Nemours and Company.

BAHIAGRASS SEEDHEAD AND VEGETATIVE SUPPRESSION

When applied as directed in the indicated noncrop areas (roadsides, airports, golf course roughs, and plant sites), this product will provide significant inhibition of seedhead emergence and will suppress vegetative growth for a period of approximately 45 days with single applications and approximately 120 days with sequential applications.

Apply this product 1 to 2 weeks after full greenup of bahiagrass or after the bahiagrass has been mowed to a uniform height of 3 to 4 inches. Applications must be made prior to seedhead emergence. Apply 6 fluid ounces per acre of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 25 gallons of water per acre.

Sequential applications of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume may be made at approximately 45 day intervals to extend the period of seedhead and vegetative growth suppression. For continued seedhead suppression, sequential applications must be made prior to seedhead emergence. Apply no more than 2 sequential applications per year. As a first sequential application, apply 4 fluid ounces of this product per acre plus nonionic surfactant. A second sequential application of 2 to 4 fluid ounces per acre plus nonionic surfactant may be made approximately 45 days after the last application.

A tank mixture of this product plus Oust **may be applied only on roadsides** for seedhead inhibition and vegetative suppression. Apply 6 fluid ounces per acre of this product plus 0.25 ounce per acre of Oust, plus 0.5 to 1 percent nonionic surfactant by total spray volume 1 to 2 weeks following an initial spring mowing. When using this product plus Oust for suppression of bahiagrass, make only one application per year.

CROPPING SYSTEMS

When applied as directed for ''Cropping Systems'', under the conditions described, this product controls annual and perennial weeds listed on this label, prior to the emergence of direct seeded crops or prior to transplanting of crops listed on this label.

See ''General Information'' and ''Mixing, Additives and Application Instructions'' sections of this label for essential product performance information.

See the following ''Cropping Systems'' sections for specific recommended uses.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF SPRAY WITH FOLIAGE, GREEN STEMS OR FRUIT OF DESIRABLE CROPS, PLANTS, TREES OR OTHER DESIRABLE VEGETATION SINCE SEVERE DAMAGE OR DESTRUCTION MAY RESULT.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. Except as otherwise specified on this label, repeat treatments must be made before the crop emerges in accordance with the instructions of this label.

Except as otherwise specified in a crop section of this label, the combined total of all treatments must not exceed 8 quarts per acre of this product per year.

Do not plant subsequent crops other than those on the label for 30 days following application.

Do not harvest or feed treated vegetation for 8 weeks following application. Following spot treatment or selective equipment use, allow 14 days before grazing domestic livestock or harvesting forage grasses and legumes.

ALFALFA*
ARTICHOKE, JERUSALEM
ASPARAGUS*
ATEMOYA
BARLEY*
BEANS (All)
BEET GREENS
BEETS (Red, Sugar)
BLACKBERRY
BLUEBERRY
BOYSENBERRY
BREADFRUIT
BROCCOLI

CABBAGE
CANISTEL
CARAMBOLA
CARROT
CAULIFLOWER
CELERY
CHICORY
CORN (All)*
COTTON*
CRANBERRY
CUCUMBER***
CURRANT
DATES
DEWBERRY
EGGPLANT***
ELDERBERRY
FORAGE GRASSES*
FORAGE LEGUMES*
GARLIC***
GOOSEBERRY
GOURDS***
HORSERADISH
HUCKLEBERRY
JABOTICABA
JACKFRUIT
KALE
LENTILS
LETTUCE
LOGANBERRY
LONGAN
LYCHEE
MELONS***
MUSTARD GREENS
OATS*
OKRA
OLALLIEBERRY
ONION
PARSNIPS
PASSION FRUIT
PEANUTS
PEAS (All)
PEPPER***
PERSIMMONS
PINEAPPLE****
POTATO (Irish, Sweet)
PUMPKIN***
RADISH
RASPBERRY (Black, Red)
RICE**
RUTABAGA
SAPODILLA
SAPOTE (Black, Mamey, White)
SORGHUM (Milo)*
SOURSOP

SOYBEANS*
SPINACH
SQUASH* (Summer, Winter)**
SUGAR APPLE
TAMARIND
TOMATILO*
TOMATOES*†**
TURNIPS
WATERMELON*
WATERCRESS*
WHEAT*
YAMS

* Spot treatments may be applied in these crops.

** Do not treat rice fields or levees when the fields contain flood water.

*** Apply only prior to planting. Allow at least 3 days between application and planting.

****Do not feed or graze treated pineapple forage following application.

† Use is restricted to direct seeded crops only.

When applying this product prior to transplanting crops into plastic mulch, care must be taken to remove residues of this product from the plastic prior to transplanting. Residues can be removed by 1/2 inch natural rainfall or by applying water via a sprinkler irrigation system.

NOTE: This product is not registered in California for use on atemoya, breadfruit, canistel, carambola, jaboticaba, jackfruit, longan, lychee, parsnips, passion fruit, sapodilla, sapote, sugar apples, tamarind, and yams.

Spot Treatment (Only those crops with ''*'' can be spot treated.)—Applications in growing crops must be made prior to heading of small grains and milo, initial pod set in soybeans, silking of corn, or boll opening on cotton.

For forage grasses and forage legumes see ''Spot Treatment'' in the ''Pastures'' section of ''Cropping Systems'' in this label.

For dilution and rates of application using boom or hand-held equipment, see ''Mixing, Additives and Application Instructions'' and ''Weeds Controlled'' sections of this label.

NOTE: FOR FORAGE GRASSES AND FORAGE LEGUMES, NO MORE THAN ONE-TENTH OF ANY ACRE SHOULD BE TREATED AT ONE TIME. FOR ALL OTHER CROPS, DO NOT TREAT MORE THAN 10 PERCENT OF THE TOTAL FIELD AREA TO BE HARVESTED.

THE CROP RECEIVING SPRAY IN TREATED AREA WILL BE KILLED. TAKE CARE TO AVOID DRIFT OR SPRAY OUTSIDE TARGET AREA FOR THE SAME REASON.

Selective Equipment—This product may be applied through recirculating sprayers, shielded applicators, or wiper applicators in cotton and soybeans. Shielded and wiper applicators may also be used in tree crops and grapes. Wiper applicators may be used in rutabagas, forage grasses and forage legumes, including pasture sites and grain sorghum (milo).

See the ''Selective Equipment'' part of the ''Application Equipment and Techniques'' section of this label for information on proper use and calibration of this equipment.

Allow at least the following time intervals between application and harvest:

Cotton, Soybeans .....7 days
Apples, Atemoya, Avocado, Breadfruit, Canistel, Carambola, Cherry, Citrus, Dates, Grapes, Jaboticaba, Jackfruit, Longan, Lychee, Passion Fruit, Pear, Persimmons, Rutabagas, Sapodilla, Sapote, Soursop, Sugar Apple, Tamarind .....14 days
Stone Fruit .....17 days
Nut Crops .....21 days
Sorghum (milo)* .....40 days

* Do not use roller applicators. Do not feed or graze treated milo fodder. Do not ensile treated vegetation.

ASPARAGUS

When applied as directed for ''Cropping Systems'' under the conditions described, this product controls weeds listed on this label in asparagus.

For specific rates of applications and instructions for control of various annual and perennial weeds, see the ''Weeds Controlled'' section of this label.

Prior to Crop Emergence—Apply this product prior to crop emergence for the control of emerged labeled annual and perennial weeds. DO NOT APPLY WITHIN A WEEK BEFORE THE FIRST SPEARS EMERGE.

Spot Treatment—Apply this product immediately after cutting, but prior to the emergence of new spears. Do not treat more than 10 percent of the total field area to be harvested. Do not harvest within 5 days of treatment.

Postharvest—Apply this product after the last harvest and all spears have been removed. If spears are allowed to regrow, delay application until ferns have developed. Delayed treatments should

be applied as directed or shielded spray in order to avoid contact of the spray with ferns, stems or spears. Direct contact of the spray with the asparagus may result in serious crop injury.

NOTE: Select and use recommended types of spray equipment for postemergence postharvest applications. A directed spray is any application where the spray pattern is aligned in such a way as to avoid direct contact of the spray with the crop. A shielded spray is any application where a physical barrier is positioned and maintained between the spray and the crop to prevent contact of spray with the crop.

BERRIES AND SMALL FRUITS

For cranberries, apply after fruit set and no later than 30 days before harvest.

For other berries, apply as a preplant broadcast application, or as a directed spray or wiper application post-planting.

Wiper applicators may be used in cranberries in accordance with instructions in this section.

See ''General Information'' and ''Mixing, Additives and Application Instructions'' sections of this label for essential product performance information.

See the ''Selective Equipment'' part of the ''Application Equipment and Techniques'' section of this label for information on recommended use and calibration of this equipment.

For Wick or other Wiper Applicators-Mix 1 gallon of this product in 4 gallons of water to prepare a 20 percent solution. Apply the solution to emerged weeds. Apply after cranberry fruit set and no later than 30 days before harvest.

In severe infestations, reduce equipment ground speed to ensure that adequate amounts of this product are wiped on the weeds. A second treatment in the opposite direction may be beneficial.

Do not permit herbicide solution to contact desirable vegetation, including green shoots, canes, or foliage.

FALLOW AND REDUCED TILLAGE SYSTEMS

FOR AERIAL APPLICATION IN CALIFORNIA, REFER TO SUPPLEMENTAL LABEL.

Use this product in fallow and reduced tillage systems for control of annual weeds prior to emergence of crops listed in this label. Refer to the ''Weeds Controlled'' section of this label for specific rates and instructions. This product may be applied using

ground or aerial spray equipment. See the ''Application Equipment and Techniques'' section of this label for instructions.

TANK MIXTURES

MON 52249 plus BANVEL plus NONIONIC SURFACTANT

MON 52249 plus 2,4-D plus NONIONIC SURFACTANT

MON 52249 plus GOAL™ plus NONIONIC SURFACTANT

DO NOT APPLY BANVEL, OR 2,4-D TANK MIXTURES BY AIR IN CALIFORNIA.

Applications of 2,4-D or Banvel must be made at least 7 days prior to planting corn. Applications of 2,4-D must be made at least 30 days prior to planting soybeans.

The addition of Banvel in a mixture with this product may provide short-term residual control of selected weed species. Some crop injury may occur if Banvel is applied within 45 days of planting. Refer to the Banvel and 2,4-D labels for cropping restrictions and other use instructions.

MON 52249 plus Goal Tank Mixtures

This product alone or in tank mixtures with Goal plus 0.5 to 1 percent nonionic surfactant by total spray volume will provide control of those weeds listed below.

Make applications when weeds are actively growing and at the recommended stages of growth. Avoid spraying when weeds are subject to moisture stress, when dust is on the foliage or when straw canopy covers the weeds.

MON 52249 12 fluid oz/acre

Wheat	18"*
Barley	12"
Bluegrass, annual	6"
Barnyardgrass	6"
Rye	6"

MON 52249 16 fluid oz/acre

Annual grasses at

left plus:

Ryegrass, annual	6"
Chickweed	6"
Groundsel	6"
Marestail	6"
Rocket, London	6"
Shepherdspurse	6"
Crabgrass	12"
Johnsongrass, seedling	12"
Lambsquarters	12"
Oats, wild	12"
Pigweed, redroot	12"
Mustards	12"

MON 52249 12 fluid oz/acre + GOAL** 2 to 4 fluid oz/acre		MON 52249 16 fluid oz/acre + GOAL** 2 to 4 fluid oz/acre	
Annual grasses above plus:		Annual weeds above plus:	
Cheeseweed, common	3"	Cheeseweed, common	6"
Chickweed	3"	Groundsel	6"
Groundsel	3"	Chickweed	12"
Rocket, London	6"	Rocket, London	12"
Shepherdspurse	6"	Shepherdspurse	12"

* Maximum height or length in inches.
** Use the higher rate when weeds approach maximum recommended height or stands are dense.

These recommended tank mixtures may be applied using ground or aerial spray equipment. Refer to the ''Weeds Controlled'' section of this label for specific rates and instructions.

™Goal is a trademark of Rohm and Haas Company.

ECOFARMING SYSTEMS

The recommendations made in this section are not registered for use in California.

The Ecofarming System consists of the following rotation: winter wheat, corn/sorghum, ecofallow.

Use the following tank mixtures for control of emerged annual weeds before planting corn or sorghum in the Ecofarming System.

MON 52249 at 16 to 20 fluid ounces per acre
plus
2,4-D at 0.375 to 0.5 pound a.i. per acre
plus
ATRAZINE at 0.75 to 1 pound a.i. per acre
plus
LASSO® at 2.5 to 3 quarts per acre

The above tank mixture should be applied in 28-0-0 or 32-0-0 liquid fertilizer carrier at 20 to 30 gallons per acre. The liquid fertilizer may be diluted with water to achieve the required carrier volume.

WEEDS CONTROLLED - The following weeds, up to a maximum height of 4 inches, will be controlled:

Brome, downy
Bromus tectorum

Cheat
Bromus secalinus

Foxtail, green
Setaria viridis

Foxtail, yellow
Setaria lutescens

Kochia*
Kochia scoparia

Lettuce, prickly
Lactuca serriola

Pigweed, redroot
Amaranthus retroflexus

Thistle, Russian
Salsola kali

Wheat, volunteer
Triticum aestivum

*For improved control of kochia, add 4 fluid ounces per acre (0.125 pound a.i. per acre) of Banvel to the above tank mixture.

Risk of crop injury from 2,4-D or Banvel can be reduced by applying this treatment 7 to 14 days before planting.

Refer to the label booklet for Lasso herbicide for preemergence weed control achieved by this tank mixture.

Refer to the specific product labels for crop rotation restrictions and cautionary statements for all products used in these tank mixtures.

®Lasso is a registered trademark of Monsanto Company.

AID TO TILLAGE

This product, when used in conjunction with preplant tillage practices, will provide control of downy brome, cheat, volunteer wheat, tansy mustard and foxtail. Apply 8 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Make applications when weeds are actively growing and before they are 6 inches in height. Application must be followed by conventional tillage practices no later than 15 days after treatment and before regrowth occurs. Allow at least 1 day after application before tillage. Tank mixtures with residual herbicides may result in reduced performance.

PASTURES

Apply this product prior to planting forage grasses and legumes.

Pasture or Hay Crop Renovation—When applied as a broadcast spray, this product controls the annual and perennial weeds listed in this label prior to planting forage grasses or legumes. Remove domestic livestock before application and wait 8 weeks after application before grazing or harvesting.

Spot Treatment—When applied as a spot treatment as recommended, this product controls annual and perennial weeds listed in this label which are growing in pastures, forage grasses and forage legumes composed of bahiagrass, bermudagrass, bluegrass, brome, fescue, orchardgrass, ryegrass, timothy, wheatgrass, alfalfa or clover.

Wiper Application—When applied as directed, this product controls or suppresses the weeds listed under ''Wiper Applicators'' in the ''Selective Equipment'' section of this label.

For spot treatment and wiper application, apply in areas where the movement of domestic livestock can be controlled. No more than one-tenth of any acre should be treated at one time. Further applications may be made in the same area at 30 day intervals. Remove domestic livestock before application and wait 14 days after application before grazing livestock or harvesting.

SUGARCANE

When applied as directed for ''Cropping Systems'', under the conditions described, this product controls those emerged annual

and perennial weeds listed on this label growing in or around sugarcane or in fields to be planted to sugarcane. This product will also control undesirable sugarcane.

NOTE: Where repeat treatments are necessary, do not exceed a total of 10.6 quarts of this product per acre per year. Do not apply to vegetation in or around ditches, canals or ponds containing water to be used for irrigation.

Broadcast Treatment—Apply this product in 10 to 40 gallons of water per acre on emerged weeds growing in fields to be planted to sugarcane.

For specific rates of application and instructions for control of various annual and perennial weeds, see the ''Weeds Controlled'' section of this label.

For removal of last stubble or ratoon cane, apply 4 to 5 quarts of this product in 10 to 40 gallons of water per acre to new growth having at least 7 or more new leaves. Allow 7 or more days after application before tillage.

Spot Treatment in or Around Sugarcane Fields—For dilution and rates of application using hand-held equipment, see ''Mixing, Additives and Application Instructions'' and ''Weeds Controlled'' sections of this label.

For control of volunteer or diseased sugarcane, make a 1 percent solution of this product in water and spray to wet the foliage of vegetation to be controlled.

NOTE: When spraying volunteer or diseased sugarcane, the plants should have at least 7 new leaves.

Avoid spray contact with healthy cane plants since severe damage or destruction may result.

Do not feed or graze treated sugarcane forage following application.

CONSERVATION TILLAGE, MINIMUM TILLAGE AND NO-TILL SYSTEMS
CORN AND SOYBEANS
Tank Mixtures

The recommendations made in this section are not registered for use in California.

When applied as recommended under the conditions described, the tank mixtures listed in this section control many emerged weeds, and give preemergence control of many annual weeds where corn or soybeans will be planted directly into a cover crop, established sod, or in previous crop residues.

Refer to specific product labels for crop rotation restrictions and cautionary statements of all products used in these tank mixtures. For mixing instructions, see the "Mixing, Additives and Application Instructions" section of this label.

Apply these tank mixtures in 10 to 20 gallons of water or 10 to 60 gallons of nitrogen solutions per acre before, during or after planting. Do not apply these mixtures after crop emergence.

When tank mixing with residual herbicides, add an agriculturally approved nonionic surfactant at 0.5 to 1 percent by volume of spray solution. The addition of 1 to 2 percent dry ammonium sulfate by weight may increase the performance of this product.

NOTE: When using these tank mixtures, do not exceed 4 quarts of this product per acre.

CORN

For residual control, this product may be tank-mixed with the following herbicides or combination of herbicides:

LASSO®/ALACHLOR	ATRAZINE
LARIAT®	CYANAZINE
BULLET®	SIMAZINE
DUAL™	PROWL™
BICEP™	

For improved burndown, this product may be tank-mixed with 2,4-D or dicamba. Applications of 2,4-D or dicamba must be made at least 7 days prior to planting corn. See the "Weeds Controlled" section for specific rate information.

SOYBEANS

For residual control, this product may be tank-mixed with the following herbicides or combination of herbicides:

CANOPY™	LOROX™ PLUS
COMMAND™	PREVIEW™
DUAL™	PROWL™
GEMINI™	TURBO™
LASSO®/ALACHLOR	SCEPTER™
LEXONE™	SENCOR™
LINURON	SQUADRON™

For improved burndown, this product may be tank-mixed with the following herbicides:

2,4-DB
2,4-D*

* Applications of 2,4-D must be made at least 30 days prior to planting soybeans. See the "Weeds Controlled" section for specific rate information.

CORN AND SOYBEANS

Annual Weeds--For difficult to control weeds such as fall panicum, barnyardgrass, crabgrass, shattercane and broadleaf signalgrass up to 2 inches tall, and Pennsylvania smartweed up to 6 inches tall, apply this product at 2 pints per acre in these tank mixtures. For other labeled annual weeds, apply 1 to 1.5 pints of this product per acre when weeds are less than 6 inches tall, and 2 to 3 pints when weeds are over 6 inches tall. For a complete list of annual weeds controlled, see the "Weeds Controlled" section of this label.

Perennial Weeds--At normal application times in minimum tillage systems, perennial weeds may not be at the proper stage of growth for control. See the "Weeds Controlled" section of this label for the proper stage of growth for perennial weeds.

Use of 2 to 4 quarts of this product per acre in the tank mixtures mentioned above, under these conditions provides top kill and reduces competition from many emerged perennial grass and broadleaf weeds. For emerged perennial weeds controlled, see the "Weeds Controlled" section of this label.

To obtain the desired stage of growth, it may be necessary to apply this product alone in the late summer or fall and then follow with a label-approved, seedling weed control program at planting.

USE OF THESE TANK MIXTURES FOR BERMUDAGRASS OR JOHNSONGRASS CONTROL IN MINIMUM TILLAGE SYSTEMS IS NOT RECOMMENDED. For bermudagrass control, follow the instructions under "Control of Perennial Weeds" section of this label and then use a label-approved, seedling weed-control program in a minimum tillage or conventional tillage system. For johnsongrass control, follow instructions under "Control of Perennial Weeds" section of this label, and then use a label approved seedling weed control program with conventional tillage.

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™Sencor and Turbo are trademarks of Bayer AG.
™Prowl, Scepter and Squadron are trademarks of American Cyanamid Company.
™Command is a trademark of FMC Corporation.

PREHARVEST APPLICATIONS

COTTON

When applied as directed under the conditions described, this product controls annual and perennial weeds listed on this label prior to the harvest of cotton.

Broadcast Applications--This product may be applied using either aerial or ground spray equipment. For ground applications with broadcast equipment, apply this product in 10 to 20 gallons of water per acre. For aerial applications, apply this product in 3 to 10 gallons of water per acre.

FOR AERIAL APPLICATIONS, REFER TO THE "APPLICATION EQUIPMENT AND TECHNIQUES" AND "AERIAL EQUIPMENT" SECTIONS OF THIS LABEL.

FOR AERIAL APPLICATIONS IN CALIFORNIA, REFER TO THE FEDERAL SUPPLEMENTAL LABEL FOR AERIAL APPLICATIONS IN THAT STATE FOR SPECIFIC INSTRUCTIONS, RESTRICTIONS AND REQUIREMENTS.

DO NOT EXCEED A MAXIMUM RATE OF 1 QUART PER ACRE OF THIS PRODUCT WHEN MAKING APPLICATIONS BY AIR.

Weed Control--For specific rates of application and instructions for control of various annual and perennial weeds for this product used alone or in the following tank mixtures, see the "Weeds Controlled" section of this label.

To control johnsongrass using multiple directed or broadcast over the top spray equipment, apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 20 gallons of water per acre. Ensure complete coverage.

For partial control of field bindweed, apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 20 gallons of water per acre. Apply when bindweed is actively growing and 12 inches or greater in length. Reduced performance may result if bindweed is under drought stress.

TANK MIXTURES

MON 52249 plus Def™ 6
MON 52249 plus Folex™
MON 52249 plus Prep™
MON 52249 plus Prep plus Def 6 or Folex

When applied as recommended under the conditions described, these tank mixtures control annual and perennial weeds listed on this label prior to the harvest of cotton. For application guidelines, precautions and use-rates, refer to the Def, Folex and Prep labels.

This product when tank mixed with DEF 6 or Folex defoliants may provide enhancement of cotton leaf drop and regrowth inhibition.

Timing of Application--Apply this product or these tank mixtures for preharvest weed control after 60 percent of the cotton bolls have opened.

NOTE: DO NOT APPLY TO CROPS GROWN FOR SEED. Allow a minimum of 7 days between application and harvest. Do not feed or graze treated cotton forage or hay following preharvest applications.

™Def is a trademark of Mobay Chemical Company.
™Folex and Prep are trademarks of Rhone-Poulenc, Inc.

TREE AND VINE CROPS

This product is recommended for weed control in established groves, vineyards, or orchards, or for site preparation prior to transplanting crops listed in this section. Applications may be made with boom equipment, CDA, shielded sprayers, hand-held and high-volume wands, lances, or orchard guns, or with wiper applicator equipment, except as directed in this section. See the "Application Equipment and Techniques" section of this label for specific information on use of equipment.

When applying this product, refer to the "Weeds Controlled" section of this label and to specific recommendations in this section for rates to be used.

NOTE

Repeat treatments may be necessary to control weeds originating from underground parts of untreated weeds or from seeds. This product does not provide residual weed control. For subsequent weed control, use repeated applications of this product. Do not apply more than 10.6 quarts of this product per acre per year.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF HERBICIDE SOLUTION, SPRAY, DRIFT, OR MIST WITH FOLIAGE OR GREEN BARK OF TRUNK, BRANCHES, SUCKERS, FRUIT, OR OTHER PARTS OF TREES OR VINES. CONTACT OF THIS PRODUCT WITH OTHER THAN MATURED BROWN BARK CAN RESULT IN SERIOUS CROP DAMAGE.

AVOID PAINTING OUT STUMPS WITH THIS PRODUCT AS INJURY RESULTING FROM ROOT GRAFTING MAY OCCUR IN ADJACENT TREES.

Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed or cut and have not been allowed to regrow to the recommended stage for treatment.

For specific rates of applications and instructions, see the "Weeds Controlled" section of this label, and to specific recommendations which follow.

MIDDLES MANAGEMENT

FOR ANNUAL WEEDS IN MIDDLES BETWEEN ROWS OF TREE AND VINE CROPS

For citrus crops treat uniformly between trees.

MON 52249
MON 52249 plus GOAL™

This product alone or in mixtures with Goal will control or suppress the annual weeds listed below.

Apply the recommended rates of this product, either alone or in mixtures with Goal, plus 0.5 to 1 percent nonionic surfactant by spray volume in 3 to 10 gallons of water per acre. Apply when weeds are actively growing and less than 6 inches in height or diameter. If weeds are under drought stress, irrigate prior to application. Reduced control may occur if weeds have been mowed prior to application. Up to 48 fluid ounces per acre of this product may be used to control weeds which have been mowed, are stressed, or are growing in dense populations.

WEED SPECIES	MAXIMUM HEIGHT/DIAMETER (INCHES)	RATE PER ACRE MON 52249 (FLUID OUNCES)		RATE PER ACRE GOAL (FLUID OUNCES)
Barley *Hordeum vulgare* **Bluegrass, annual** *Poa annua*	6	8		--
Barnyardgrass *Echinochloa crus-galli* **Chickweed, common** *Stellaria media* **Red Maids** *Calandrinia ciliata*	6	12		--
Crabgrass *Digitaria spp.* **Fleabane, flaxleaf** *Conyza bonariensis* **Groundsel, common** *Senecio vulgaris* **Junglerice** *Echinochloa colonum* **Lambsquarters, common** *Chenopodium album*	6	16	OR	--
		16 to 32	+	4 to 16**

Pigweed, redroot *Amaranthus retroflexus* **Rocket, London** *Sisymbrium irio* **Ryegrass, common** *Lolium multiflorum* **Shepherdspurse** *Capsella bursa-pastoris* **Sowthistle, annual** *Sonchus oleraceus*				
Cheeseweed, common *Malva spp.*	3	12 to 32	+	4 to 16
Cheeseweed, common *Malva spp.* **Filaree*** *Erodium spp.* **Horseweed/Marestail** *Conyza canadensis* **Nettle, stinging** *Urtica dioica* **Purselane, common*** *Purtulaca oleracea*	6	16 to 32	+	4 to 16

* Suppression only.
**The mixture of this product plus Goal is recommended when weeds are stressed or growing in dense populations.

STRIPS

FOR ANNUAL AND PERENNIAL WEEDS IN STRIPS
OF TREE AND VINE CROPS

■ **TANK MIXTURES WITH RESIDUAL HERBICIDES** ■

When applied as a tank mixture, this product provides control of the emerged annual weeds and control or suppression of emerged perennial weeds listed in this label. The following residual herbicides will provide preemergence control of those weeds listed in the individual product labels.

■ **MON 52249 plus GOAL™ 1.6E** ■

■ **MON 52249 plus KARMEX™ DF** ■

■ **MON 52249 plus KROVAR™ I** ■

■ **MON 52249 plus KROVAR™ II** ■

■ **MON 52249 plus SIMAZINE, PRINCEP CALIBER™ 90** ■

■ **MON 52249 plus SIMAZINE 4L** ■

- **MON 52249 plus SIMAZINE 80W**
- **MON 52249 plus SOLICAM™ 80DF**
- **MON 52249 plus SURFLAN™ AS**
- **MON 52249 plus SURFLAN 75W**
- **MON 52249 plus SIMAZINE (80W, or 4L, or PRINCEP CALIBER 90) plus SURFLAN (AS or 75W)**
- **MON 52249 plus GOAL (1.6E) plus SURFLAN (AS or 75W)**
- **MON 52249 plus GOAL (1.6E) plus SIMAZINE (80W, or 4L, or PRINCEP CALIBER 90)**
- **MON 52249 plus GOAL (1.6E) plus SURFLAN (AS or 75W) plus SIMAZINE (80W, 4L, or PRINCEP CALIBER 90)**

Do not apply these tank mixtures in Puerto Rico.

When tank-mixing with residual herbicides, add an agriculturally approved nonionic surfactant at 0.5 to 1 percent by volume of spray solution.

Refer to the individual product labels for specific crops, rates, geographical restrictions and precautionary statements.

Read and carefully observe the label claims, cautionary statements, rates and all other information on the labels of all products.

™Karmex is a trademark of E.I. duPont de Nemours and Company.

RECOMMENDED RATES

Annual Weeds - Apply 1 to 5 quarts per acre of this product in these tank mixtures. Use rates at the higher end of the recommended range when weeds are stressed, growing in dense populations or are greater than 12 inches tall.

Perennial Weeds - Apply 1 pint to 5 quarts per acre of this product in these tank mixtures to control or suppress perennial weeds. Follow the recommendations in the "Weeds Controlled" section of this label for stage of growth and application rates for specific perennial weeds.

- **MON 52249 plus GOAL plus SIMAZINE/SURFLAN**

This product plus low rates of Goal in three-way or four-way mixtures with simazine and/or Surflan will provide postemergence control of the weeds listed below.

Refer to the individual simazine and Surflan labels for preemergence rates, weeds controlled, precautionary statements and other important information.

Apply these tank mixtures in 3 to 40 gallons of water. Add 0.5 to 1 percent nonionic surfactant by total spray volume to the spray solution.

Apply 1 to 5 quarts per acre of this product plus 4 to 48 fluid ounces per acre of Goal plus labeled rates of simazine and/or Surflan to control the following weeds:

Barley, wild
Hordeum leporinum
Bluegrass, annual
Poa annua
Cheeseweed, common
Malva spp.
Chickweed, common
Stellaria media
Filaree*
Erodium spp.
Fleabane, flaxleaf
Conyza bonariensis
Groundsel, common
Senecio vulgaris
Horseweed/Marestail
Conyza canadensis
Nettle, stinging
Urtica dioica
Pineappleweed
Matricaria matricariodes
Rocket, London
Sisymbrium irio
Shepherdspurse
Capsella bursa-pastoris
Sowthistle, annual
Sonchus oleraceus

*Use a minimum of 1.5 quarts of this product in these mixtures.

NOTE: This recommendation does not preclude the use of Goal in these mixtures at higher, labeled rates for preemergence weed control.

PERENNIAL GRASS SUPPRESSION
ORCHARD FLOORS

When applied as directed, this product will suppress vegetative growth as indicated below.

Bahiagrass

This product will provide significant inhibition of seedhead emergence and will suppress vegetative growth for a period of approximately 45 days with a single application and approximately 120 days with sequential applications. Apply this product 1 to 2 weeks after full green-up or after mowing to a uniform height of 3 to 4 inches. Applications must be made prior to seedhead emergence. Apply 6 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 25 gallons of water per acre.

Sequential applications of this product plus nonionic surfactant may be made at approximately 45-day intervals to extend the period of seedhead and vegetative growth suppression. For continued seedhead suppression, sequential applications must be made prior to seedhead emergence. Apply no more than 2 sequential applications per year. As a first sequential application, apply 4 fluid ounces of this product plus nonionic surfactant. A second sequential application of 2 to 4 fluid ounces may be made approximately 45 days after the last application.

Bermudagrass

For burndown, apply 1 to 2 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 20 gallons of water per acre. Use 1 quart of this product in 3 to 20 gallons of water per acre east of the Rocky Mountains. Use 1 to 2 quarts of this product in 3 to 10 gallons of water per acre west of the Rocky Mountains. Use this treatment only if reduction of the bermudagrass stand can be tolerated. When burndown is required prior to harvest, allow at least 21 days to ensure sufficient time for burndown to occur.

Suppression only (east of the Rocky Mountains)—Apply 6 to 16 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 20 gallons of water per acre no sooner than 1 to 2 weeks after full green-up. Mowing prior to application may occur provided a minimum height of 3 inches is maintained. Rates of 6 to 10 fluid ounces of this product plus nonionic surfactant should be used in shaded conditions or where a lesser degree of suppression is desired. Sequential applications may be made when regrowth occurs and bermudagrass injury and stand reduction can be tolerated.

Suppression only (west of the Rocky Mountains)—Apply 16 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre up to 6 inches in height and no sooner than 1 to 2 weeks after full green-up. Mowing prior to application may occur provided a minimum height of 3 inches is maintained. Sequential applications may be

made when regrowth occurs and bermudagrass injury and stand reduction can be tolerated.

Cool Season Grass Covers

For suppression of tall fescue, fine fescue, orchardgrass and quackgrass, apply 8 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 20 gallons of water per acre. For best suppression, add ammonium sulfate to the spray solution at a rate of 2 percent by weight or 17 pounds per 100 gallons of spray solution.

For suppression of Kentucky bluegrass covers, apply 6 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant. Do not add ammonium sulfate.

For best results, mow cool-season grass covers in the spring to even their height and apply the recommended rate of this product 3 to 4 days after mowing. Avoid treating cool season grass covers under poor growing conditions, such as drought stress (drip irrigation), disease or insect damage.

LOW VOLUME APPLICATION
(FLORIDA AND TEXAS)

For burndown or control of the weeds listed, apply the recommended rates of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 30 gallons of water per acre. Where weed foliage is dense, use 10 to 30 gallons of water per acre.

Annual Weeds

Goatweed--Apply 2 to 3 quarts per acre of this product plus 17 pounds of ammonium sulfate per 100 gallons of water plus 0.5 to 1 percent nonionic surfactant by total spray volume. Apply in 20 to 30 gallons of water per acre when plants are actively growing. Use 2 quarts per acre when plants are less than 8 inches tall and 3 quarts per acre when plants are greater than 8 inches. If goatweed is greater than 8 inches, the addition of Krovar™ II or Karmex™ may improve control. Use labeled rates for these residual products.

Read and carefully observe the label claims, cautionary statements, rates and all other information on the Krovar II and Karmex labels.

Perennial Weeds

Apply when weeds are actively growing and at the growth stages listed in the ''Perennial Weeds Controlled'' section of this label. If perennial weeds are mowed, allow weeds to regrow to the recommended stage of growth.

S = Suppression	B = Burndown
PC = Partial control	C = Control

WEED SPECIES	MON 52249 RATE PER ACRE 1 qt	2 qts	3 qts	5 qts
Bermudagrass	B	•	PC	C
Guineagrass				
Texas and Florida Ridge	B	C	C	C
Florida Flatwoods	•	B	C	C
Paragrass	B	C	C	C
Torpedograss	S	•	PC	C

TREE CROPS

Citrus*: citron, grapefruit, kumquat, lemon, lime, orange, pummelo, tangelo, tangerine, tangors.

Nuts:** almond, chestnuts, filbert, macadamia, pecan, pistachio, walnut.

Pome Fruit*: apple, pear.

Stone Fruit*:** apricots, cherries, nectarines, olives, peaches, plums/prunes.

For cherries, any application equipment listed in this section may be used in all states.

For citron and olives, apply as a directed spray only.

Any application equipment listed in this section may be used in apricots, nectarines, peaches, and plums/prunes growing in Arizona, California, Colorado, Idaho, Kansas, Kentucky, New Jersey, North Dakota, Oklahoma, Oregon, Texas, Utah, and Washington, except for peaches grown in the states specified in the following paragraph. In all other states use wiper equipment only.

For PEACHES grown in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee only, apply with a shielded boom sprayer or shielded wiper applicator which prevents any contact of this product with the foliage or bark of trees. Apply no later than 90 days after first bloom. Applications made after this time may result in severe damage. Remove suckers and low hanging limbs at least 10 days prior to application. Avoid applications near trees with recent pruning wounds or other mechanical injury. Apply only near trees which have been planted in the orchard for 2 or more years. EXTREME CARE MUST BE TAKEN TO ENSURE NO PART OF THE PEACH TREE IS CONTACTED.

Tropical Fruit: acerola, atemoya*, avocado*, banana (plantains), breadfruit*, canistel*, carambola*, coffee****, dates*, figs*, guava, jabotícaba*, jackfruit*, longan*, lychee*, mango*, papaya, passion fruit*, persimmons*, sapodilla, sapote, soursop, sugar

apple*, tamarind, tea. Allow a minimum of 1 day between last application and harvest of guava and papaya. In coffee and banana, delay applications 3 months after transplanting to allow the new coffee or banana plant to become established.

NOTE:

* Allow a minimum of 14 days between last application and harvest.

** Allow a minimum of 21 days between last application and harvest of these crops.

*** Allow a minimum of 17 days between last application and harvest.

****Allow a minimum of 28 days between last application and harvest.

VINE CROPS

Kiwi Fruit*

Grapes:* Any variety of table, wine, or raisin grape may be treated with any equipment listed in this section.

In the northeast and Great Lakes regions, applications must be made prior to the end of bloom stage of grapes to avoid injury.

* Applications should not be made when green shoots, canes, or foliage are in the spray zone.

* Allow a minimum of 14 days between last application and harvest.

CALIFORNIA

This product has been approved by the U.S. Environmental Protection Agency and by the state of California for the uses, crops and sites listed in this label. With the exception of these items, this booklet contains the material approved by California.

These use conditions, crops and sites may not be treated with this product in California until approval is received:

• Cool season truf growth regulation

Product protected by
U.S. Pat. No 4,405,531
Other patents pending.
No license granted under any

non-U.S. patent(s).

EPA Reg. No. 524-XXX

This product has been approved for use in California except as stated otherwise on page XXX.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

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MONSANTO COMPANY
AGRICULTURAL PRODUCTS
ST. LOUIS, MISSOURI, 63167 U.S.A.

Monsanto

Monsanto Company
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May 4, 1992

Office of Pesticide Programs - H7504C
Document Processing Desk
U.S. Environmental Protection Agency
Room 226A, Crystal Mall #2
1921 Jefferson Davis Highway
Arlington, Virginia 22202

Attention: Mr. Robert J. Taylor
Product Manager (25)

Subject: **MON-52249 Herbicide (EPA File Symbol 524-ULU)**
Acute Inhalation and Eye Irritation Studies
Response to EPA Letter Dated April 14, 1992

Dear Sir:

Enclosed is Monsanto's response to your letter of April 14, 1992, regarding the scientific review and evaluation of the information submitted in support of the registration of MON-52249 herbicide. MON-52249 herbicide contains 41% of the isopropylamine salt of glyphosate and [redacted] surfactant. The data package for MON-52249 herbicide was submitted as R.D. 1057 in September, 1991 (MRIDs 42035500-7). An expedited review was requested for this submission.

Monsanto has noted that the following studies have been classified as either core-guideline or core-minimum:

Toxicity Study	Category
Acute Oral	IV
Acute Dermal	IV
Skin Irritation	IV
Skin Sensitization	Negative

The Agency has classified the acute inhalation and acute eye irritation studies as core-supplementary. At this time, Monsanto is providing additional data in order to upgrade both of these studies. In the attached, we have addressed each of the

Inert ingredient information may be entitled to confidential treatment

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[redacted]

reviewer's comments and provided the requested additional information.

The response to the questions regarding the acute inhalation study has been prepared by B.R. Dudek, Ph.D. This response includes a listing of the particle size distribution used in the study, as well as clarification of the other points. Extensive pretest evaluations led to the selection of exposure systems that would obtain both the highest possible atmospheric concentrations and the highest possible number of particles less than 1 μm. An inhalation LC_{50} of 2.1 mg/L was conclusively established, placing MON-52249 in Category III for inhalation toxicity.

The response to the acute eye irritation study has been prepared by A.M. Kirk, Associate Toxicologist. We consider Bio/dynamics to be a laboratory of unquestionable integrity and exceptional expertise in the conduct of acute toxicology studies, and believe that the questions raised by the reviewer arise from differences in the *reporting* of the data, not in the actual grading of the symptoms observed. Although the reviewer indicated that this study was not upgradable, we believe that this study satisfactorily meets EPA testing guidelines. All eyes unequivocally cleared by day 14, conclusively indicating a Category II for eye irritation. A repeat of this study would not produce any meaningful new information and would be an unnecessary use of animals.

Note that at several points in her response, Ms. Kirk refers to the CPSC Illustrated Guide for Grading Eye Irritation. Unfortunately, the plates in this guide are color photographs which could not be easily reproduced for inclusion in this response. However, we will be happy to provide them to the Agency when we meet to discuss this study (see below).

Monsanto requests that the Agency review the enclosed data and approve the registration of MON-52249 herbicide. Monsanto further requests a meeting with the Agency as soon as possible to discuss this additional information. Attending for Monsanto will be Dr. Russ Schneider, Ms. Annette Kirk, Dr. Chuck Hastings, Ph.D., D.A.B.T., and myself.

If you have any questions regarding this submission, please contact Dr. Russ Schneider or me.

Sincerely,

Sheila A. Schuette

Sheila A. Schuette, Ph.D.
Senior Registration Specialist
(314) 694-7248

cc: R.P. Schneider
D.P. Ward

Marriott
HOTELS•RESORTS•SUITES

524-ULU

Lucy - will upgrade acute inhalation
needed to see particle distribution

Monsanto will include chart in
every acute inhalation

Eye Irritation
need slit lamp
Biodynamics uses fluore norm light
& pin light - does not use slit lamp every
time.

Lucy - from plates

draize - no difference between ulceration and
opacity scored as
will upgrade to Category II
since healing occurred

conj epi sloughing instead nucreus (superficial)
define terms

descriptive terms

Crystal City Marriott (703) 413-5500

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RESPONSE TO USEPA QUESTIONS PERTINENT TO UPGRADING OF EHL REPORT 91044, ACUTE INHALATION STUDY OF MON 52249

B. R. DUDEK, Ph.D.
MONSANTO AGRICULTURAL GROUP
ENVIRONMENTAL HEALTH LABORATORY
645 S. NEWSTEAD
ST. LOUIS, MO 63110

a. MMAD was calculated only once during the exposure. There is no assurance that the particle size remained constant during the entire exposure.

The FIFRA acute inhalation Guideline (Subdivision F, 81-3) states in Section (h) (7) (iii) "particle size analysis during the animals test exposures should be carried out as often as necessary to characterize the aerosols to which the animals are exposed.". The two types of generation systems and generation methodology used for the exposures in this report produce stable aerosols. Therefore, one determination of MMAD and GSD during the 4 hour exposure is sufficient. The double flask system pictured in report Appendix 2, Figure 1 (used for groups 2 and 3; 1.3 and .25 mg/l, respectively) uses test material at a constant rate (this rate is determined by the air pressure supplied to the nebulizers) from the large flask reservoirs. The reservoirs were never exhausted during the course of the exposure. Air pressure to the nebulizers, which is critical for maintaining a stable output, was verified every 30 minutes during the exposure and remained constant (data attached). For exposure of group 1 (5.8 mg/l), the FMI pump delivered test material to the Laskin-style nebulizer at a constant rate (verified every 30 minutes, data attached) from a large reservoir. The air pressure to the nebulizer remained constant during the exposure and was also verified (see attached data) every 30 minutes. These systems were considered stable for particle size output since none of the aerosol generation parameters (air pressure and delivery) changed during the course of the exposures. The stability of the test atmospheres is also indicated by the tightness of the concentration data given in Appendix 1, Exhibit 2, Table 1 of the report. In addition, particle sizing done during pretest for the systems selected (report Appendix 2, Table 1) gave MMAD's very similar to those of the subsequent test atmospheres. Given the above, the one particle size determination made during each exposure was sufficient to characterize the particle size of the exposure atmospheres.

b. The particle size distribution is not presented. There are large differences in the exposure concentrations. Of greater concern is the differences in concentration between group 2 and 1. Group 2 was exposed to 1.3 mg/L and Group 1 was exposed to 5.8 mg/L. Since the particle size distribution is not presented,

it is not possible to determine if less than expected mortality in group 1 was due to a lower percentage of particles. Giving the percentage of particles under 1 μm is not enough .

As per your request, we have attached a tabular distribution of particle size for this study. By specifying the MMAD and GSD in the report the particle size distribution is given; the particle size distribution of an aerosol is described by the MMAD and the geometric standard deviation and can be reproduced from these two parameters.

In this study, as the concentration was increased, the response also increased and a LC50 could be calculated using the probit method (report text, Table 1). The observed response may not necessarily be linear; only part of a typical dose response curve is linear. The actual response may not be the "expected" value using extrapolation.

The difference in exposure concentrations between groups 2 and 1 was dictated by the response; partial percent mortalities within the groups are necessary for a valid calculation of an LC50 value. For these groups, as the concentration of the atmosphere increased, the MMAD also increased while the percent of particles less than 1 micron decreased. Likely, this was due to increased coagulation as the atmosphere concentration increased. Although the percentage of particles less than 1 micron decreased in group 1 compared to group 2, the mass of particles less than 1 micron was actually 76% greater as a result of the greater chamber concentration (see report text Table 3):

Exposure Concentration		% < 1μm		mg/L < 1μm
5.8 mg/L	X	3%	=	0.174 mg/L
1.3 mg/L	X	7.6%	=	0.0988 mg/L

The issue of particle size in acute inhalation toxicology studies has recently been reviewed and the difficulties of generating high concentrations of aerosols with small diameters as a result of coagulation has been discussed (Commentary, (1992). *Fundam. Appl. Toxicol.* **18,** 321-327). A copy of this publication is attached.

c. The system of generation of the test atmosphere was different at the highest level. We would prefer to have all levels of exposure to be generated the same way. This would avoid adding a variable to the test system. The presentation of the particle size distribution at both exposures was comparable in percentage at comparable stages.

For acute inhalation studies we endeavor to meet two criteria; one is concentration; i.e., 5 mg/L as a high limit (USEPA 1986. Pesticide assessment guidelines, subdivision F, hazard evaluation: Human and domestic animals (Revised). NTIS Report PB86-108958, Washington, DC) and the other is attempting to have 25% of the particles less than 1 micron (USEPA 1988. Hazard evaluation division: Standard evaluation procedure, inhalation toxicity testing, NTIS Report PB89-100366, Washington DC). Consequently, because physical laws for aerosol generation and behavior limit the minimum size of particles in an exposure atmosphere at a concentration at or near 5 mg/L, two systems must be used to satisfy these criteria; one system to achieve a maximum concentration and another to get a high <u>percentage</u> of particles less than 1 micron. Therefore, 2 systems were used since a single system did not satisfy both criteria. Appendix 2, Table 1 of the report documents pretest efforts to meet both criteria. The FMI pump/Laskin-style nebulizer gave an analytical concentration of 6.6 mg/L, but only 3.2% of the particles were less than 1 micron. When the double flask generator with discriminator was used, a lower concentration of 1.1 mg/L was achieved but the percent of particles less than 1 micron was increased by an approximate factor of 3 to 9.4 percent. These data appeared to conform with the idea that particle coagulation increases as the particle concentration goes up. Therefore, two systems were required and represented our best effort to satisfy the testing criteria requirements.

d. The summary table of observed symptoms of toxicity must agree with the tabulated data for individual observations. This was not the case in the present data. It is not certain what symptoms were observed in which group. Group 1 and Group 3 seem to be confused with one another according to the way it is presented in the report. This needs to be clarified.

Some confusion may exist in report Table 5 because of the column "Exp Rank". This column indicates the relative exposure concentration (exposure rank) for the individual animal; low(1) → high(3) . For example, the first entry in Table 5 indicates that animal F03 005 (female 5 from group 3) appeared dehydrated on Day 7 post exposure. This animal received the lowest exposure, i.e., exposure rank 1. This column was intended to be an aid to the reader as dose-response should be easier to discern. This being understood, there is a direct and complete correspondence between the summary of observations during the post exposure period (report text, Table 4) and the individual observations (report text, Table 5). An annotated table is attached.

e. The sampling rates and volumes must be specific. It is not sufficient to state that it was sampled at a known rate. The volume of sampling must be uniform. It is not explained why the volume varied from 5 to 30 L.

Tabulated data that show total volumes sampled are attached. Sampling flow rate was 2 liters/minute for all samples. Specific details of the sampling and analytical procedures that result in the calculation of the test atmosphere concentration are contained in the study data package and the SOP's of the Environmental Health Laboratory. However, in general, sampling rates are held constant and sampling times are varied. Varying the sampling time to increase total volume of sample (and therefore total analyte) is necessary because at lower concentrations more sample may be required for the chemical analysis. All chemical methods of analysis have a threshold of detection, therefore at lower chamber levels more sample must be collected. The sample volume is factored into the final calculation of the exposure atmosphere using the formula presented in report Appendix 1, Exhibit 1, 5.) (page 39) Air Concentration .

f. It is not clear how opacity of the eye observed at death can be attributable to death. A clarification of this as well as what is meant by other terminology as "disuse of limbs" and "high pitched sounds" is necessary. Was the "disuse" paralysis, and neurological in origin, or was it physical injury? Were the high pitched sounds due to respiratory distress or distress in general.

Opacity of the eyes is a common post mortem change in experimental animals. It can occur as a result of the drying of the cornea and subsequent changes after death that result in a cloudy appearance of the eyes. Its appearance may be related to the length of time between death and observation. In general the terms used to describe what can be observed in the experimental animals are carefully chosen to avoid being diagnostic in any way. When an animal is not using its limbs in a normal way, i.e. misuse of limbs, there can be more than one cause. Assigning the term "paralysis" associates this observation with the nervous system. Operationally, using this assignment becomes a diagnosis of a nervous system abnormality which is based solely on a clinical observation. Similarly, high pitched sounds are reported as such and represent the best possible description of what was observed without offering a diagnosis. Assigning an unequivocal etiology of the sounds; either caused by general distress or respiratory distress was considered beyond the scope of an acute inhalation study and in reality cannot be made based only on acute toxicity data. In toxicity testing the assignment of a cause and effect relationship is usually done only after careful, methodical investigation typically with large numbers of animals.

Concerning the possibility of an injury being the cause of the observation of disuse of limbs, the observation "injury" is one of the descriptive terms available to the observer and was not used in this case. What was seen was not due to an injury.

- **ACUTE EXPOSURE DATA (GROUPS 1, 2 and 3)**
  Generation Air Pressure to Nebulizer

Note that the generation air pressures (air pressure to nebulizer) were essentially constant during the exposures.

GENERATION AIR PRESSURE TO NEBULIZER STUDY 91044

TIME	GENERATION PRESSURE (psig)
GROUP 1	
7:43	37
8:13	37
8:43	37
9:13	38
9:43	38
10:14	38
10:45	38
11:13	38
11:43	38
GROUP 2	
9:11	30
9:41	30
10:11	30
10:33	30
11:18	30
11:42	30
12:09	30
12:40	30
1:13	30
GROUP 3	
7:31	30
8:01	30
8:31	30
9:01	30
9:31	30
10:01	30
10:35	30
11:04	30
11:31	30

- PARTICLE SIZE DISTRIBUTIONS FOR GROUPS 1, 2 AND 3

PARTICLE SIZE DATA STUDY 91044

GROUP 1

DIAMETER (microns)	WEIGHT PERCENT	CUMMULATIVE PERCENT
10	0	100
9	2.78	97.2
5.8	12.7	84.5
4.7	10.8	73.7
3.3	24.3	49.4
2.1	27.9	21.5
1.1	17.6	3.9
0.65	3.27	0.65
0.43	0.53	0.12
0	0.12	0

GROUP 2

DIAMETER (microns)		
10	0	100
9	0.83	99.2
5.8	3.34	95.8
4.7	3.86	92
3.3	13.7	78.3
2.1	34.8	43.5
1.1	34	9.46
0.65	7.87	1.59
0.43	1.43	0.16
0	0.16	0

GROUP 3

DIAMETER (microns)		
10	0	100
9	2.77	97.2
5.8	9.85	87.4
4.7	9.74	77.6
3.3	21.9	55.7
2.1	29.6	26.1
1.1	21.4	4.76
0.65	4.19	0.57
0.43	0.34	0.23
0	0.23	0

• ANNOTATED REPORT TABLE 5

Explanation of the relationship of animal number, group and exposure rank

EHL 91044

Individual Observations

Observation	Animal* Number	Exp** Rank	Day After Exposure 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Dehydrated	F03 005	1								X							
Disuse of Limbs	F01 002	3	X														
Labored Respiration	F02 003	2		X													
	F02 004	2	X	X													
	F02 005	2		X													
	F01 005	3		X	X	X			X	X							
	W01 005	3		X	X	X											
Gasping	F01 002	3	X														
	F01 003	3	X														
	F01 005	3	X														
	W01 001	3	X	X													
	W01 002	3	X														
	W01 003	3	X	X													
	W01 004	3	X	X													
	W01 005	3	X														
Rapid Respiration	F01 004	3	X														
Shallow Respiration	F01 005	3									X	X	X				
High-pitched Sounds	F02 003	2		X													
	F02 004	2	X														
	F02 005	2		X													
	W01 005	3			X												
Rattling Sounds	W01 002	3	X														
Red/Pink Nasal Discharge	F02 003	2	X														
	F02 004	2	X														
	F02 005	2	X														
	W02 002	2	X														
Red/Brown Perinasal Encrustation	F02 002	2	X														
	F02 003	2		X													
	F02 004	2		X													
	F02 005	2		X													
	W02 001	2		X													
	W02 002	2		X													
	W02 004	2		X													
	F01 005	3		X	X	X											
	W01 003	3		X													
	W01 005	3		X	X	X											
Eyelids Partially/Completely Closed	W01 001	3	X	X													
	W01 004	3		X													
	W01 005	3	X	X													
Ocular Opacity	F01 002	3	X														
	W01 001	3		X													
	W01 003	3	X	X													
Periocular Encrustation	F02 003	2		X													
	W02 004	2		X													
	F01 005	3		X	X	X											
	W01 001	3		X													
	W01 003	3	X	X													
	W01 004	3		X													
Focal Loss of Hair	W01 005	3							X							X	

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EHL 91044

Individual Observations

Observation	Animal* Number	Exp** Rank	Day After Exposure 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Generalized Loss of Hair	F01 005	3							X	X	X	X	X			X	X
	M01 005	3								X	X	X	X				

* Animal number includes group number as the first two digits following the sex (M/F) designation and is related to the exposure level by:

Group	mg/L
0 1	5
0 2	1.3
0 3	0.25

** Exp Rank refers to exposure rank and is related to the exposure level by:

Exp Rank	mg/L
1	0.25
2	1.3
3	5.8

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INHALATION ANALYTICAL SAMPLE DATA
Volume of Air Sampled

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VOLUME OF AIR SAMPLED STUDY 91044

SAMPLE	VOLUME OF AIR SAMPLED (LITERS)
GROUP 1	
1	5
2	5
3	5
4	5
GROUP 2	
1	20
2	20
3	20
4	20
GROUP 3	
1	30
2	30
3	30
4	30

- RECENT PUBLICATION ON PARTICLE SIZE IN ACUTE INHALATION STUDIES

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FUNDAMENTAL AND APPLIED TOXICOLOGY 18, 321–327 (1992)

COMMENTARY

Recommendations for the Conduct of Acute Inhalation Limit Tests

Prepared by the Technical Committee of the Inhalation Specialty Section, Society of Toxicology

Received October 18, 1991; accepted October 18, 1991

Commentary—Recommendations for the Conduct of Acute Inhalation Limit Tests (Prepared by the Technical Committee of the Inhalation Specialty Section, Society of Toxicology) (1992). *Fundam. Appl. Toxicol.* 18, 321–327.

This paper reviews the scientific issues related to exposure concentrations and particle sizes used in acute inhalation limit tests. The current United States Environmental Protection Agency (USEPA) recommended exposure concentration for such tests is 5 mg/liter; while this level is very high, it is often achievable. On the other hand, its toxicological relevance is questionable. The USEPA recommendation that 25% of the particle distribution be less than 1 μm is a more difficult issue to address. Physical laws for aerosol particle generation and behavior limit the minimum size of particles in an exposure atmosphere at a concentration of 5 mg/liter. Particle size also influences deposition site in the respiratory tract. Since damage to any region of the respiratory tract can produce lethality, and it is not possible to predict, a priori, the most responsive region of the tract or the most harmful particle size of an untested agent, acute limit testing should employ particles in a size range that deposits throughout the entire rodent respiratory tract. Particles between 1 and 4 μm mass median aerodynamic diameter (MMAD) are well suited for such studies. It is, therefore, recommended that the limit test concentration should be the highest concentration (up to 5 mg/liter) that can be achieved while still maintaining a particle size distribution having an MMAD between 1 and 4 μm. © 1992 Society of Toxicology.

The guidelines for acute inhalation toxicity tests, as proposed by the United States Environmental Protection Agency (USEPA), emerged as a major issue of concern among members of the Inhalation Specialty Section (ISS) of the Society of Toxicology (SOT) over the past few years. The Technical Committee of the ISS was, therefore, charged with reviewing the existing scientific database on this issue, and with developing a Position Paper. After extensive deliberations, debate, and contributions from both the Committee members and other members of the Specialty Section, a consensus Position Paper was drafted and approved by the Executive Committee of the ISS.

Acute toxicity limit tests define an upper limit for exposure concentrations; if no mortality is observed at this concentration, no additional exposures are required. Guidelines for the conduct of acute inhalation limit tests have been prepared by a number of regulatory agencies, with those of the U.S. Environmental Protection Agency (1986, 1988) being among the most comprehensive. The USEPA guideline related to exposure concentration (U.S. Environmental Protection Agency, 1986) is that the limit be 5 mg/liter, while the guidelines related to particle size (U.S. Environmental Protection Agency, 1988) are that 1 μm mass median aerodynamic diameter (MMAD) particles are desirable, but that at least 25% of the particle distribution should be ≤1 μm. It is the purpose of this Position Paper to provide information on the unique problems associated with acute inhalation limit tests and to examine criteria for selection of concentration and particle size, two factors of critical importance in determining the dose delivered during inhalation exposures (Gross, 1987).

The exposure concentration, defined as the mass concentration of particles suspended in the atmosphere at the nose, determines the amount of material which can enter the respiratory tract of the test animal. The exposure particle size distribution is a prime determinant of the fraction of inspired material that deposits within the respiratory tract, as well as of regional deposition patterns. These exposure factors, as well as physical constraints on generating aerosols at high concentrations, are considered in this paper. Emphasis is placed on exposure of rats, since this is the species most often used in acute toxicity tests.

EXPOSURE CONCENTRATION

The limit concentration of 5 mg/liter currently recommended by the USEPA (1988) is technically challenging, and of dubious toxicological or physiological relevance. Such high concentrations are rarely achieved in real-life occupa-

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tional or ambient environmental exposures. Furthermore, exposure to dusts at levels near this concentration has been reported to cause physical blockage of the airways and outright suffocation (Scott *et al.*, 1982). Nevertheless, such high concentrations achieved in laboratory tests do serve to maximize exposure, and numerous data are available from exposures conducted at 5 mg/liter. As it is often possible to attain this concentration, it may represent a reasonable upper limit for an acute toxicity test. It is, however, imperative to recognize that problems may exist with the generation of some aerosols which can make achievement of this concentration impossible. If so, the highest practically achievable concentration must represent the limit for that specific agent. It must also be recognized that, due to aerosol coagulation, the median particle size increases as total aerosol concentration increases. Thus, de facto imposition of particle size criteria for limit tests imposes upper limits on achievable exposure concentrations while maintaining that particle size.

PARTICLE SIZE

Deposition Pattern and Relation to Acute Toxicity

The deposition of particles having a polydisperse distribution is usually best predicted by the MMAD (Morrow *et al.*, 1966); 50% of the mass of the particle distribution is less than the MMAD, and 50% of the mass is greater than the MMAD.

Both the total respiratory tract and the regional deposited doses of inhaled particles are strongly dependent on particle size. Particles deposited in the nasopharyngeal, tracheobronchial, or pulmonary (alveolar) airways may be absorbed directly into the blood stream, and/or translocated to the gastrointestinal tract where absorption may occur. Thus, the systemic effects of soluble agents (that are not locally damaging) would be expected to depend on the total amount deposited and to be more independent of particle size than agents which cause effects at the initial deposition site. In contrast, deposition site is of primary importance for agents which act locally, since inhaled materials may be selectively toxic to the nasopharyngeal, tracheobronchial, or pulmonary regions (Dahl *et al.*, 1988; Féron and Bosland, 1989). Local effects and/or lethality can result from injury to any of these regions (Amdur, 1958; Morris and Smith, 1982; Rosenholtz *et al.*, 1963).

Because of the complexity of the respiratory tract and its responses to inhaled materials, it is impossible to predict a priori whether or not greater toxicity would be expected from small or large particles of a given material. Exposure to larger size particles of some agents produces greater toxicity than exposure to smaller size particles of the same material, whereas for other agents the opposite is observed (Amdur, 1958; Salem and Cullumbine, 1961; Tsuda *et al.*, 1986; Wolff *et al.*, 1979; Oberdorster *et al.*, 1990). Therefore, for acute exposures to materials of unknown toxicity, it is most appropriate to use a particle size distribution that will result in significant deposition within all regions of the respiratory tract. Such an approach would maximize the potential for producing and detecting toxic effects (see Appendix C). In this regard, an important distinction between acute and chronic testing should be noted. Chronic respiratory tract toxicity often results from the accumulation of insoluble particles within the pulmonary region. The use of particle sizes to maximize deposition in this region may be desirable for assessing chronic effects (Lewis *et al.*, 1989) but, for the reasons cited above, may not be ideal for acute testing because the use of small particle sizes to maximize pulmonary region deposition minimizes nasal deposition, enhancing the possibility of failing to detect potential nasal toxicity.

Differences between laboratory tests in rats and actual human exposures should be recognized when attempting to use acute inhalation data in assessing hazards. Both particle size distribution in the real world compared to that used in the laboratory and rat–human deposition differences need to be considered to provide an adequate perspective.

Particle Size and Deposition Patterns

Particles of interest in inhalation toxicology generally penetrate beyond the upper respiratory tract into thoracic airways (Phalen *et al.*, 1988) and, thus, may deposit in the tracheobronchial and pulmonary regions of the lungs (Morrow *et al.*, 1966). When inhaled through the nose, the nasopharyngeal deposition of such particles is also significant (Cheng *et al.*, 1990). For humans, particles up to 10 μm MMAD may exhibit thoracic deposition with nose breathing, and particles up to 15 μm MMAD with mouth breathing (U.S.E.P.A., 1982; Jarabek *et al.*, 1989; Phalen *et al.*, 1988).

Species differences exist in regional particle deposition patterns. In general, obligate nose-breathing rodents exhibit lower pulmonary and higher nasal and tracheobronchial deposition than do humans (Raabe *et al.*, 1988; Schlesinger, 1985). Deposition in the tracheobronchial and pulmonary regions also falls off more rapidly with particle size in rats compared to humans. Unfortunately, the rodent data are not sufficiently complete to allow precise estimation of an upper size cutoff for particles which deposit in the thoracic regions.

The data presented in Fig. 1, as well as those from other sources (Mauderly *et al.*, 1987; Raabe *et al.*, 1988), indicate that inhaled particles between 1 and 4 μm MMAD will deposit within all regions of the rat respiratory tract. Within this size range, nasopharyngeal and tracheobronchial deposition increase as particle size increases, but pulmonary deposition remains relatively constant. Based merely on pulmonary region deposition efficiencies, 1 μm particles offer no distinct advantage over 4 μm particles. Thus, because 1 4 μm particles will likely deposit in all regions of the respi-

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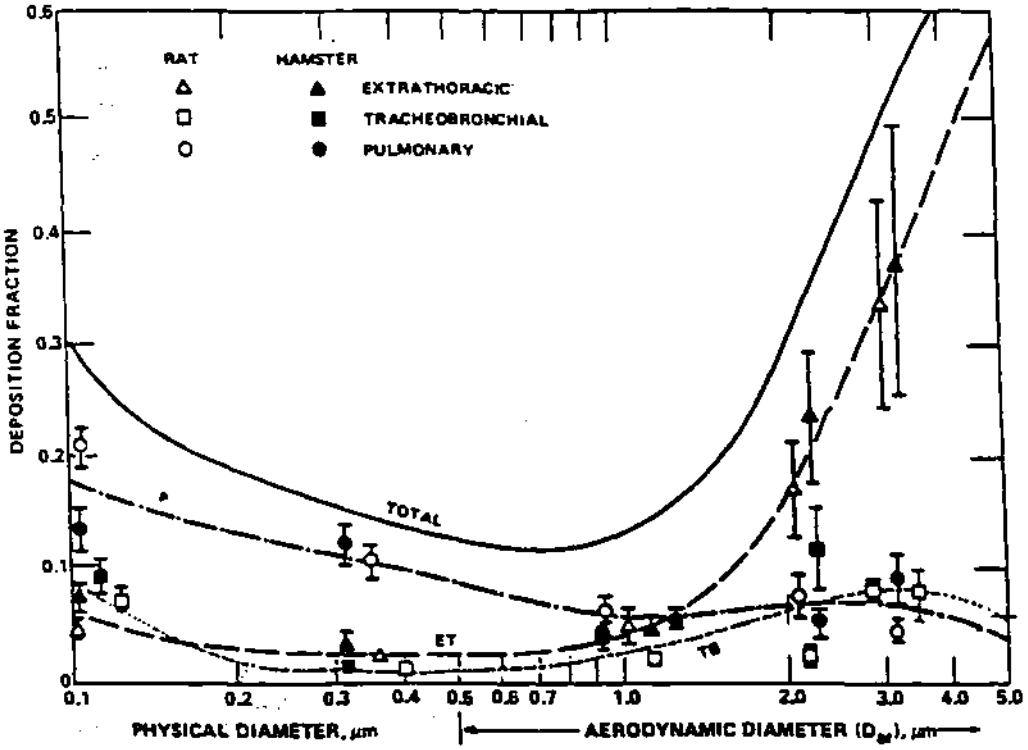

FIG. 1. Deposition of inhaled monodisperse aerosols of fused aluminosilicate spheres in small rodents showing the deposition in the nasopharyngeal region (ET), the tracheobronchial region (TB), and pulmonary region (P), and the total respiratory tract (Total). (From USEPA, 1982)

ratory tract, this size range is highly desirable for acute limit testing.

Nasopharyngeal deposition increases substantially in rodents for large particles, and is the dominant deposition site for particles larger than 4 μm. Because acute limit tests are designed to provide only an approximate index of toxicity, and because nasal effects can be of considerable importance, upper particle size cutoffs need not be so stringent as recommended for chronic inhalation toxicity studies.

The data of Raabe *et al.* (1988) are virtually all that are available on the deposition of larger particles in the rodent respiratory tract. They suggest that, for 6 μm MMAD particles, pulmonary deposition is small, while for 10-μm MMAD particles, it is negligible. Modeling by Schum and Yeh (1980) and by Jarabek *et al.* (1989) indicates that tracheobronchial and pulmonary deposition decreases rapidly above 5 μm MMAD. Based upon these limited data, a size of 4 μm MMAD is an appropriate upper cutoff for acute inhalation toxicity testing; at this size there is substantial pulmonary deposition, while nasal deposition has not become the completely dominant factor. Furthermore, there is significant deposition in all regions of the rat respiratory tract for 4 μm MMAD particles.

The degree of polydispersity is not a major concern, because particle distributions having geometric standard deviations between 1.5 and 2.5 will provide widespread deposition throughout the respiratory tract.

Aerosol Generation

The high mass concentrations used for the limit tests require extremely large numbers of particles per unit volume of air. Under these conditions, coagulation is extensive and results in particle growth (Hinds, 1982). Consequently, there are physical limits to reducing particle size while maintaining high exposure concentrations. A theoretical discussion of particle coagulation is provided in Appendix A; experimental data demonstrating the existence of coagulation in inhalation chambers are provided in Appendix B. At 5 mg/liter, the minimum theoretical attainable size for unit density particles is 1 μm (Appendix A), based on the assumption that particles are infinitely small when originally generated. It is theoretically impossible to generate an aerosol in exposure chambers having a concentration of 5 mg/liter and a particle size less than 1 μm MMAD.

In practice, it has not been possible to achieve the theoretical limit within a factor of two (i.e., 25% of particle mass ≤1 μm, as recommended by the U.S.E.P.A.) at concentra-

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tions of 5 mg/liter (Appendix B). Virtually all aerosol generation methods, and particularly dry powder methodologies for generating solid particles, use finite size particles as starting materials (Grassel, 1976; Hinds, 1979; McClellan and Henderson, 1989; Phalen, 1984). It is often very difficult to reduce the size of starting materials below 2–3 μm because of the kinetic energy needed for deagglomeration (Cheng *et al.*, 1985). Generation of aerosols of materials designed to be "dust-free" or "sticky" is also extremely difficult.

The production of liquid aerosols also has physical limits. Finite droplets are initially generated, and then dried to evaporate the solvent. The minimum particle size is achieved when all solvent has evaporated and only solute remains. Because the evaporated solvent also enters the exposure chamber, potential toxic effects of the solvent can significantly confound the results.

The above problems increase as attempts are made to reduce particle size. As stated previously, a particle size of 1 μm offers no distinct advantage over 4 μm particles for acute limit tests. Thus, the expenditure of considerable effort to approach this theoretical minimum of 1 μm is without significant toxicologic value.

CONCLUSIONS

Particle concentration and size are critical factors in determining the deposited dose and the ultimate toxic outcome resulting from inhalation exposure. A particle concentration of 5 mg/liter can be attained in exposure chambers, albeit with difficulty. Exposure to such a concentration may, however, be of limited value due to: (1) lack of toxicological or real-world exposure relevance, and (2) the possibility of airway obstruction and suffocation. As it may be impossible to predict the most sensitive respiratory tract target or the most harmful particle size of a particular agent, acute limit tests should use a particle size distribution that results in deposition throughout the entire rodent respiratory tract. Particle distributions having MMADs between 1 and 4 μm should, therefore, be considered as acceptable for the needs of acute inhalation limit tests, and the recommended exposure concentration of 5 mg/liter can frequently be achieved if this size range is specified. However, if these concentration and size conditions cannot be met, it is the opinion of the Inhalation Specialty Section that the acute inhalation limit test concentration should be the highest concentration (up to 5 mg/liter) that can be achieved while maintaining a particle size distribution having an MMAD ≤4 μm.

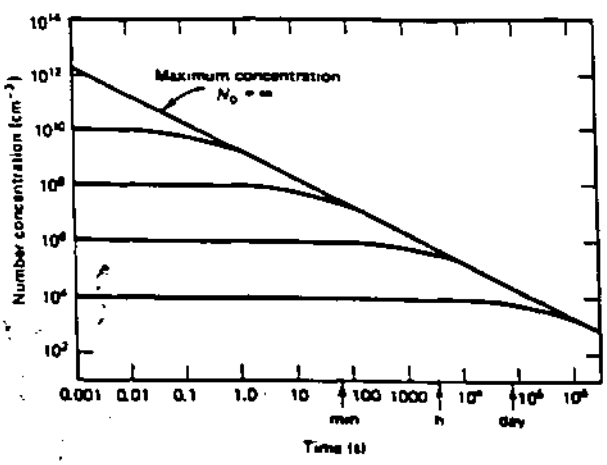

FIG. 2. Simple monodisperse particle coagulation. Number concentration vs log of time for various initial number concentrations. The maximum possible concentration is shown as the diagonal line. This corresponds to initial conditions of infinitely large number concentration and infinitely small particle size (from *Aerosol Technology* by William C. Hinds, copyright © 1982 by John Wiley & Sons, Inc. Reprinted by permission of John Wiley & Sons, Inc.)

TABLE 1
Concentrations and Particle Sizes Achieved When Using a Cyclone*

Concentration (mg/liter)	MMAD (μm)	% < 1 μm
1.1	0.4	68
1.2	0.6	62
2.5	2.9	16

* R. K. Wolff, personal communication.

APPENDIX A

Theoretical Minimum Particle Size Calculations

The theoretical minimum particle size will occur in coincidence with maximum particle concentration. The analysis of Hinds (1982) shows that theoretical maximum particle concentrations are 0.9–1.2 × 10^7 particles/cm^3 for typical exposure chamber residence times of 4–5 min. (Fig. 2). The minimum particle size can be calculated from the equation below for spherical particles of unit density. The mass in individual particles is multiplied by the particle concentration, equated to the mass concentration, and the equation solved for the particle diameter, as shown below:

Mass concentration (mg/liter) = $n \times 4/3\ \pi(D/2)^3 \times 10^{-6}$ × density, where n = particle concentration (particles/cm^3) and D = particle diameter (μm). At a concentration of 5 mg/liter this equation indicates a minimum particle size of 1–1.1 μm, assuming unit density particles.

APPENDIX B

Particle Size Measurements from Actual Acute Inhalation Studies

Experimental data from acute inhalation toxicology studies in Fig. 3 and 4 show that it is rarely possible to generate

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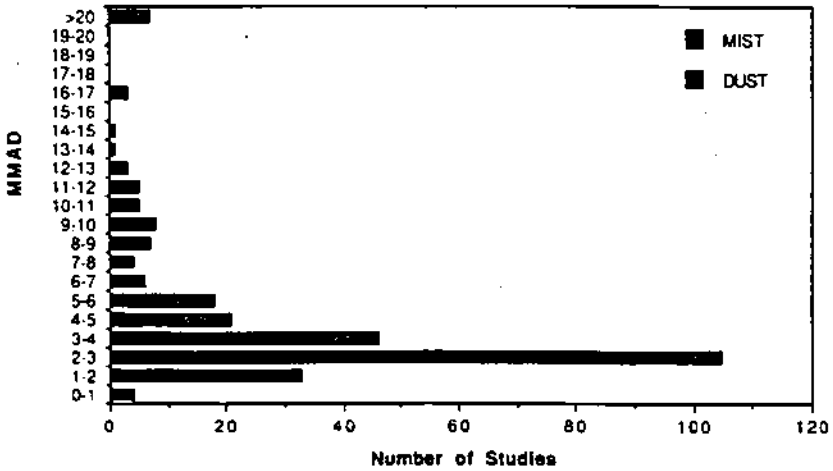

FIG. 3. Distribution of number of acute inhalation toxicity studies vs particle size (MMAD, μm) for aerosols generated as solids (dusts) or liquids (mists). Exposure concentrations were in the 0.5–5 mg/liter range. Data from 246 acute inhalation studies conducted by industry sources between 1985 and 1989 for EPA FIFRA submissions.

submicrometer particles at exposure concentrations in the 0.5–5-mg/liter range. The data in Fig. 3 show that the mode of the distribution of MMADs was in the 2–4 μm range for liquid aerosols and 3–6 μm for solid aerosols; particle size is more difficult to control with solids than liquids. Figure 4 indicates that only in a few cases was 25% of the par-

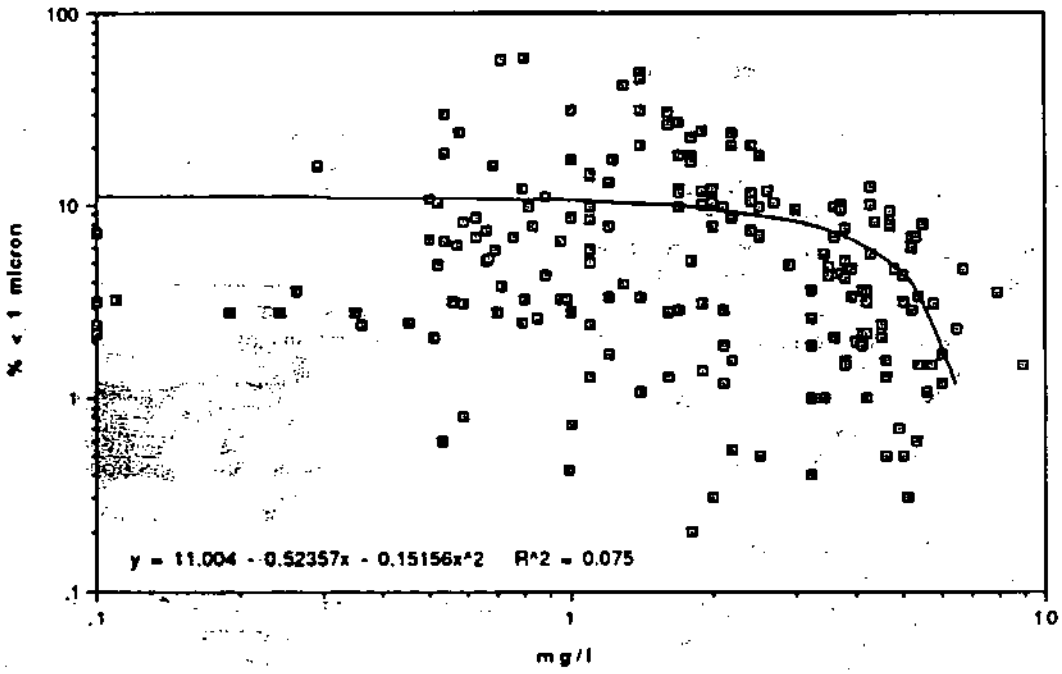

FIG. 4. Plot of percentage of particles less than 1 μm vs concentration for the same 246 inhalation studies shown in Fig. 3. The line is a least squares fit to the data.

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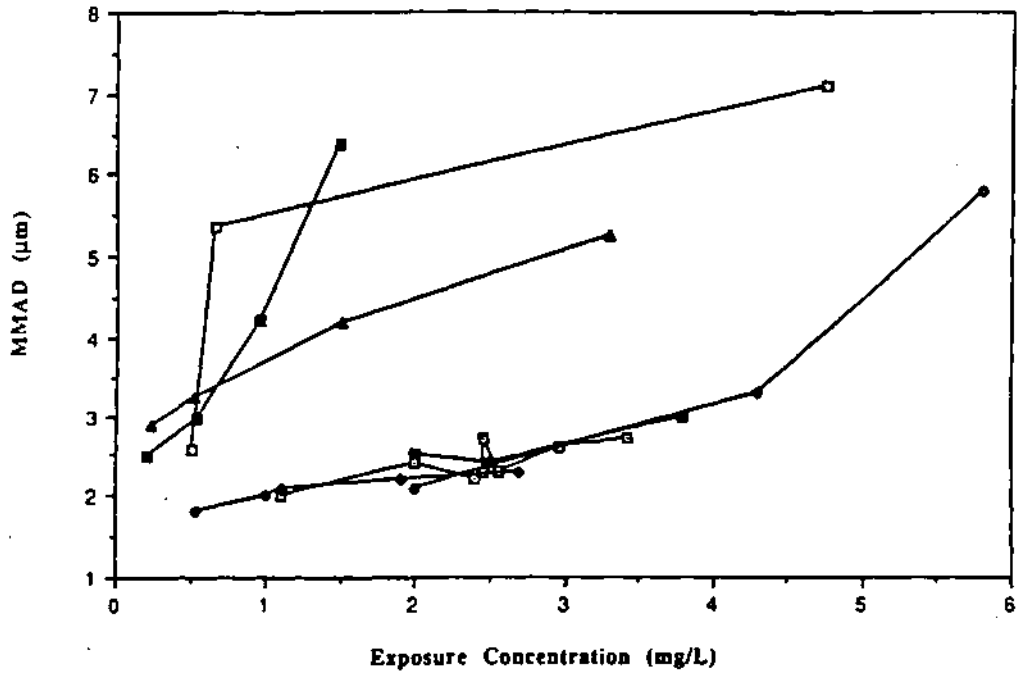

FIG. 5. Particle size growth with increasing concentration for various individual compounds (defined by the different symbols) from industry sources. The solid lines join the data for each set of studies with an individual compound. For a given compound the same generation method was used to produce the multiple concentrations.

ticle mass associated with particles less than 1 μm, and the highest concentration at which this occurred was 1.4 mg/liter.

Coagulation effects are also evident from Fig. 5, which shows data from studies in which multiple concentrations were generated for the same compounds. Because the generation method was constant for each compound, initial particle sizes were similar; the initial number concentrations were greater at the higher mass concentrations. This figure clearly shows the increase in particle size that occurs with increasing particle concentration. Coagulation is a dominant feature at these high concentrations.

The argument might be made that inertial separation devices, such as cyclones, can be used to reduce particle size. Although this is achievable, exposure concentrations will be reduced (Table 1 and Appendix C). However, the aerosol would still be subject to the physical laws of coagulation. Table 1 shows that it is possible to produce aerosols with MMAD's < 1 μm at concentrations of approximately 1 mg/liter. At a concentration of 2.5 mg/liter the particle size increases to 2.9 μm MMAD. Thus, even when using some of the best available aerosol technology, it was impossible to approach the theoretical minimum of 1 μm MMAD at a concentration of 5 mg/liter.

APPENDIX C

Effects of Cyclone Use in Inhalation Study

Given below is an example in which the use of a cyclone reduced the particle size at the expense of also reducing the exposure concentration.

	With cyclone	Without cyclone
% of particle mass < 1 μm	30.0	9.7
Chamber concentration (mg/liter)	0.54	1.7
MMAD (μm)	1.5	3.0
GSD	2.0	1.7

Calculations of the mass concentration of particles less than 1 μm in diameter for both conditions are:

with cyclone: 0.30×0.54 mg/liter = 0.16 mg/liter

without cyclone: 0.097×1.7 mg/liter = 0.17 mg/liter.

Despite the smaller fraction of submicrometer particles when a cyclone was not used, the mass concentrations of submicrometer particles were almost identical under both conditions. Interestingly, there was greater mortality in animals exposed to an aerosol produced without a cyclone, for which

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a higher dose of test material presumably would have been deposited in the upper respiratory tract. These data underscore the fact that large particles can contribute significantly to acute lethality (Tsuda *et al.*, 1986)

ACKNOWLEDGMENTS

Members of the Technical Committee were Drs. G. L. Kennedy, J. B. Morris, M. V. Roloff, H. Salem (Chair), C. E. Ulrich, R. Valentine, and R. K. Wolff. The assistance of Drs. R. Henderson, J. Mauderly, and R. B. Schlesinger, as well as the comments provided by various members of the Specialty Section, are gratefully acknowledged.

REFERENCES

Amdur, M. O. (1958). The respiratory response of guinea pigs to sulfuric acid mist. *AMA Arch. Ind. Health* **18**, 407–414.

Cheng, Y. S., Marshall, T. C., Henderson, R. F., and Newton, G. J. (1985). Use of a jet mill for dispersing dry powder for inhalation studies. *Am. Ind. Hyg. Assoc.* **46**, 449–454.

Cheng, Y. S., Hansen, G. K., Su, Y. F., Yeh, H. C., and Morgan, K. T. (1990). Deposition of ultrafine aerosols in rat nasal molds. *Toxicol. Appl. Pharmacol.* **106**, 222–233.

Dahl, A. R., Bond, J. A., Petridou-Fischer, J., Sabourin, P. J., and Whaley, S. J. (1988). Effects on the respiratory tract of inhaled material. *Toxicol. Appl. Pharmacol.* **93**, 484–492.

Feron, V. J., and Bosland, M. C. (Eds.). (1989). *Nasal Carcinogenesis in Rodents: Relevance to Human Health Risks*. Pudoc, Wageningen, Netherlands.

Grassel, E. E. (1976). Aerosol generation for industrial research and product testing. In *Fine Particles* (B. Y. H. Liu, Ed.), pp. 145–172, Academic Press, New York.

Gross, S. B. (1987). Issues of regulatory requirements for inhalation toxicology testing. In *Inhalation Toxicology* (H. Salem, Ed.), pp. 361–383, Dekker, New York/Basel.

Hinds, W. C. (1979). Dry-generation aerosol generators. In *Generation of Aerosols and Facilities for Exposure Experiments* (K. Willeke, Ed.), pp. 171–188, Ann Arbor Science Pub., Ann Arbor.

Hinds, W. C. (1982). *Aerosol Technology*, pp. 233–239. Wiley, New York.

Jarabek, A. M., Menache, M. G., Overton, J. H., Dourson, M. L., and Miller, F. J. (1989). Inhalation reference dose: An application of interspecies dosimetry modelling for risk assessment of insoluble particles. *Health Phys.* **57**(Suppl. 1), 177–183.

Lewis, T. R., Morrow, P. F., McClellan, R. O., Raabe, O. G., Kennedy, G. L., Schwetz, B. A., Goehl, T. J., Royercroft, J. H., and Chabra, R. S. (1989). Establishing aerosol concentrations for inhalation toxicology studies. *Toxicol. Appl. Pharmacol.* **99**, 377–383.

Mauderly, J. L., Bice, D. E., Carpenter, R. L., Hanson, R. L., Henderson, R. F., Jones, R. K., McClellan, R. O., and Wolff, R. K. (1987). Effects of 4-week inhalation exposure of rats to oil shale dust and diesel exhaust. In *Health and Environmental Research on Complex Organic Mixtures*. CONF-851027, available from NTIS.

McClellan, R. O. and Henderson, R. F. (1989). *Concepts in Inhalation Toxicology*, pp. 63–119. Hemisphere, New York.

Morris, J. D. and Smith, F. A. (1982). Regional deposition and absorption of inhaled hydrogen fluoride in the rat. *Toxicol. Appl. Pharmacol.* **62**, 81–89.

Morrow, P. E., Bates, D. V., Fish, B. R., Hatch, T. F., and Mercer, T. T. (1966). Task group on lung dynamics. Deposition and retention models for internal dosimetry of the human respiratory tract. *Health Phys.* **12**, 173–208.

Oberdorster, G., Ferin, J., Finkelstein, J., Wade, P., and Corson, N. (1990). Increased pulmonary toxicity of ultrafine particles. II. Lung lavage studies. *J. Aerosol Sci.* **21**, 384–391.

Phalen, R. F. (1984). *Inhalation Studies: Foundation and Techniques*, p. 25, CRC Press, Boca Raton, FL.

Phalen, R. F., Stuart, B. O., and Lioy, P. J. (1988). Rationale and implications of particle size-selective sampling. In *Advances in Air Sampling*, pp. 3–15. American Conference of Governmental Industrial Hygienists, Lewis Publishers, Chelsea, MI.

Raabe, O. G., Al-Bayati, M. A., Teague, S. V., and Rasolt, A. (1988). Regional deposition of inhaled monodisperse coarse and fine aerosol particles in small laboratory animals. *Ann. Occup. Hyg.* **32**, 53–63.

Rosenholtz, M. J., Carson, T. R., Weeks, M. H., Wilinski, F., Ford, D. F., and Oberst, F. W. (1963). A toxico pathologic study in animals after brief single exposures to hydrogen fluoride. *Am. Ind. Hyg. Assoc. J.* **24**, 253–261.

Salem, H. and Cullumbine, H. (1961). Kerosene smoke and atmospheric pollutants. *Arch. Environ. Health* **2**, 641–647.

Schlesinger, R. B. (1985). Comparative deposition of inhaled aerosols in experimental animals and humans: A review. *J. Toxicol. Environ. Health* **15**, 197–214.

Schum, M. and Yeh, H. C. (1980). Theoretical evaluation of aerosol deposition in anatomical models of mammalian lung airways. *Bull. Math. Biol.* **42**, 1–15.

Scott, J. B., Macaskill, S. M., Belizi, P. J., Stuart, B. O., and Zwicker, G. M. (1982). Acute inhalation studies with an amorphous silicon dioxide dust. *Toxicologist* **2**, 59–60.

Tsuda, S., Iwasaki, M., Yosida, M., Ikeda, T., and Shirasu, Y. (1986). Effect of particle size on inhalation toxicity of chlorfenvinphos. *Jpn. J. Vet. Sci.* **48**(4), 729–737.

U.S. Environmental Protection Agency. (1982). Air Quality Criteria for Sulfur Oxides and Particulates. EPA-600/8-82-029c, 11-28–11-32.

U.S. Environmental Protection Agency. (1986). Pesticide assessment guidelines, subdivision F, hazard evaluation: Human and domestic animals (Revised). NTIS Report PB86-108958, Washington, DC.

U.S. Environmental Protection Agency. (1988). Hazard evaluation division: Standard evaluation procedure, inhalation toxicity testing. NTIS Report PB89-100366, Washington, DC.

Wolff, R. K., Silbaugh, S. A., Brownstein, D. G., Carpenter, R. L., and Mauderly, J. L. (1979). Toxicity of 0.4 and 0.8 μm sulfuric acid aerosols in the guinea pig. *J. Toxicol. Environ. Health* **5**, 1037–1047.

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RESPONSE TO US EPA REVIEW AND EVALUATION COMMENTS/CONCLUSIONS PERTAINING TO ACUTE EYE IRRITATION TEST OF MON 52249

A.M. Kirk
Monsanto Company
The Agricultural Group
May 1, 1992

II. Acute Toxicology

D. Acute Eye Irritation

Comment 2. **The grading of the ocular irritation, contrary to what the laboratory believes to be according to EPA grading system, is not according to the grading system the guidelines have specified. There is no EPA grading system. EPA guidelines have adopted the Draize system in its entirety.**

The EPA Test guideline, Subdivision F, Part 81-4, does not indicate that the scoring system presented is the "Draize system in its entirety". The scoring system presented in the test guideline is similar to the Draize system, but some of the definitions have been modified and the summations of the scores have been omitted. Regardless of this, the grading system utilized at Bio/dynamics, Inc. is exactly according to the grading system specified in the EPA test guideline; nothing has been omitted.

Clear guidance is provided in guideline 81-4 indicating that in addition to the individual scoring, all ocular irritation effects observed should be recorded. Guideline 81-4, section (d) Standard of the test method. states, (1), "*The degree of irritation/corrosion is evaluated...and...is fully described to provide a complete evaluation of the effects.*". Also, as stated in section (g)(2) Evaluation of results. "...*The individual scores do not represent an absolute standard for the irritant properties of a material. They shall be viewed as reference values and are only meaningful when supported by a full description and evaluation of the observations.*".

Every contract laboratory with which we have experience, follows this guidance and reports (usually by using descriptive codes) all effects which are not specifically discussed in the test guideline scoring system. Bio/dynamics has chosen to go beyond simple descriptive codes and includes additional scoring parameters to aid in recording all ocular effects.

Comment 3. **Draize makes no distinction between ulceration and opacity. Therefore, all ulceration and necrosis is to be graded with the maximum score of opacity. If the corneal epithelium is missing due to treatment, as it is defined in the legend, then this is destruction of tissue. If evaluated correctly, it is not easily reversible, and certainly not within 4 days.**

It is obvious under the test guideline grading system and other guidance presented in the test guideline that a

distinction is made between corneal ulceration and corneal opacity. As indicated in the grading system, a score of "0" for Opacity, is achieved when "*No ulceration or opacity*" is present. In addition, the test guideline section (f)(6)(iii) specifies that "*an illustrated guide in grading eye irritation should be used*.", and references the CPSC Illustrated Guide for Grading Eye Irritation Caused by Hazardous Substances. The CPSC Illustrated Guide clearly makes a distinction between ulceration and opacity. Plate 2 of this Guide demonstrates varying degrees of opacity (scores of 1 through 4). Plate 3 presents the same eyes after staining with fluorescein. The eye with the opacity score of "1" had extensive corneal ulceration; the eye with opacity score of "4" had opacity of the entire corneal surface, but had ulceration of only a small portion of the cornea. Also, there can exist ulceration of the corneal epithelium, as demonstrated by retention of fluorescein dye, and the details of the iris will be clearly visible. The criteria for an opacity score of "4" is: "*Opaque cornea, iris not discernible through opacity*". This example does not meet this criteria and therefore cannot be given an opacity score of "4". In addition, Subdivision F, Series 81-4, Eye Irritation, Addendum 2 on Data Reporting, Jan. 1988, Appendix I indicates that fluorescein staining should be recorded ("+" or "-") independent of "opacity". It is well known that these ocular effects can and do occur separately. As stated in the US EPA Hazard Evaluation Division, Standard Evaluation Procedure: Eye Irritation Studies, August, 1988, page 2, "*Examination of the cornea for irritant effects includes evaluation of both stromal lesions and epithelial lesions....Epithelial lesions may occur independently of stromal lesions...Stromal lesions are detected as opacities...*". In other words, if the effect on the cornea is at the epithelial layer only and does not reach the stroma, epithelial ulceration can be observed in the absence of opacity. There is certainly no indication in the test guideline, as stated by the reviewer, that "all ulceration and necrosis is to be graded with the maximum score of opacity". To grade in this way is clearly not appropriate.

With regards to reversibility, ulceration of the cornea is reversible. A missing patch of corneal epithelium would perhaps, by definition, be considered "destruction of tissue", but is not by any means "equivalent to irreversible damage". If the damage is limited to the epithelium, it is most often readily and completely reversible. If the degree of irritation is greater, with stromal damage occurring, as indicated by the presence of opacity, then the effects may not be as easily reversible. The CPSC Illustrated Guide demonstrates with slides 19 and 20 how much damaged cornea can regenerate in 24 hours. In slide 19, greater than 75% of the corneal surface had ulceration at 48 hours and in the same eye in slide 20, only 25-50% remained ulcerated at 72 hours. Also, as stated in Principles and Procedures for Evaluating

the Toxicity of Household Substances, The National Research Council, National Academy of Sciences, 1977, "*Superficial epithelial damage is best detected by staining with fluorescein. ...damage in a small area usually clears after 1 to 3 days. When the entire corneal epithelium is denuded, healing is usually complete by 3 to 7 days.*".

The ulceration seen in the Bio/dynamics study in question was first observed in one animal at the 24 hour scoring interval. It was given an ulceration grade of "3", which Bio/dynamics describes as "greater than half, but less that three quarters" of the epithelium missing. Its presence was confirmed by the use of fluorescein stain. This ulceration persisted but was gradually healing over the next three scoring intervals (48 hours, 72 hours and 7 days). At day 7, the ulceration was given a grade of "1", which Bio/dynamics describes as "one quarter (or less), but not zero". In other words, a very small area of ulceration remained and subsequently was observed as completely healed at study day 10. It is not unusual for such small areas of ulceration to heal in a very short period of time. Overall, from the time it was first observed this ulceration took somewhere between 6 and 10 days to clear.

It should be made clear that, the presence of the ulceration was considered a "positive" finding and was used in determination of the eye irritation category.

Comment 4. **In recording iritis, if it is present at all, it is remarkable, no matter how slight the observer considers it to be and must be given a numerical evaluation. If it is slight enough, the observed iritis will not be persistent, and will not influence the toxicological standing of the test.**

We agree with the reviewer that changes to the iris, no matter how slight, are "remarkable" and certainly must be noted. However, it is not appropriate to force the observer to assign a more severe score than is warranted by the observation. According to Subdivision F, 81-4, (f)(6)(i) Table 1, a score of "1" for iritis is achieved with "*Markedly deepened rugae, congestion, swelling, moderate circumcorneal hyperemia, or injection, any of these or combination of any thereof, iris still reacting to light (sluggish reaction is positive)*". If the iris has **slight** hyperemia of circumcorneal blood vessels or has only **slight** deepening of the rugae, and meets none of the criteria for iritis, it cannot be given a score of "1". Bio/dynamics used a score of "+" to indicate the presence of these slight changes which are not severe enough to warrant an iritis score of "1".

Comment 5. **Necrosis of the conjunctiva is considered in depth injury. We are unable to accept necrosis that is**

> **present one day and disappears the next without leaving a trace, as it is recorded in two cases, and in another healed completely within four days. Necrosis is defined as death of tissue, either as individual cells, groups of cells, or in small localized areas. The recorded necrosis would have to be in localized areas to be observed grossly, since individual cells and even small groups of cell would not be observable to the naked eye. It is not clear how a group of cells could die and be replaced overnight with others, without a trace of the destruction.**

Understandably, the term "necrosis" is diagnostic and cannot actually be confirmed without microscopic examination of the cells. However, macroscopically (by gross visual examination), the conjunctival "necrosis" which Bio/dynamics observes can appear as a white non-vascularized plaque of tissue (as seen in the CPSC Illustrated Guide, Slide 8). When this dead tissue sloughs off, the tissue beneath can be vascularized and appear normal. It is the experience of Bio/dynamics, that it is not unusual for this process of sloughing and return to normal to occur within a 24-hour period, especially for very small localized areas. This is especially true in rabbits, which often exhibit very rapid healing of ocular injuries.

Summary

The eye irritation study conducted on MON 52249 by Bio/dynamics, Inc. meets or exceeds the EPA Test Guidelines and provides a realistic evaluation of this materials' ocular irritation properties. **Even if the eye irritation scores were graded as the reviewer suggests, the ultimate conclusion of the study would remain the same.** All ocular irritation observed completely cleared in all animals within 14 days, indicating a category II for eye irritation. For this reason, we strongly object to the request for the submission of a new eye irritation test. A repeat study would be an unnecessary use of animals and would provide no new or useful information regarding the eye irritation potential of this formulation.

APR 14 1992

Dr. Sheila A. Schuette
Monsanto Company
700 14th Street NW., Suite 1100
Washington, DC 20005

Dear Dr. Schuette:

Subject: MON-52249 Herbicide
EPA File Symbol 524-ULU
Your Application Dated September 20, 1991

The scientific review and evaluation of the information submitted in support of the subject registration have been completed. The following are our conclusions and/or comments:

I. Product Chemistry

- The Confidential Statement of Formula and product chemistry data are acceptable.

II. Acute Toxicology

A. Acute Oral Toxicity

1. This study is classified as core-guideline.

2. The estimated LD_{50} for this study is > 5000 mg/kg.

3. The toxicity Category is IV.

B. Acute Dermal Toxicity

1. This study is classified as core-minimum for the following reasons:

a. The test material was applied to a larger area than recommended in the guidelines. The guidelines state that the test material should be applied to 10% of body

56078:I:Taylor:WP25-4:KEVRIC:04/08/92:05/08/92:rj:wo:dd:rj

CONCURRENCES

SYMBOL	H7505C							198
SURNAME	UHWalters							
DATE	4/14/92							

EPA Form 1320-1 (12-70) OFFICIAL FILE COPY

surface, not a minimum of 10%. By shaving the entire trunk, dorsum and ventrum, the exposed area was significantly larger than it should have been. This minimizes the effects on the skin and consequently alters the rate of absorption.

b. Individual doses for rats is not presented. This would have given a better idea of the propriety of the area used.

c. The guideline state that the test material should be applied to the dorsum of the animals. In the test all the shaved area, including the ventrum, was used.

2. The estimated LD_{50} is > 5000 mg/kg.

3. The toxicity category for this study is IV.

C. Acute Inhalation Study

1. This study is classified as core supplementary for the following reasons:

a. MMAD was calculated only once during exposure. There is no assurance that the particle size remained constant during the entire exposure.

b. The particle size distribution is not presented. There are large differences in the exposure concentrations. Of greater concern is the difference in concentration between group 2 and 1. Group 2 was exposed to 1.3 mg/L and Group 1 was exposed to 5.8 mg/L. Since the particle size distribution is not presented, it is not possible to determine if less than expected mortality in group 1 was due to lower percentage of particles under 1 um is not enough.

c. The system of generation of the test atmosphere was different at the highest level. We would prefer to have all levels of exposure to be generated the same way. This would avoid adding a variable to the test system. The presentation of the particle size distribution at both exposures was comparable in percentage at comparable stages.

d. The summary table of observed symptoms of toxicity must agree with the tabulated data for individual observations. This was not the case in the present data. It is not certain what symptoms were observed in which group. Group 1 and Group 3 seem to be confused with one

another according to the way it is presented in the report. This needs to be clarified.

e. The sampling rates and volumes must be specific. It is not sufficient to state that it was sampled at a known rate. The volumes of sampling must be uniform. It is not explained why the volume varied from 5 to 30 L.

f. It is not clear how opacity of the eye observed at death can be attributable to death. A clarification of this as well as what is meant by other terminology as "disuse of limbs" and "High pitched sounds" is necessary. Was the "disuse" paralysis, and neurological in origin, or was it physical injury? Were the high pitched sounds due to respiratory distress or distress in general?

2. This test may be upgraded if the particle size distribution is presented and data clarified as mentioned in the above remarks.

D. Acute Eye Irritation

1. This test is classified as core supplementary data.

2. The grading of the ocular irritation, contrary to what the laboratory believes to be according to EPA grading system, is not according to the grading system the guidelines have specified. There is no EPA grading system. EPA guidelines have adopted the Draize system in its entirety.

3. Draize makes no distinction between ulceration and opacity. Therefore, all ulceration and necrosis is to be graded with the maximum score of opacity. If the corneal epithelium is missing due to treatment, as it is defined in the legend, then this is destruction of tissue. If evaluated correctly, it is not easily reversible, and certainly not within 4 days.

4. In recording iritis, if it is present at all, it is remarkable, no matter how slight the observer considers it to be and must be given a numerical evaluation. If it is slight enough, the observed iritis will not be persistent, and will not influence the toxicological standing of the test.

5. Necrosis of the conjunctiva is considered in depth injury. We are unable to accept necrosis that is present one day and disappears the next without leaving a trace, as it is recorded in two cases, and in another healed completely within four days. Necrosis is defined as death of tissue, either as individual cells, groups of cells, or in small localized areas. The recorded necrosis would have to be in

localized areas to be observed grossly, since individual cells and even small groups of cells would not be observable to the naked eye. It is not clear how a group of cells could die and be replaced overnight with others, without a trace of the destruction.

6. A new eye irritation test must be submitted that evaluates the eyes more realistically.

E. Skin Irritation

1. This study is classified as core guideline.

2. The Primary Eye Irritation Index is 0.8.

3. The toxicity category is IV.

F. Skin Sensitization Testing

1. This study is classified as core guideline.

2. This product is not a dermal sensitizer.

G. The labeling for this product cannot be reviewed until an acceptable eye irritation study is submitted and the acute inhalation study is upgraded.

Further consideration of this application for registration will await submission of requested acute toxicology information.

Sincerely yours,

Robert J. Taylor
Product Manager (25)
Fungicide-Herbicide Branch
Registration Division (H7505C)

MEMORANDUM:

Subject: EPA File Symbol/EPA Reg. No.:524-ULU

From: Lucy D. Markarian, Biologist LM 3/11/92
Precautionary Review Section
Registration Support Branch
Registration Division (H7505C)

To: Robert J. Taylor/Vickie Walters, PM 25
Fungicide-Herbicide Branch
Registration Division (H7505C)

Thru: Thomas C. Ellwanger, Section Head E 3/26/92
Precautionary Review Section
Registration Support Branch
Registration Division (H7505C)

Applicant: Monsanto Agricultural Company
800 N. Lindbergh Blvd.
St. Louis, Missouri 63167

FORMULATION FROM LABEL:

Active Ingredient(s):	% by wt.
Glyphosate: N-(phosphonomethyl)glycine)	41.3 %
Inert Ingredient(s):	
.....	58.7 %
Total:	100.0 %

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BACKGROUND

Monsanto Agricultural has submitted six studies for the registration of MON 52249 herbicide under EPA symbol 524-ULU.

RECOMMENDATION

The oral and dermal toxicity, dermal irritation and sensitization tests are acceptable support for the registration.
The inhalation toxicity is considered supplementary data until such time as the requested information as specified in the rationale for the rating of the test is supplied and found satisfactory.
The eye irritation study is considered supplementary data . A new eye study that evaluates eyes more realistically must be submitted.

The following is the rationale behind the rating of the submitted tests:

Dermal Toxicity- Core minimum

1-The test material was applied to a larger area than recommended in the guidelines. The guidelines state that the test material should be applied to 10 % of the body surface, not a minimum of 10 %. By shaving the entire trunk, dorsum and ventrum, the exposed area was significantly larger than it should have been. This minimizes the effects on the skin consequently alters the rate of absorption.

2- Individual doses for rats is not presented. This would have given a better idea of the propriety of the area used.

3- the guidelines state that the test material should be applied to the dorsum of the animals. In the test all the shaved area, including the ventrum, was used.

Inhalation Toxicity- supplementary: upgradeable

1-MMAD was calculated only once during exposure. There is no assurance that the particle size remained constant during the entire exposure.

2- The particle size distribution is not presented. There are large differences in the exposure concentrations. Of greater concern is the difference in concentration between group 2 and 1. Group 2 was exposed to 1.3 mg/L and group 1 was exposed to 5.8 mg/L. In group 1 the mortality rate was twice that of group 2 . Since the particle size distribution is not presented, it is not possible to determine if less than expected mortality in group 1 was due to a lower percentage of respirable particles. Giving the percentage of particles under 1 um is not enough.

3-The system of generation of the test atmosphere was

different at the highest level. PRS would prefer to have all levels of exposure to be generated the same way. This would avoid adding a variable to the test system. The presentation of the particle size distribution would have been reassuring, especially if the distribution at both exposures were comparable in percentage at comparable stages.

4-The summary table of observed symptoms of toxicity must agree with the tabulated data for individual observations. This was not the case in the presented data. It is not certain what symptoms were observed in which group. Group 1 and group 3 seem to be confused with one another according the way it is presented in the report.This needs to be clarified.

5- The sampling rates and volumes must be specific. It is not sufficient to state that it was sampled at a known rate. The volumes of sampling must be uniform. It is not explained why the volume varied from 5 to 30 L.

6- It is not clear how opacity of the eye observed at death can be attributable to death. A clarification of this as well as what is meant by other terminology as :"disuse of limbs", and "High pitched sounds" is necessary. Was the "disuse" paralysis, and neurological in origin or was it physical injury? Were the high pitched sounds due to respiratory distress or distress in general?

The test may be upgraded if the particle size distribution is presented and data clarified as mentioned in the above remarks.

Eye Irritation- Supplementary

1-The grading of the ocular irritation, contrary to what the laboratory believes to be according to EPA grading system, is not according to the grading system the guidelines have specified. There is no EPA grading system. EPA guidelines have adopted the Draize system in its entirety.

2-Draize makes no distinction between ulceration and opacity. Therefore, PRS expects all ulceration and necrosis to be graded with the maximum irritation score of opacity. If the corneal epithelium is missing due to treatment, as it is defined in the legend, then this is destruction of tissue. If evaluated correctly, it is not easily reversible, and certainly not within 4 days.

3-In recording iritis, if it is present at all it is remarkable, no matter how slight the observer considers it to be, and must be given a numerical evaluation. If it is slight enough, the observed iritis will not be persistent, and will not influence the toxicological standing of the test.

4-Necrosis of the conjunctiva is considered in depth injury.

> PRS is unable to accept necrosis that is present one day and disappears the next without leaving a trace, as it is recorded in two cases, and in another healed completely within four days. Necrosis is defined as death of tissue, either as individual cells, groups of cells, or in small localized areas. The recorded necrosis would have to be in localized areas to be observed grossly, since individual cells and even small groups of cells would not be observable to the naked eye. It is not clear how a group of cells could die and be replaced overnight with others, without a trace of the destruction.

A new eye irritation test must be submitted that evaluates the eyes more realistically.

LABELING

It is not possible to assign a signal word at this time due to the supplementary rating of the eye study.

Upon the presentation of a successful eye study, and supplying the missing information from the inhalation test,precautionary label will be reviewed. The successful tests at this time do not require any precautionary statements.

5

DATA REVIEW FOR ACUTE ORAL TOXICITY TESTING (§ 81-1)

Product Manager:25
MRID No.:420355-02
Testing Facility: Bio/Dynamics, Inc.
Author(s): Donna L. Blaszcak
Species: Rat, Spragur Dawley
Age:9 - 12 weeks old
Weight: Males 261-284 g, Females 226-252 g
Source: Charles River Breeding Laboratories,Kingston, NY
Test Material:MON-52249 Lot RUD-9104-3089-F, yellow liquid
Quality Assurance (40 CFR §160.12): Included

Reviewer: L. Markarian
Report Date:2/11/92
Report No.6053-91

Conclusion:

1. **The estimated LD_{50} is** > 5000 mg/kg
2. **Tox. Category:** IV **Classification:** Guideline

Procedure (Deviations from §81-1):

Fasted animals were intubated with the test material as received. Observations were at 1, 2, and 4 hrs after intubation, and daily thereafter. Body weights were taken before fasting, at initiation and on days 7 and 14 and at death. Necropsy was performed on all animals. Carbon dioxide euthanasia was used.

Results:

Dosage mg/kg	(Number Killed/Number Tested)		
	Males	Females	Combined
5000	0/5	1/5	1/10

Symptoms & Gross Necropsy Findings:
One female died on day 2. Symptoms of toxicity included dyspnea, wet and dry rales, soft stools and resulting stains, unthrifty appearance, abdominal gripe, decreased activity and decreased food consumption.
Dry rales, unthrifty appearance, and decreased food consumption lasted to termination in one animal. One male lost body weight at 7 days, and although gained back some of the weight, did not reach the pretest body weight at termination.
At necropsy the female that died showed a swollen uterus and red walls of the intestines as well as some autolytic changes. The survivors showed discoloration of and red foci on the lungs.

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DATA REVIEW FOR ACUTE DERMAL TOXICITY TESTING (§81-2)

Product Manager: 25
MRID No.: 420355-03
Testing Laboratory: Bio/ Dynamics
Author(s): Donna L. Blaszcak
Species: Rat, Sprague Dawley
Weight: **males 253 - 269 g, females 241 - 266 g**
Source: Charles River Breeding Laboratories, Inc. Kingston, NY
Test Material: MON 52249, Lot RUD-9104-3089-F, yellow liquid
Quality Assurance (40 CFR §160.12): Included

Reviewer: L. Markarian
Report Date: 3/11/92
Report No.: 6054-91

Summary:

1. **The estimated LD_{50} is > 5000 mg/kg**

2. **Tox. Category:** IV **Classification:** core minimum

Procedure (Deviation From §81-2):

The trunks of the rats were clipped 24 hr prior to application. The test material was applied to the entire shaved area of the animals, covered with 8 ply gauze and overwrapped with plastic secured by tape. At 24 hours the wrappings were removed and the test sites wiped with wet paper towels. Observations were at 1, 2, and 4 hours after application and daily thereafter. There were twice daily viability checks. Necropsy was performed on all animals. Carbon dioxide euthanasia was used.

Results:

Reported Mortality

DOSAGE mg/kg	(NUMBER KILLED/NUMBER TESTED)		
	Males	Females	Combined
5000	0/5	0/5	0/10

Symptoms & Gross Necropsy Findings:

No mortality, signs of systemic toxicity or gross pathology is reported. It is stated that no severe dermal reactions were observed.

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DATA REVIEW FOR ACUTE INHALATION TOXICITY TESTING (§81-3)

Product Manager: 25
MRID No.: 420355-04
Testing Laboratory: Monsanto Environmental Health Laboratory
Author(s): B.R.Dudek
Species: Rat, Sprague Dawley
Weight: **Males 292-325 g, Females 209 - 228 g**
Source: Charles River Breeding Laboratory, Portage, MI
Test Material: MON 52249, Lot RUD-9104-3089-F, Yellow liquid
Quality Assurance (40 CFR §160.12): Included

Reviewer: L. Markarian
Report Date: 3/11/92
Report No.: ML-91-136/ EHL 91044

Summary:

1. LC_{50} **(mg/kg):** **Males** =1.6 (0.33728-8.2727)
   Females = 2.8 (0.56359-26.410)
   Combined =2.1 (1.0137-4.6700)
2. **Tox. Category:** III **Classification:** supplementary upgradeable

Procedure (Deviation From §81-3):

Four hour exposures were in 250 L NY University style stainless steel chamber.

Two types of generation were used. For the two lower chamber concentrations (group II & III) the double flask/Laskin type nebulizer and discriminator system, and at the highest concentration (Group I) the FMI pump/ nebulizer system was used to create the aerosol.
The double flask system created a finer aerosol, but was not able to create a high enough concentration to determine the LC_{50} of the test material. Each flask contained a nebulizer. The generated vapor passed through a particle discriminator before entering the exposure chamber,as a result the smaller particle size was possible. The discriminator was designed at Monsanto.
The pump/ nebulizer system consisted of FMI fluid metering pump(Model RP-G20) that delivered the test fluid to the liquid inlet of the nebulizer. The aerosol was generated by compressed dried air delivered to the nebulizer. The resultant atmosphere was introduced into the chamber.

Chamber concentrations were measured four times during each exposure by sampling from the breathing zone with glass impingers containing 0.1 % Antifoam in water at a known rate (unspecified) in 5- 30 L volume. It is not stated why such variation was necessary in the sampling volume. Analysis was by liquid chromatography.

Particle size analysis was made using an Anderson Cascade Impactor once every exposure at the sampling rate of 28 lpm. Volume of sample not specified.

Chamber air flow, temperature and humidity were monitored constantly and recorded at 30 minute intervals.

Observations were hourly during exposure but limited by the placement of the cages in the chamber. The animals were observed immediately after the removal from the chamber and daily thereafter. There were mortality checks twice a day.
Body weights were recorded at initiation and on days 2, 7, and 14.
Necropsy was performed on all animals.

RESULTS

Group	**III**	**II**	**I**
Mean Concentration mg/L analytic	0.25	1.3	5.8
Range	**0.24-0.28**	**1.1-1.5**	**5.5-6.0**
MMAD um	3.0	2.2	3.2
GSD	1.7	1.7	1.8
Particles< 1 um %	3.9	7.6	3.0
Mean air flow lpm	146.4	128.6	102.2
Mean temperature $^{\circ}$ **C**	23.3	23.2	23.6
Mean Humidity %	49.9	54.2	73.9
MORTALITY			
Males	0/5	3/5	4/5
Females	0/5	1/5	4/5
combined	0/10	4/10	8/10

Symptoms and Gross Necropsy Findings:

The symptoms of toxicity are reported as dehydration, disuse of limbs (paralysis?), labored ,rapid or shallow respiration, high pitched sounds, rattling sounds (not clear if respiratory) nasal discharge, periocular encrustation, partially or completely closed eyes, focal or general loss of hair, and ocular opacity. These symptoms are given as summaries and as individual observations. However the individual observations do not agree with the summary tables. What is attributed to group 3 in individual observations is attributed to group 1 in the summary.
Necropsy statement says that opacity observed in the eyes of the highest level animals were attributable to death. Other observations at necropsy as abnormal discharge and encrustation from the nose and the turbinates were not considered to be exposure related either.

DATA REVIEW FOR ACUTE EYE IRRITATION TESTING (§81-4)

Product Manager:25
MRID No.:420355-05
Testing Laboratory: Bio/Dynamics, Inc.
Author(s): Donna C. Blaszcak
Species: Rabbit, New Zealand White
Sex: 3 male and 3 female
Weight:2.2 - 2.7 K
Source: Hazleton Research Products, Inc., Denver, PA
Dosage:0.1 ml
Test Material:MON 52249, Lot RUD-9102-2825-F, yellow liquid
Quality Assurance (40 CFR §160.12): Included

Reviewer: L. Markarian
Report Date:3/11/92
Report No.:6023-91

Summary:

1. **Toxicity Category:**

2. **Classification:**Supplementary

Procedure (Deviations From §81-4):

Test material as received was instilled in the conjunctival sacs of six preexamined right eyes. Left eyes served as control. examinations were conducted at 1, 24, 48, 72 hours and on days 7, 10, and 14, or until all irritation cleared. Scoring was according to a method similar to Draize. There were twice daily viability checks.

Results:

Observations	(number "positive"/number tested)							
	Hour	Days						
	1	1	2	3	4	7	14	21
Cornea Opacity	0/6	1/6[1]	2/6[2]	1/6	-	1/6[1]	0/6	
Iris	1/6[3]	0/6	0/6	0/6	-	0/6	0/6	
Conjunctivae								
Redness	6/6	6/6	6/6	5/6	-	2/6	0/6	
Chemosis	6/6	3/6	0/6	0/6	-	0/6	0/6	
Discharge	5/6	0/6	0/6	0/6	-	0/6	0/6	
Necrosis	0/6	0/6	2/6	1/6	-	0/6	0/6	

-1 The draize evaluation system which EPA uses does not distinguish between ulceration and opacity. Ulceration must be graded as opacity. Ulceration should be graded with grade 4 opacity, as it is described as "absence of a gross patch of corneal epithelium", and this is considered equivalent to irreversible damage.

-2 Dullness observed after the one hour reading cannot be evaluated as a negative response. Grading with + signs is not included in the accepted Draize Scale.
-3 If iritis is present at all it must be evaluated with a numerical grade of 1. As it is stated for grading of opacity, + signs are not acceptable according to the Draize scoring system.

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DATA REVIEW FOR SKIN IRRITATION TESTING (§81-5)

Product Manager:25
MRID No.: 429355-06
Testing Laboratory: Bio/Dynamics Inc.
Author(s): Donna C. Blaszcak
Species: Rabbit, New Zealand White
Age:at least 8 weeks old, Young adult
Sex:two males & four females
Dosage:0.5 ml
Test Material:MON 52249,Lot RUD-9104-3089-F, Yellow liquid
Quality Assurance (40 CFR §160.12): Included

Reviewer: L. Markarian
Report Date:3/11/92
Report No.:6055-91

Summary:

1. **The Primary Irritation Index** =0.8

2. **Toxicity Category:**IV

3. **Classification:**Guideline

Procedure (Deviations From §81-5):

Undiluted test material was applied to the shaved skin of the animals at two locations on the dorsum contralaterally. The sites were covered with 1 x 1 inch gauze and tape.the trunks of the animals were wrapped in gauze and covered with porous tape to semiocclude the sites. Collars were placed around the necks of the animals. At 4 hrs the wrappings were removed and the sites wiped with wet paper towels. Observations were made at 30 min, and 24, 48, and 72 hrs according to a scale similar to Draize.

Results:

Grade 2 erythema was observed at 30 minutes at 10/12 sites. One of these also showed grade 1 edema. At later intervals the highest irritation was grade 1 erythema. One animal still showed grade 1 erythema at 72 hrs.

Special Comments:

Guidelines do not require more than one patch per test material. Using more than one patch per animal is not encouraged.

DATA REVIEW FOR SKIN SENSITIZATION TESTING (§81-6)

Product Manager:25
MRID No.: 420355-07
Testing Laboratory: Bio/Dynamics, Inc.
Author(s): Donna L. Blaszcak
Species: Guinea Pig, Hartley
Weight:307 - 419 g
Source: Hazleton Research Products, Inc.
Test Material: Mon 52249, Lot RUD-9104-3089-F, Yellow Liquid
Positive Control Material:DNCB
Quality Assurance (40 CFR §160.12): Included

Reviewer: L. Markarian
Report Date:3/11/92
Report No.:6056-91

Method: Closed Patch Repeat Insult Dermal Sensitization (Buehler)

Summary:

1. **This Product is not a dermal sensitizer.**

2. **Classification:**Guideline

Procedure (Deviation From §81-6):

A pretest screening was made to define the induction and elicitation concentrations, using six guinea pigs and four concentrations. Four patches were applied per guinea pig: one each at 100 % and dilutions at 50, 25, and 10 % in distilled water in Hilltop chambers. No reaction was observed at any concentration, and 100 % was used for inductions and elicitations.

The test material was applied to the shaved skin of ten animals, undiluted, in 0.3 ml aliquots in Hilltop chambers. The trunks of the animals were wrapped in impermeable plastic and firmly secured by elastic bandage wrapped around the trunk also. At six hours the wrappings were removed and the sites wiped clean of residue with gauze and water. The procedure was repeated three times, once per week for three weeks. Challenge was two weeks after the last induction at the same concentration and applied similarly at a naive site. At the same time ten naive animals were challenged similarly.
Evaluations were made at 24 and 48 hours after each induction and challenge applications according to Buehler.

Reference is given to a series of tests conducted with DNCB (induced at 0,5 % and challenged at 0.3 %), the last of which was within three months of the presented test. DNCB tests demonstrate the ability of the laboratory to induce sensitization.

Results:

No reaction was observed after any of the applications at induction or at challenge. The test material is not considered to be a sensitizer.

Tox Chem No 471AAB Current Date:3/11/92

Laboratories:Bio/Dynamics, Inc., Mettlers Road, East Millstone, NJ 08875-2360
Monsanto Company, Environmental Health Laboratory,
645 S.Newstead Ave., St. Louis, Missouri 63110

STUDY	MATERIAL	MRID No	RESULTS	TOX CAT	CORE GRADE
Oral Toxicity Limit test (rats) Bio/Dynamics 6053-91 8/15/91	MON-52249 Lot RUD-9104-3089-F	420355-02	LD_{50}>5000 mg/kg	IV	Guideline
Dermal Toxicity Limit Test (rats) Bio/Dynamics 6054-91 8/15/91	" " "	420355-03	LD_{50}>5000 mg/kg	IV	minimum
Inhalation Toxicity LD_{50} study (rats) Monsanto ML-91-136/EHL 91044 8/28/92	" " "	420355-04			Supplementary Upgradeable
Eye Irritation in Rabbits Bio/Dynamics 6023-91 8/15/92	" " "	420355-05			Supplementary
Dermal Irritation in Rabbits Bio/Dynamics 6055-91 8/15/91	" " "	420355-06	PII 0.8 minimally irritating	IV	Guideline
Dermal Sensitization in Guinea Pigs Bio/Dynamics 6056-91 9/9/91	" "	420255-07	not sensitizer	NA	Guideline

DATE: 1/6/92 PRODUCT CHEMIST/REVIEWER: Getz, M.E.

PAGE: 1 OF 1 CONCURRED BY: _____

COMPANY: Monsanto EPA REG. NO: 524-CLC

PRODUCT NAME: MON-52249 Herbicide

TO PM NO: 25 ACTION CODE: 16T

BACKGROUND: Review product chemistry CSF and Label

ACTIVE INGREDIENT LABEL CLAIM/ LATEST LABEL CLAIM (DATED / /)

Glyphosate - N-(phosphonomethyl glycine) 41.5%

REFERENCES USED: _____

FOOD USE (✓) INERTS CLEARED C(✓), D(✓) NON FOOD USE ( )
CFR 21 PARTS 170-199 ( ) TOXIC INERTS LIST 1( ), 2( )

The CSF and Label are acceptable.

Product chemistry is acceptable

Because of this product may form the gas in certain conditions, this should be referred to precautionary Review

1/7/92

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Monsanto

Monsanto Company
Suite 1100
700 14th Street, N.W.
Washington, D.C. 20005

541 2762

September 20, 1991

Document Processing Center (APPL)
Office of Pesticide Programs - H7504C
U.S. Environmental Protection Agency
1921 Jefferson Davis Highway
Crystal Mall #2, Room 226A
Arlington, Virginia 22202

Attention: Mr. Robert J. Taylor
Product Manager (25)

Subject: Request for Registration of a New Product Containing Glyphosate: MON-52249 Herbicide

Dear Sir:

Roundup® herbicide (EPA Reg. No. 524-308), a formulation containing the isopropylamine salt of glyphosate, is registered for use in both agricultural and non-agricultural sites using a variety of application techniques. Monsanto has now developed a new liquid formulation of glyphosate - MON-52249 herbicide.

MON-52249 contains the isopropylamine salt of glyphosate at the same concentration as Roundup (41%), but contains a reduced amount of a slightly different surfactant. The new surfactant, [redacted] is present at a nominal level of [redacted] in the formulation. This surfactant is produced for Monsanto by [redacted] respectively). It is Monsanto's understanding that this surfactant is approved under 40 CFR 180.1001. Both [redacted] have authorized Monsanto access to their Master Files for the purpose of registering MON-52249; copies of these letters are included in the administrative portion of this submission.

Since the only change in the formulation is a slight difference in the surfactant, all other data necessary to support the registration of this product for agricultural and non-agricultural uses should remain unchanged.

The enclosed eight-volume submission, designated R.D. 1057, contains product chemistry data, acute toxicity data, label use instructions and the administrative materials required for the registration of MON-52249. We ask the EPA to approve

Inert ingredient information may be entitled to confidential treatment

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TELEPHONE: (202) 783-2460 FACSIMILE: (202) 783-2468

this submission as quickly as possible.

If you have any questions regarding this submission, please contact Dr. Kevin Cannon or me.

Sincerely,

Sheila A. Schuette

Sheila A. Schuette, Ph.D.
Senior Registration Specialist
(314) 694-7248

cc: R.P. Schneider
K.F. Cannon

OCT - 2 1991

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Pesticide Programs

MONSANTO COMPANY
700 14TH ST., NW, SUITE 1100
WASHINGTON, DC 20005

Report of Analysis for Compliance with PR Notice 86-5

Thank you for your transmittal of 09/24/91. Our staff has completed a preliminary analysis of the material. The results are provided as follows:

Your submittal was found to be in full compliance with the standards for submission of data contained in PR Notice 86-5. A copy of your bibliography is enclosed, annotated with Master Record ID's (MRIDs) assigned to each document submitted. Please use these numbers in all future references to these documents. Thank you for your cooperation. If you have any questions concerning this data submission, please raise them with the cognizant Product Manager, to whom the data have been released.

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420355-00

TRANSMITTAL DOCUMENT

SUBMITTED BY

Monsanto Agricultural Company
800 N. Lindbergh Blvd.
St. Louis, Missouri 63167

REGULATORY ACTION IN SUPPORT OF WHICH THIS PACKAGE IS SUBMITTED

Registration of MON-52249 Herbicide

TRANSMITTAL DATE

September 20, 1991

SUBMITTED STUDY

R.D. 1057

LIST OF SUBMITTED DOCUMENTS

Volume 1: Administrative Materials Required for the Registration of MON-52249 Herbicide

Volume 2: 420355-01 Nord, P.J., "Product Chemistry Data for MON-52249 Herbicide" (1991), MSL-11310, an unpublished report by Monsanto Agricultural Company. (Guideline Series 61, 62, and 63).

Volume 3: 420355-02 Blaszcak, D.L., "Acute Oral Toxicity Study in Rats with MON-52249" (1991) Study No. 6053-91, Monsanto Reference No. BD-91-132, an unpublished study by Bio/dynamics, Inc., conducted for Monsanto Company. (Guideline 81-1).

Volume 4: 420355-03 Blaszcak, D.L., "Acute Dermal Toxicity Study in Rats with MON-52249" (1991) Study No. 6054-91, Monsanto Reference No. BD-91-133, an unpublished study by Bio/dynamics, Inc., conducted for Monsanto Company. (Guideline 81-2).

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Volume 5: 42035504 Dudek, B.R., "Acute Inhalation Study of MON-52249" (1991) ML-91-136/EHL 91044, an unpublished study by Monsanto Company. (Guideline 81-3),

Volume 6: 42035505 Blaszcak, D.L., "Primary Eye Irritation Study in Rabbits with MON-52249" (1991) Study No. 6023-91, Monsanto Reference No. BD-91-84, an unpublished study by Bio/dynamics, Inc., conducted for Monsanto Company. (Guideline 81-4).

Volume 7: 42035506 Blaszcak, D.L., "Primary Dermal Irritation Study in Rabbits with MON-52249" (1991) Study No. 6055-91, Monsanto Reference No. BD-91-134, an unpublished study by Bio/dynamics, Inc., conducted for Monsanto Company. (Guideline 81-5).

Volume 8: 42035507 Blaszcak, D.L., "Closed-Patch Repeated Insult Dermal Sensitization Study in Guinea Pigs with MON-52249" (1991) Study No. 6056-91, Monsanto Reference No. BD-91-135, an unpublished study by Bio/dynamics, Inc., conducted for Monsanto Company. (Guideline 81-6).

COMPANY OFFICIAL: Sheila A. Schuette
Sheila A. Schuette, Ph.D.
Senior Registration Specialist

COMPANY NAME: MONSANTO AGRICULTURAL COMPANY

COMPANY CONTACT: Dr. Kevin F. Cannon (202) 783-2460

Please read instructions and notice on reverse before completing form. Form Approved. OMB No. 2070-0060. Approval expires 6-30-90.

United States Environmental Protection Agency
Office of Pesticide Programs (TS-767)
Washington, DC 20460

EPA

Application for Pesticide: [X] Registration [ ] Amendment

OPP Identifier Number: 134088

Section I

1. Company/Product Number	2. Date	3. Product Manager	4. Proposed Classification
Monsanto/524-XXX ULU	September 20, 1991	Robert J. Taylor (25)	[X] General [ ] Restricted

5. Name and Address of Applicant (Include ZIP Code)

Monsanto Company
Suite 1100
700 14th Street, N.W.
Washington, D.C. 20005

[ ] Check if this is a new address

6. Product Name
MON-52249 Herbicide

Section II - Amendment Information

1. Subject
[ ] Resubmission in response to Agency letter [ ] Final printed label in response to Agency letter [X] Other (explain below)

Date of Letter: 9/20/91

Application for registration of glyphosate formulation MON-52249 Herbicide.

Section III

1. Material This Product Will Be Packaged In

Child-Resistant Packaging	Unit Packaging	Water-Soluble Packaging
[ ] Yes [X] No	[X] Yes [ ] No	[ ] Yes [X] No
	If "Yes," Unit package wgt: ; No. per container: 2	If "Yes," Package weight: ; No. per container:

2. Type of Container
[ ] Metal
[ ] Plastic
[ ] Glass
[X] Paper
[ ] Other (Specify)

3. Location of Net Contents Information
[ ] Label [X] Container

4. Size(s) of Retail Container
2.5 gallon, 30 gallon

5. Location of Label Directions
[X] On Label
[X] On material accompanying product

6. Manner in Which Label Is Affixed To Product
[ ] Lithograph
[ ] Paper glued
[ ] Stenciled
[X] Other (Specify) Vinyl glued

Section IV

1. Contact Point (Complete items directly below for identification of individual to be contacted, if necessary, to process this application).

Name: Kevin F. Cannon, Ph.D.

Title: Manager, Agricultural Affairs

Telephone No. (Include Area Code): (202) 783-2460

6. Date Application Received (Stamped)

Certification
I certify that the statements I have made on this form and all attachments thereto are true, accurate, and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law.

2. Signature: Sheila A. Schuette

3. Title: Senior Registration Specialist

4. Typed Name: Sheila A. Schuette, Ph.D.

5. Date Signed: Sept. 20, 1991

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EPA Form 8570-1 (Rev. 9-88) Previous editions are obsolete.

Paperwork Reduction Act Notice and Instructions

Paperwork Reduction Act Notice

Public reporting burden for this collection of information is estimated to average of 0.85 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Instructions

General

This form is to be used for all applications for new and amended registrations for pesticide products.

In order to process an application for new registration submitted on this form, the following material must accompany the application:

1. Offer to Pay Statement (EPA Form 8570-22, -23, or -24). (If not exempted by 40 CFR 162.9-1(b).)
2. Confidential Statement of Formula (EPA Form 8570-4).
3. Five copies of draft labeling.
4. Three copies of any data submitted.

Submission of Labeling - Labeling should first be submitted in the form of draft labels with all applications for new registration. Such draft labels may be in the form of typed label text on 8 1/2 x 11 inch paper or as a mockup of the proposed label. If prepared as a mockup it should be constructed in such a way as to facilitate storage in an 8 1/2 x 11 inch file. Mockup labels significantly smaller than 8 1/2 x 11 inches should be mounted on 8 1/2 x 11 inch paper for submission.

Submission of Data - Data submitted in support of this application must be submitted in accordance with PR Notice 86-5.

Specific

Please read the instructions listed below before completing this application. First determine the type of registration action, listed in Block A, for which you are submitting this application. For applications submitted in connection with New Registration actions, Section I, III, and IV must be completed by the applicant. For applications submitted in connection with amended registration actions, Section I, II, and IV must be completed by the applicant.

Block A - Check the appropriate action for which you are submitting this form.

Section I - This Section must be completed for both Registration and Amended Registration actions.

1. **Company/Product Number** - Insert your company number, if one has been assigned. This number may have been assigned to you as a basic registrant, a distributor, or as an establishment. If application is for an amendment, insert the registration number of the product.
2. **Date** - Fill in the appropriate date.
3. **Product Manager** - If known, fill in the name and number of the Product Manager.
4. **Proposed Classification** - Specify the proposed classification for this product.
5. **Name and Address of Applicant** - The name of the firm or person and address shown in your application is the person or firm to whom registration will be issued. If you are acting in behalf of another party, you must submit authorization from that party to act for them in registration matters. An applicant not residing in the United States must have an authorized agent residing in the United States to act for them in all registration matters. The name and complete mailing address of such an agent must accompany this application.
6. **Product Name** - Enter the complete product name of this pesticide as it will appear on the label. The name must be specific to this product only. Duplication of names is not permitted among products of the same company. Do not include any brand name or company line designations.

Amendment Information

Section II - This Section must be completed for all applications submitted in connection with Amended Registration.

1. **Subject of Amendment** - Check the appropriate block, and provide a brief explanation of the purpose(s) for the amendment, such as: "the addition of a site, pest, or crop"; "to change inert ingredient"; "general label revisions of precautionary statements," etc.

Packaging and Container Information

Section III - This Section must be completed for all applications submitted in connection with New Registration.

1. **Type of Packaging** - Check the appropriate block if your product will be packaged in the indicated packaging types. Indicate the size of the individual packets and number per retail container.
2. **Type of Retail Container** - Indicate type of container in which product will be marketed.
3. **Location of Net Contents** - Specify the net contents of all retail containers for your product.
4. **Size(s) of Retail Container** - Specify the net contents of all retail containers for your product.
5. **Location of Use Directions** - Indicate the location of the use directions for your product.
6. **Manner in which label is affixed to product** - Indicate the method product labeling is attached to retail container.

Contact Point

Section IV - This Section must be completed for all Registration and Amended Registration applications.

1-5. Self-explanatory.

6. EPA Use Only.

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U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDE PROGRAMS (PM-357)
WASHINGTON, D.C. 20460

LABEL TECHNICAL DATA

(See INSTRUCTIONS on back of last part)

F

1. COMPANY REGISTRATION NO.: 524-XXX ULO

2. EPA USE ONLY: – –

3. PRODUCT NAME: MON-52249 Herbicide

	4. APPLICATION SITES (Check all that apply)		5. PEST TYPE (Check all that apply)		7. USER TYPE (Check all that apply)
X	01 CROPS (Fruit)		01 ALGAE	X	01 UNSPECIFIED GENERAL USE
X	02 CROPS (Vegetable)		02 AMPHIBIAN/REPTILE		02 UNSPECIFIED RESTRICTED USE
X	03 CROPS (Field)		03 BACTERIA		03 HOMEOWNER USE
	04 CROPS (Spice)		04 BIRDS		04 JANITORIAL USE
X	05 CROPS (Nut)		05 FISH		05 PEST CONTROL OPERATOR USE
	06 CROPS (Other)		06 FOULING ORGANISMS	X	06 COMMERCIAL APPLICATOR USE
	10 SOIL TREATMENT (No crop specified)		07 FUNGI	X	07 FARMER USE
X	20 FOREST		08 INSECTS AND MITES		08 MEDICAL USE
X	30 ORNAMENTALS		09 MAMMALS		09 VETERINARY USE
	40 TURF		10 NEMATODES		10 GOVERNMENT AGENCY USE
	50 STORED PRODUCTS TREATMENT	X	11 PLANTS		11 MANUFACTURING USE
	51 ANIMALS (Livestock)		12 RODENTS		**8. FORMULATION (Check one only)**
	52 ANIMALS (Dairy)		13 SLIME		
	53 ANIMALS (Pet)		14 SLUGS AND SNAILS		01 TECHNICAL CHEMICAL
	54 ANIMALS (Laboratory)		15 VIRUS		02 FORMULATION INTERMEDIATE
	55 ANIMALS (Other)		16 OTHER (Specify)		03 DUST
X	71 OUTDOOR (Nocrop Agricultural)				04 GRANULAR
	72 OUTDOOR (Resident/Commercial)				05 PELLETED/TABLETTED
X	73 OUTDOOR (Non agricultural)				06 WETTABLE POWDER
	81 BUILDINGS (Agricultural)		**6. MODE OF ACTION (Check all that apply)**		07 WETTABLE POWDER/DUST
	82 BUILDINGS (Commercial)				08 CRYSTALLINE
	83 BUILDINGS (Food Processing)		01 ATTRACTANT		09 MICROENCAPSULATED
	84 BUILDINGS (Medical)		02 BIOLOGICAL CONTROL		10 IMPREGNATED MATERIALS
	85 BUILDINGS (Residential)		03 CHEMOSTERILANT		11 SELF-GENERATING SMOKE
	91 EQUIPMENT (Commercial)		04 DEFOLIANT		12 EMULSIFIABLE CONCENTRATE
	92 EQUIPMENT (Food)		05 DESICCANT		13 INVERT EMULSION
	93 EQUIPMENT (Agricultural)		06 FEEDING DEPRESSANT		14 FLOWABLE CONCENTRATE
	94 EQUIPMENT (Medical)	X	07 GROWTH INHIBITOR	X	15 SOLUBLE CONCENTRATE
	95 EQUIPMENT (Transportation)		08 GROWTH REGULATOR		16 SOLUTION (Ready to Use)
	96 LAUNDRY AND DRY CLEANING		09 POISON (Single dose)		17 OILS (No added pesticide)
	97 INDUSTRIAL PRESERVATIVES		10 POISON (Multiple Dose)		18 PRESSURIZED (Gas)
	98 PESTICIDE (Manufacturing only)		11 PRESERVATIVE		19 PRESSURIZED (Liquid)
	99 OTHER (Specify)		12 REPELLENT		20 PRESSURIZED (Dust)
			13 OTHER (Specify)		21 OTHER (Specify)

REMARKS:

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EPA Form 8570-10 (11-74)

BURDEN STATEMENT FOR DATA REFERENCE SHEET
(EPA Form 8570-20; OMB Form No. 0070-0060)

The public reporting burden for this collection of information is estimated to average one hour per completed Data Reference Sheet. This includes reviewing instructions, identifying pertinent references, and citing the references on this instrument. It is estimated that approximately eight (8) hours are required to prepare a complete set of references for an initial application to register a "typical" or "average" chemical. After that, additional supporting references may be necessary but would not require the number of references necessary for an initial application to register. Send comments regarding this burden, to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460; and to the Office of Management and Budget, Paperwork Reduction Project (2070-0060), Washington, DC 20503

Form Approved. OMB No. 2070-0060. Approval expires 11/30/93

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGISTRATION DIVISION (TS-767)
WASHINGTON, D.C. 20460

DATA REFERENCE SHEET

(See instructions on the back of the last page before completing.)

1. PAGE: 1 OF 1

2. EPA REGISTRATION NO./FILE SYMBOL: 524-ULU

3. APPLICANT'S NAME AND ADDRESS:
Monsanto Company
700 14th Street, N.W., Suite 1100
Washington, D.C. 20005

4. PRODUCT NAME: MON-52249

5. PRODUCT MANAGER: Robert J. Taylor (25)

6. TO ACCOMPANY APPLICATION FOR REGISTRATION DATED: September 20, 1991

7. NAME OF STUDY	SOURCE OF STUDY: a. APPLICANT CONDUCTED STUDY (mark "X")	b. OBTAINED FROM EPA (mark "X")	c. OBTAINED FROM ANOTHER FIRM OR SOURCE (give name and address)	d. OBTAINED FROM PUBLIC LITERATURE (give reference)	e. OTHER (explain)	f. ACCESSION NUMBER (if known)
V1. Administrative Material Required for the Registr. of MON-52249 Herbicide	X					
V2. Product Chemistry Data for MON-52249 Herbicide.	X					
V3. Acute Oral Toxicity in Rats with MON-52249	X					
V4. Acute Dermal Toxicity Study in Rats with MON-52249	X					
V5. Acute Inhalation Study of MON-52249	X					
V6 Primary Eye Irritation Study in Rabbits with MON-52249	X					
V7. Primary Dermal Irritation Study in Rabbits with MON-52249	X					
V8. Closed-Patch Repeated Insult Dermal Sensitization Study in Guinea Pigs with MON-52249	X					

If you marked "X" in this column, do you wish your name placed on the Data Submitters List? ☒ YES ☐ NO

EPA Form 8570-20 (Rev. 1-91) APPLICANT-RETAIN THE LAST COPY EPA COPY

Paperwork Reduction Act Notice

Public reporting burden for this collection of information is estimated to 1.0 hours per response, including time for reviewing instructions, certifying the existence of the appropriate data, and completing and mailing this form. Send comments regarding the burden estimate or any other aspect of this certification process including suggestions for reducing the burden to:

Chief, Information Policy Branch, PM-223
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

and to

Office of Management and Budget
Paperwork Reduction Project (2070-0060)
Washington, DC 20503

EPA Form 8570-29 (7-86) Reverse

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United States Environmental Protection Agency
Washington, DC 20460

EPA

Certification with Respect to Citation of Data

Form Approved
OMB No. 2070-0060
Approval expires 9-30-90

Applicant's Name and Address	EPA File Symbol/Registration Number
	524-XXX ULU
	Product Name: MON-52249 Herbicide
	Date of Application: September 20, 1991

1. This application is supported by all data submitted or cited in the application. In addition, if cite-all options are indicated, this application is supported by all data in the Agency's files that concern the properties or effects of this product or of any other product that is identical or substantially similar, and that is one of the types of data that would be required to be submitted if this application sought the initial registration of a product of identical or similar composition and intended uses under the data requirements in effect on the date of approval of this application.

2. I certify that, for each study cited in support of this application for registration that is an exclusive use study, I am the original data submitter, or have obtained the written permission of the original data submitter to cite that study.

3. I certify that, for each study cited in support of this application for registration that is not an exclusive use study:

I am the original data submitter; or I have obtained the written permission of the original data submitter to cite that study; or

I have notified in writing the companies who have submitted data I have cited to support this application and have offered to: (a) Pay compensation for those data in accordance with section 3(c)(1)(D) and 3(c)(2)(D) of the Federal Insecticide, Fungicide and Rodenticide Act; and (b) Commence negotiations to determine which data are subject to the compensation requirement of FIFRA and the amount and terms of compensation due, if any. The companies I have notified are: *(Check one)*

☐ All companies listed on the Pesticide Data Submitters List for all active ingredients contained in my product (cite-all method or cite-all option under Selective Method). *(Also sign the General Offer to Pay Statement below.)*

☒ Those companies who have submittted the studies which I have cited (Selective method).

Signature	Name and Title	Date
Sheila A. Schuette	Schuette A. Schuette, Ph.D. Sr. Registration Specialist	Sept 20, 1991

General Offer to Pay: I hereby offer and agree to pay compensation to other persons, with regard to the approval of this application, to the extent required by FIFRA sec. 3(c)(1)(D) and 3(c)(2)(D).

Signature	Name and Title	Date

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EPA Form 8570-29 (7-86)

SECTION II

REGISTRATION REQUEST

Proposed MON-52249 Herbicide Label

SPOUT PANEL

PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals

WARNING! CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY. HARMFUL IF SWALLOWED OR INHALED.
Do not get in eyes or on clothing. Wear goggles or a face shield. Avoid breathing vapor or spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.
FIRST AID: IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention.
IF SWALLOWED, this product will cause gastrointestinal irritation. Immediately dilute by swallowing water or milk. Get medical attention.
IF INHALED, remove victim to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. Get medical attention.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards
Do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical and Chemical Hazards
Spray solutions of this product should be mixed, stored and applied only in stainless steel, aluminum, fiberglass, plastic and plastic-lined steel containers.

(Continued on opposite side panel)

FRONT PANEL

MON 52249

HERBICIDE BY Monsanto

Keep out of reach of children.
WARNING! Read precautions on side panel

Read the entire label before using this product.
Use only according to label instructions.
Read "LIMIT OF WARRANTY AND LIABILITY before buying or using. booklet, before buying or using. If terms are not acceptable, return at once unopened.

REFORMULATION OR REPACKAGING IS PROHIBITED.

ACTIVE INGREDIENTS:

*Glyphosate, N-(phosphonomethyl)glycine	41.3%
INERT INGREDIENTS.....	58.7%
	100.0%

*Contains 480 grams per litre or 4 pounds per U.S. gallon of the active ingredient, glyphosate, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid glyphosate.

® Registered trademark of Monsanto Company

NET 2.5 GALLONS

HANDLE SIDE PANEL

(Continued from opposite side panel)

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT INGALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product reacts with such containersand tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

DIRECTIONS FOR USE
It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.
DISPOSAL:
Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is destroyed.

Do not reuse emptied container. Triple rinse and then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

(See label booklet for Complete Directions for Use)

BACK PANEL

LIMIT OF WARRANTY AND LIABILITY

This Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the "Complete Directions for Use label booklet ("Directions") when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE, OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this Company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

Buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this Company, including, but not limited to, incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather, weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied, as well as weather conditions which are outside the application ranges set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF THE LIABILITY OF THIS COMPANY OR ANY OTHER SELLER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE) SHALL BE THE PURCHASE PRICE PAID BY THE USER OR BUYER FOR THE QUANTITY OF THIS PRODUCT INVOLVED, OR, AT THE ELECTION OF THIS COMPANY OR ANY OTHER SELLER, THE REPLACEMENT OF SUCH QUANTITY, OR IF NOT ACQUIRED BY PURCHASE, REPLACEMENT OF SUCH QUANTITY. IN NO EVENT SHALL THIS COMPANY OR ANY OTHER SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES.

Buyer and all users are deemed to have accepted the terms of this LIMIT OF WARRANTY AND LIABILITY which may not be varied by any verbal or written agreement.

Product protected by U.S. Pat. No. 4,405,531. Other patents pending.

MONSANTO COMPANY
AGRICULTURAL PRODUCT
ST. LOUIS, MISSOURI 63167 U.S.A.

EPA Reg. No. 524-XXX

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EPA Est. 524-XX-X

MAP-32041

01400139 26

MON 52249

Herbicide by Monsanto

Complete Directions for Use

EPA Reg. No. 524-XXX

AVOID CONTACT WITH FOLIAGE, GREEN STEMS, OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, SINCE SEVERE INJURY OR DESTRUCTION MAY RESULT.

This product has been approved for use in California except as stated otherwise on pages XXX.

199X-1

Read each of these sections of this label for essential product performance information.

USE THESE CONVENIENT SECTION MARKERS.

GENERAL INFORMATION

MIXING, ADDITIVES, AND APPLICATION INSTRUCTIONS

WEEDS CONTROLLED

NONCROP USES

CROPPING SYSTEMS

MINIMUM TILLAGE

TREE AND VINE CROPS

Read the entire label before using this product.

Use only according to label instructions.

Read ''LIMIT OF WARRANTY AND LIABILITY'' before buying or using. If terms are not acceptable, return at once unopened.

REFORMULATION IS PROHIBITED. SEE INDIVIDUAL CONTAINER LABEL FOR REPACKAGING LIMITATIONS.

LIMIT OF WARRANTY AND LIABILITY

(Not applicable to consumer applications applied by the homeowner for noncommercial purposes as permitted by the supplemental labeling for one-quart containers.)

This Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the Complete Directions for Use label booklet (''Directions'') when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

Buyer and all users shall promptly notify this Company of any claims whether based in contract, negligence, strict liability, other tort or otherwise.

Buyer and all users are responsible for all loss or damage from use or handling which results from conditions beyond the control of this Company, including, but not limited to, incompatibility with products other than those set forth in the Directions, application to or contact with desirable vegetation, unusual weather, weather conditions which are outside the range considered normal at the application site and for the time period when the product is applied, as well as weather conditions which are outside the application ranges set forth in the Directions, application in any manner not explicitly set forth in the Directions, moisture conditions outside the moisture range specified in the Directions, or the presence of products other than those set forth in the Directions in or on the soil, crop or treated vegetation.

THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF THE LIABILITY OF THIS COMPANY OR ANY OTHER SELLER FOR ANY AND ALL LOSSES, INJURIES OR DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT (INCLUDING CLAIMS BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE) SHALL BE THE PURCHASE PRICE PAID BY THE USER OR BUYER FOR THE QUANTITY OF THIS PRODUCT INVOLVED, OR, AT THE ELECTION OF THIS COMPANY OR ANY OTHER SELLER, THE REPLACEMENT OF SUCH QUANTITY, OR, IF NOT ACQUIRED BY PURCHASE, REPLACEMENT OF SUCH QUANTITY. IN NO EVENT SHALL THIS COMPANY OR ANY OTHER SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES.

Buyer and all users are deemed to have accepted the terms of this LIMIT OF WARRANTY AND LIABILITY which may not be varied by any verbal or written agreement.

(INDEX PAGES)
PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

Keep out of reach of children.

WARNING!

CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.
HARMFUL IF SWALLOWED OR INHALED.

Do not get in eyes or on clothing.

Wear goggles or a face shield.

Avoid breathing vapor or spray mist.

Wash thoroughly with soap and water after handling.

Remove contaminated clothing and wash before reuse.

FIRST AID: IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention.

IF SWALLOWED, this product will cause gastrointestinal irritation. Immediately dilute by swallowing water or milk. Get medical attention.

IF INHALED, remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present or in intertidal areas below the mean highwater mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or

plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

ACTIVE INGREDIENT:
*Glyphosate, N-(phosphonomethyl) glycine, in the form of its isopropylamine salt.....41.3%
INERT INGREDIENTS:.....58.7%
100.0%

*Contains 480 grams per litre or 4 pounds per U.S. gallon of the active ingredient glyphosate, in the form of its isopropylamine salt. Equivalent to 356 grams per litre or 3 pounds per U.S. gallon of the acid, glyphosate.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling.

Storage and Disposal

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

See container label for STORAGE AND DISPOSAL instructions.

GENERAL INFORMATION

DO NOT APPLY THIS PRODUCT USING AERIAL SPRAY EQUIPMENT EXCEPT UNDER CONDITIONS AS SPECIFIED WITHIN THIS LABEL.

This product, a water soluble liquid, mixes readily with water to be applied as a foliar spray for the control or destruction of most herbaceous plants. It may be applied through most standard

industrial or field-type sprayers after dilution and thorough mixing with water in accordance with label instructions.

This product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days, but on most perennial weeds may not occur for 7 days or more. Extremely cool or cloudy weather following treatment may slow activity of this product and delay visual effects of control. Visible effects are a gradual wilting and yellowing of the plant which advances to complete browning of aboveground growth and deterioration of underground plant parts.

Unless otherwise specified on this label, delay application until vegetation has emerged and reached the stages described for control of such vegetation under the ''Weeds Controlled'' section of this label. Unemerged plants arising from unattached underground rhizomes or root stocks of perennials will not be affected by the herbicide and will continue to grow. For this reason, best control of most perennial weeds is obtained when treatment is made at late growth stages approaching maturity.

Always use the higher rate of this product per acre within the recommended range when (1) weed growth is heavy or dense, or (2) weeds are growing in an undisturbed (noncultivated) area.

Do not treat weeds under poor growing conditions such as drought stress, disease or insect damage, as reduced weed control may result. Reduced results may also occur when treating weeds heavily covered with dust.

Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed, or cut, and have not been allowed to regrow to the recommended stage for treatment.

Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Heavy rainfall or irrigation within 2 hours after application may wash the chemical off the foliage and a repeat treatment may be required.

This product does not provide residual weed control. For subsequent residual weed control, follow a label-approved herbicide program. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of mixtures of this product with herbicides or other materials that are not expressly recommended in this labeling. Mixing this product with herbicides or other materials not recommended on this label may result in reduced performance.

For best results, spray coverage should be uniform and complete. Do not spray weed foliage to the point of runoff.

Keep people and pets off treated areas until spray solution has dried.

DOMESTIC ANIMALS: This product is considered to be relatively nontoxic to dogs and other domestic animals; however, ingestion of this product or large amounts of freshly sprayed vegetation may result in temporary gastrointestinal irritation (vomiting, diarrhea, colic, etc.). If such symptoms are observed, provide the animal with plenty of fluids to prevent dehydration. Call a veterinarian if symptoms persist for more than 24 hours.

ATTENTION

AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Do not allow the herbicide solution to mist, drip, drift, or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants, or other areas on which treatment was not intended. The likelihood of injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. AVOID APPLYING AT EXCESSIVE SPEED OR PRESSURE.

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences. Keep container closed to prevent spills and contamination.

MIXING, ADDITIVES AND APPLICATION INSTRUCTIONS

APPLY THESE SPRAY SOLUTIONS IN PROPERLY MAINTAINED AND CALIBRATED EQUIPMENT CAPABLE OF DELIVERING DESIRED VOLUMES. DO NOT APPLY WHEN WIND OR OTHER CONDITIONS FAVOR DRIFT. HAND GUN APPLICATIONS SHOULD BE PROPERLY DIRECTED TO AVOID SPRAYING DESIRABLE PLANTS. NOTE: REDUCED RESULTS MAY OCCUR IF WATER CONTAINING SOIL IS USED, SUCH AS WATER FROM PONDS AND UNLINED DITCHES.

MIXING

This product mixes readily with water. Mix spray solutions of this product as follows: Fill the mixing or spray tank with the required amount of water. Add the recommended amount of this product (see the ''Directions for Use'' and ''Weeds Controlled'' sections of this label) near the end of the filling process and mix well. Remove hose from tank immediately after filling to avoid siphoning back into the carrier source. During mixing and application, foaming of the spray solution may occur. To prevent or minimize foam, avoid the use of mechanical agitators, terminate by-pass and return lines at the bottom of the tank and, if needed, use an approved anti-foam or defoaming agent.

TANK MIXTURES

Always predetermine the compatibility of labeled tank mixtures of this product with water carrier by mixing small proportional quantities in advance.

Mix labeled tank mixtures of this product with water as follows:

1. Place a 20 to 35 mesh screen or wetting basket over filling port.

2. Through the screen, fill the sprayer tank one-half full with water and start agitation.

3. If a wettable powder is used, make a slurry with the water carrier, and add it SLOWLY through the screen into the tank. Continue agitation.

4. If a flowable formulation is used, premix one part flowable with one part water. Add diluted mixture SLOWLY through the screen into the tank. Continue agitation.

5. If an emulsifiable concentrate formulation is used, premix one part emulsifiable concentrate with two parts water. Add diluted mixture slowly through the screen into the tank. Continue agitation.

6. Continue filling the sprayer tank with water and add the required amount of this product near the end of the filling process.

7. Where nonionic surfactant is recommended, add this to the spray tank before completing the filling process.

8. Add individual formulations to the spray tank as follows: wettable powder, flowable, emulsifiable concentrate, drift control additive, water soluble liquid followed by surfactant.

Maintain good agitation at all times until the contents of the tank

are sprayed. If the spray mixture is allowed to settle, thorough agitation is required to resuspend the mixture before spraying is resumed.

Keep by-pass line on or near bottom of tank to minimize foaming. Screen size in nozzle or line strainers should be no finer than 50 mesh. Carefully select proper nozzle to avoid spraying a fine mist. For best results with conventional ground applications equipment, use flat fan nozzles.

Clean sprayer and parts immediately after using this product by thoroughly flushing with water.

ADDITIVES

SURFACTANTS

Nonionic surfactants which are labeled for use with herbicides may be used. Do not reduce rates of this product when adding surfactant. When adding additional surfactant use 0.5 percent surfactant concentration (2 quarts per 100 gallons of spray solution) when using surfactants which contain at least 70 percent active ingredient or a 1 percent surfactant concentration (4 quarts per 100 gallons of spray solution) for those surfactants containing less than 70 percent active ingredient. Read and carefully observe surfactant cautionary statements and other information appearing on the surfactant label.

AMMONIUM SULFATE

The addition of 1 to 2 percent dry ammonium sulfate by weight or 8.5 to 17 pounds per 100 gallons of water may increase the performance of this product, and this product plus 2,4-D, Banvel™ or residual herbicide tank mixtures on annual and perennial weeds. The improvement in performance may be apparent where environmental stress is a concern. Low quality ammonium sulfate may contain material that will not readily dissolve which could result in nozzle tip plugging. To determine quality, perform a jar test by adding 1/3 cup of ammonium sulfate to 1 gallon of water and agitate for 1 minute. If undissolved sediment is observed, predissolve the ammonium sulfate in water and filter prior to addition to the spray tank. If ammonium sulfate is added directly to the spray tank, add slowly with agitation. Adding too quickly may clog outlet line. Ensure that ammonium sulfate is completely dissolved in the spray tank before adding herbicides or surfactant. Thoroughly rinse the spray system with clean water after use to reduce corrosion.

NOTE: The use of ammonium sulfate as an additive does not preclude the need for additional surfactant. Do not use herbicide rates

lower than recommended in this label.

Banvel™ is a trademark of Sandoz, Inc.

COLORANTS OR DYES

Agriculturally approved colorants or marking dyes may be added to this product. Colorants or dyes used in spray solutions of this product may reduce performance, especially at lower rates or dilutions. Use colorants or dyes according to the manufacturer's recommendations.

APPLICATION EQUIPMENT AND TECHNIQUES

Do not apply this product through any type of irrigation system.

This product may be applied with the following application equipment:

Aerial -- Fixed Wing and Helicopter

Broadcast Spray

Controlled Droplet Applicator (CDA) -- Hand-held or boom-mounted applicators which produce a spray consisting of a narrow range of droplet sizes.

Hand-Held and High-Volume Spray Equipment -- Knapsack and backpack sprayers, pump-up pressure sprayers, handguns, handwands, lances and other hand-held spray equipment used to direct the spray onto weed foliage and vehicle-mounted high-volume spray equipment for spray-to-wet applications.

Selective equipment -- Recirculating sprayers, shielded sprayers and wiper applicators.

See the appropriate part of this section for specific rates of application and instructions.

AERIAL EQUIPMENT

Use the recommended rates of this herbicide in 3 to 15 gallons of water per acre unless otherwise specified on this label. See the ''Weeds Controlled'' section of this label for specific rates. Unless otherwise specified, do not exceed one quart per acre. **(Aerial applications of this product may be made in annual cropping conventional tillage systems, fallow and reduced tillage systems, preharvest, silvicultural sites, and rights-of-way. Refer to the individual use area sections of this label for recommended**

volumes and application rates.) FOR AERIAL APPLICATION IN CALIFORNIA, REFER TO THE FEDERAL SUPPLEMENTAL LABEL FOR AERIAL APPLICATIONS IN THAT STATE FOR SPECIFIC INSTRUCTIONS, RESTRICTIONS AND REQUIREMENTS.

This product plus Oust tank mixtures may not be applied by air in California.

Avoid direct application to any body of water.

AVOID DRIFT--DO NOT APPLY DURING INVERSION CONDITIONS, WHEN WINDS ARE GUSTY, OR UNDER ANY OTHER CONDITION WHICH FAVORS DRIFT. DRIFT MAY CAUSE DAMAGE TO ANY VEGETATION CONTACTED TO WHICH TREATMENT IS NOT INTENDED. TO PREVENT INJURY TO ADJACENT DESIRABLE VEGETATION, APPROPRIATE BUFFER ZONES MUST BE MAINTAINED.

Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations which dispense spray as fine spray droplets. Do not angle nozzles forward into the airstream and do not increase spray volume by increasing nozzle pressure.

Drift control additives may be used. When a drift control additive is used, read and carefully observe the cautionary statements and all other information appearing on the additive label.

Ensure uniform application -- To avoid streaked, uneven or overlapped application, use appropriate marking devices.

Thoroughly wash aircraft, especially landing gear, after each day of spraying to remove residues of this product accumulated during spraying or from spills. PROLONGED EXPOSURE OF THIS PRODUCT TO UNCOATED STEEL SURFACES MAY RESULT IN CORROSION AND POSSIBLE FAILURE OF THE PART. LANDING GEAR ARE MOST SUSCEPTIBLE. The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion.

■ BROADCAST EQUIPMENT ■

For control of annual or perennial weeds listed on this label using broadcast equipment -- Use the recommended rates of this product in 3 to 40 gallons of water per acre as a broadcast spray unless otherwise specified on this label. See the ''Weeds Controlled'' section of this label for specific rates. As density of weeds increases, spray volume should be increased within the recommended range to ensure complete coverage. Carefully select proper nozzle to avoid spraying a fine mist. For best results with ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

■ CONTROLLED DROPLET ■

APPLICATION (CDA)

The rate of this product applied per acre by vehicle-mounted CDA equipment must not be less than the amount recommended in this label when applied by conventional broadcast equipment. For vehicle-mounted CDA equipment, apply 3 to 15 gallons of water per acre.

For the control of labeled annual weeds with hand-held CDA units, apply a 20 percent solution of this product at a flow rate of 2 fluid ounces per minute and a walking speed of 1.5 MPH (1 quart per acre). For the control of labeled perennial weeds, apply a 20 to 40 percent solution of this product at a flow rate of 2 fluid ounces per minute and a walking speed of 0.75 MPH (2 to 4 quarts per acre).

Controlled droplet application equipment produces a spray pattern which is not easily visible. Extreme care must be exercised to avoid spray or drift contacting the foliage or any other green tissue of desirable vegetation, as damage or destruction may result.

HAND-HELD and HIGH-VOLUME EQUIPMENT

Use coarse sprays only.

Mix this product in clean water and apply to foliage of vegetation to be controlled. For applications made on a spray-to-wet basis, spray coverage should be uniform and complete. Do not spray to the point of runoff.

For control of annual weeds listed on this label, apply a 0.5 percent solution of this product plus nonionic surfactant to weeds less than 6 inches in height or runner length. Apply prior to seedhead formation in grass or bud formation in broadleaf weeds. Allow three or more days before tillage or mowing.

For annual weeds over 6 inches tall, or when not using additional surfactant, or unless otherwise specified, use a 1 percent solution. For best results, use a 2 percent solution on harder-to-control perennials, such as bermudagrass, dock, field bindweed, hemp dogbane, milkweed and Canada thistle.

Less than complete coverage of weeds may result from the use of spray equipment designed for motorized spot treatments. Where less than complete coverage of annual weeds occurs, use a 5 percent solution. Do not reduce recommended concentrations of this product when adding surfactant.

Prepare the desired volume of spray solution by mixing the amount

of this product in water as shown in the following table:

Spray Solution

DESIRED VOLUME	AMOUNT OF MON 52249				
	1/2%	1%	1 1/2%	2%	5%
1 gallon	2/3 oz	1-1/3 oz	2 oz	2-2/3 oz	6½ oz
25 gallons	1 pt	1 qt	1½ qt	2 qt	5 qt
100 gallons	2 qt	1 gal	1½ gal	2 gal	5 gal

2 tablespoons = 1 fluid ounce

For use in knapsack sprayers, it is suggested that the proper amount of this product be mixed with water in a larger container. Fill sprayer with the mixed solution.

For hand-held WIPER APPLICATORS, see the ''Selective Equipment'' section and for hand-held CONTROLLED DROPLET APPLICATORS, see the ''Controlled Droplet Application (CDA)'' section of this label.

SELECTIVE EQUIPMENT

This product may be applied through a recirculating spray system, a shielded applicator, or a wiper applicator after dilution and thorough mixing with water to listed weeds growing in any noncrop site specified on this label and only when specifically recommended in cropping systems.

A recirculating spray system directs the spray solution onto weeds growing above desirable vegetation, while spray solution not intercepted by weeds is collected and returned to the spray tank for reuse.

A shielded applicator directs the herbicide solution onto weeds while shielding desirable vegetation from the herbicide.

A wiper applicator applies the herbicide solution onto weeds by rubbing the weed with an absorbent material containing the herbicide solution.

AVOID CONTACT WITH DESIRABLE VEGETATION.

Contact of the herbicide solution with the desirable vegetation may result in damage or destruction. Applicators used above desired vegetation should be adjusted so that the lowest spray stream or wiper contact point is at least two inches above the desirable vegetation. Droplets, mist, foam, or splatter of the herbicide solution settling on desirable vegetation may result in

discoloration, stunting, or destruction.

Applications made above the crops should be made when the weeds are a minimum of 6 inches above the desirable vegetation. Better results may be obtained when more of the weed is exposed to the herbicide solution. Weeds not contacted by the herbicide solution will not be affected. This may occur in dense clumps, severe - infestations, or when the height of the weeds varies so that not all weeds are contacted. In these instances, repeat treatment may be necessary.

See the ''Weeds Controlled'' section of this label for recommended stage of growth for specific weeds.

NOTE

- Maintain equipment in good operating condition. Avoid leakage or dripping onto desirable vegetation.
- Adjust height of applicator to insure adequate contact with weeds.
- Keep nozzle tips and wiping surfaces clean.
- Keep spray patterns aligned into recovery chamber of the recirculating sprayer.
- Keep shields on shielded applicators adjusted to protect desirable vegetation.
- Maintain recommended roller RPM on roller applicators while in use.
- Keep wiper material at proper degree of saturation with herbicide solution.
- DO NOT use wiper equipment when weeds are wet.
- DO NOT operate equipment at ground speeds greater than 5 mph. Weed control may be affected by speed of application equipment. As weed density increases, reduce equipment ground speed to ensure good coverage of weeds.
- Be aware that, on sloping ground, the herbicide solution may migrate, causing dripping on the lower end and drying on the upper end of a wiper applicator.
- Variation in equipment design may affect weed control. With wiper applicators, the wiping material and its orientation must allow delivery of sufficient quantities of the recommended herbicide solution directly to the weed.

- Care must be taken with all types of wipers to ensure that the absorbent material does not become oversaturated, causing the herbicide to drip on desirable vegetation.

- Mix only the amount of solution to be used during a one-day period, as reduced activity may result from use of leftover solutions. With all equipment, drain and clean sprayer and wiper parts immediately after using this product by thoroughly flushing with water.

RECIRCULATING SPRAYERS

Recirculating sprayer calibration is made on the basis of ground speed and delivery volume. Two procedures can be used to calibrate: (1) determine the discharge being delivered per minute, then operate at the designated ground speed, or (2) select the desired ground speed and then adjust the sprayer to deliver the recommended volume per minute (this may require nozzle changes). Use the appropriate table below.

Do not operate at nozzle pressure above 20 PSI.

Table 1. Use this table when calibrating box or row-type recirculating sprayers. Box or row-type sprayer calibration is based on the total discharge collected per row. Use only straight stream or 15° fan-type nozzles.

*VOLUME PER MINUTE PER ROW

MPH	Fluid Ounces
2	26 to 35
3	38 to 51
4	51 to 68
5	65 to 86

*NOTE: Be certain the amount collected is for all spray streams treating one row.

Table 2. Use this table when calibrating broadcast type recirculating sprayers. Broadcast recirculating sprayer calibration is based on the discharge collected per minute from one nozzle on a 20-inch spacing.

VOLUME PER MINUTE PER NOZZLE

MPH	Fluid Ounces
2	7 to 9
3	10 to 13
4	13 to 18
5	16 to 22

When applied as recommended under the conditions described for recirculating sprayers, this product will control the following weeds growing a minimum of 6 inches above desirable vegetation.

Perennial Broadleaf Weeds -- To SUPPRESS the following weeds, mix in a ratio of 4 quarts of this product in 20 gallons of water and apply as directed.

Dogbane, hemp
Apocynum cannabinum

Milkweed
Asclepias syriaca

Perennial Grasses and Annual Broadleaf Weeds -- To control the following weeds, mix in a ratio of 3 quarts of this product in 20 gallons of water and apply as directed:

Cocklebur
Xanthium strumarium

Johnsongrass
Sorghum halepense

Pigweed, redroot
Amaranthus retroflexus

Sunflower
Helianthus annuus

Annual Grasses -- To control the following weeds, mix in a ratio of 2 quarts of this product in 20 gallons of water and apply as directed:

Corn
Zea mays

Shattercane
Sorghum bicolor

SHIELDED APPLICATORS

When applied as directed under conditions described for shielded

applicators, this product will control those weeds listed in the ''Weeds Controlled'' section of this label.

Shielded applicators which apply the herbicide solution as a spray band should be calibrated on a broadcast equivalent rate and volume basis. To determine these:

Band width in inches / Row width in inches	X	Herbicide Broadcast RATE per acre	=	Herbicide Band RATE per acre

Band width in inches / Row width in inches	X	Herbicide VOLUME of solution per acre	=	Herbicide VOLUME of solution per acre

Use nozzles that provide uniform coverage within the treated area. EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT WITH DESIRABLE VEGETATION.

For specific rates of application and instructions for control of various annual and perennial weeds, see the ''Weeds Controlled'' section of this label.

WIPER APPLICATORS

Wiper applicators include either roller or wick devices which physically wipe appropriate concentrations or amounts of this product directly onto the weed. Equipment must be designed, maintained, and operated to prevent the herbicide solution from contacting desirable vegetation. Operate this equipment at ground speeds no greater than 5 mph. Performance may be improved by reducing speed in areas of heavy weed infestations to ensure adequate wiper saturation. Better results may be obtained if two applications are made in opposite directions.

Do not add surfactant to the herbicide solution.

For Roller Applicators -- Mix 1 gallon of this product in enough water to prepare 10 gallons of herbicide solution (10 percent solution). Apply this solution to perennial weeds or annual broadleaf weeds listed in this ''Wiper Applicators'' section.

Mix 1 gallon of this product in enough water to provide 20 gallons of herbicide solution (5 percent solution). Apply this solution to annual grasses listed in this ''Wiper Applicators'' section.

Roller speed should be maintained at 40 to 60 RPM.

For Wick or Wiper Applicators -- Mix 1 gallon of this product in 2 gallons of water to prepare a 33 percent solution. Apply this solution to weeds listed in this ''Wiper Applicators'' section.

In severe infestations, reduce equipment ground speed to ensure that adequate amounts of this product are wiped on the weeds. A second treatment in the opposite direction may be beneficial.

Do not permit herbicide solution to contact desirable vegetation.

When applied as recommended under the conditions described for ''Wiper Applicators'', this product CONTROLS the following weeds:

ANNUAL GRASSES

Corn
Zea mays

Panicum, Texas
Panicum texanum

Rye, common
Secale cereale

Shattercane
Sorghum bicolor

ANNUAL BROADLEAVES

Sicklepod
Cassia obtusifolia

Spanishneedles
Bidens bipinnata

Starbur, bristly
Acanthospermum hispidum

When applied as recommended under the conditions described for ''Wiper Applicators'', this product SUPPRESSES the following weeds:

ANNUAL BROADLEAVES

Beggarweed, Florida
Desmodium tortuosum

Dogfennel
Eupatorium capilliflorium

Pigweed, redroot

Amaranthus retroflexus

Ragweed, common
Ambrosia artemisiifolia

Ragweed, giant
Ambrosia trifida

Sunflower
Helianthus annuus

Thistle, musk
Carduus nutans

Velvetleaf
Abutilon theophrasti

PERENNIAL GRASSES

Bermudagrass
Cynodon dactylon

Guineagrass
Panicum maximum

Johnsongrass
Sorghum halepense

Smutgrass
Sporobolus poiretii

Vaseygrass
Paspalum urvillei

PERENNIAL BROADLEAVES

Dogbane, hemp
Apocynum cannabinum

Milkweed
Ascelepias syriaca

Nightshade, silverleaf
Solanum elaeagnifolium

Thistle, Canada
Cirsium arvense

WEEDS CONTROLLED

This herbicide controls many annual and perennial grasses and broadleaf weeds.

ANNUAL WEEDS

- Apply to actively growing grass and broadleaf weeds.
- Allow at least 3 days after treatment before tillage.
- For maximum agronomic benefit, apply when weeds are 6 inches or less in height.
- To prevent seed production, applications should be made prior to seedhead formation.
- This product does not provide residual control; therefore, delay application until maximum weed emergence. Repeat treatments may be necessary to control later germinating weeds.

LOW-VOLUME BROADCAST APPLICATION
(LOW-RATE TECHNOLOGY)

When applied as directed under the conditions described, this product will control the weeds listed below when:

1. Water carrier volumes of 3 to 10 gallons per acre for ground applications and 3 to 5 gallons per acre for aerial applications are recommended. (See the ''Aerial Application'' section of this label for approved sites.)
2. A nonionic surfactant is added at 0.5 to 1 percent by total spray volume. Use 0.5 percent surfactant concentration when using surfactants which contain at least 70 percent active ingredient or a 1 percent surfactant concentration for those surfactants containing less than 70 percent active ingredient.

NOTE

- The addition of 2 percent dry ammonium sulfate by weight or 17 pounds per 100 gallons of water may increase the performance of this product on annual weeds. The improvement in performance may be apparent where environmental stress is a concern. Refer to the ''Mixing, Additives and Application Instructions'' section of this label.
- Do not tank-mix with soil residual herbicides when using these rates unless otherwise specified.
- For weeds that have been mowed, grazed, or cut, allow regrowth

to occur prior to treatment.

- Refer to the ''Tank Mixtures'' portion of this section for control of additional broadleaf weeds.

WEED SPECIES	MAXIMUM HEIGHT/LENGTH	RATE PER ACRE** (Fluid Ounces)
Foxtail *Setaria spp.*	12"	8 oz.
Barnyardgrass *Echinochloa crus-galli*	6" (0 to 4" (4 to 6"	12 oz. 16 oz.[1]) 24 oz.[1])
Bluegrass, annual *Poa annua*		
Brome, downy* *Bromus tectorum*		
Mustard, blue *Chorispora tenella*		
Mustard, tansy *Descurainia pinnata*		
Mustard, tumble *Sisymbrium altissimum*		
Mustard, wild *Sinapis arvensis*		
Spurry, umbrella *Holosteum umbellatum*		
Barley *Hordeum vulgare*	12"	
Rye *Secale cereale*		
Sandbur, field *Cenchrus spp.*		
Shattercane *Sorghum bicolor*		

Stinkgrass *Eragrostis cilianensis*		
Wheat *Triticum aestivum*	18"	
Morningglory *Ipomea spp.*	2"	16 oz.
Sicklepod *Cassia obtusifolia*		
Bluegrass, bulbous *Poa bulbosa*	6"	
Cheat *Bromus secalinus*		
Chickweed, common *Stellaria media*		
Chickweed, mouseear *Cerastium vulgatum*		
Corn *Zea mays*		
Goatgrass, jointed *Aegilops cylindrica*		
Groundsel, common *Senecio vulgaris*		
Horseweed/Marestail *Conyza canadensis*		
Lambsquarters, common *Chenopodium album*		
Pennycress, field *Fanweed* *Thlaspi arvense*		
Rocket, London *Sisymbrium irio*		
Ryegrass, Italian		

Lolium multiflorum

Shepherdspurse
Capsella bursa-pastoris

Spurge, annual
Euphorbia spp.

Buttercup 12"
Ranunculus spp.

Cocklebur
Xanthium strumarium

Crabgrass
Digitaria spp.

Dwarfdandelion
Krigia cespitosa

Falseflax, smallseed
Camelina microcarpa

Foxtail, Carolina
Alopecurus carolinianus

Johnsongrass, seedling
Sorghum halepense

Oats, wild
Avena fatua

Panicum, fall
Panicum dichotomiflorum

Panicum, Texas
Panicum texanum

Pigweed, redroot
Amaranthus retroflexus

Pigweed, smooth
Amaranthus hybridus

Witchgrass
Panicum capillare

Sicklepod 3 to 4" 24 oz
Cassia obtusifolia

Signalgrass, broadleaf *Brachiaria platyphylla*	4"	
Horseweed/Marestail *Conyza canadensis*	7 to 12"	
Lambsquarters, common *Chenopodium album*		
Spurge, annual *Euphorbia spp.*		
Rice, red *Oryza sativa*	4"	32 oz.
Teaweed *Sida spinosa*		
Sprangletop *Leptochloa spp.*	6"	
Geranium, Carolina *Geranium carolinianum*	12"	
Goosegrass *Eleusine indica*		
Primrose, cutleaf evening *Oenothera laciniate*		
Pusley, Florida *Richardia scabra*		
Sicklepod *Cassia obtusifolia*	5 to 12"	
Spanishneedles *Bidens bipinnata*		
Filaree *Erodium spp.*	12"	48 oz.
Sprangletop *Leptochloa spp.*		

[1]Use these rates to control barnyardgrass in Alabama, Arkansas, Mississippi, Missouri, Louisiana and Texas for preplant treatments.

* For control in no-till systems, use 16 fluid ounces per acre.

** For those rates less than 32 fluid ounces per acre, this product at rates up to 32 fluid ounces per acre may be used where heavy weed densities exist.

TANK MIXTURES

MON 52249 plus BANVEL plus NONIONIC SURFACTANT

MON 52249 plus 2,4-D plus NONIONIC SURFACTANT

DO NOT APPLY BANVEL OR 2,4-D TANK MIXTURES BY AIR IN CALIFORNIA.

These tank mixtures are recommended for use in fallow and reduced tillage areas only. Follow use directions as given in the ''Low-Volume Broadcast Application'' section.

This product plus Banvel or 2,4-D will control the annual grasses and broadleaf weeds previously listed for this product alone at the indicated heights (except 8 fluid ounces per acre applications), plus the following broadleaf weeds. For those weeds previously listed at 8 fluid ounces of this product alone per acre, use 12 fluid ounces in these tank mixtures.

NOTE: Refer to the specific product labels for crop rotation restrictions and cautionary statements of all products used in tank mixtures. Some crop injury may occur if Banvel is applied within 45 days of planting. The addition of Banvel in a mixture with this product may provide short-term residual control of selected weed species.

Apply 12 to 16 fluid ounces of this product plus 0.25 lb. a.i. of Banvel or 0.5 pound a.i. of 2,4-D, plus 0.5 to 1 percent nonionic surfactant by total spray volume per acre to control dense populations of the following annual broadleaf weeds when less than the height indicated:

Cocklebur (12")
Xanthium strumarium

Kochia* (6")
Kochia scoparia

Lambsquarters (12")
Chenopodium album

Lettuce, prickly (6")
Lactuca serriola

Marestail/Horseweed (6")
Conyza canadensis

Morningglory (6")
Ipomea spp.

Pigweed, redroot (12")
Amaranthus retroflexus

Pigweed, smooth (12")
Amaranthus hybridus

Thistle, Russian (12")
Salsola kali

*Controlled with Banvel tank mixture only.

Apply 16 fluid ounces of this product plus 0.5 pound a.i. of 2,4-D, plus 0.5 to 1 percent nonionic surfactant by total spray volume per acre to control the following annual broadleaf weeds when less than 6 inches in height.

Ragweed, common
Ambrosia artemisiifolia

Ragweed, giant
Ambrosia trifida

Smartweed, Pennsylvania
Polygonum pensylvanicum

Velvetleaf
Abutilon theophrasti

HIGH-VOLUME BROADCAST APPLICATIONS

When applied as directed under the conditions described, this product will control the weeds listed below when water carrier volumes are 10 to 40 gallons per acre for ground applications.

Apply 1 to 1.5 quarts of this product per acre plus 0.5 to 1 percent nonionic surfactant by total spray volume. Use 1 quart per acre if weeds are less than 6 inches tall and 1.5 quarts per acre if weeds are over 6 inches tall. If weeds have been mowed, grazed, or cut, allow adequate time for new growth to recommended stages prior to treatment. These rates will also provide control of weeds listed in the ''Low-Volume Broadcast Application'' section.

WEED SPECIES

Balsamapple*
Momordica charantia

Bassia, fivehook
Bassia hyssopifolia

Brome
Bromus spp.

Fiddleneck
Amsinckia spp.

Flaxleaf Fleabane
Conyza bonariensis

Fleabane
Erigeron spp.

Kochia
Kochia scoparia

Lettuce, prickly
Lactuca serriola

Panicum
Panicum spp.

Ragweed, common
Ambrosia artemisiifolia

Ragweed, giant
Ambrosia trifida

Smartweed, Pennsylvania
Polygonum pensylvanicum

Sowthistle, annual
Sonchus cleraceus

Sunflower
Helianthus annuus

Thistle, Russian
Salsola kali

Velvetleaf
Abutilon theophrasti

*Apply with hand-held equipment only.

PERENNIAL WEEDS

Apply this product as follows to control or destroy most perennial weeds:

NOTE: If weeds have been mowed or tilled, do not treat until plants have resumed active growth and have reached the recommended stages.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. Repeat treatments must be made prior to crop emergence.

The addition of 1 to 2 percent dry ammonium sulfate by weight or 8.5 to 17 pounds per 100 gallons of water may increase the performance of this product on perennial weeds. The improvement in performance may be apparent where environmental stress is a concern. Refer to the ''Mixing, Additives and Application Instructions'' section of this label.

When applied as recommended under the conditions described, this product WILL CONTROL the following PERENNIAL WEEDS:

Alfalfa
Medicago sativa

Alligatorweed*
Alternanthera philoxeroides

Artichoke, Jerusalem
Helianthus tuberosus

Bahiagrass
Paspalum notatum

Bentgrass
Agrostis spp.

Bermudagrass
Cynodon dactylon

Bermudagrass, water (knotgrass)
Paspalum distichum

Bindweed, field
Convolvulus arvensis

Bluegrass, Kentucky
Poa spp.

Blueweed, Texas
Helianthus ciliaris

Brackenfern
Pteridium aquilinum

Bromegrass, smooth
Bromus inermis

Bursage, woollyleaf
Franseria tomentosa

Canarygrass, reed
Phalaris arundinacea

Cattail
Typha spp.

Clover, red
Trifolium pratense

Clover, white
Trifolium repens

Cogongrass
Imperata cylindrica

Dallisgrass
Paspalum dilatatum

Dandelion
Taraxacum officinale

Dock, curly
Rumex crispus

Dogbane, hemp
Apocynum cannabinum

Fescues
Festuca spp.

Fescue, tall
Festuca arundinacea

Guineagrass
Pancium maximum

Horsenettle
Solanum carolinense

Horseradish
Armoracia rusticana

Johnsongrass
Sorghum halepense

Kikuyugrass
Pennisetum clandestinum

Knapweed
Centaurea repens

Lantana
Lantana camara

Milkweed
Asclepias spp.

Muhly, wirestem
Muhlenbergia frondonsa

Mullein, common
Verbascum thapsus

Napiergrass
Pennisetum purpureum

Nightshade, silverleaf
Solanum elaeagnifolium

Nutsedge, purple, yellow
Cyperus rotundus
Cyperus esculentus

Orchardgrass
Dactylis glomerata

Pampas
Cortaderia jubata

Paragrass
Brachiaria mutica

Phragmites*
Phragmites spp.

Quackgrass
Agropyron repens

Redvine*
Brunnichia ovata

Reed, giant
Arundo donax

Ryegrass, perennial
Lolium perenne

Smartweed, swamp
Polygonum coccineum

Spurge, leafy*
Euphorbia esula

Sweet potato, wild*
Ipomoea pandurata

Thistle, Canada
Cirsium arvense

Timothy
Phleum pratense

Torpedograss*
Panicum repens

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

Wheatgrass, western
Agropyron smithii

*Partial Control

This product is not registered in California for use on water bermudagrass, redvine and trumpetcreeper.

See ''Directions for Use'' and ''Mixing, Additives and Application Instructions'' sections of this label for labeled uses and specific application instructions.

Alfalfa--Apply 1 quart of this product per acre plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Make application after the last hay cutting in the fall. Allow alfalfa to regrow to a height of 6 to 8 inches or more prior to treatment. Applications should be

followed with deep tillage at least 7 days after treatment, but before soil freeze-up.

Alligatorweed--Apply 4 quarts of this product per acre or apply a 1½ percent solution with hand-held equipment to provide partial control. Apply when most of the plants are in bloom. Repeat applications will be required to maintain such control.

Bentgrass--For suppression in grass seed production areas. For ground applications only, apply 1.5 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 20 gallons of water per acre. Ensure entire crown area has resumed growth prior to a fall application. Bentgrass should be actively growing and have at least 3 inches of growth. Tillage prior to treatment should be avoided. Tillage 7 to 10 days after application is recommended for best results. Failure to use tillage after treatment may result in unacceptable control.

Bermudagrass--For control, apply 5 quarts of this product per acre and, for partial control, apply 3 quarts per acre. Treat when bermudagrass is actively growing and seedheads are present. Retreatment may be necessary to maintain control. Allow 7 or more days after application before tillage.

Bermudagrass, water (knotgrass)--Apply 1.5 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 5 to 10 gallons of water per acre. Apply when water bermudagrass is actively growing and 12 to 18 inches in length. Allow 7 or more days before tilling, flushing or flooding the field.

Fall applications only - Apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 5 to 10 gallons of water per acre. Fallow fields should be tilled prior to application. Apply prior to frost on water bermudagrass that is actively growing and 12 to 18 inches in length. Allow 7 or more days before tillage.

Bindweed, field--For control, apply 4 to 5 quarts of this product per acre west of the Mississippi River and 3 to 4 quarts east of the Mississippi River. Apply when the weeds are actively growing and are at or beyond full bloom. Do not treat when weed is under drought stress as good soil moisture is necessary for active growth. For best results, apply in late summer or fall. Fall treatments must be applied before a killing frost. Allow 7 or more days after application before tillage.

Also for control, apply 2 quarts of this product plus 0.5 pound a.i. of Banvel in 10 to 20 gallons of water per acre. At these rates, apply using ground application only.

The following tank mixtures with 2,4-D may be applied using aerial

application equipment (except in California) in fallow and reduced tillage systems only.

For suppression on irrigated agricultural land apply 1 to 2 quarts of this product plus 1 pound a.i. of 2,4-D in 10 to 20 gallons of water per acre with ground equipment only. Applications should be made following harvest or on fall fallow ground when the bindweed is actively growing and the majority of runners are 12 inches or more in length. The use of at least one irrigation will promote active bindweed growth.

For suppression, apply 16 fluid ounces of this product plus 0.5 pound a.i. of 2,4-D plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre for ground applications and 3 to 5 gallons of water per acre for aerial applications. Applications should be delayed until maximum emergence has occurred and when vines are between 6 to 18 inches in length.

In California only, apply 1 to 5 quarts of this product per acre. Actual rate needed for suppression or control will vary within this range depending on local conditions. Also, for more specific use recommendations for California refer to the following paragraph:

> For suppression on irrigated land where annual tillage is performed, apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Apply to actively growing bindweed that has reached a length of 12 inches or greater. Allow maximum weed emergence and runner growth. Do not treat when weed is under drought stress as good soil moisture is necessary for active growth. Allow 3 or more days after application before tillage.

Bluegrass, Kentucky / Bromegrass, smooth / Orchardgrass--Apply 2 quarts of this product in 10 to 40 gallons of water per acre when the grasses are actively growing and most plants have reached boot-to-early seedhead stage of development. For partial control in pasture or hay crop renovation, apply 1 to 1½ quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Apply to actively growing plants when most have reached 4 to 12 inches in height. Allow 7 or more days after application before tillage.

Orchardgrass (sods going to no-till corn)--Apply 1 to 1.5 quarts of this product per acre plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Apply to orchardgrass that is a minimum of 12 inches tall for spring applications and 6 inches tall for fall applications. Allow at least three days following application before planting. A sequential application of 3.75 to 4.5 quarts of Lariat® herbicide, or equivalent, will be necessary for optimum results. Lariat should

be applied within 3 to 10 days following spring applications to prevent annual weed growth.

Lariat is not registered for use in California.

®Lariat is a registered trademark of Monsanto Company.

Blueweed, Texas--Apply 4 to 5 quarts of this product per acre west of the Mississippi River and 3 to 4 quarts per acre east of the Mississippi River. Apply when weed is actively growing and is at or beyond full bloom. Do not treat when weed is under drought stress as good soil moisture is necessary for active growth. New leaf development indicates active growth. For best results, apply in late summer or fall. Fall treatments must be applied before a killing frost. Allow 7 or more days after application before tillage.

Brackenfern--Apply 3 to 4 quarts of this product per acre as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment. Apply to fully expanded fronds which are at least 18 inches long.

Bursage, woollyleaf--For control, apply 2 quarts of this product plus 1 pint of Banvel per acre. For partial control, apply 1 quart of this product plus 1 pint of Banvel per acre. Add 0.5 to 1 percent nonionic surfactant by total spray volume and apply 3 to 20 gallons of water per acre. Apply when plants are producing new active growth which has been initiated by moisture for at least 2 weeks and when plants are at or beyond flowering.

Canarygrass, reed/Timothy / Wheatgrass, western--Apply 2 to 3 quarts of this product per acre. For best results, apply to actively growing plants when most have reached the boot-to-head stage of growth. Allow 7 or more days after application before tillage.

Cogongrass--Apply 3 to 5 quarts of this product plus 0.5 to 1 percent nonionic surfactant in 10 to 40 gallons of water per acre. Apply when Cogongrass is at least 18 inches tall and actively growing in late summer or fall. Allow 7 or more days after application before tillage or mowing. Due to uneven stages of growth and the dense nature of vegetation preventing good spray coverage, repeat treatments may be necessary to maintain control.

Dandelion/Dock, curly--Apply 3 to 5 quarts of this product per acre when plants are actively growing and most have reached the early bud stage of growth. Allow 7 or more days after application before tillage.

Also for control, apply 16 fluid ounces of this product plus 0.5 pounds a.i. 2,4-D plus 0.5 to 1 percent nonionic surfactant by

total spray volume in 3 to 10 gallons of water per acre.

Dogbane, hemp--Apply 4 quarts of this product per acre. Apply when actively growing and when most weeds have reached the late bud to flower stage of growth. Following crop harvest or mowing, allow weeds to regrow to a mature stage prior to treatment. For best results, apply in late summer or fall. Allow 7 or more days after application before tillage.

For suppression, apply 16 fluid ounces of this product plus 0.5 pound a.i. of 2,4-D plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre for ground applications and 3 to 5 gallons of water per acre for aerial applications. Delay applications until maximum emergence of dogbane has occurred.

Fescue, tall--Apply 3 quarts of this product in 10 to 40 gallons of water per acre to actively growing plants when most have reached boot-to-early seedhead stage of development.

Fall applications only--Apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Apply to fescue in the fall when actively growing and plants have 6 to 12 inches of new growth. Allow 7 or more days after application before tillage. A sequential application of 1 pint per acre of this product plus nonionic surfactant will improve long-term control and control seedlings germinating after fall treatments or the following spring.

Guineagrass--Apply 3 quarts of this product per acre or use a 1 percent solution with hand-held equipment. Apply to actively growing guineagrass when most has reached at least the 7-leaf stage of growth. Ensure thorough coverage when using hand-held equipment. Allow 7 or more days after application before tillage.

Johnsongrass/Ryegrass, perennial--Apply 1 to 3 quarts of this product per acre. In annual cropping systems apply 1 to 2 quarts of this product per acre. Apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Use 2 quarts of this product when applying 10 to 40 gallons of water per acre. In noncrop or areas where annual tillage (no-till), is not performed, apply 2 to 3 quarts of this product in 10 to 40 gallons of water per acre. For best results, apply to actively growing plants when most have reached the boot-to-head stage of growth or in the fall prior to frost. Allow 7 or more days after application before tillage. Do not tank-mix with residual herbicides when using the 1 quart per acre rate.

For burndown of Johnsongrass, apply 1 pint per acre plus 0.5 to 1

percent nonionic surfactant in 3 to 10 gallons of water per acre before the plants reach a height of 12 inches. For this use, allow at least 3 days after treatment before tillage.

Spot Treatment (partial control or suppression)--Apply a 1 percent solution of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume when johnsongrass is 12 to 18 inches in height. Coverage should be uniform and complete.

Kikuyugrass--Apply 2 to 3 quarts of this product per acre. Spray when most kikuyugrass is at least 8 inches in height (3 or 4-leaf stage of growth) and actively growing. Allow 3 or more days after application before tillage.

Knapweed/Horseradish--Apply 4 quarts of this product per acre. Apply when actively growing and when most weeds have reached the late bud to flower stage of growth. Following crop harvest or mowing, allow weeds to regrow to a mature stage prior to treatment. For best results, apply in late summer or fall. Allow 7 or more days after application before tillage.

Lantana--Apply this product as a 1 to 1½ percent solution using hand-held equipment only. Apply to actively growing lantana at or beyond the bloom stage of growth. Use the higher application rate for plants that have reached the woody stage of growth. Allow 7 or more days after application before tillage.

Milkweed, common--Apply 3 quarts of this product per acre. Apply when actively growing and most of the milkweed has reached the late bud to flower stage of growth. Following small grain harvest or mowing, allow milkweed to regrow to a mature stage prior to treatment. Allow 7 or more days after application before tillage.

Muhly, wirestem--Apply 1 to 2 quarts of this product per acre. Use 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Use 2 quarts of this product when applying 10 to 40 gallons of water per acre or in pasture, sod, or noncrop areas. Spray when the wirestem muhly is 8 inches or more in height and actively growing. Do not till between harvest and fall applications or in the fall or spring prior to spring applications. Allow 3 or more days after application before tillage. This product will not provide residual control of wirestem muhly from seeds which germinate after application of this product. Do not tank mix with residual herbicides when using the 1 quart per acre rate.

Nightshade, silverleaf--For control, apply 2 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Applications should be made when at least 60 percent of the plants have berries. Fall treatments must be applied before a killing frost. Allow 7 or more days after

application before tillage. Do not treat when weed is under drought stress as good soil moisture is necessary for active growth.

Nutsedge: purple, yellow--Apply 3 quarts of this product per acre as a broadcast spray, or apply a 2 percent solution from hand-held equipment to control existing nutsedge plants and immature nutlets attached to treated plants. Treat when plants are in flower or when new nutlets can be found at rhizome tips. Nutlets which have not germinated will not be controlled and may germinate following treatment. Repeat treatments will be required for long-term control of ungerminated tubers.

Sequential applications of 1 to 2 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre will provide control. Make applications when a majority of the plants are in the 3 to 5 leaf stage (less than 6 inches tall). Repeat this application, as necessary, when newly emerging plants reach the 3 to 5 leaf stage. Subsequent applications will be necessary for long-term control.

For suppression to partial control of existing plants, apply 1 pint to 2 quarts of this product per acre, plus 0.5 to 1 percent nonionic surfactant in 3 to 40 gallons of water per acre. Treat when plants have 3 to 5 leaves and most are less than 6 inches tall. Repeat treatments will be required to control subsequent emerging plants or regrowth of existing plants. Wait 7 days after treatment before tillage or mowing.

Pampas--Apply this product as a 1½ to 2 percent solution using hand-held equipment. Apply to plants that are actively growing at or beyond the boot stage of growth. Thorough coverage is necessary for best control.

Phragmites--For partial control of phragmites in Florida and the counties of other states bordering the Gulf of Mexico, apply 5 quarts per acre as a broadcast spray or apply a 2 percent solution from hand-held equipment. In other areas of the U.S., apply 3 quarts per acre as a broadcast spray or apply a 1 percent solution from hand-held equipment for partial control. For best results, treat during late summer or fall months or when plants are actively growing and in full bloom. Treatment before or after this stage may lead to reduced control. Due to the dense nature of the vegetation, which may prevent good spray coverage or uneven stages of growth, repeat treatments may be necessary to maintain control. Visual control symptoms will be slow to develop.

Quackgrass--In Annual Cropping Systems, or in Pastures and Sods Followed by Deep Tillage: Apply 1 to 2 quarts of this product per acre. For the one quart rate, apply 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. For the 2 quart rate, apply in 10 to 40 gallons of water per

acre. Do not tank mix with residual herbicides when using the 1 quart rate. Spray when quackgrass is 6 to 8 inches in height and actively growing. Do not till between harvest and fall applications or in fall or spring prior to spring application. Allow 3 or more days after application before tillage. In pastures or sods, for best results use a moldboard plow.

Quackgrass—Pasture or Sod or Other Noncrop Areas Where Deep Tillage is Not Planned Following Application: Apply 2 to 3 quarts in 10 to 40 gallons of water per acre. Spray when the quackgrass is greater than 8 inches tall and actively growing. Do not till between harvest and fall application or in fall or spring prior to spring application. Allow 3 or more days after application before tillage.

Redvine--For suppression, apply 24 fluid ounces of this product per acre at each of two applications 7 to 14 days apart or a single application of 2 quarts per acre. Apply recommended rates in 5 to 10 gallons of water per acre plus 0.5 to 1 percent nonionic surfactant by total volume. Apply to actively growing plants in late September or early October, which are at least 18 inches tall and have been growing 45 to 60 days since the last tillage operation. Make applications at least one week before a killing frost.

Reed, giant—For control of giant reed, apply a 2 percent solution of this product when plants are actively growing. Best results are obtained when applications are made in late summer to fall.

Smartweed, swamp--Apply 3 to 5 quarts of this product per acre when plants are actively growing and most have reached the early bud stage of growth. Allow 7 or more days after application before tillage.

Also for control, apply 16 fluid ounces of this product plus 0.5 pound active ingredient of 2,4-D plus 0.5 to 1 percent nonionic surfactant by total volume in 3 to 10 gallons of water per acre in the late summer or fall. Apply when plants are actively growing and most have reached the early bud stage of growth. Allow 7 or more days after application before tillage.

Spurge, leafy--For suppression, apply 16 fluid ounces of this product plus 0.5 pound active ingredient 2,4-D plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre in the late summer or fall. Apply when plants are actively growing. If mowing has occurred prior to treatment, apply when most of the plants are 12 inches tall. Allow 7 or more days after application before tillage.

Sweet Potato, wild—Apply this product as a 2 percent solution using hand-held equipment. Apply to actively growing weeds that are at or beyond the bloom stage of growth. Repeat applications will be

required. Allow the plant to reach the recommended stage of growth before retreatment. Allow 7 or more days before tillage.

Thistle, Canada—Apply 2 to 3 quarts of this product per acre. Apply to actively growing thistles when most are at or beyond the bud stage of growth. After harvest, mowing or tillage in the late summer or fall, allow at least 4 weeks for initiation of active growth and rosette development prior to the application of this product. Fall treatments must be applied before a killing frost. Allow 3 or more days after application before tillage.

For suppression of Canada thistle, apply 1 quart per acre of this product, or 1 pint of this product plus 0.5 pound a.i. 2,4-D per acre, plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre in the late summer or fall after harvest, mowing or tillage. Allow rosette regrowth to a minimum of 6 inches in diameter before treating. Applications can be made as long as leaves are still green and plants are actively growing at the time of application. Allow 3 or more days after application before tillage.

Torpedograss—Apply 4 to 5 quarts of this product per acre to provide partial control of torpedograss. Apply to actively growing torpedograss when most plants are at or beyond the seedhead stage of growth. Repeat applications will be required to maintain control. Fall treatments must be applied before frost. Allow 7 or more days after application before tillage.

Trumpetcreeper--For control, apply 2 quarts of this product per acre in 5 to 10 gallons of water per acre. Apply to actively growing plants in late September or October, which are at least 18 inches tall and have been growing 45 to 60 days since the last tillage operation. Make applications at least 1 week before a killing frost.

Other perennials listed on this label—Apply 3 to 5 quarts of this product per acre. Apply when actively growing and most have reached early head or early bud stage of growth. Allow 7 or more days after application before tillage.

WOODY BRUSH AND TREES

When applied as recommended under the conditions described, this product CONTROLS or PARTIALLY CONTROLS the following woody brush, plants and trees:

Alder
Alnus spp.

Ash*
Fraxinus spp.

Aspen, quaking
Populus tremuloides

Bearmat (Bearclover)
Chamaebatia foliolosa

Birch
Betula spp.

Blackberry
Rubus spp.

Broom:
French
Cytisus monspessulanus

Scotch
Cytisus scoparius

Buckwheat, California*
Eriogonum fasciculatum

Cascara*
Rhamnus purshiana

Catsclaw*
Acacia greggi

Ceanothus*
Ceanothus spp.

Chamise
Adenostoma fasciculatum

Cherry:

Bitter
Prunus emarginata

Black
Prunus serotina

Pin
Prunus pensylvanica

Coyote brush
Baccharis consanguinea

Creeper, Virginia*
Parthenocissus quinquefolia

Dewberry
Rubus trivialis

Elderberry
Sambucus spp.

Elm*
Ulmus spp.

Eucalyptus, Bluegum
Eucalyptus glotulus

Hasardia*
Haplopappus squamosus

Hawthorn
Crataegus spp.

Hazel
Corylus spp.

Honeysuckle
Lonicera spp.

Kudzu
Pueraria lobata

Locust, black*
Robinia pseudoacacia

Madrone
Arbutus menziesii

Manzanita
Arctostaphylos spp.

Maple:

Red**
Acer rubrum

Sugar
Acer saccharum

Vine*
Acer circinatum

Monkey Flower*
Mimulus guttatus

Oak:

Black*
Quercus velutina

Northern Pin
Quercus palustris

Post
Quercus stellata

Red
Quercus rubra

Southern Red
Quercus falcata

White*
Quercus alba

Persimmon*
Diospyros spp.

Poison Ivy
Rhus radicans

Poison Oak
Rhus toxicodendron

Poplar*, yellow
Liriodendron tulipifera

Raspberry
Rubus spp.

Rose, multiflora
Rosa multiflora

Russian-olive**
Elaeagnus angustifolia

Sage, black
Salvia mellifera

Sagebrush, California
Artemisia californica

Salmonberry
Rubus spectabilis

Sassafras
Sassafras aibidum

Sourwood
Oxydendrum arboreum

Sumac:
Poison*
Rhus vernix

Smooth*
Rhus glabra

Winged*
Rhus copallina

Sweetgum
Liquidambar styraciflua

Swordfern*
Polystichum munitum

Tallowtree, Chinese
Sapium sebiferum

Tan Oak
Lithocarpus densiflorus

Thimbleberry
Rubus parviflorus

Tobacco, tree*
Nicotiana glauca

Trumpetcreeper
Campsis radicans

Willow
Salix spp.

* Partial control
** See below for control or partial control instructions.
*** This product is not registered in California for use on Russian-olive.

NOTE: If brush has been mowed or tilled or trees have been cut, do not treat until regrowth has reached the recommended stages of growth.

Apply this product when plants are actively growing and, unless otherwise directed, after full leaf expansion. Use the higher rate for larger plants and/or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage of

growth. Best results are obtained when application is made in late summer or fall after fruit formation.

In arid areas, best results are obtained when application is made in the spring to early summer when brush species are at high moisture content and are flowering.

Ensure thorough coverage when using hand-held equipment. Symptoms may not appear prior to frost or senescence with fall treatments.

Allow 7 or more days after application before tillage, mowing or removal. Repeat treatments may be necessary to control plants regenerating from underground parts or seed. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Reduced performance may result if fall treatments are made following a frost.

See ''Directions for Use'', and ''Mixing, Additives, and Application Instructions'' sections of this label for labeled uses and specific application instructions.

Apply this product as follows to control or partially control the following woody brush and trees.

Alder/Dewberry/Honeysuckle/Post Oak/Raspberry—For control, apply 3 to 4 quarts per acre of this product as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment.

Aspen, quaking/Cherry: bitter, black, pin/Hawthorn /Oak, southern red/Sweetgum/Trumpetcreeper— For control, apply 2 to 3 quarts of this product per acre as a broadcast spray or as a 1 to 1½ percent solution with hand-held equipment.

Birch/Elderberry/Hazel/Salmonberry/ Thimbleberry—For control, apply 2 quarts per acre of this product as a broadcast spray or as a 1 percent solution with hand-held equipment.

Blackberry—For control, apply 3 to 4 quarts per acre of this product as a broadcast spray, or 1 to 1½ percent solution with hand-held equipment. Make application after plants have reached full leaf maturity. Best results are obtained when applications are made in late summer or fall. After berries have set or dropped in late fall, blackberry can be controlled by applying a 3/4 percent solution of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume with hand-held equipment. For control of blackberries after leaf drop and until killing frost or as long as stems are green, apply 3 to 4 quarts of this product in 10 to 40 gallons of water per acre.

Broom: French, Scotch—For control, apply a 1½ to 2 percent solution with hand-held equipment.

Buckwheat, California/Hasardia/Monkey Flower/ Tobacco, tree—For partial control of these species, apply a 1 to 2 percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.

Catsclaw—For partial control, apply as a 1 to 1½ percent solution with hand-held equipment.

Coyote Brush—For control, apply a 1½ to 2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Eucalyptus/Bluegum—For control of eucalyptus resprouts, apply a 2 percent solution of this product with hand-held equipment when resprouts are 6 to 12 feet tall. Ensure complete coverage. Apply when plants are growing actively. Avoid application to drought-stressed plants.

Kudzu—For control, apply 4 quarts of this product per acre as a broadcast spray or as a 2 percent solution with hand-held equipment. Repeat applications will be required to maintain control.

Madrone resprouts—For suppression or partial control, apply a 2 percent solution of this product to resprouts less than 3 to 6 feet tall. Best results are obtained with spring/early summer treatments.

Maple, red**—For control, apply as a 1 to 1½ percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed. For partial control, apply 2 to 4 quarts of this product per acre as a broadcast spray.

Maple, sugar/Oak, northern pin/Oak red—For control, apply as a 1 to 1½ percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.

Poison Ivy/Poison Oak—For control, apply 4 to 5 quarts of this product per acre as a broadcast spray or as a 2 percent solution with hand-held equipment. Repeat applications may be required to maintain control. Fall treatments must be applied before leaves lose green color.

Rose, multiflora—For control, apply 2 quarts of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment. Treatments should be made prior to leaf deterioration by leaf-feeding insects.

Sage, black/Sagebrush, California/Chamise/Tallowtree, Chinese—For control of these species, apply a 1 percent solution of this

product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.

Tan oak resprouts—For suppression or partial control, apply a 2 percent solution of this product to resprouts less than 3 to 6 feet tall. Best results are obtained with fall applications.

Willow—For control, apply 3 quarts of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment.

Other Woody Brush and Trees listed on this label—For partial control, apply 2 to 4 quarts of this product per acre as a broadcast spray or as a 1 to 2 percent solution with hand-held equipment.

NONCROP USES

See ''General Information'' and ''Mixing, Additives and Application Instructions'' sections of this label for essential product performance information and the following ''Noncrop'' sections for specific recommended uses.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF SPRAY WITH FOLIAGE OF DESIRABLE TURFGRASSES, TREES, SHRUBS, OR OTHER DESIRABLE VEGETATION SINCE SEVERE DAMAGE OR DESTRUCTION MAY RESULT.

NOTE: If spraying areas adjacent to desirable plants,use a shield made of cardboard, sheet metal or plyboard while spraying to help prevent spray from contacting foliage of desirable plants.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seeds.

This product does not provide residual weed control. For subsequent weed control, follow a label-approved herbicide program.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

INDUSTRIAL, RECREATIONAL AND PUBLIC AREAS

When applied as directed for ''Noncrop Uses'', under conditions described, this product controls annual and perennial weeds listed on this label growing in areas such as airports, ditch banks, dry ditches, dry canals, fencerows, golf courses, highways, industrial plant sites, lumber yards, parking areas, parks, petroleum tank farms and pumping installations, pipelines, power and telephone rights-of-way, railroads, roadsides, schools, storage areas, other public areas and similar industrial or noncrop areas.

For specific rates of application and instructions for control of various annual and perennial weeds and woody brush and trees, see the ''Weeds Controlled'' section of this label.

This product may be applied with recirculating sprayers, shielded applicators, or wiper applicators in any noncrop site specified on this label. See the ''Selective Equipment part of ''Application Equipment and Techniques'' section of this label for information on proper use and calibration of this equipment.

TANK MIXTURES FOR

INDUSTRIAL SITES AND FORESTRY SITE PREPARATIONS

MON 52249 plus OUST™

Use on industrial sites including airports, industrial plants, lumberyards, petroleum tank farms, pumping stations, pipelines, railroads, roadsides, storage areas or other similar sites where bare ground is desired.

This tank mixture may also be used as a site preparation treatment for sites to be planted to jack pine, loblolly pine, red pine, slash pine and Virginia pine.

When applied as directed for ''Noncrop Uses'' under the conditions described, this product plus Oust provides control of annual weeds listed in the ''Weeds Controlled'' section of the label for this product and Oust, and control or partial control of the perennial weeds listed below.

Apply 1 to 2 quarts of this product with 2 to 4 ounces of Oust in 10 to 40 gallons of spray solution per acre as a broadcast spray to actively growing weeds.

This mixture may be applied by aerial equipment in site prep operations. When applied by air, use the recommended rates in 5 to 15 gallons of spray solution per acre.

This product plus Oust tank mixtures may not be applied by air in California.

For control of annual weeds, use the lower rates of these products.

For control of the listed perennial weeds, use the higher rates of both products. For partial control, use the lower rates.

Bahiagrass
Paspalum notatum

Bermudagrass*
Cynodon dactylon

Broomsedge
Andropogon virginicus

Dock, curly
Rumex crispus

Dogfennel
Eupatorium capilliforium

Fescue, tall
Festuca arundinacea

Johnsongrass**
Sorghum halepense

Poorjoe**
Diodia teres

Quackgrass
Agropyron repens

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

Vervain, blue
Verbena hastata

*Suppression at the higher rates only.

**Control at the lower rates.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

™Oust is a trademark of E. I. du Pont de Nemours and Company.

TANK MIXTURES
NONCROP SITES

When applied as a tank mixture, this product provides control of the emerged annual weeds and partial control of the emerged perennial weeds listed in this label. When applied as a tank mixture, the following residual herbicides will provide preemergence control of the weeds listed in the individual product labels.

MON 52249 plus DIURON

MON 52249 plus KROVAR™ I

MON 52249 plus KROVAR II

MON 52249 plus RONSTAR™ 50WP

MON 52249 plus SIMAZINE,

PRINCEP™ CALIBER™ 90

- MON 52249 plus SIMAZINE 4L
- MON 52249 plus SIMAZINE 80W
- MON 52249 plus SURFLAN™ 75W
- MON 52249 plus SURFLAN AS

When tank mixing with residual herbicides, add an agriculturally approved nonionic surfactant at 0.5 to 1 percent by volume of spray solution. See the ''Mixing, Additives and Application Instructions'' section of this label before preparing these tank mixtures.

Read and carefully observe the label claims, cautionary statements, recommended use rates and all other information on the labels of all products used in these tank mixtures. Use according to the most restrictive label directions for each product in the mixture.

CONTROL OF EMERGED WEEDS

Annual Weeds—Apply 1 quart per acre of this product in these tank mixtures when weeds are less than 6 inches tall and 1½ quarts per acre when weeds are more than 6 inches tall.

Perennial Weeds—For partial control of perennial weeds using these tank mixtures, apply 2 to 5 quarts per acre of this product. Follow the recommendations in the ''Weeds Controlled'' section of this label for stage of growth and rate of application for specific perennial weeds.

PREEMERGENCE WEED CONTROL

For preemergence weed control, refer to the individual product labels for specific noncrop sites, rates, carrier volumes and precautionary statements.

Mix only the quantity of spray solution which can be used during the same day. Do not allow these tank mixtures to stand overnight as this may result in reduced weed control.

APPLY THESE TANK MIXTURES THROUGH CONVENTIONAL BROADCAST EQUIPMENT ONLY.

™Princep and Caliber are trademarks of Ciba-Geigy Corporation.

™Krovar is a trademark of E.I. du Pont de Nemours and Company.

"Ronstar is a trademark of Rhone-Poulenc, Inc.

"Surflan is a trademark of Elanco Products Company.

FARMSTEAD WEED CONTROL

When applied as directed for ''Noncrop Uses'', under conditions described, this product controls undesirable vegetation listed on this label around farmstead building foundations, along and in fences, shelterbelts, and for general nonselective farmstead weed control.

For specific rates of application and instructions for control of various annual and perennial weeds, see the 'Weeds Controlled'' section of this label.

ORNAMENTALS

THIS PRODUCT IS NOT RECOMMENDED FOR USE AS AN OVER-THE-TOP BROADCAST SPRAY IN ORNAMENTALS.

When applied as instructed for the conditions described for "Noncrop Uses", this product controls undesirable vegetation listed on this label prior to planting ornamentals, within and around greenhouses and shadehouses, and as a postdirected spray around established ornamentals.

For specific rates of application and instructions for control of various annual and perennial weeds, see the ''Weeds Controlled'' section of this label.

Where repeat applications are necessary, do not exceed 10.6 quarts of this product per acre per year.

Site Preparation—Following preplant applications of this product, any ornamental species may be planted. Precautions should be taken to protect nontarget plants during site preparation applications.

Greenhouse/Shadehouse Use—This product may be used to control weeds listed on this label which are growing in greenhouses. Desirable vegetation must not be present during application and air circulation fans must be turned off.

Postdirected Spray—Use as a postdirected spray around established woody ornamentals species such as those listed below. Care must be exercised to avoid contact of spray, drift or mist with foliage of or green bark of established ornamental species.

Arborvitae
Thuja spp.

Azalea
Rhododendron spp.

Boxwood
Buxus spp.

Crabapple
Malus spp.

Euonymus
Euonymus spp.

Fir
Abies spp.
Pseudotsuga spp.

Jojoba
Simmondsia chinensis

Hollies
Ilex spp.

Lilac
Syringa spp.

Magnolia
Magnolia spp.

Maple
Acer spp.

Oak
Quercus spp.

Privet
Ligustrum spp.

Pine
Pinus spp.

Spruce
Picea spp.

Yew
Taxus spp.

SILVICULTURAL SITES,

RIGHTS-OF-WAY
and CHRISTMAS TREES

NOTE: NOT RECOMMENDED FOR USE AS AN OVER-THE-TOP BROADCAST SPRAY IN SILVICULTURAL NURSERIES, OR CHRISTMAS TREE PLANTATIONS.

When applied as directed for ''Noncrop Uses'' under conditions described, this product controls undesirable vegetation listed on this label. This product also suppresses or controls undesirable vegetation listed on this label when applied at recommended rates for release of established coniferous species listed on this label.

For specific rates of application and instructions for control of various brush, annual and perennial weeds, see the ''Weeds Controlled'' section of this label. For specific rates of application for release of listed coniferous species, see the ''Conifer Release'' part of this section of the label.

Where repeat applications are necessary, do not exceed 10.6 quarts of this product per acre per year.

Aerial Application—This product may be applied using aerial spray equipment for silvicultural site preparation, conifer release and rights-of-way treatments. See the ''Application Equipment and Techniques'' part of the ''Mixing, Additives and Application Instructions'' section of this label for information on how to apply this product by air.

DO NOT APPLY THIS PRODUCT BY AIR TO RIGHTS-OF-WAY SITES IN THE STATE OF CALIFORNIA.

In order to reduce the aerial application drift hazard to aquatic sites*, to nontarget sites, or any site containing desirable vegetation, always maintain appropriate buffer zones. A buffer zone of the following minimum distances should be maintained:

- Helicopters using a Microfoil™ boom, a Thru-Valve™ boom (TVB-45), or equivalent drift control systems, should maintain at least a 50-foot buffer zone.
- When using other aerial equipment:

1. Maintain at least a 75-foot buffer zone for applications using 2 quarts or less per acre of this product.
2. Maintain at least a 125-foot buffer zone for applications using more than 2 quarts per acre of this product.
3. Maintain at least a 400-foot buffer zone for applications on rights-of-way when applied from 75 feet or more above ground level.

These distances should be increased if conditions favoring drift exist.

* Aquatic sites include all lakes, ponds, and streams used for significant domestic purposes or angling.

*Microfoil is a trademark of Union Carbide Agricultural Products, Inc.

*Thru-Valve is a trademark of Waldrum Specialties, Inc.

SITE PREPARATION

Following preplant applications of this product, any silvicultural species may be planted.

POSTDIRECTED SPRAY

In established silvicultural sites, use as a spray on the foliage of undesirable vegetation. Care must be exercised to avoid contact of spray, drift or mist with foliage or green bark of desirable species.

CONIFER RELEASE

For release, apply only where conifers have been established for more than one year. Vegetation should not be disturbed prior to treatment or until visual symptoms appear after treatment. Symptoms of treatment are slow to appear, especially in woody species treated in late fall. Injury may occur to conifers treated for release, especially where spray patterns overlap or the higher rates are applied or when applications are made during periods of active conifer growth. **Do not use additional surfactant with conifer release applications.**

Applications must be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in spring. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Use the following rates for conifer release to control or partially control the weeds listed in the ''Weeds Controlled'' section of this label.

For release of the following conifer species:

Douglas fir
Pseudotsuga menziesii

Fir
Abies spp.

Hemlock
Tsuga spp.

Pines*
Pinus spp.

Spruce
Picea spp.

* Includes all species except eastern white pine, loblolly pine or slash pine.

Apply 1½ to 2 quarts of this product per acre except in Washington and Oregon, west of the crest of the Cascade Mountains. For spring treatments west of the crest of the Cascade Mountains, apply 1 quart of this product per acre before conifer bud swell for control of annual weeds. For fall treatments in Washington and Oregon, west of the crest of the Cascade Mountains, apply 1 to 1½ quarts of this product per acre before any major leaf drop of deciduous species.

For release of western hemlock, apply 1 quart of this product per acre.

For release of the following conifer species:

Loblolly pine
Pinus taeda

Eastern white pine
Pinus strobus

Slash pine
Pinus elliottii

Late Season Application—Apply 1½ to 2 quarts of this product in a minimum of 5 gallons of spray solution per acre during early autumn. Applications made prior to September 1 or when conditions are conducive to rapid growth of conifers will create the potential for increased injury in the form of tip and/or needle burn. Injury may decrease with later applications. Some autumn colors are acceptable at time of application. Apply prior to frost or leaf drop of undesirable plants. Applications made according to label directions will release loblolly pine, eastern white pine and slash pine by reducing competition from the following species:

Ash
Fraxinus spp.

Cherry:
Black

Prunus serotina

Pin
Prunus pensylvanica

Elm
Ulmus spp.

Hawthorn
Crataegus spp.

Locust, black
Robina pseudoacacia

Maple, red
Acer rubra

Oak:
Black
Quercus velutina

Post
Quercus stellata

Southern Red
Quercus falcata

White
Quercus alba

Persimmon
Diospyros spp.

Poplar, yellow
Liriodendron tulipfera

Sassafras
Sassafras albidum

Sourwood
Oxydendrum arboreum

Sumac:
Poison
Rhus vernix

Smooth
Rhus glabra

Winged
Rhus copallina

Sweetgum
Liquidambar styraciflua

Apply only to those sites where woody brush and trees listed in this label constitute the majority of the undesirable species.

▪ MON 52249 plus Oust Tank Mixtures for Conifer Release from Herbaceous Weeds ▪

To release **loblolly pines** from herbaceous weeds, tank mixtures of this product with Oust will provide control of annual weeds listed in the ''Weeds Controlled'' section of this and the Oust label, and partial control of the perennial weeds listed below.

Apply 16 to 24 fluid ounces of this product with 2 to 4 ounces of Oust in 10 to 30 gallons of spray solution per acre. Make application to actively growing weeds as a broadcast spray over the top of the young loblolly pines.

This product plus Oust tank mixtures may not be applied by air in California.

This tank mixture may be applied using aerial equipment. When applying by air, use the recommended rate in 5 to 15 gallons of spray solution per acre.

For control of annual weeds below 12 inches in height (or runner length on annual vines), use the low rates of both products. Use the higher rates of both products when annual weeds are in more advanced stages of growth and approaching flower or seed formation.

Use the higher rates of both products for partial control of the following perennial weeds. Use the lower rates for suppression of growth.

Bahiagrass
Paspalum notatum

Broomsedge
Andropogon virginicus

Dock, curly
Rumex crispus

Dogfennel
Eupatorium capilliforium

Fescue, tall
Festuca arundinacea

Johnsongrass**
Sorghum halepense

Poorjoe**
Diodia teres

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

Vervain, blue
Verbena hastata

*Suppression at the higher rates only.

**Control at the higher rates.

Pine damage may occur or can be accentuated if treatment takes place when young trees are under stress from drought, flood water, insects or disease.

Read and observe the cautionary statements and all other information appearing on the label of all herbicides used.

NOTE TO USER

This product must not be used in areas where adverse impact on Federally designated endangered/threatened plant or aquatic species is likely.

Prior to making applications, the user of this product must determine that no such species are located in or immediately adjacent to the area to be treated.

CUT STUMP TREATMENTS

Woody vegetation may be controlled by treating freshly cut stumps of trees and resprouts with this product. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut vegetation close to the soil surface. Apply a 50 to 100 percent solution of this product to the freshly cut surface immediately after cutting. Delays in application may result in reduced performance. For best results, applications should be made during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will CONTROL, PARTIALLY CONTROL or SUPPRESS many types of woody brush and tree species, some of which are listed below:

Alder
Alnus spp.

Eucalyptus/Bluegum
Eucalyptus glotulus

Madrone
Arbutus menziesii

Oak
Quercus spp.

Reed, giant
Arundo donax

Saltcedar
Tamarisk spp.

Sweetgum
Liquidambar styraciflua

Tan Oak
Lithocarpus densiflorus

INJECTION AND FRILL APPLICATIONS

Woody vegetation may be controlled by injection or frill application of this product. Apply this product using suitable equipment which must penetrate into the living tissue. Apply the equivalent of 1 ml of this product per each 2 to 3 inches of trunk diameter (DBH). This is best achieved by applying 50 to 100 percent concentration of this material either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying diluted material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frill or cut areas in species that exude sap freely after frills or cutting. In species such as this, make frill or cut at an oblique angle so as to produce a cupping effect and use undiluted material. For best results, application should be made during periods of active growth and after full leaf expansion.

This treatment WILL CONTROL the following woody species:

Oak
Quercus spp.

Poplar

Populus spp.

Sweetgum
Liquidambar styraciflua

Sycamore
Platanus occidentalis

This treatment WILL SUPPRESS the following woody species:

Black gum
Nyssa sylvatica

Dogwood
Cornus spp.

Hickory
Carya spp.

Maple, red
Acer rubrum

TURFGRASSES AND GRASSES FOR SEED PRODUCTION

PREPLANT AND RENOVATION

When applied as directed for ''Noncrop Uses'', under conditions described, this product controls most existing vegetation prior to the planting or renovation of either turfgrasses or grass seed production areas.

For specific rates of application and instructions for control of various annual and perennial weeds, and woody brush and trees, see the ''Weeds Controlled'' section of this label.

For maximum control of existing vegetation, delay planting to determine if any regrowth from escaped underground plant parts occurs. Where repeat treatments are necessary, sufficient regrowth must be attained prior to application. For warm-season grasses, such as bermudagrass, summer or fall applications provide best control.

DO NOT DISTURB SOIL OR UNDERGROUND PLANT PARTS BEFORE TREATMENT. Tillage or renovation techniques such as vertical mowing, coring or slicing should be delayed for 7 days after application to allow proper translocation into underground plant parts.

TURFGRASSES

Where existing vegetation is growing in a field or unmowed situation, apply this product to actively growing weeds at the stages of growth given in the ''Weeds Controlled'' section of this label.

Where existing vegetation is growing under mowed turfgrass management, apply this product after omitting at least one regular mowing to allow sufficient growth for good interception of the spray.

Desirable turfgrasses may be planted following the above procedures.

GRASSES FOR SEED PRODUCTION

Apply this product to actively growing weeds at the stages of growth given in the ''Weeds Controlled'' section of this label prior to planting or renovation of turf or forage grass areas grown for seed production.

DO NOT feed or graze treated areas within 8 weeks after application.

■ **ANNUAL WEED CONTROL IN DORMANT BERMUDAGRASS AND BAHIAGRASS TURF** ■

When applied as directed for ''Noncrop Uses'' under the conditions described, this product will provide control or suppression of many winter annual weeds and tall fescue for effective release of dormant bermudagrass and bahiagrass turf. Refer to the rate table for Roundup alone under the ''Release of Bermudagrass and Bahiagrass'' section of this label for recommended rates and volumes on the species to be suppressed or controlled. Treat only when turf is dormant and prior to spring greenup. Spot treatments or broadcast applications of this product in excess of 16 fluid ounces per acre may result in injury or delayed greenup in highly maintained turfgrass areas; i.e., golf courses, lawns, etc. DO NOT APPLY TANK MIXTURES of this product plus Oust in highly maintained turfgrass areas.

RELEASE OF BERMUDAGRASS OR BAHIAGRASS

NOTE: Use only in areas where bermudagrass or bahiagrass are desirable ground covers and where some temporary injury or discoloration can be tolerated. Use tank mixtures of this product plus Oust only on railroads, highways, utility plant sites, or other right-of-way areas.

When applied as directed for ''Noncrop Uses'' under the conditions described, this product will provide control or suppression of many winter annual weeds and tall fescue for effective release of dormant bermudagrass or bahiagrass. This product may be tank-mixed with Oust as recommended for residual control. Make applications to dormant bermudagrass or bahiagrass. Tank mixtures of this product plus Oust may delay greenup. To avoid delays in greenup and minimize injury, do not add more than 1 ounce per acre of Oust on bermudagrass or more than ½ ounce per acre on bahiagrass, or treat when these grasses are in a semi-dormant condition.

For best results on winter annuals, treat when plants are in an early growth stage (below 6 inches in height) after most have germinated. For best results on tall fescue, treat when fescue is in or beyond the 4 to 6-leaf stage.

WEEDS CONTROLLED

Rate recommendations for control or suppression of winter annuals and tall fescue are listed below:

Apply the recommended rates of this product alone or as a tank mixture in 10 to 25 gallons of water, plus 0.5 to 1 percent nonionic surfactant by total spray volume per acre.

For the best recommendation for the mixture of weeds within your geographic areas, contact your Monsanto sales representative.

WEEDS CONTROLLED OR SUPPRESSED WITH MON 52249 ALONE*

NOTE: C = Control
S = Supression

	MON 52249 FLUID OZ/ACRE					
WEED SPECIES	8	12	16	24	32	64
Barley, little *Hordeum pusilium*	S	C	C	C	C	C
Bedstraw, catchweed *Galium aparine*	S	C	C	C	C	C
Bluegrass, annual *Poa annua*	S	C	C	C	C	C

Chervil *Chaerophyllum tainturieri*	S	C	C	C	C	C
Chickweed, common *Stellaria media*	S	C	C	C	C	C
Clover, crimson *Trifolium incarnatum*	•	S	S	C	C	C
Clover, large hop *Trifolium campestre*	•	S	S	C	C	C
Fescue, tall *Festuca arundinaceae*	•	•	•	•	S	S
Geranium, Carolina *Geranium carolinianum*	•	•	S	S	C	C
Henbit *Lamium amplexicaule*	•	S	C	C	C	C
Ryegrass **Italian** *Lolium multiflorum*	•	•	S	C	C	C
Speedwell, corn *Veronica arvensis*	S	C	C	C	C	C
Vetch, common *Vicia sativa*	•	•	S	C	C	C

* These rates apply only to sites where an established competitive turf is present.

WEEDS CONTROLLED OR SUPPRESSED WITH MON 52249 PLUS OUST*

NOTE: C = Control
S = Suppression

		MON 52249 + OUST						
WEED SPECIES	MON 52249 (FL. OZ/A) + OUST (OZ/A)	+ ¼	8 + ¼	12 + ½	12 + ¼	16 + ½	16 + 1	12 + 1
Barley, little *Hordeum pusilium*		C	C	C	C	C	C	C

Bedstraw, catchweed *Galium aparine*	C	C	C	C	C	C	C
Bluegrass, annual *Poa annua*	S	C	C	C	C	C	C
Chervil *Chaerophyllum tainturieri*	C	C	C	C	C	C	C
Chickweed, common *Stellaria media*	S	C	C	C	C	C	C
Clover, crimson *Trifolium incarnatum*	S	S	S	S	C	C	C
Clover, large hop *Trifolium campestre*	•	•	S	S	S	C	C
Fescue, tall *Festuca arundinaceae*	•	•	•	•	•	S	S
Geranium, Carolina *Geranium carolinianum*	•	S	S	C	C	C	C
Henbit *Lamium amplexicaule*	•	S	C	C	C	C	C
Ryegrass, Italian *Lolium multiflorum*	•	S	S	C	C	C	C
Speedwell, corn *Veronica arvensis*	S	C	C	C	C	C	C
Vetch, common *Vicia sativa*	C	C	C	C	C	C	C

* These rates or mixtures of rates apply only to sites where an established competitive turf is present.

RELEASE OF ACTIVELY GROWING BERMUDAGRASS

When applied as directed, this product will aid in the release of bermudagrass by providing control of annual species listed in the ''Weeds Controlled'' section of this and the Oust label, and suppression or partial control of certain perennial weeds.

For control or suppression of those annual species listed on this label, use 1 to 3 pints of this product as a broadcast spray in 10 to 25 gallons of spray solution per acre. Use the lower rate when

treating annual weeds less than 6 inches in height (or length of runner in annual vines). Use the higher rate as plant size increases or as they approach flower or seedhead formation.

Use the higher rate of this product for partial control of the following perennial species. Use the lower rates for suppression of growth. For best results, see the ''Weeds Controlled'' section of this label for proper stage of growth.

Bahiagrass
Paspalum notatum

Bluestem, silver
Andropogon saccharoides

Fescue, tall
Festuca arundinacea

Johnsongrass**
Sorghum halepense

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

*Suppression at higher rates only.

**Control at the higher rates.

This product may be tank-mixed with Oust. If tank-mixed, use no more than 1 to 2 pints per acre of this product with 1 to 2 ounces of Oust per acre.

Use the lower rates of both mixtures to control annual weeds less than 6 inches in height (or runner length in annual vines) that are listed in the ''Weeds Controlled'' section of this booklet and the Oust label. Use the higher rates as annual weeds increase in size and approach the flower or seedhead stages.

Use the higher rates of this product to provide partial control of the following perennial weeds. Use the lower rates for suppression of growth.

Bahiagrass
Paspalum notatum

Bluestem, silver
Andropogon saccharoides

Broomsedge
Andropogon virginicus

Dock, curly
Rumex crispus

Dogfennel
Eupatorium capilliforium

Fescue, tall
Festuca arundinacea

Johnsongrass*
Sorghum halepense

Poorjoe**
Diodia teres

Trumpetcreeper*
Campsis radicans

Vaseygrass
Paspalum urvillei

Vervain, blue
Verbena hastata

*Suppression at higher rates only.

**Control at the higher rates.

Use only on well-established bermudagrass. Bermudagrass injury may result from the treatment but regrowth will occur under moist conditions. Repeat applications in the same season are not recommended, since severe injury may result.

Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used.

COOL SEASON TURF GROWTH REGULATION

When applied as directed, this product will suppress growth and seedhead development of listed turf species in industrial sites.

This product is recommended for management of coarse turf on roadside rights-of-way or other industrial areas. Do not use on high-quality turf or other areas where some turf color changes cannot be tolerated. Slight turf discoloration may occur but turf

will regreen and regrow under moist conditions as effects of this product wear off.

Apply 4 to 6 fluid ounces of this product per acre alone or in a recommended tank mixture. Spray volumes of 10 to 40 gallons per acre are recommended.

When using this product, mix 2 quarts of a nonionic surfactant per 100 gallons of spray solution.

This product can be used for growth and seedhead suppression of:

Tall Fescue
Smooth Brome

For best results, apply this product in a recommended tank mixture to actively growing turfgrasses after greenup in the spring of the year. For suppression of seedheads, applications must be made before boot-to-seedhead stage of development. Applications made from seedhead emergence until maturity may result in turf discoloration or injury.

After mowing or removal of seedheads, this product in a recommended tank mixture may also be used to suppress the growth of certain turfgrasses. Allow turf to recover from stress caused by heat, drought, or mowing before making applications. Applications made to turf under stress may increase the potential for discoloration or injury.

ANNUAL GRASSES

For growth suppression of some annual grasses such as annual ryegrass, wild barley and wild oats, apply 3 to 4 fluid ounces of this product in 10 to 40 gallons of spray solution per acre. Applications should be made when annual grasses are actively growing and before the seedheads are in the boot stage of development. Treatments made after seedhead emergence may cause injury to the desired grasses.

TANK MIXTURES

For the following tank mixtures, consult each product label for weeds controlled and the correct stage of application. Do not treat turf under stress.

Tank mixtures plus 2,4-D Amine

For additional weed control benefits, up to 1 pound a.i. per acre of 2,4-D amine may be added to the following tank mixtures. Consult the label for 2,4-D amine for weeds controlled.

TALL FESCUE

MON 52249 plus Telar™

For suppression of tall fescue growth and seedheads, and control or partial control of some annual weeds, apply this tank mixture after greenup and prior to boot-to-seedhead stage of development. Use up to ½ ounce of Telar per acre.

This tank mixture can also be applied after mowing or removal of tall fescue seedheads for turf growth suppression. Make only one of the above applications per growing season.

MON 52249 plus Oust™

For suppression of tall fescue growth and seedheads, and control or partial control of some annual weeds, apply this tank mixture after greenup and prior to boot-to-seedhead stage of development. Use up to 1/4 ounce of Oust per acre.

MON 52249 plus Escort™

This tank mixture can be applied after mowing or removal of tall fescue seedheads for turf growth suppression and control or partial control of some annual weeds. Use up to 1/3 ounce of Escort per acre.

SMOOTH BROME

MON 52249 plus Oust

For suppression of smooth brome growth and seedheads and control or partial control of some annual weeds, apply this tank mixture after greenup and prior to boot-to-seedhead stage of development. Use up to 1/4 ounce of Oust per acre.

™Escort and Telar are trademarks of E. I. du Pont de Nemours and Company.

BAHIAGRASS SEEDHEAD AND VEGETATIVE SUPPRESSION

When applied as directed in the indicated noncrop areas (roadsides, airports, golf course roughs, and plant sites), this product will provide significant inhibition of seedhead emergence and will suppress vegetative growth for a period of approximately 45 days with single applications and approximately 120 days with sequential applications.

Apply this product 1 to 2 weeks after full greenup of bahiagrass or after the bahiagrass has been mowed to a uniform height of 3 to 4 inches. Applications must be made prior to seedhead emergence. Apply 6 fluid ounces per acre of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 25 gallons of water per acre.

Sequential applications of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume may be made at approximately 45 day intervals to extend the period of seedhead and vegetative growth suppression. For continued seedhead suppression, sequential applications must be made prior to seedhead emergence. Apply no more than 2 sequential applications per year. As a first sequential application, apply 4 fluid ounces of this product per acre plus nonionic surfactant. A second sequential application of 2 to 4 fluid ounces per acre plus nonionic surfactant may be made approximately 45 days after the last application.

A tank mixture of this product plus Oust **may be applied only on roadsides** for seedhead inhibition and vegetative suppression. Apply 6 fluid ounces per acre of this product plus 0.25 ounce per acre of Oust, plus 0.5 to 1 percent nonionic surfactant by total spray volume 1 to 2 weeks following an initial spring mowing. When using this product plus Oust for suppression of bahiagrass, make only one application per year.

CROPPING SYSTEMS

When applied as directed for ''Cropping Systems'', under the conditions described, this product controls annual and perennial weeds listed on this label, prior to the emergence of direct seeded crops or prior to transplanting of crops listed on this label.

See ''General Information'' and ''Mixing, Additives and Application Instructions'' sections of this label for essential product performance information.

See the following ''Cropping Systems'' sections for specific recommended uses.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF SPRAY WITH FOLIAGE, GREEN STEMS OR FRUIT OF DESIRABLE CROPS, PLANTS, TREES OR OTHER DESIRABLE VEGETATION SINCE SEVERE DAMAGE OR DESTRUCTION MAY RESULT.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed. Except as otherwise specified on this label, repeat treatments must be made before the crop emerges in accordance with the instructions of this label.

Except as otherwise specified in a crop section of this label, the combined total of all treatments must not exceed 8 quarts per acre of this product per year.

Do not plant subsequent crops other than those on the label for 30 days following application.

Do not harvest or feed treated vegetation for 8 weeks following application. Following spot treatment or selective equipment use, allow 14 days before grazing domestic livestock or harvesting forage grasses and legumes.

ALFALFA*
ARTICHOKE, JERUSALEM
ASPARAGUS*
ATEMOYA
BARLEY*
BEANS (All)
BEET GREENS
BEETS (Red, Sugar)
BLACKBERRY
BLUEBERRY
BOYSENBERRY
BREADFRUIT
BROCCOLI

CABBAGE
CANISTEL
CARAMBOLA
CARROT
CAULIFLOWER
CELERY
CHICORY
CORN (All)*
COTTON*
CRANBERRY
CUCUMBER***
CURRANT
DATES
DEWBERRY
EGGPLANT***
ELDERBERRY
FORAGE GRASSES*
FORAGE LEGUMES*
GARLIC***
GOOSEBERRY
GOURDS***
HORSERADISH
HUCKLEBERRY
JABOTICABA
JACKFRUIT
KALE
LENTILS
LETTUCE
LOGANBERRY
LONGAN
LYCHEE
MELONS***
MUSTARD GREENS
OATS*
OKRA
OLALLIEBERRY
ONION
PARSNIPS
PASSION FRUIT
PEANUTS
PEAS (All)
PEPPER***
PERSIMMONS
PINEAPPLE****
POTATO (Irish, Sweet)
PUMPKIN***
RADISH
RASPBERRY (Black, Red)
RICE**
RUTABAGA
SAPODILLA
SAPOTE (Black, Mamey, White)
SORGHUM (Milo)*
SOURSOP

SOYBEANS*
SPINACH
SQUASH* (Summer, Winter)**
SUGAR APPLE
TAMARIND
TOMATILO*
TOMATOES*†**
TURNIPS
WATERMELON*
WATERCRESS*
WHEAT*
YAMS

* Spot treatments may be applied in these crops.

** Do not treat rice fields or levees when the fields contain flood water.

*** Apply only prior to planting. Allow at least 3 days between application and planting.

****Do not feed or graze treated pineapple forage following application.

† Use is restricted to direct seeded crops only.

When applying this product prior to transplanting crops into plastic mulch, care must be taken to remove residues of this product from the plastic prior to transplanting. Residues can be removed by 1/2 inch natural rainfall or by applying water via a sprinkler irrigation system.

NOTE: This product is not registered in California for use on atemoya, breadfruit, canistel, carambola, jaboticaba, jackfruit, longan, lychee, parsnips, passion fruit, sapodilla, sapote, sugar apples, tamarind, and yams.

Spot Treatment (Only those crops with ''*'' can be spot treated.)—Applications in growing crops must be made prior to heading of small grains and milo, initial pod set in soybeans, silking of corn, or boll opening on cotton.

For forage grasses and forage legumes see ''Spot Treatment'' in the ''Pastures'' section of ''Cropping Systems'' in this label.

For dilution and rates of application using boom or hand-held equipment, see ''Mixing, Additives and Application Instructions'' and ''Weeds Controlled'' sections of this label.

NOTE: FOR FORAGE GRASSES AND FORAGE LEGUMES, NO MORE THAN ONE-TENTH OF ANY ACRE SHOULD BE TREATED AT ONE TIME. FOR ALL OTHER CROPS, DO NOT TREAT MORE THAN 10 PERCENT OF THE TOTAL FIELD AREA TO BE HARVESTED.

THE CROP RECEIVING SPRAY IN TREATED AREA WILL BE KILLED. TAKE CARE TO AVOID DRIFT OR SPRAY OUTSIDE TARGET AREA FOR THE SAME REASON.

Selective Equipment—This product may be applied through recirculating sprayers, shielded applicators, or wiper applicators in cotton and soybeans. Shielded and wiper applicators may also be used in tree crops and grapes. Wiper applicators may be used in rutabagas, forage grasses and forage legumes, including pasture sites and grain sorghum (milo).

See the ''Selective Equipment'' part of the ''Application Equipment and Techniques'' section of this label for information on proper use and calibration of this equipment.

Allow at least the following time intervals between application and harvest:

Cotton, Soybeans .....7 days
Apples, Atemoya, Avocado, Breadfruit, Canistel, Carambola, Cherry, Citrus, Dates, Grapes, Jaboticaba, Jackfruit, Longan, Lychee, Passion Fruit, Pear, Persimmons, Rutabagas, Sapodilla, Sapote, Soursop, Sugar Apple, Tamarind .....14 days
Stone Fruit .....17 days
Nut Crops .....21 days
Sorghum (milo)* .....40 days

* Do not use roller applicators. Do not feed or graze treated milo fodder. Do not ensile treated vegetation.

ASPARAGUS

When applied as directed for ''Cropping Systems'' under the conditions described, this product controls weeds listed on this label in asparagus.

For specific rates of applications and instructions for control of various annual and perennial weeds, see the ''Weeds Controlled'' section of this label.

Prior to Crop Emergence—Apply this product prior to crop emergence for the control of emerged labeled annual and perennial weeds. DO NOT APPLY WITHIN A WEEK BEFORE THE FIRST SPEARS EMERGE.

Spot Treatment—Apply this product immediately after cutting, but prior to the emergence of new spears. Do not treat more than 10 percent of the total field area to be harvested. Do not harvest within 5 days of treatment.

Postharvest—Apply this product after the last harvest and all spears have been removed. If spears are allowed to regrow, delay application until ferns have developed. Delayed treatments should

be applied as directed or shielded spray in order to avoid contact of the spray with ferns, stems or spears. Direct contact of the spray with the asparagus may result in serious crop injury.

NOTE: Select and use recommended types of spray equipment for postemergence postharvest applications. A directed spray is any application where the spray pattern is aligned in such a way as to avoid direct contact of the spray with the crop. A shielded spray is any application where a physical barrier is positioned and maintained between the spray and the crop to prevent contact of spray with the crop.

BERRIES AND SMALL FRUITS

For cranberries, apply after fruit set and no later than 30 days before harvest.

For other berries, apply as a preplant broadcast application, or as a directed spray or wiper application post-planting.

Wiper applicators may be used in cranberries in accordance with instructions in this section.

See ''General Information'' and ''Mixing, Additives and Application Instructions'' sections of this label for essential product performance information.

See the ''Selective Equipment'' part of the ''Application Equipment and Techniques'' section of this label for information on recommended use and calibration of this equipment.

For Wick or other Wiper Applicators—Mix 1 gallon of this product in 4 gallons of water to prepare a 20 percent solution. Apply the solution to emerged weeds. Apply after cranberry fruit set and no later than 30 days before harvest.

In severe infestations, reduce equipment ground speed to ensure that adequate amounts of this product are wiped on the weeds. A second treatment in the opposite direction may be beneficial.

Do not permit herbicide solution to contact desirable vegetation, including green shoots, canes, or foliage.

FALLOW AND REDUCED TILLAGE SYSTEMS

FOR AERIAL APPLICATION IN CALIFORNIA, REFER TO SUPPLEMENTAL LABEL.

Use this product in fallow and reduced tillage systems for control of annual weeds prior to emergence of crops listed in this label. Refer to the ''Weeds Controlled'' section of this label for specific rates and instructions. This product may be applied using

ground or aerial spray equipment. See the ''Application Equipment and Techniques'' section of this label for instructions.

TANK MIXTURES

MON 52249 plus BANVEL plus NONIONIC SURFACTANT

MON 52249 plus 2,4-D plus NONIONIC SURFACTANT

MON 52249 plus GOAL™ plus NONIONIC SURFACTANT

DO NOT APPLY BANVEL, OR 2,4-D TANK MIXTURES BY AIR IN CALIFORNIA.

Applications of 2,4-D or Banvel must be made at least 7 days prior to planting corn. Applications of 2,4-D must be made at least 30 days prior to planting soybeans.

The addition of Banvel in a mixture with this product may provide short-term residual control of selected weed species. Some crop injury may occur if Banvel is applied within 45 days of planting. Refer to the Banvel and 2,4-D labels for cropping restrictions and other use instructions.

MON 52249 plus Goal Tank Mixtures

This product alone or in tank mixtures with Goal plus 0.5 to 1 percent nonionic surfactant by total spray volume will provide control of those weeds listed below.

Make applications when weeds are actively growing and at the recommended stages of growth. Avoid spraying when weeds are subject to moisture stress, when dust is on the foliage or when straw canopy covers the weeds.

MON 52249 12 fluid oz/acre

Wheat	18"*
Barley	12"
Bluegrass, annual	6"
Barnyardgrass	6"
Rye	6"

MON 52249 16 fluid oz/acre

Annual grasses at

left plus:

Ryegrass, annual	6"
Chickweed	6"
Groundsel	6"
Marestail	6"
Rocket, London	6"
Shepherdspurse	6"
Crabgrass	12"
Johnsongrass, seedling	12"
Lambsquarters	12"
Oats, wild	12"
Pigweed, redroot	12"
Mustards	12"

MON 52249 12 fluid oz/acre + GOAL** 2 to 4 fluid oz/acre		MON 52249 16 fluid oz/acre + GOAL** 2 to 4 fluid oz/acre	
Annual grasses above plus:		Annual weeds above plus:	
Cheeseweed, common	3"	Cheeseweed, common	6"
Chickweed	3"	Groundsel	6"
Groundsel	3"	Chickweed	12"
Rocket, London	6"	Rocket, London	12"
Shepherdspurse	6"	Shepherdspurse	12"

* Maximum height or length in inches.
** Use the higher rate when weeds approach maximum recommended height or stands are dense.

These recommended tank mixtures may be applied using ground or aerial spray equipment. Refer to the ''Weeds Controlled'' section of this label for specific rates and instructions.

™Goal is a trademark of Rohm and Haas Company.

ECOFARMING SYSTEMS

The recommendations made in this section are not registered for use in California.

The Ecofarming System consists of the following rotation: winter wheat, corn/sorghum, ecofallow.

Use the following tank mixtures for control of emerged annual weeds before planting corn or sorghum in the Ecofarming System.

MON 52249 at 16 to 20 fluid ounces per acre
plus
2,4-D at 0.375 to 0.5 pound a.i. per acre
plus
ATRAZINE at 0.75 to 1 pound a.i. per acre
plus
LASSO® at 2.5 to 3 quarts per acre

The above tank mixture should be applied in 28-0-0 or 32-0-0 liquid fertilizer carrier at 20 to 30 gallons per acre. The liquid fertilizer may be diluted with water to achieve the required carrier volume.

WEEDS CONTROLLED - The following weeds, up to a maximum height of 4 inches, will be controlled:

Brome, downy
Bromus tectorum

Cheat
Bromus secalinus

Foxtail, green
Setaria viridis

Foxtail, yellow
Setaria lutescens

Kochia*
Kochia scoparia

Lettuce, prickly
Lactuca serriola

Pigweed, redroot
Amaranthus retroflexus

Thistle, Russian
Salsola kali

Wheat, volunteer
Triticum aestivum

*For improved control of kochia, add 4 fluid ounces per acre (0.125 pound a.i. per acre) of Banvel to the above tank mixture.

Risk of crop injury from 2,4-D or Banvel can be reduced by applying this treatment 7 to 14 days before planting.

Refer to the label booklet for Lasso herbicide for preemergence weed control achieved by this tank mixture.

Refer to the specific product labels for crop rotation restrictions and cautionary statements for all products used in these tank mixtures.

®Lasso is a registered trademark of Monsanto Company.

AID TO TILLAGE

This product, when used in conjunction with preplant tillage practices, will provide control of downy brome, cheat, volunteer wheat, tansy mustard and foxtail. Apply 8 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre. Make applications when weeds are actively growing and before they are 6 inches in height. Application must be followed by conventional tillage practices no later than 15 days after treatment and before regrowth occurs. Allow at least 1 day after application before tillage. Tank mixtures with residual herbicides may result in reduced performance.

PASTURES

Apply this product prior to planting forage grasses and legumes.

Pasture or Hay Crop Renovation—When applied as a broadcast spray, this product controls the annual and perennial weeds listed in this label prior to planting forage grasses or legumes. Remove domestic livestock before application and wait 8 weeks after application before grazing or harvesting.

Spot Treatment—When applied as a spot treatment as recommended, this product controls annual and perennial weeds listed in this label which are growing in pastures, forage grasses and forage legumes composed of bahiagrass, bermudagrass, bluegrass, brome, fescue, orchardgrass, ryegrass, timothy, wheatgrass, alfalfa or clover.

Wiper Application—When applied as directed, this product controls or suppresses the weeds listed under ''Wiper Applicators'' in the ''Selective Equipment'' section of this label.

For spot treatment and wiper application, apply in areas where the movement of domestic livestock can be controlled. No more than one-tenth of any acre should be treated at one time. Further applications may be made in the same area at 30 day intervals. Remove domestic livestock before application and wait 14 days after application before grazing livestock or harvesting.

SUGARCANE

When applied as directed for ''Cropping Systems'', under the conditions described, this product controls those emerged annual

and perennial weeds listed on this label growing in or around sugarcane or in fields to be planted to sugarcane. This product will also control undesirable sugarcane.

NOTE: Where repeat treatments are necessary, do not exceed a total of 10.6 quarts of this product per acre per year. Do not apply to vegetation in or around ditches, canals or ponds containing water to be used for irrigation.

Broadcast Treatment—Apply this product in 10 to 40 gallons of water per acre on emerged weeds growing in fields to be planted to sugarcane.

For specific rates of application and instructions for control of various annual and perennial weeds, see the ''Weeds Controlled'' section of this label.

For removal of last stubble or ratoon cane, apply 4 to 5 quarts of this product in 10 to 40 gallons of water per acre to new growth having at least 7 or more new leaves. Allow 7 or more days after application before tillage.

Spot Treatment in or Around Sugarcane Fields—For dilution and rates of application using hand-held equipment, see ''Mixing, Additives and Application Instructions'' and ''Weeds Controlled'' sections of this label.

For control of volunteer or diseased sugarcane, make a 1 percent solution of this product in water and spray to wet the foliage of vegetation to be controlled.

NOTE: When spraying volunteer or diseased sugarcane, the plants should have at least 7 new leaves.

Avoid spray contact with healthy cane plants since severe damage or destruction may result.

Do not feed or graze treated sugarcane forage following application.

CONSERVATION TILLAGE, MINIMUM TILLAGE AND NO-TILL SYSTEMS
CORN AND SOYBEANS
Tank Mixtures

The recommendations made in this section are not registered for use in California.

When applied as recommended under the conditions described, the tank mixtures listed in this section control many emerged weeds, and give preemergence control of many annual weeds where corn or soybeans will be planted directly into a cover crop, established sod, or in previous crop residues.

Refer to specific product labels for crop rotation restrictions and cautionary statements of all products used in these tank mixtures. For mixing instructions, see the "Mixing, Additives and Application Instructions" section of this label.

Apply these tank mixtures in 10 to 20 gallons of water or 10 to 60 gallons of nitrogen solutions per acre before, during or after planting. Do not apply these mixtures after crop emergence.

When tank mixing with residual herbicides, add an agriculturally approved nonionic surfactant at 0.5 to 1 percent by volume of spray solution. The addition of 1 to 2 percent dry ammonium sulfate by weight may increase the performance of this product.

NOTE: When using these tank mixtures, do not exceed 4 quarts of this product per acre.

CORN

For residual control, this product may be tank-mixed with the following herbicides or combination of herbicides:

LASSO®/ALACHLOR	ATRAZINE
LARIAT®	CYANAZINE
BULLET®	SIMAZINE
DUAL™	PROWL™
BICEP™	

For improved burndown, this product may be tank-mixed with 2,4-D or dicamba. Applications of 2,4-D or dicamba must be made at least 7 days prior to planting corn. See the "Weeds Controlled" section for specific rate information.

SOYBEANS

For residual control, this product may be tank-mixed with the following herbicides or combination of herbicides:

CANOPY™	LOROX™ PLUS
COMMAND™	PREVIEW™
DUAL™	PROWL™
GEMINI™	TURBO™
LASSO®/ALACHLOR	SCEPTER™
LEXONE™	SENCOR™
LINURON	SQUADRON™

For improved burndown, this product may be tank-mixed with the following herbicides:

2,4-DB
2,4-D*

* Applications of 2,4-D must be made at least 30 days prior to planting soybeans. See the "Weeds Controlled" section for specific rate information.

CORN AND SOYBEANS

Annual Weeds--For difficult to control weeds such as fall panicum, barnyardgrass, crabgrass, shattercane and broadleaf signalgrass up to 2 inches tall, and Pennsylvania smartweed up to 6 inches tall, apply this product at 2 pints per acre in these tank mixtures. For other labeled annual weeds, apply 1 to 1.5 pints of this product per acre when weeds are less than 6 inches tall, and 2 to 3 pints when weeds are over 6 inches tall. For a complete list of annual weeds controlled, see the "Weeds Controlled" section of this label.

Perennial Weeds--At normal application times in minimum tillage systems, perennial weeds may not be at the proper stage of growth for control. See the "Weeds Controlled" section of this label for the proper stage of growth for perennial weeds.

Use of 2 to 4 quarts of this product per acre in the tank mixtures mentioned above, under these conditions provides top kill and reduces competition from many emerged perennial grass and broadleaf weeds. For emerged perennial weeds controlled, see the "Weeds Controlled" section of this label.

To obtain the desired stage of growth, it may be necessary to apply this product alone in the late summer or fall and then follow with a label-approved, seedling weed control program at planting.

USE OF THESE TANK MIXTURES FOR BERMUDAGRASS OR JOHNSONGRASS CONTROL IN MINIMUM TILLAGE SYSTEMS IS NOT RECOMMENDED. For bermudagrass control, follow the instructions under "Control of Perennial Weeds" section of this label and then use a label-approved, seedling weed-control program in a minimum tillage or conventional tillage system. For johnsongrass control, follow instructions under "Control of Perennial Weeds" section of this label, and then use a label approved seedling weed control program with conventional tillage.

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™Command is a trademark of FMC Corporation.

PREHARVEST APPLICATIONS

COTTON

When applied as directed under the conditions described, this product controls annual and perennial weeds listed on this label prior to the harvest of cotton.

Broadcast Applications--This product may be applied using either aerial or ground spray equipment. For ground applications with broadcast equipment, apply this product in 10 to 20 gallons of water per acre. For aerial applications, apply this product in 3 to 10 gallons of water per acre.

FOR AERIAL APPLICATIONS, REFER TO THE "APPLICATION EQUIPMENT AND TECHNIQUES" AND "AERIAL EQUIPMENT" SECTIONS OF THIS LABEL.

FOR AERIAL APPLICATIONS IN CALIFORNIA, REFER TO THE FEDERAL SUPPLEMENTAL LABEL FOR AERIAL APPLICATIONS IN THAT STATE FOR SPECIFIC INSTRUCTIONS, RESTRICTIONS AND REQUIREMENTS.

DO NOT EXCEED A MAXIMUM RATE OF 1 QUART PER ACRE OF THIS PRODUCT WHEN MAKING APPLICATIONS BY AIR.

Weed Control--For specific rates of application and instructions for control of various annual and perennial weeds for this product used alone or in the following tank mixtures, see the "Weeds Controlled" section of this label.

To control johnsongrass using multiple directed or broadcast over the top spray equipment, apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 20 gallons of water per acre. Ensure complete coverage.

For partial control of field bindweed, apply 1 quart of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 20 gallons of water per acre. Apply when bindweed is actively growing and 12 inches or greater in length. Reduced performance may result if bindweed is under drought stress.

TANK MIXTURES

MON 52249 plus Def™ 6
MON 52249 plus Folex™
MON 52249 plus Prep™
MON 52249 plus Prep plus Def 6 or Folex

When applied as recommended under the conditions described, these tank mixtures control annual and perennial weeds listed on this label prior to the harvest of cotton. For application guidelines, precautions and use-rates, refer to the Def, Folex and Prep labels.

This product when tank mixed with DEF 6 or Folex defoliants may provide enhancement of cotton leaf drop and regrowth inhibition.

Timing of Application--Apply this product or these tank mixtures for preharvest weed control after 60 percent of the cotton bolls have opened.

NOTE: DO NOT APPLY TO CROPS GROWN FOR SEED. Allow a minimum of 7 days between application and harvest. Do not feed or graze treated cotton forage or hay following preharvest applications.

™Def is a trademark of Mobay Chemical Company.
™Folex and Prep are trademarks of Rhone-Poulenc, Inc.

TREE AND VINE CROPS

This product is recommended for weed control in established groves, vineyards, or orchards, or for site preparation prior to transplanting crops listed in this section. Applications may be made with boom equipment, CDA, shielded sprayers, hand-held and high-volume wands, lances, or orchard guns, or with wiper applicator equipment, except as directed in this section. See the "Application Equipment and Techniques" section of this label for specific information on use of equipment.

When applying this product, refer to the "Weeds Controlled" section of this label and to specific recommendations in this section for rates to be used.

NOTE

Repeat treatments may be necessary to control weeds originating from underground parts of untreated weeds or from seeds. This product does not provide residual weed control. For subsequent weed control, use repeated applications of this product. Do not apply more than 10.6 quarts of this product per acre per year.

EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF HERBICIDE SOLUTION, SPRAY, DRIFT, OR MIST WITH FOLIAGE OR GREEN BARK OF TRUNK, BRANCHES, SUCKERS, FRUIT, OR OTHER PARTS OF TREES OR VINES. CONTACT OF THIS PRODUCT WITH OTHER THAN MATURED BROWN BARK CAN RESULT IN SERIOUS CROP DAMAGE.

AVOID PAINTING OUT STUMPS WITH THIS PRODUCT AS INJURY RESULTING FROM ROOT GRAFTING MAY OCCUR IN ADJACENT TREES.

Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed or cut and have not been allowed to regrow to the recommended stage for treatment.

For specific rates of applications and instructions, see the "Weeds Controlled" section of this label, and to specific recommendations which follow.

MIDDLES MANAGEMENT

FOR ANNUAL WEEDS IN MIDDLES BETWEEN ROWS
OF TREE AND VINE CROPS

For citrus crops treat uniformly between trees.

MON 52249
MON 52249 plus GOAL™

This product alone or in mixtures with Goal will control or suppress the annual weeds listed below.

Apply the recommended rates of this product, either alone or in mixtures with Goal, plus 0.5 to 1 percent nonionic surfactant by spray volume in 3 to 10 gallons of water per acre. Apply when weeds are actively growing and less than 6 inches in height or diameter. If weeds are under drought stress, irrigate prior to application. Reduced control may occur if weeds have been mowed prior to application. Up to 48 fluid ounces per acre of this product may be used to control weeds which have been mowed, are stressed, or are growing in dense populations.

WEED SPECIES	MAXIMUM HEIGHT/DIAMETER (INCHES)	RATE PER ACRE MON 52249 (FLUID OUNCES)		RATE PER ACRE GOAL (FLUID OUNCES)
Barley *Hordeum vulgare* **Bluegrass, annual** *Poa annua*	6	8		--
Barnyardgrass *Echinochloa crus-galli* **Chickweed, common** *Stellaria media* **Red Maids** *Calandrinia ciliata*	6	12		--
Crabgrass *Digitaria spp.* **Fleabane, flaxleaf** *Conyza bonariensis* **Groundsel, common** *Senecio vulgaris* **Junglerice** *Echinochloa colonum* **Lambsquarters, common** *Chenopodium album*	6	16	OR	--
		16 to 32	+	4 to 16**

Pigweed, redroot *Amaranthus retroflexus* **Rocket, London** *Sisymbrium irio* **Ryegrass, common** *Lolium multiflorum* **Shepherdspurse** *Capsella bursa-pastoris* **Sowthistle, annual** *Sonchus oleraceus*				
Cheeseweed, common *Malva spp.*	3	12 to 32	+	4 to 16
Cheeseweed, common *Malva spp.* **Filaree*** *Erodium spp.* **Horseweed/Marestail** *Conyza canadensis* **Nettle, stinging** *Urtica dioica* **Purselane, common*** *Purtulaca oleracea*	6	16 to 32	+	4 to 16

* Suppression only.
**The mixture of this product plus Goal is recommended when weeds are stressed or growing in dense populations.

STRIPS

FOR ANNUAL AND PERENNIAL WEEDS IN STRIPS
OF TREE AND VINE CROPS

TANK MIXTURES WITH RESIDUAL HERBICIDES

When applied as a tank mixture, this product provides control of the emerged annual weeds and control or suppression of emerged perennial weeds listed in this label. The following residual herbicides will provide preemergence control of those weeds listed in the individual product labels.

MON 52249 plus GOAL™ 1.6E

MON 52249 plus KARMEX™ DF

MON 52249 plus KROVAR™ I

MON 52249 plus KROVAR™ II

MON 52249 plus SIMAZINE, PRINCEP CALIBER™ 90

MON 52249 plus SIMAZINE 4L

- **MON 52249 plus SIMAZINE 80W**
- **MON 52249 plus SOLICAM™ 80DF**
- **MON 52249 plus SURFLAN™ AS**
- **MON 52249 plus SURFLAN 75W**
- **MON 52249 plus SIMAZINE (80W, or 4L, or PRINCEP CALIBER 90) plus SURFLAN (AS or 75W)**
- **MON 52249 plus GOAL (1.6E) plus SURFLAN (AS or 75W)**
- **MON 52249 plus GOAL (1.6E) plus SIMAZINE (80W, or 4L, or PRINCEP CALIBER 90)**
- **MON 52249 plus GOAL (1.6E) plus SURFLAN (AS or 75W) plus SIMAZINE (80W, 4L, or PRINCEP CALIBER 90)**

Do not apply these tank mixtures in Puerto Rico.

When tank-mixing with residual herbicides, add an agriculturally approved nonionic surfactant at 0.5 to 1 percent by volume of spray solution.

Refer to the individual product labels for specific crops, rates, geographical restrictions and precautionary statements.

Read and carefully observe the label claims, cautionary statements, rates and all other information on the labels of all products.

™Karmex is a trademark of E.I. duPont de Nemours and Company.

RECOMMENDED RATES

Annual Weeds - Apply 1 to 5 quarts per acre of this product in these tank mixtures. Use rates at the higher end of the recommended range when weeds are stressed, growing in dense populations or are greater than 12 inches tall.

Perennial Weeds - Apply 1 pint to 5 quarts per acre of this product in these tank mixtures to control or suppress perennial weeds. Follow the recommendations in the "Weeds Controlled" section of this label for stage of growth and application rates for specific perennial weeds.

- **MON 52249 plus GOAL plus SIMAZINE/SURFLAN**

This product plus low rates of Goal in three-way or four-way mixtures with simazine and/or Surflan will provide postemergence control of the weeds listed below.

Refer to the individual simazine and Surflan labels for preemergence rates, weeds controlled, precautionary statements and other important information.

Apply these tank mixtures in 3 to 40 gallons of water. Add 0.5 to 1 percent nonionic surfactant by total spray volume to the spray solution.

Apply 1 to 5 quarts per acre of this product plus 4 to 48 fluid ounces per acre of Goal plus labeled rates of simazine and/or Surflan to control the following weeds:

Barley, wild
Hordeum leporinum
Bluegrass, annual
Poa annua
Cheeseweed, common
Malva spp.
Chickweed, common
Stellaria media
Filaree*
Erodium spp.
Fleabane, flaxleaf
Conyza bonariensis
Groundsel, common
Senecio vulgaris
Horseweed/Marestail
Conyza canadensis
Nettle, stinging
Urtica dioica
Pineappleweed
Matricaria matricariodes
Rocket, London
Sisymbrium irio
Shepherdspurse
Capsella bursa-pastoris
Sowthistle, annual
Sonchus oleraceus

*Use a minimum of 1.5 quarts of this product in these mixtures.

NOTE: This recommendation does not preclude the use of Goal in these mixtures at higher, labeled rates for preemergence weed control.

PERENNIAL GRASS SUPPRESSION
ORCHARD FLOORS

When applied as directed, this product will suppress vegetative growth as indicated below.

Bahiagrass

This product will provide significant inhibition of seedhead emergence and will suppress vegetative growth for a period of approximately 45 days with a single application and approximately 120 days with sequential applications. Apply this product 1 to 2 weeks after full green-up or after mowing to a uniform height of 3 to 4 inches. Applications must be made prior to seedhead emergence. Apply 6 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 25 gallons of water per acre.

Sequential applications of this product plus nonionic surfactant may be made at approximately 45-day intervals to extend the period of seedhead and vegetative growth suppression. For continued seedhead suppression, sequential applications must be made prior to seedhead emergence. Apply no more than 2 sequential applications per year. As a first sequential application, apply 4 fluid ounces of this product plus nonionic surfactant. A second sequential application of 2 to 4 fluid ounces may be made approximately 45 days after the last application.

Bermudagrass

For burndown, apply 1 to 2 quarts of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 20 gallons of water per acre. Use 1 quart of this product in 3 to 20 gallons of water per acre east of the Rocky Mountains. Use 1 to 2 quarts of this product in 3 to 10 gallons of water per acre west of the Rocky Mountains. Use this treatment only if reduction of the bermudagrass stand can be tolerated. When burndown is required prior to harvest, allow at least 21 days to ensure sufficient time for burndown to occur.

Suppression only (east of the Rocky Mountains)—Apply 6 to 16 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 20 gallons of water per acre no sooner than 1 to 2 weeks after full green-up. Mowing prior to application may occur provided a minimum height of 3 inches is maintained. Rates of 6 to 10 fluid ounces of this product plus nonionic surfactant should be used in shaded conditions or where a lesser degree of suppression is desired. Sequential applications may be made when regrowth occurs and bermudagrass injury and stand reduction can be tolerated.

Suppression only (west of the Rocky Mountains)—Apply 16 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 10 gallons of water per acre up to 6 inches in height and no sooner than 1 to 2 weeks after full green-up. Mowing prior to application may occur provided a minimum height of 3 inches is maintained. Sequential applications may be

made when regrowth occurs and bermudagrass injury and stand reduction can be tolerated.

Cool Season Grass Covers

For suppression of tall fescue, fine fescue, orchardgrass and quackgrass, apply 8 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 10 to 20 gallons of water per acre. For best suppression, add ammonium sulfate to the spray solution at a rate of 2 percent by weight or 17 pounds per 100 gallons of spray solution.

For suppression of Kentucky bluegrass covers, apply 6 fluid ounces of this product plus 0.5 to 1 percent nonionic surfactant. Do not add ammonium sulfate.

For best results, mow cool-season grass covers in the spring to even their height and apply the recommended rate of this product 3 to 4 days after mowing. Avoid treating cool season grass covers under poor growing conditions, such as drought stress (drip irrigation), disease or insect damage.

LOW VOLUME APPLICATION
(FLORIDA AND TEXAS)

For burndown or control of the weeds listed, apply the recommended rates of this product plus 0.5 to 1 percent nonionic surfactant by total spray volume in 3 to 30 gallons of water per acre. Where weed foliage is dense, use 10 to 30 gallons of water per acre.

Annual Weeds

Goatweed--Apply 2 to 3 quarts per acre of this product plus 17 pounds of ammonium sulfate per 100 gallons of water plus 0.5 to 1 percent nonionic surfactant by total spray volume. Apply in 20 to 30 gallons of water per acre when plants are actively growing. Use 2 quarts per acre when plants are less than 8 inches tall and 3 quarts per acre when plants are greater than 8 inches. If goatweed is greater than 8 inches, the addition of Krovar™ II or Karmex™ may improve control. Use labeled rates for these residual products.

Read and carefully observe the label claims, cautionary statements, rates and all other information on the Krovar II and Karmex labels.

Perennial Weeds

Apply when weeds are actively growing and at the growth stages listed in the ''Perennial Weeds Controlled'' section of this label. If perennial weeds are mowed, allow weeds to regrow to the recommended stage of growth.

S = Suppression	B = Burndown
PC = Partial control	C = Control

WEED SPECIES	MON 52249 RATE PER ACRE 1 qt	2 qts	3 qts	5 qts
Bermudagrass	B	•	PC	C
Guineagrass				
Texas and Florida Ridge	B	C	C	C
Florida Flatwoods	•	B	C	C
Paragrass	B	C	C	C
Torpedograss	S	•	PC	C

TREE CROPS

Citrus*: citron, grapefruit, kumquat, lemon, lime, orange, pummelo, tangelo, tangerine, tangors.

Nuts**: almond, chestnuts, filbert, macadamia, pecan, pistachio, walnut.

Pome Fruit*: apple, pear.

Stone Fruit***: apricots, cherries, nectarines, olives, peaches, plums/prunes.

For cherries, any application equipment listed in this section may be used in all states.

For citron and olives, apply as a directed spray only.

Any application equipment listed in this section may be used in apricots, nectarines, peaches, and plums/prunes growing in Arizona, California, Colorado, Idaho, Kansas, Kentucky, New Jersey, North Dakota, Oklahoma, Oregon, Texas, Utah, and Washington, except for peaches grown in the states specified in the following paragraph. In all other states use wiper equipment only.

For PEACHES grown in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee only, apply with a shielded boom sprayer or shielded wiper applicator which prevents any contact of this product with the foliage or bark of trees. Apply no later than 90 days after first bloom. Applications made after this time may result in severe damage. Remove suckers and low hanging limbs at least 10 days prior to application. Avoid applications near trees with recent pruning wounds or other mechanical injury. Apply only near trees which have been planted in the orchard for 2 or more years. EXTREME CARE MUST BE TAKEN TO ENSURE NO PART OF THE PEACH TREE IS CONTACTED.

Tropical Fruit: acerola, atemoya*, avocado*, banana (plantains), breadfruit*, canistel*, carambola*, coffee****, dates*, figs*, guava, jaboticaba*, jackfruit*, longan*, lychee*, mango*, papaya, passion fruit*, persimmons*, sapodilla, sapote, soursop, sugar

apple*, tamarind, tea. Allow a minimum of 1 day between last application and harvest of guava and papaya. In coffee and banana, delay applications 3 months after transplanting to allow the new coffee or banana plant to become established.

NOTE:

* Allow a minimum of 14 days between last application and harvest.

** Allow a minimum of 21 days between last application and harvest of these crops.

*** Allow a minimum of 17 days between last application and harvest.

****Allow a minimum of 28 days between last application and harvest.

VINE CROPS

Kiwi Fruit*

Grapes:* Any variety of table, wine, or raisin grape may be treated with any equipment listed in this section.

In the northeast and Great Lakes regions, applications must be made prior to the end of bloom stage of grapes to avoid injury.

* Applications should not be made when green shoots, canes, or foliage are in the spray zone.

* Allow a minimum of 14 days between last application and harvest.

CALIFORNIA

This product has been approved by the U.S. Environmental Protection Agency and by the state of California for the uses, crops and sites listed in this label. With the exception of these items, this booklet contains the material approved by California.

These use conditions, crops and sites may not be treated with this product in California until approval is received:

- Cool season truf growth regulation

Product protected by
U.S. Pat. No 4,405,531
Other patents pending.
No license granted under any

non-U.S. patent(s).

EPA Reg. No. 524-XXX

This product has been approved for use in California except as stated otherwise on page XXX.

In case of an emergency involving this product, Call Collect, day or night, (314) 694-4000.

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MONSANTO COMPANY
AGRICULTURAL PRODUCTS
ST. LOUIS, MISSOURI, 63167 U.S.A.

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SECTION III

Glyphosate 40 CFR 150 Data Reference List

RIN#910-02

EPA Registration File Jacket# 524-454

Page ___ is not included in this copy.

Pages 323 through 348 are not included in this copy.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product inert impurities.

_____ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

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