UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 2 8 2018

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

MEMORANDUM

SUBJECT: Malathion (057701) National and State Use and Usage Summary

FROM: Don Atwood, Ph.D., Entomologist
Science Information and Analysis Branch
Biological and Economic Analysis Division (7503P)

THRU: Diann Sims, Chief
Science Information and Analysis Branch
Biological and Economic Analysis Division (7503P)

TO: Kristina Garber, Senior Science Advisor
Environmental Fate and Effects Division (7507P)

Malathion: National and State Use and Usage Summary

(March 21, 2018)

Introduction

The Environmental Protection Agency (EPA) has been working with the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to develop a method for assessing the risks of pesticides to endangered and threatened species. Given that many listed species range over large areas, it is necessary to consider use of pesticides on a landscape scale, rather than simply a field or a small watershed. One consideration involves the percent of the crop in a given area (relevant to a listed species' range) that is treated with a pesticide. There are uncertainties in extrapolating from national level usage data to regional and state level ranges of protected species. In particular, national level data does not distinguish if there are areas of a species' range where usage is greater or less than the average national usage. In order to address these concerns, this document provides all available estimates of pesticide usage data for malathion, nationally and by state. All registered use sites as of March 2018 are listed although usage data are not available for every site.

The intended use of the data presented here are to inform assumptions about how malathion is used in the United States, and the extent, variability, and rate of that usage at the state-level. Pesticide usage data are reported at the state-level; usage data at smaller levels may not be statistically valid due to reduced sample size. Extent and variability of usage at the state-level are presented using minimum, maximum, and average percent crop treated (PCT) over the five-year observation period. PCT is calculated as the percent of the acres grown for a crop that are treated with malathion. Additionally, the data may inform assumptions about crops and states where malathion is likely not being used, by identifying crops that are surveyed for but where usage is not observed during the observation period. The state-level estimates of pesticide usage presented here (especially PCT) can be used to inform estimates of the proportion of a species range that may be exposed to malathion.

The pesticide usage data summarized herein were obtained from both public and private (proprietary) sources. As presented, the data are not proprietary, business confidential, or a trade secret. The most recent five years of available data were used, 2011-2015, in order to more accurately reflect current usage. Additionally, Figure 1 presents the malathion usage trend for the 1998-2015 reporting period.

Data Sources

- **Agricultural Market Research Data (AMRD)** – proprietary pesticide usage data from 1998 to 2015 for historical use trend and 2011 to 2015 for current usage estimates. These data are collected and sold by a private market research firm. The data are collected by annual surveys of agricultural users in the continental United States and provides pesticide usage data for about 60 crops, including both specialty and row crops. The survey design targets at least 80 percent of US acreage/production of the surveyed commodities. Survey methodology provides statistically valid results, typically at the state-level.

- **United States Department of Agriculture's National Agricultural Statistics Service (NASS)** – publicly available pesticide usage data from 2011 to 2015. NASS data are based on surveys that focus on the top-producing states that together account for the majority of U.S. acres or production of the surveyed commodity. NASS survey design targets a minimum of 80 percent of the acreage/production for every fruit, vegetable, and field crop surveyed. Operation level data are combined during summary and, pending compliance with disclosure rules, published at the state and national levels. NASS does not collect data annually for each crop, but surveys for various commodities on a rotating schedule.
- **California Department of Pesticide Regulation (CADPR) Pesticide Use Reporting (PUR)** – publicly available pesticide usage data for 2011 to 2015. The PUR database contains detailed records and summaries of agricultural applications of pesticides on crops based on application permits. All agricultural growers must submit their production agricultural pesticide use reports monthly and pest control businesses must submit pesticide use reports within 7 days after application. As such, CADPR data is a census of all usage rather than a survey. The Pesticide Use Summary reports are published annually.
- **Non-Agricultural Market Research Data (NMRD)** - Proprietary data source that provides market data for agrochemicals/specialty pesticides for various market sectors, including professional turf and ornamental plants, professional pest control, consumer pesticides, and vegetation management. Market reports reflect usage by class/market segment and chemical and are based on sales information (manufacturer and retail) and end-user surveys. Study dates vary by market sector.

The presented usage data are averaged over the number of years of available survey data based on sampling frequency (five years for AMRD and CADPR, and 1-2 years for NASS and NMRD), regardless of whether usage is observed in each surveyed year. The presented data may thus underestimate the maximum yearly usage. In certain cases, data are unavailable or withheld. These cases are indicated in the tables:

- Some data sources do not provide all data elements. When a data element is not available, this is indicated with a "--"notation in the relevant column.
- In some cases, not enough samples are available to establish a robust average. This is indicated with the notation "Insufficient number of reports to establish an estimate" or "(S)". Generally, this indicates that the chemical is only periodically used by a small number of users.
- If a registered use site is surveyed by one of our data sources but no usage is observed, this is indicated with the notation "Surveyed but no usage reported" across the data columns. Lack of reported usage data for the pesticide on a surveyed crop indicates that there is a very low likelihood that the given pesticide is used on that crop.
- If a registered use site is not surveyed nationally by any of our data sources, this is indicated with the notation "Not Surveyed at National Level" across the data columns.

Summary

Nationally, agricultural malathion usage has decreased in terms of both pounds applied and total acres treated since 1998. Total agricultural acres treated with malathion has decreased by 75%, and annual

pounds applied agriculturally has decreased 61% since its peak in 1998. (Figure 1). During the most recent five years of available survey data (2011 - 2015), an annual average of approximately 856,000 pounds of malathion were applied to an approximate average of 685,000 acres of agricultural crops, (Table 1), in 38 states (Table 2). Approximately 85% of pounds of malathion applied agriculturally are to eight crops: oranges, alfalfa, winter wheat, strawberries, cherries, caneberries, walnuts, and cotton. In terms of total acres treated, approximately 85% of the acres treated with malathion are for nine crops: alfalfa, oranges, winter wheat, cherries, strawberries, cotton, caneberries, walnuts, and lettuce. The remaining 15% of malathion applications are spread over 138 other crops. Further information on national usage of malathion by crop is available in Table 1. While the majority of malathion is only applied to a handful of crops, examination of the percent of individual crops grown by state that are treated with malathion indicates that it is an important pest control tool for certain crops in certain states. Further information on percent of crops treated with malathion by state is available in Table 2. Overall, yearly average agricultural application of malathion from 2011 to 2015 was approximately 1 million pounds.

National non-agricultural usage data is more limited than agricultural data. However, available survey data indicates that more pounds of malathion are applied in non-agricultural usage. During the survey period, approximately 1.7 million pounds of malathion were applied annually to non-agricultural sites. Consumer application (garden, lawn, ornamental, and non-plant) and mosquito control application account for approximately 85% of non-agricultural malathion usage (Table 3).

Agricultural Usage

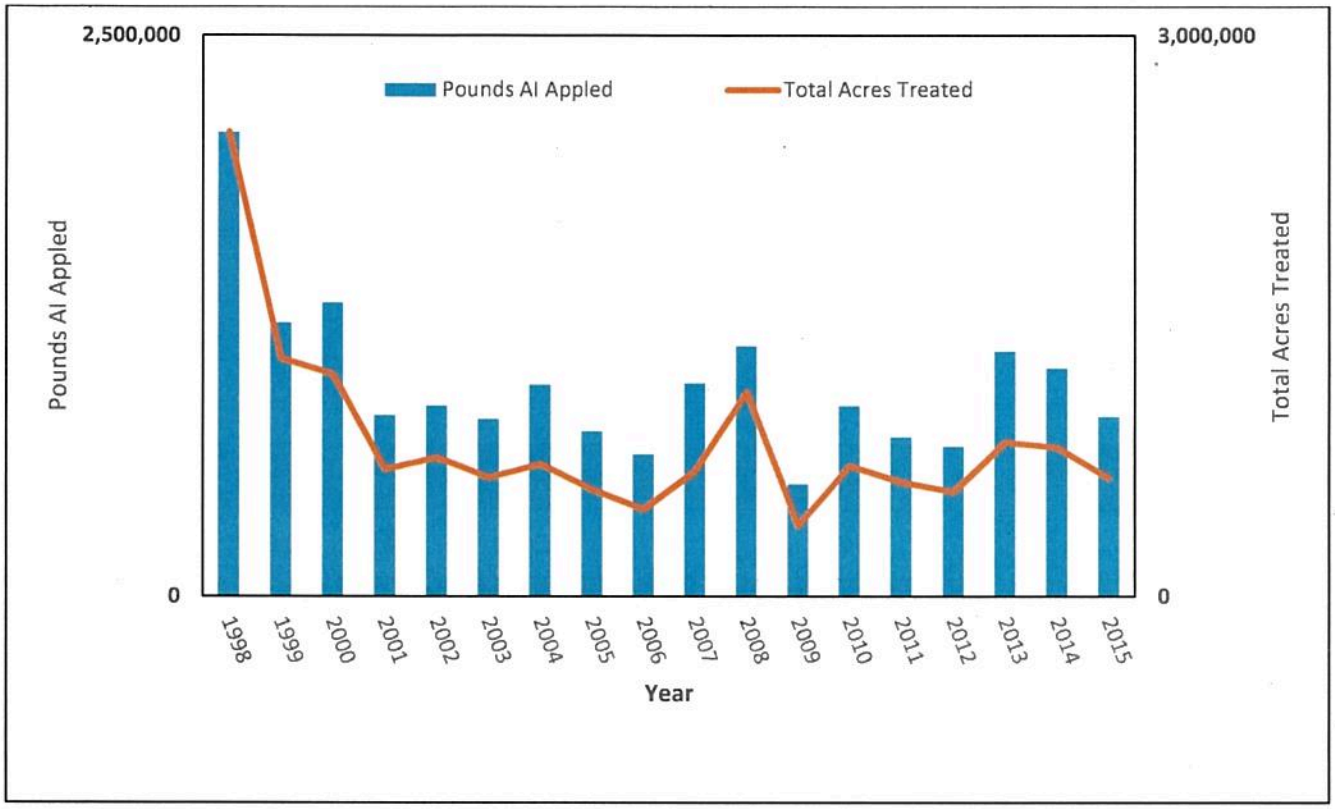

Figure 1: Malathion Total Acres Treated and Total Pounds A.I. Applied (1998-2015).

Source: Agricultural Market Research Data (AMRD). 2011-2015. (Does not include usage data for crops surveyed only by other data sources)

Table 1. National Malathion Agricultural Usage by Crop (Data Averaged Over Reported Years).

Crop	Data Source	States with Reported Usage	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	% Applied by Air	Avg. Single AI Rate	Max Single Labeled Rate lb/a [d]
Root and Tuber Vegetables (including leaves)	**See individual crops below**						**Full Group Not Registered**
Beets (Garden/Table)	Not Surveyed at National Level**						1.250
Carrots	AMRD (2011-2015)	CA	500	300	19	1.600[c]	1.250
Chayote roots	Not Surveyed at National Level**						1.560
Horseradish	Not Surveyed at National Level**						1.250
Parsnip	Not Surveyed at National Level**						1.250

(Continued on next page)

Crop	Data Source	States with Reported Usage	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	% Applied by Air	Avg. Single AI Rate	Max Single Labeled Rate lb/a [d]
Potatoes	AMRD (2011-2015)	ID, MN, MT	1,200	1,100	98	1.03	1.560
Radish	Not Surveyed at National Level**						1.000
Rutabagas	Not Surveyed at National Level**						1.000
Salsify	Not Surveyed at National Level**						1.250
Sweet Potato	Not Surveyed at National Level**						1.560
Turnips	Not Surveyed at National Level**						1.250
Yams	Not Surveyed at National Level**						1.560
Bulb Vegetable	**See individual crops below**						**Full Group Not Registered**
Garlic	CADPR (2011-2015)	CA	137	206	65	0.663	1.560
Leeks	Not Surveyed at National Level**						1.560
Onions (Bulb/Green)	AMRD (2011-2015)	CA, ID, OR, WA	10,300	6,900	9	1.468	1.560
Shallots	Not Surveyed at National Level**						1.560
Leafy Vegetables (except Brassica)	**See individual crops below**						**Full Group Not Registered**
Amaranth	Not Surveyed at National Level**						1.250
Arugula	Not Surveyed at National Level**						1.250
Celery	CADPR (2011-2015)	CA	10,200	7,000	23	1.461	1.500
Celtuce	Not Surveyed at National Level**						1.250
Chrysanthemum (Edible)	Not Surveyed at National Level**						1.250
Corn Salad	Not Surveyed at National Level**						1.250
Dandelion	Not Surveyed at National Level**						1.250
Dock (Sorrel)	Not Surveyed at National Level**						1.250
Endive	Not Surveyed at National Level**						1.250
Florence fennel (Finnochio)	Not Surveyed at National Level**						1.250
Kale	Not Surveyed at National Level**						1.000
Kohlrabi	Not Surveyed at National Level**						1.250
Lettuce (Leaf and Head)	AMRD (2011-2015)	AZ, CA	17,500	9,900	1	1.772	1.880
Mustard Greens	Not Surveyed at National Level**						1.000
Mustard Spinach	Not Surveyed at National Level**						1.250
Orach	Not Surveyed at National Level**						1.250
Parsley	Not Surveyed at National Level**						1.500

(Continued on next page)

Crop	Data Source	States with Reported Usage	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	% Applied by Air	Avg. Single AI Rate	Max Single Labeled Rate lb/a [d]
Purslane (Garden/Winter)	Not Surveyed at National Level**						1.250
Radicchio	Not Surveyed at National Level**						0.188
Spinach	AMRD (2011-2015)	CA	800	600	0	1.368[c]	1.000
Swiss Chard	Not Surveyed at National Level**						1.000
Watercress	Not Surveyed at National Level**						1.250
Brassica (Cole) Leafy Vegetables	**See individual crops below**						**1.250**
Broccoli	CADPR (2011-2015)	CA	14,513	10,558	30	1.375[c]	1.250
Broccoli Raab/Rappini	CADPR (2011-2015)	CA	12	7	51	1.635[c]	1.250
Brussels sprout	CADPR (2011-2015)	CA	2,102	1,484	4	1.416[c]	1.250
Cabbage	AMRD (2011-2015)	CA, FL, MI	2,000	1,700	0	1.162	1.250
Cabbage, Chinese (Bok choy/ Napa)	Not Surveyed at National Level**						1.250
Cauliflower	CADPR (2011-2015)	CA	2,000	1,500	18	1.293[c]	1.250
Cavalo Broccolo	Not Surveyed at National Level**						1.250
Collards	Not Surveyed at National Level**						1.000
Chinese broccoli (Gai lon)	Not Surveyed at National Level**						1.250
Chinese mustard (Gai choy)	Not Surveyed at National Level**						1.250
Mizuna	Not Surveyed at National Level**						1.250
Mustard spinach	Not Surveyed at National Level**						1.250
Rape greens	Not Surveyed at National Level**						1.250
Legume Vegetables	**See individual crops below**						**Full Group Not Registered**
Beans (Succulent)	AMRD (2011-2015)	Surveyed but no usage reported.					0.610
Dry Beans/Peas	AMRD (2011-2015)	CA, ID, TX	1,000	1,000	0	1.000[c]	0.610
Lima Beans	AMRD (2011-2015)	Surveyed but no usage reported.					0.610

(Continued on next page)

Crop	Data Source	States with Reported Usage	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	% Applied by Air	Avg. Single AI Rate	Max Single Labeled Rate lb/a [d]
Peas (Fresh/Green/ Sweet)	AMRD (2011-2015)	Surveyed but no usage reported.					1.000
Fruiting Vegetable	**See individual crops below**						**Full Group Not Registered**
Eggplant	Not Surveyed at National Level**						1.560
Okra	Not Surveyed at National Level**						1.200
Peppers	AMRD (2011-2015)	CA, TX	700	500	0	1.297	1.560
Tomatillos	Not Surveyed at National Level**						1.560
Tomatoes	AMRD (2011-2015)	CA, FL	5,600	4,900	0	1.141	1.560
Cucurbit Vegetables	**See individual crops below**						**Full Group Not Registered**
Chayote fruit	Not Surveyed at National Level**						1.750
Cucumbers	AMRD (2011-2015)	FL	1,100	900	0	1.25	1.750
Melons	(see individual crops below)						1.873
Cantaloupe	AMRD (2011-2015)	CA, TX	400	400	91	0.994	1.000
Casabas	Not Surveyed at National Level**						1.000
Crenshaw	Not Surveyed at National Level**						1.000
Honey Balls	Not Surveyed at National Level**						1.000
Honeydews	Not Surveyed at National Level**						1.000
Muskmelons	Not Surveyed at National Level**						1.000
Persians	Not Surveyed at National Level**						1.000
Pumpkins	AMRD (2011-2015)	CA, IL, IN, NJ, NY, OH, PA, TN, VA	1,700	1,900	6	0.910	1.000
Squash (Summer & Winter)	AMRD (2011-2015)	CA, GA, OH, TX	1,800	1,900	0	0.950	1.750 (summer) 1.000 (winter)
Watermelons	AMRD (2011-2015)	MS, OK, SC, TX	2,400	2,400	0	1.031	1.500

(Continued on next page)

Crop	Data Source	States with Reported Usage	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	% Applied by Air	Avg. Single AI Rate	Max Single Labeled Rate lb/a [d]
Citrus	**See individual crops below**						**7.5 (CA) 4.5 (non-CA)**
Grapefruit	AMRD (2011-2015)	FL	6,300	5,700	41	1.098	7.500
Kumquats	Not Surveyed at National Level**						4.500
Lemons	CADPR (2011-2015)	CA	145	92	0	1.571	7.500
Limes	Not Surveyed at National Level**						7.500
Oranges	AMRD (2011-2015)	CA, FL	174,400	148,600	24	1.173	7.500
Tangelos	NASS (2011, 2015)	FL	550	1,000	--	0.550	7.500
Tangerines	NASS (2011, 2015)	FL, CA	16,150	19,918	--	0.811	7.500
Other citrus hybrids	Not Surveyed at National Level**						7.500
Pome Fruit	**See individual crops below**						**Full Group Not Registered**
Pears	AMRD (2011-2015)	Surveyed but no usage reported.					1.250
Stone Fruits	**See individual crops below**						**Full Group Not Registered**
Apricots*	CADPR (2011-2015)	CA	2	6	0	0.415	1.500
Cherries (Sweet/Tart)	AMRD (2011-2015)	CA, OR, WA	66,500	49,200	55	1.351	1.750
Nectarines	CADPR (2011-2015)	CA	8	2	0	3.920[c]	3.000
Peaches	AMRD (2011-2015)	MI, TX, WA	2,300	1,600	0	1.49	3.000
Berry and Small Fruit	**See individual crops below**						**Full Group Not Registered**
Bushberries	(see individual crops below)						
Blueberries	NASS (2011, 2015)	GA, MI, NJ, NC, OR, WA	75,950	70,209	NA	1.082	1.250
Currants	Not Surveyed at National Level**						1.250
Gooseberries	Not Surveyed at National Level**						2.000
Caneberries[1]	AMRD (2011-2015)	CA, OR, WA	53,600	28,300	5	1.892	2.000

(Continued on next page)

Crop	Data Source	States with Reported Usage	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	% Applied by Air	Avg. Single AI Rate	Max Single Labeled Rate lb/a [d]
Grapes	CADPR (2011-2015)	CA	2,041	1,288	0	1.584	1.880
Grapes, Raisin/Table	CADPR (2011-2015)	CA	1,162	776	0	1.498	1.880
Grapes, Wine	CADPR (2011-2015)	CA	879	512	0	1.716	1.880
Grape vines	Not Surveyed at National Level**						1.888
Strawberries	AMRD (2011-2015)	CA, FL, MI, NY, OR, PA, WA	91,800	48,800	0	1.883	2.000
Tree Nuts	**See individual crops below**						**Full Group Not Registered**
Chestnuts	Not Surveyed at National Level**						2.500
Macadamia Nut	Not Surveyed at National Level**						0.940
Pecans	AMRD (2011-2015)	AL, GA, TX	7,800	2,900	21	2.701[c]	2.500
Walnuts	CADPR (2011-2015)	CA	14,333	6,228	16	2.301	2.500
Cereal Grains	**See individual crops below**						**Full Group Not Registered**
Barley	NASS (2011)	CA	Insufficient number of reports to establish an estimate.				1.250
Corn	(see individual crops below)						1.000
Corn, Field	AMRD (2011-2015)	MI	500	800	0	0.625	1.000
Corn, Pop	Not Surveyed at National Level**						1.000
Corn, Sweet	AMRD (2011-2015)	CA	6,200	6,100	35	1.005	1.000
Oats	Not Surveyed at National Level**						1.000
Rice	AMRD (2011-2015)	AR, LA, TX	7,100	7,500	100	0.944	1.250
Rye	Not Surveyed at National Level**						1.000
Sorghum (Milo)	AMRD (2011-2015)	TX	1,100	1,200	0	0.938	1.000
Wheat	AMRD (2011-2015)	CA, ID, KS, OK, TX, WY	100,700	85,700	71	1.175[c]	1.000
Spring Wheat	AMRD (2011-2015)	CA, ID	8,800	9,000	0	0.979	1.000
Winter Wheat	AMRD (2011-2015)	CA, KS, OK, TX, WA	91,900	76,700	79	1.198[c]	1.000
Wild rice	Not Surveyed at National Level**						1.250

(Continued on next page)

Crop	Data Source	States with Reported Usage	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	% Applied by Air	Avg. Single AI Rate	Max Single Labeled Rate lb/a [d]
Grass Forage, Fodder, and Hay	**See individual crops below**						**Full Group Not Registered**
Alfalfa	AMRD (2011-2015)	AZ, CA, CO, IL, IN, KS, KY, MI, NE, ND, OH, OK, PA, SD, UT, WY	155,300	166,100	17	0.935	1.250
Birdsfoot Trefoil	Not Surveyed at National Level**						1.250
Grasses[2]	Not Surveyed at National Level**						1.250
Pasture and Rangeland	Not Surveyed at National Level**						1.250
Nongrass Animal Feeds	**See individual crops below**						**Full Group Not Registered**
Clover	Not Surveyed at National Level**						1.250
Lespedeza	Not Surveyed at National Level**						1.250
Lupine	Not Surveyed at National Level**						0.610
Vetch	Not Surveyed at National Level**						1.250
Oilseed Crops	**See individual crops below**						**Full Group Not Registered**
Cotton	AMRD (2011-2015)	AR, LA, MO, OK, TX	46,800	39,600	17	1.182	2.500
Flax	Not Surveyed at National Level**						0.500
Edible Fungi	**See individual crops below**						**Full Group Not Registered**
Mushrooms	Not Surveyed at National Level**						1.700
Stalk Stem and Leaf Petiole Vegetables	**See individual crops below**						**Full Group Not Registered**
Asparagus	AMRD (2011-2015)	CA	2,100	2,000	0	1.037	1.250
Tropical and Subtropical Fruit	**See individual crops below**						**Full Group Not Registered**
Avocados	CADPR (2011-2015)	CA	146	38	65	3.805	4.700
Figs	CADPR (2011-2015)	CA	781	455	59	1.716	2.000
Guava	Not Surveyed at National Level**						1.250
Mangos	Not Surveyed at National Level**						0.940
Papaya	Not Surveyed at National Level**						1.250
Passion Fruit	Not Surveyed at National Level**						1.000
Pineapples	Not Surveyed at National Level**						2.000

(Continued on next page)

Crop	Data Source	States with Reported Usage	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	% Applied by Air	Avg. Single AI Rate	Max Single Labeled Rate lb/a [d]
Misc. Crops	**See individual crops below**						**Full Group Not Registered**
Hops	Not Surveyed at National Level**						0.630
Mint	Not Surveyed at National Level**						0.940
Peppermint	Not Surveyed at National Level**						0.940
Spearmint	Not Surveyed at National Level**						0.940

[1] Caneberries include blackberries, boysenberries, dewberries, loganberries, and raspberries.

[2] Grasses include Bermuda, barnyard grass, canary grass, fescue, orchardgrass, red top, timothy, and yellow foxtail

Notes	
AMRD (YEAR-YEAR)	Agricultural usage surveyed by market research firm(s)
NASS (YEAR)	Surveyed by United States Department of Agriculture National Agricultural Statistics Service
Cal DPR (YEAR)	Surveyed by the California Department of Pesticide Regulation. Over than 80% of crop grown in California
a	The pounds AI displayed in this document may differ from those displayed in the SLUA and other BEAD documents, because different calculation methods were used.
b	Total Acres Treated accounts for multiple applications to a single area. This may overestimate the number of acres treated as some acres are treated more than once.
c	Malathion underwent re-registration, which culminated in a registration eligibility decision in 2009. As a result of that decision the maximum single application rate was reduced to the "Max Labeled Single AI Rate" listed for this crop. Because the malathion maximum single application rate for this crop was immediately prior to the sampling interval (2011-2015), products bearing the reduced application rate may not have entered the marketplace until after the beginning of the sampling interval and/or existing stocks of product with the higher pre-reregistration application rate were likely still being exhausted by growers during the sampling interval. For these reasons, use rate averages during the sampling interval that exceed the current labeled maximum use rates are not unexpected. The observed exceedance of the current "Max Labeled Single AI Rate" for this crop during the sampling interval is not suggestive of any exceedances of the maximum application rate by applicators. Furthermore, due to the application rate change near or during the sampling interval, the reported single application rate average cannot be considered a reliable estimate of the current average single application rate for this crop. The "Max Labeled Single AI Rate" should be considered the application rate for this crop.
d	Max labeled rate from 2017 EFED 1-3 Master Use Table.
NR*	Surveyed by the indicated source in the years listed, but no usage reported.
**	Site not surveyed at national level
(S)	Insufficient number of reports to establish an estimate. This indicates that the chemical is only periodically used by a small number of users.

Table 2. Malathion Agricultural Usage by Crop and State (Data Averaged Over Reported Years).

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Root and Tuber Vegetables (including leaves)	**See individual crops below**						
Beets (Garden)	Not Surveyed at National Level**						
Carrots	AMRD (2011-2015)	California	67,000	500	0.0	2.5	0.5
		MI	3,000	Surveyed but no usage reported			
		TX	1,700	Surveyed but no usage reported			
		WA	7,000	Surveyed but no usage reported			
		WI	4,800	Surveyed but no usage reported			
Chayote fruit/roots	Not Surveyed at National Level**						
Horseradish	Not Surveyed at National Level**						
Potatoes	AMRD (2011-2015)	Idaho	324,800	300	0.0	0.4	0.1
		Minnesota	47,000	800	0.0	7.1	1.4
		Montana	11,500	20	0.0	0.8	0.2
		CA	34,700	Surveyed but no usage reported			
		CO	58,600	Surveyed but no usage reported			
		FL	35,000	Surveyed but no usage reported			
		ME	54,400	Surveyed but no usage reported			
		MI	45,800	Surveyed but no usage reported			
		NE	18,500	Surveyed but no usage reported			
		NY	17,400	Surveyed but no usage reported			
		NC	15,700	Surveyed but no usage reported			
		ND	82,800	Surveyed but no usage reported			
		OR	40,000	Surveyed but no usage reported			
		PA	7,700	Surveyed but no usage reported			
		TX	18,100	Surveyed but no usage reported			
		WA	164,000	Surveyed but no usage reported			
		WI	63,300	Surveyed but no usage reported			
Radish	CADPR (2011-2015)	California (13%)⁺	1,499	183	0.5	1.0	0.8
Rutabagas	Not Surveyed at National Level**						
Salsify	Not Surveyed at National Level**						
Sweet Potato	CADPR (2011-2015)	California (14%)⁺	18,658	1	0.0	0.0	0.0

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Turnips	CADPR (2011-2015)	California (1%)+	235	77	0.5	3.2	1.8
Yams	Not Surveyed at National Level**						
Bulb Vegetable	**See individual crops below**						
Garlic	CADPR (2011-2015)	California (86%)+	23,500	100	0.0	0.8	0.3
Leeks	CADPR (2011-2015)	California (--%)+	625	500	0.0	3.7	1.7
Onions (bulb and green)	AMRD (2011-2015)	California	45,100	800	0.2	4.5	1.7
		Idaho	8,400	500	0.0	16.5	5.4
		Oregon	19,700	6,000	4.7	26.0	12.9
		Washington	23,900	2,900	0.0	16.6	3.3
		CO	5,700	Surveyed but no usage reported			
		GA	12,700	Surveyed but no usage reported			
		NY	8,900	Surveyed but no usage reported			
		TX	9,800	Surveyed but no usage reported			
Shallots	Not Surveyed at National Level**						
Leafy Vegetables (except Brassica)	**See individual crops below**						
Amaranth	Not Surveyed at National Level**						
Arugula	Not Surveyed at National Level**						
Celery	CADPR (2011-2015)	California (83%)+	27,220	10,204	1.3	2.4	1.8
Celtuce	Not Surveyed at National Level**						
Chervil	Not Surveyed at National Level**						
Chrysanthemum (edible)	CADPR (2011-2015)	California (--%)+	--	0.5	0.0	100.0	35.0
Corn Salad	Not Surveyed at National Level**						
Dandelion	CADPR (2011-2015)	California (--%)+	--	9	0	0.6	0.3
Dock (Sorrel)	Not Surveyed at National Level**						
Endive	CADPR (2011-2015)	California (62%)+	489	45	0.0	0.1	0.0
Florence fennel	CADPR (2011-2015)	California (--%)+	--	75	0.0	0.5	0.1
Kale	CADPR (2011-2015)	California (27%)+	4,671	488	0.2	2.7	0.9

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Kohlrabi	CADPR (2011-2015)	California (--%)+	58	23	0.0	1.0	0.5
Lettuce (leaf and head)	AMRD (2011-2015)	Arizona	12,800	100	0.0	0.6	0.1
		California	200,600	17,400	3.2	7.3	4.3
Mustard Greens	CADPR (2011-2015)	California (11%)+	736	1	0	0.1	0.00
Mustard Spinach	Not Surveyed at National Level**						
Orach	Not Surveyed at National Level**						
Parsley	CADPR (2011-2015)	California (48%)+	3,391	40	0.0	0.2	0.1
Purslane	Not Surveyed at National Level**						
Radicchio	CADPR (2011-2015)	California (--%)+	1,743	19	0	0.7	0.1
Swiss Chard	CADPR (2011-2015)	California (--%)+	1,468	42	0.0	0.1	0.0
Watercress	CADPR (2011-2015)	California (31%)+	229	354	2.9	52.9	25.0
Brassica (Cole) Leafy Vegetables	**See individual crops below**						
Broccoli	CADPR (2011-2015)	California (81%)+	121,600	14,513	0.5	0.6	0.5
Broccoli Raab/Rappini	CADPR (2011-2015)	California (--%)+	2,580	12	0.0	0.0	0.0
Brussels sprout	CADPR (2011-2015)	California (96%)+	2,342	2,102	1.3	9.3	3.6
Cabbage	AMRD (2011-2015)	California	13,300	600	0.0	4.5	1.8
		Florida	9,400	1,200	0.0	9.5	2.8
		Michigan	3,200	200	0.0	23.3	5.3
		AZ	2,900	Surveyed but no usage reported			
		CO	1,800	Surveyed but no usage reported			
		GA	5,400	Surveyed but no usage reported			
		NY	9,900	Surveyed but no usage reported			
		NC	4,000	Surveyed but no usage reported			
		TX	6,800	Surveyed but no usage reported			
		WI	3,000	Surveyed but no usage reported			

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Chinese cabbage (bok choy and Napa)	CADPR (2011-2015)	California (43%)+	6,910	1,749	1.1	1.9	1.6
Cauliflower	CADPR (2011-2015)	California (82%)+	34,580	1,995	0.2	0.4	0.3
Cavalo Broccolo	Not Surveyed at National Level**						
Collards	CADPR (2011-2015)	California (5%)+	250	147	0	5.1	1.5
Chinese broccoli (Gai lon)	CADPR (2011-2015)	California (--%)+	--	21	0.0	10.3	3.3
Chinese mustard (Gai choy)	CADPR (2011-2015)	California (--%)+	--	7	0.9	54.3	22.6
Mizuna	Not Surveyed at National Level**						
Mustard Spinach	Not Surveyed at National Level**						
Rape greens	CADPR (2011-2015)	California (--%)+	--	17	0	100.0	20
Legume Vegetables	**See individual crops below**						
Beans (Succulent)	AMRD (2011-2015)	*CA*	9,000	Surveyed but no usage reported			
		FL	42,200	Surveyed but no usage reported			
		GA	10,300	Surveyed but no usage reported			
		IL	8,300	Surveyed but no usage reported			
		IN	3,600	Surveyed but no usage reported			
		MI	19,000	Surveyed but no usage reported			
		NY	26,200	Surveyed but no usage reported			
		NC	6,600	Surveyed but no usage reported			
		OR	13,200	Surveyed but no usage reported			
		PA	12,800	Surveyed but no usage reported			
		TN	8,700	Surveyed but no usage reported			
		TX	2,600	Surveyed but no usage reported			
		WI	71,200	Surveyed but no usage reported			

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Dry Beans/Peas	AMRD (2011-2015)	California	49,100	100	0.0	0.6	0.2
		Idaho	188,800	300	0.0	0.8	0.2
		Texas	23,600	500	0.0	8.9	2.2
		CO	45,400	Surveyed but no usage reported			
		MI	206,000	Surveyed but no usage reported			
		MN	156,000	Surveyed but no usage reported			
		MT	602,000	Surveyed but no usage reported			
		NE	131,000	Surveyed but no usage reported			
		NY	9,200	Surveyed but no usage reported			
		ND	970,000	Surveyed but no usage reported			
		WA	245,000	Surveyed but no usage reported			
		WI	37,200	Surveyed but no usage reported			
Lima Beans	AMRD (2011-2015)	CA	7,600	Surveyed but no usage reported			
		DE	11,700	Surveyed but no usage reported			
		GA	1,600	Surveyed but no usage reported			
		IL	2,400	Surveyed but no usage reported			
		MD	400	Surveyed but no usage reported			
		SC	500	Surveyed but no usage reported			
		WA	2,500	Surveyed but no usage reported			
		WI	4,200	Surveyed but no usage reported			
Peas (Fresh/Green/ Sweet)	AMRD (2011-2015)	*MN*	70,800	Surveyed but no usage reported			
		OR	16,700	Surveyed but no usage reported			
		WA	39,300	Surveyed but no usage reported			
		WI	37,900	Surveyed but no usage reported			
Fruiting Vegetable	**See individual crops below**						
Eggplant	CADPR (2011-2015)	California (23%)+	1,202	11	0.1	0.8	0.5
Okra	Not Surveyed at National Level**						
Peppers	AMRD (2011-2015)	California	29,100	652	0.0	2.7	1.2
		Texas	3,000	10	0.0	1.6	0.3
		AZ	1,300	Surveyed but no usage reported			
		FL	16,200	Surveyed but no usage reported			
		GA	3,700	Surveyed but no usage reported			
		NJ	3,300	Surveyed but no usage reported			
		NM	9,200	Surveyed but no usage reported			
		NC	2,400	Surveyed but no usage reported			
		OH	3,000	Surveyed but no usage reported			

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Tomatillos	Not Surveyed at National Level**						
Tomato	AMRD (2011-2015)	California	306,900	1,900	0.0	2.9	0.6
		Florida	32,000	3,700	0.0	8.7	3.5
Cucurbit Vegetables	**See individual crops below**						
Chayote fruit/roots	Not Surveyed at National Level**						
Cucumbers	AMRD (2011-2015)	Florida	26,000	1,100	0.0	4.0	0.8
		CA	8,7000	Surveyed but no usage reported			
		DE	4,800	Surveyed but no usage reported			
		GA	10,400	Surveyed but no usage reported			
		MD	2,600	Surveyed but no usage reported			
		MI	33,700	Surveyed but no usage reported			
		MO	4,700	Surveyed but no usage reported			
		NJ	700	Surveyed but no usage reported			
		NC	11,900	Surveyed but no usage reported			
		SC	2,900	Surveyed but no usage reported			
		WA	1,800	Surveyed but no usage reported			
		WI	5,600	Surveyed but no usage reported			
Melons	(see individual crops below)						
Cantaloupe	AMRD (2011-2015)	California	34,800	400	0.0	5.4	1.1
		Texas	2,500	40	0.0	7.6	1.5
		AZ	16,600	Surveyed but no usage reported			
		FL	2,900	Surveyed but no usage reported			
		GA	3,400	Surveyed but no usage reported			
		IN	1,900	Surveyed but no usage reported			
		NC	1,700	Surveyed but no usage reported			
		SC	200	Surveyed but no usage reported			
Casabas	Not Surveyed at National Level**						
Crenshaws	Not Surveyed at National Level**						
Honey Balls	Not Surveyed at National Level**						
Honeydews*	Not Surveyed at National Level**						
Muskmelons	Not Surveyed at National Level**						
Persians	Not Surveyed at National Level**						

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Pumpkins	AMRD (2011-2015)	California	5,900	100	0.0	4.1	0.8
		Illinois	17,300	10	0.0	0.3	0.1
		Indiana	3,400	100	0.0	12.5	2.5
		New Jersey	2,400	200	0.0	26.7	5.3
		New York	6,000	90	0.0	7.7	1.5
		Ohio	7,100	1,100	0.0	38.4	7.8
		Pennsylvania	6,600	30	0.0	2.3	0.6
		Tennessee	1,800	80	0.0	23.3	4.9
		Virginia	2,200	60	0.0	7.5	1.9
		CT	1,400	Surveyed but no usage reported			
		MD	1,100	Surveyed but no usage reported			
		MA	2,000	Surveyed but no usage reported			
		MI	6,500	Surveyed but no usage reported			
		MN	2,300	Surveyed but no usage reported			
		MO	1,300	Surveyed but no usage reported			
		NM	2,000	Surveyed but no usage reported			
		NC	500	Surveyed but no usage reported			
		OR	2,100	Surveyed but no usage reported			
		TX	2,200	Surveyed but no usage reported			
		WA	2,100	Surveyed but no usage reported			
		WI	3,300	Surveyed but no usage reported			
Squash (summer and winter)	AMRD (2011-2015)	California	6,200	200	0.0	4.7	0.9
		Georgia	3,300	10	0.0	1.3	0.3
		Ohio	1,900	900	0.0	91.8	32.5
		Texas	1,900	700	0.0	29.2	6.9
		CT	800	Surveyed but no usage reported			
		FL	9,100	Surveyed but no usage reported			
		MA	1,700	Surveyed but no usage reported			
		MI	6,100	Surveyed but no usage reported			
		NJ	3,100	Surveyed but no usage reported			
		NY	4,600	Surveyed but no usage reported			
		NC	3,300	Surveyed but no usage reported			
		OR	2,600	Surveyed but no usage reported			
		PA	900	Surveyed but no usage reported			
		SC	1.600	Surveyed but no usage reported			
		TN	300	Surveyed but no usage reported			
		WI	1.000	Surveyed but no usage reported			

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Watermelons	AMRD (2011-2015)	Mississippi	2,200	1,000	0.0	62.1	12.4
		Oklahoma	4,800	4	0.0	0.4	0.1
		South Carolina	7,900	90	0.0	6.2	1.6
		Texas	27,000	1,400	0.0	5.8	2.3
		AL	3,400	Surveyed but no usage reported			
		AZ	2,800	Surveyed but no usage reported			
		CA	10,600	Surveyed but no usage reported			
		FL	24,300	Surveyed but no usage reported			
		GA	23,300	Surveyed but no usage reported			
		IN	7,400	Surveyed but no usage reported			
		MD	700	Surveyed but no usage reported			
		MO	2,300	Surveyed but no usage reported			
		NC	7,300	Surveyed but no usage reported			
Citrus	**See individual crops below**						
Grapefruit	AMRD (2011-2015)	Florida	52,400	6,300	4.8	12.9	9.4
		TX	18,300	Surveyed but no usage reported			
Lemons	CADPR (2011-2015)	California (80%)⁺	44,543	145	0.0	0.4	0.2
Limes	Not Surveyed at National Level**						
Oranges	AMRD (2011-2015)	California	191,700	1,800	0.2	1.0	0.6
		Florida	481,800	172,700	12.1	33.2	24.5
Tangelos	NASS (2011, 2015)	Florida	4,925	550	7.0	41.0	20.3
Tangerines	NASS (2011, 2015)	California	104,180	15,900	26.0	26.0	26.0
		Florida	31,238	3,400	12.0	12.0	12.0
Other Hybrids	Not Surveyed at National Level**						
Pome Fruit	**See individual crops below**						
Pears	AMRD (2011-2015)	*CA*	13,500	Surveyed but no usage reported			
		OR	17,100	Surveyed but no usage reported			
		WA	23,000	Surveyed but no usage reported			

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Stone Fruits	**See individual crops below**						
Apricots	CADPR (2011-2015)	California (84%)+	9,836	2	0.0	0.1	0.0
Cherries (sweet and tart)	AMRD (2011-2015)	California	36,600	38,500	23.9	49.3	34.9
		Oregon	17,000	11,000	3.0	71.1	21.3
		Washington	42,200	17,000	6.9	29.4	16.2
		MI	45,900	Surveyed but no usage reported			
Nectarines	CADPR (2011-2015)	California (87%)+	24,500	8	0.0	0.0	0.0
Peaches	AMRD (2011-2015)	Michigan	4,100	20	0.0	3.0	0.6
		Texas	5,100	1,600	0.0	55.0	13.6
		Washington	2,600	700	0.0	67.2	13.4
		AL	2,300	Surveyed but no usage reported			
		CA	52,500	Surveyed but no usage reported			
		CO	700	Surveyed but no usage reported			
		GA	10,500	Surveyed but no usage reported			
		IL	1,400	Surveyed but no usage reported			
		NJ	5,300	Surveyed but no usage reported			
		NY	400	Surveyed but no usage reported			
		PA	5,000	Surveyed but no usage reported			
		SC	18,000	Surveyed but no usage reported			
Berry and Small Fruit	**See individual crops below**						
Bushberries	See individual crops below						
Blueberries	NASS (2011, 2015)	Georgia	44,171	23,450	54.0	55.0	54.5
		Michigan	28,381	9,100	13.0	26.0	19.5
		New Jersey	13,239	3,750	4.0	27.0	15.5
		North Carolina	35,709	17,800	55.0	60.0	57.5
		Oregon	17,775	11,750	32.0	58.0	45.0
		Washington	15,592	10,050	32.0	75.0	53.5
Currants	CADPR (2011-2015)	California (--%)+	--	0.1	0	37	7.4
Gooseberries	Not Surveyed at National Level**						
Caneberries	AMRD (2011-2015)	California	7,200	17,200	21.9	66.3	47.8
		Oregon	11,800	9,500	5.1	59.8	39.0
		Washington	9,300	26,800	0.0	87.1	51.9

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Grapes	CADPR (2011-2015)	California (83%)+	859,200	1,162	0.0	0.1	0.3
Grapes, Raisin/Table	CADPR (2011-2015)	California (--%)+	317,168	776	0.1	0.3	0.2
Grapes, Wine	CADPR (2011-2015)	California (--%)+	569,945	512	0	0.1	0.1
Grape vines (overwinter nursery stock)	Not Surveyed at National Level**						
Strawberries	AMRD (2011-2015)	California	39,700	89,600	36.1	57.7	47.7
		Florida	9,700	700	0.0	9.8	2.5
		Michigan	700	20	0.0	5.7	1.4
		New York	1,400	50	0.0	6.0	1.4
		Oregon	2,100	1,000	16.8	60.2	37.5
		Pennsylvania	800	10	0.0	3.6	1.0
		Washington	1,200	400	0.0	39.3	10.9
Tree Nuts	**See individual crops below**						
Chestnuts	Not Surveyed at National Level**						
Macadamia Nut	Not Surveyed at National Level**						
Pecans	AMRD (2011-2015)	Arizona	14,200	2,200	0.0	4.9	1.8
		Georgia	117,900	800	0.0	1.3	0.3
		Texas	170,900	4,900	0.4	2.0	1.0
		AL	14,100	Surveyed but no usage reported			
		LA	3,200	Surveyed but no usage reported			
		NM	40,100	Surveyed but no usage reported			
		OK	126,700	Surveyed but no usage reported			
Walnuts	CADPR (2011-2015)	California (99%)+	332,800	14,300	1.1	2.1	1.6
Cereal Grains	**See individual crops below**						
Barley	NASS (2011)	California	(S)	(S)	(S)	(S)	(S)

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Corn	(see individual crops below)						
Corn, Field	AMRD (2011-2015)	Michigan	2,600,000	500	0.0	0.2	0.0
		AL	296,000	Surveyed but no usage reported			
		AR	648,000	Surveyed but no usage reported			
		CA	556,000	Surveyed but no usage reported			
		CO	1,268,000	Surveyed but no usage reported			
		DE	186,000	Surveyed but no usage reported			
		GA	379,000	Surveyed but no usage reported			
		ID	352,000	Surveyed but no usage reported			
		IL	12,300,000	Surveyed but no usage reported			
		IN	5,980,000	Surveyed but no usage reported			
		IA	542,000	Surveyed but no usage reported			
		KS	4,490,000	Surveyed but no usage reported			
		KY	1,520,000	Surveyed but no usage reported			
		LA	542,000	Surveyed but no usage reported			
		MD	490,000	Surveyed but no usage reported			
		MN	8,440,000	Surveyed but no usage reported			
		MS	748,000	Surveyed but no usage reported			
		M0	3,400,000	Surveyed but no usage reported			
		NE	9,740,000	Surveyed but no usage reported			
		NM	122,000	Surveyed but no usage reported			
		NY	1,150,000	Surveyed but no usage reported			
		NC	878,000	Surveyed but no usage reported			
		ND	3,090,000	Surveyed but no usage reported			
		OH	3,710,000	Surveyed but no usage reported			
		OK	358,000	Surveyed but no usage reported			
		PA	1,460,000	Surveyed but no usage reported			
		SC	319,000	Surveyed but no usage reported			
		SD	5,640,000	Surveyed but no usage reported			
		TN	890,000	Surveyed but no usage reported			
		TX	2,150,000	Surveyed but no usage reported			
		VA	494,000	Surveyed but no usage reported			
		WA	196,000	Surveyed but no usage reported			
		WI	4,200,000	Surveyed but no usage reported			
		WY	95,000	Surveyed but no usage reported			
Corn, Pop	Not Surveyed at National Level**						

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied [a]	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Corn, Sweet	AMRD (2011-2015)	California	32,700	6,200	7.2	29.3	17.5
		FL	46,100	Surveyed but no usage reported			
		GA	21,500	Surveyed but no usage reported			
		IL	17,200	Surveyed but no usage reported			
		MI	9,900	Surveyed but no usage reported			
		MN	124,000	Surveyed but no usage reported			
		NJ	7,500	Surveyed but no usage reported			
		NY	32,900	Surveyed but no usage reported			
		OH	16,000	Surveyed but no usage reported			
		OR	23,600	Surveyed but no usage reported			
		PA	14,700	Surveyed but no usage reported			
		WA	93,300	Surveyed but no usage reported			
		WY	78,300	Surveyed but no usage reported			
Oats	CADPR (2011-2015)	California (2%)+	6,800	400	0.2	0.7	0.4
Rice	AMRD (2011-2015)	Arkansas	1,262,000	700	0.0	0.4	0.1
		Louisiana	424,400	6,000	0.0	2.7	1.4
		Texas	144,400	100	0.0	0.6	0.1
		CA	511,200	Surveyed but no usage reported			
		MS	152,000	Surveyed but no usage reported			
		MO	178,200	Surveyed but no usage reported			
Rye	CADPR (2011-2015)	California (0.7%)+	7,497	4	0.0	1.2	0.2
Sorghum (Milo)	AMRD (2011-2015)	Texas	2,510,000	1,100	0.0	0.1	0.0
		AR	191,600	Surveyed but no usage reported			
		CO	316,000	Surveyed but no usage reported			
		GA	48,000	Surveyed but no usage reported			
		IL	28,600	Surveyed but no usage reported			
		KS	2,850,000	Surveyed but no usage reported			
		LA	112,000	Surveyed but no usage reported			
		MO	88,000	Surveyed but no usage reported			
		NE	201,000	Surveyed but no usage reported			
		NM	112,000	Surveyed but no usage reported			
		OK	344,000	Surveyed but no usage reported			
		SD	226,000	Surveyed but no usage reported			

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Wheat	AMRD (2011-2015)	California	691,000	82,800	0.0	55.5	21.1
		Idaho	1,341,000	1,500	0.0	1.2	0.2
		Kansas	9,280,000	12,900	0.0	0.4	0.1
		Oklahoma	5,360,000	2,400	0.0	0.4	0.1
		Texas	5,830,000	1,100	0.0	0.1	0.0
		Washington	2,290,000	60	0.0	0.1	0.0
		AZ	89,600	Surveyed but no usage reported			
		AR	508,000	Surveyed but no usage reported			
		CO	2,490,000	Surveyed but no usage reported			
		GA	300,000	Surveyed but no usage reported			
		IL	718,000	Surveyed but no usage reported			
		IN	406,000	Surveyed but no usage reported			
		KY	590,000	Surveyed but no usage reported			
		MI	594,000	Surveyed but no usage reported			
		MN	1,410,000	Surveyed but no usage reported			
		MO	870,000	Surveyed but no usage reported			
		MT	5,560,000	Surveyed but no usage reported			
		NE	1,480,000	Surveyed but no usage reported			
		NM	433,000	Surveyed but no usage reported			
		NC	814,000	Surveyed but no usage reported			
		ND	7,460,000	Surveyed but no usage reported			
		OH	650,000	Surveyed but no usage reported			
		OR	890,000	Surveyed but no usage reported			
		SD	2,670,000	Surveyed but no usage reported			
		TN	470,000	Surveyed but no usage reported			
		VA	286,000	Surveyed but no usage reported			
Spring Wheat	AMRD (2011-2015)	California	95,000	7,300	0.0	55.5	11.1
		Idaho	559,800	1,500	0.0	1.2	0.2
		AZ	89,600	Surveyed but no usage reported			
		MN	1,410,000	Surveyed but no usage reported			
		MT	3,260,000	Surveyed but no usage reported			
		ND	6,950,000	Surveyed but no usage reported			
		OR	114,000	Surveyed but no usage reported			
		SD	1,290,000	Surveyed but no usage reported			
		WA	580,000	Surveyed but no usage reported			

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Winter Wheat	AMRD (2011-2015)	California	596,000	75,500	0.0	47.1	10.0
		Kansas	9,280,000	12,900	0.0	0.4	0.1
		Oklahoma	5,360,000	2,400	0.0	0.4	0.1
		Texas	5,830,000	1,100	0.0	0.1	0.0
		Washington	1,710,000	60	0.0	0.1	0.0
		AR	508,000	Surveyed but no usage reported			
		CO	2,490,000	Surveyed but no usage reported			
		GA	300,000	Surveyed but no usage reported			
		ID	780,000	Surveyed but no usage reported			
		IL	718,000	Surveyed but no usage reported			
		IN	406,000	Surveyed but no usage reported			
		KY	590,000	Surveyed but no usage reported			
		MI	594,000	Surveyed but no usage reported			
		MO	870,000	Surveyed but no usage reported			
		MT	2,300,000	Surveyed but no usage reported			
		NE	1,480,000	Surveyed but no usage reported			
		NM	433,000	Surveyed but no usage reported			
		NC	814,000	Surveyed but no usage reported			
		OH	508,000	Surveyed but no usage reported			
		OR	776,000	Surveyed but no usage reported			
		SD	1,384,000	Surveyed but no usage reported			
		TN	470,000	Surveyed but no usage reported			
		VA	286,000	Surveyed but no usage reported			
		WI	291,000	Surveyed but no usage reported			
Wild rice	CADPR (2011-2015)	California (25%)⁺	8,228	784	2.5	6.4	4.400

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Grass Forage, Fodder, and Hay	**See individual crops below**						
Alfalfa	AMRD (2011-2015)	Arizona	258,000	49,900	0.0	21.1	7.9
		California	914,000	61,800	2.6	9.2	7.5
		Colorado	742,000	4,900	0.0	1.4	0.5
		Illinois	318,000	700	0.0	2.0	0.4
		Indiana	268,000	2,500	0.0	4.4	0.9
		Kansas	640,000	4,200	0.0	1.7	0.5
		Kentucky	201,000	1,900	0.0	2.4	0.9
		Michigan	662,000	50	0.0	0.1	0.0
		Nebraska	772,000	200	0.0	0.2	0.0
		North Dakota	1,498,000	1,800	0.0	0.7	0.1
		Ohio	330,000	50	0.0	0.1	0.0
		Oklahoma	260,000	200	0.0	0.4	0.1
		Pennsylvania	394,000	200	0.0	0.3	0.1
		South Dakota	2,010,000	15,700	0.0	4.7	1.2
		Utah	538,000	7,500	0.1	3.2	1.2
		Wyoming	520,000	3,700	0.0	4.2	1.2
		ID	1,060,000	Surveyed but no usage reported			
		IA	756,000	Surveyed but no usage reported			
		MN	1,020,000	Surveyed but no usage reported			
		MO	250,000	Surveyed but no usage reported			
		MT	1,870,000	Surveyed but no usage reported			
		NV	241,000	Surveyed but no usage reported			
		NM	212,000	Surveyed but no usage reported			
		NY	380,000	Surveyed but no usage reported			
		OR	388,000	Surveyed but no usage reported			
		TX	126,000	Surveyed but no usage reported			
		VA	79,000	Surveyed but no usage reported			
		WA	416,000	Surveyed but no usage reported			
		WI	520,000	Surveyed but no usage reported			
Birdsfoot Trefoil	Not Surveyed at National Level**						

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Grass crops (forage, hay)	(see individual crops below)						
Bermuda	Not Surveyed at National Level**						
Barnyardgrass	Not Surveyed at National Level**						
Canarygrass	Not Surveyed at National Level**						
Fescue	Not Surveyed at National Level**						
Orchardgrass	CADPR (2011-2015)	California (--%)+	--	86	0.0	57.8	15.7
Red top	Not Surveyed at National Level**						
Timothy	CADPR (2011-2015)	California (--%)+	--	253	0.0	44.4	11.4
Yellow foxtail	Not Surveyed at National Level**						
Pasture and Rangeland	CADPR (2011-2015)	California (3%)+	18,673,416	78	0.0	0.5	0.1
Nongrass Animal Feeds	**See individual crops below**						
Clover	CADPR (2011-2015)	California (--%)+	1,098	61	0	14.4	5.2
Lespedeza	Not Surveyed at National Level**						
Lupine	Not Surveyed at National Level**						
Vetch	Not Surveyed at National Level**						
Oilseed Crops	**See individual crops below**						
Cotton	AMRD (2011-2015)	Arkansas	421,000	5,900	0.0	2.8	1.0
		Louisiana	188,000	32,500	0.0	23.0	9.5
		Missouri	287,000	3,900	0.0	8.5	1.7
		Oklahoma	275,000	700	0.0	1.6	0.3
		Texas	6,234,000	3,800	0.0	0.1	0.0
		AL	377,000	Surveyed but no usage reported			
		AZ	177,000	Surveyed but no usage reported			
		CA	293,000	Surveyed but no usage reported			
		FL	111,000	Surveyed but no usage reported			
		GA	1,340,000	Surveyed but no usage reported			
		KS	41,200	Surveyed but no usage reported			
		MS	451,000	Surveyed but no usage reported			
		NC	535,000	Surveyed but no usage reported			
		SC	271,000	Surveyed but no usage reported			
		TN	310,000	Surveyed but no usage reported			
Flax	Not Surveyed at National Level**						

(Continued on next page)

Crop	Data Source	State	Avg. Annual Crop Acres Grown †	Avg. Annual Total Lbs. AI Applied ª	Min. Annual PCT	Max. Annual PCT	Avg. Annual PCT
Edible Fungi	**See individual crops below**						
Mushrooms	CADPR (2011-2015)	California (17%)+	309	0.06	0.0	0.0	0.0
Stalk Stem and Leaf Petiole Vegetables	**See individual crops below**						
Asparagus	AMRD (2011-2015)	California	11,800	2,100	0.8	26.3	12.2
		MI	10,000	Surveyed but no usage reported			
		WA	5,100	Surveyed but no usage reported			
Tropical and Subtropical Fruit	**See individual crops below**						
Avocados	CADPR (2011-2015)	California (81%)+	58,098	146	0.0	0.3	0.1
Figs	CADPR (2011-2015)	California (96%)+	7,220	781	1.0	11.1	5.3
Guava	CADPR (2011-2015)	California (15%)+	7,312	0.1	0.0	1.6	0.3
Mangos	Not Surveyed at National Level**						
Papaya	Not Surveyed at National Level**						
Passion Fruit	Not Surveyed at National Level**						
Pineapples	Not Surveyed at National Level**						
Misc. Crops	**See individual crops below**						
Hops	Not Surveyed at National Level**						
Mint	CADPR (2011-2015)	California (3%)+	1,390	34	0.2	1.6	0.8
Peppermint	CADPR (2011-2015)	California (4%)+	1,390	12	0.0	11.0	4.3
Spearmint	Not Surveyed at National Level**						

Notes	
AMRD (YEAR-YEAR)	Agricultural usage surveyed by market research firm(s)
NASS (YEAR)	Surveyed by United States Department of Agriculture National Agricultural Statistics Service
Cal DPR (YEAR- YEAR)	Surveyed by the California Department of Pesticide Regulation. Over than 80% of crop grown in California
+	Percent of crop grown in California

(Continued on Next Page)

†	Crop Acres Grown (CAG) represents the total number of acres that are grown of the crop in each state. It is independent of treatment with any pesticide. CAG values for the data sources come from the following: AMRD comes from AMRD estimate, NASS comes from the 2012 Census of Agriculture, and CADPR estimates come from 2011-2015 California County Agricultural Commissioners' Reports.
a	The pounds AI displayed in this document may differ from those displayed in the SLUA and other BEAD documents, because different calculation methods were used.
NR*	Surveyed by the indicated source in the years listed, but no usage reported.
**	Site not surveyed at national level
(S)	Insufficient number of reports to establish an estimate. This indicates that the chemical is only periodically used by a small number of users.
--	Crop acreage estimate not available

Non-Agricultural Usage

Table 3. National Malathion Non-Agricultural Usage by Crop. Data Averaged Over Reported Years.

Crop	Survey Status	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	Max Single Labeled Rate [c] (lb AI/A)	Max Single Labeled Rate [c] (lb AI/ 1000 sq ft)	Max Single Labeled Rate [c] (lb AI/ bushel)
Forest Trees	***See Sector usage below***					
Christmas Tree Plantation	NASS (2009)	600	507	3.2	--	--
Pine Seed Orchard	Not surveyed at National Level**			3.2	--	--
Slash Pine	Not surveyed at National Level**			3.2	--	--
Post-Harvest	***See Sector usage below***					
Cull Fruit and Vegetable Dumps	Not surveyed at National Level**			--	16	--
Stored Grain (barley, corn, oats, rye, and wheat)	***See Sector usage below***					
Loading/Surface Treatment	NMRD (2012)	122,000	--	--	--	10
Stored Grain Facilities			--		0.6	--
Household/Domestic Dwellings Outdoor	***See Sector usage below***					
Garden, Ornamental, and Non-plant	NMRD (2012)	1,170,000	--	2.033	--	--
Outdoor Ornamentals	***See Sector usage below***					
Ornamental and/or Shade Trees	NASS (2009)	3,900	--	2.5	--	--

(Continued on next page)

Crop	Survey Status	Avg. Annual Pounds AI Applied [a]	Avg. Annual Total Acres Treated [b]	Max Single Labeled Rate [c] (lb AI/A)	Max Single Labeled Rate [c] (lb AI/ 1000 sq ft)	Max Single Labeled Rate [c] (lb AI/ bushel)
Ornamental Evergreens	NASS (2009)	6,200	--	5.2		
Ornamental Herbaceous Plants	NASS (2009)	1,800	--	2.5	--	--
Ornamental Non-Flowering Plants	NASS (2009)	2,300	--	2.5	--	--
Ornamental Woody Shrubs and Vines	NASS (2009)	7,700	--	2.5	--	--
Nurseries and Greenhouses	NMRD (2012)	27,600	--	--	--	--
Non-Agricultural Uncultivated Areas						
Fence row/Hedge Row	Not surveyed			1.875	--	--
Mosquito Control - National (see regions below)	NMRD (2016)	188,000	4,455,000	0.5	--	--
Northeast (CT. ME, MA, NH, NJ, NY, PA, RI, VT)		800	--	--	--	--
South (AL, AR, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV)		176,700	--	--	--	--
West (AZ, CA, CO, ID, MT, NV, NM, OR, UT, WA, WY)		10,500	--	--	--	--
Northwest (IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI)		No observed usage	--	--	--	--

Notes	
NMRD (YEAR)	Nonagricultural usage surveyed by market research firms.
NASS (YEAR)	Surveyed by United States Department of Agriculture National Agricultural Statistics Service
a	The pounds AI displayed in this document may differ from those displayed in the SLUA and other BEAD documents, because different calculation methods were used.
b	Total Acres Treated accounts for multiple applications to a single area. This may overestimate the number of acres treated as some acres are treated more than once.
c	Max labeled rate from 2017 EFED 1-3 Master Use Table.
*	Surveyed by the indicated source in the years listed, but no usage reported.
**	Site not surveyed at national level
--	Data not available