Summary of
Pesticide Use Report Data
2007

California Department of Pesticide Regulation
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California Environmental Protection Agency
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For information on purchase of additional copies or of electronic data files, see order form on Page ii.
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The 1989 - 2007 *Summary of Pesticide Use Report Data* indexed by chemical or commodity reports can be found on DPR's web at www.cdpr.ca.gov. The *Summary of Pesticide Use Report Data* is available in two formats. One report is indexed by chemical and lists the amount of each pesticide used, the commodity on which it was used, the number of agricultural applications, and the acres/units treated. The second report is indexed by commodity and lists the chemicals used, the number of agricultural applications, amount of pesticides used, and the acres/units treated.

The Annual Pesticide Use Report Data (the complete database of reported pesticide applications for 1990-2007) are available on CD ROM. The files are in text (comma delimited format).

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I. INTRODUCTION

DEVELOPMENT AND IMPLEMENTATION OF THE PESTICIDE USE REPORTING SYSTEM

This 2007 *Summary of Pesticide Use Report Data* includes agricultural applications and other selected uses reported in California. The report represents a summary of the data gathered under full use reporting. The Department of Pesticide Regulation (DPR) uses the data to help estimate dietary risk and to ensure compliance with clean air laws, as well as ground water protection regulations. Site-specific use report data, combined with geographic data on endangered species habitats, also help county agricultural commissioners resolve potential pesticide use conflicts. Detailed, individual pesticide use report (PUR) data may be obtained from DPR for in-depth, analytical purposes.

Under full use reporting, which began in 1990, California became the first state to require reporting of all agricultural pesticide use, including amounts applied and types of crops or places (e.g., structures, roadsides) treated. Commercial applications–including structural fumigation, pest control, and turf applications–must also be reported. Pesticide use reporting is explained in more detail below.

TYPES OF PESTICIDE APPLICATIONS REPORTED

Partial reporting of agricultural pesticide use has been in place in California since at least the 1950s. Beginning in 1970, anyone who used restricted materials was required to file a pesticide use report with the county agricultural commissioner. The criteria established to designate a pesticide as a restricted material include potential hazard to:

- public health;
- farm workers;
- domestic animals;
- honeybees;
- the environment;
- wildlife;
- other crops.

With certain exceptions, restricted materials may be possessed or used only by, or under the supervision of, licensed or certified persons, and only in accordance with an annual permit issued by a county agricultural commissioner.

In addition, the State required commercial pest control operators[1] to report all pesticides used, whether restricted or nonrestricted. These reports included information about the pesticide applied, when and where the application was made, and the crop involved if the application was in agriculture. The reports were entered into a computerized database and summarized by chemical and crop in annual reports.

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[1] Pest control operators include those in the business of applying pesticides such as agricultural applicators, structural fumigators, and professional gardeners.

With implementation of full use reporting in 1990, the following pesticide uses are required to be reported to the commissioner, who, in turn, reports the data to DPR:

- For the production of any agricultural commodity, except livestock.
- For the treatment of postharvest agricultural commodities.
- For landscape maintenance in parks, golf courses, and cemeteries.
- For roadside and railroad rights-of-way.
- For poultry and fish production.
- Any application of a restricted material.
- Any application of a pesticide with the potential to pollute ground water [listed in section 6800(b) of the California Code of Regulations, Title 3, Division 6, Chapter 4, Subchapter 1, Article 1] when used outdoors in industrial and institutional settings.
- Any application by a licensed pest control operator.

The primary exceptions to the use reporting requirements are home and garden use and most industrial and institutional uses.

HOW PESTICIDE DATA ARE USED

DPR undertook the expansion of use reporting primarily in response to concerns of many individuals and groups, including government officials, scientists, farmers, legislators, and public interest groups. It was generally acknowledged that the system for estimating dietary exposure to pesticide residues did not provide sufficient data on which to make realistic assessments; this often resulted in overestimates of risk. Farm worker representatives were also asking for more information to determine exposure and potential risk to those who handle pesticides or who work in treated fields.

There are several key areas in which data generated by full use reporting are proving beneficial.

Risk Assessment

Without information on actual pesticide use, regulatory agencies conducting risk assessment assume all planted crop acreage is treated with many pesticides, even though most crops are treated with just a few chemicals. If the assumptions used by regulatory agencies are incorrect, regulators could make judgments on pesticide risks that are too cautious by several orders of magnitude, reducing the credibility of risk management decisions. The use report data, on the other hand, provides actual use data so DPR can better assess risk and make more realistic risk management decisions.

After the passage of the federal Food Quality Protection Act (FQPA) in 1996, complete pesticide use data became even more important to commodity groups in California and to the U.S. Environmental Protection Agency (U.S. EPA). FQPA contains a new food safety standard against which all pesticide tolerances must be measured. The increased interest in the state’s pesticide use data, especially for calculating percent crop treated, came at a time when DPR was increasing the efficiency with which it produced its annual report.

DPR was able to provide up-to-date use data and summaries to commodity groups, University of California specialists, U.S. EPA programs, and other interested parties as they developed the necessary information for the reassessment of existing tolerances.

Worker Health and Safety

Under the pesticide regulations [section 6619 of the California Code of Regulations, Title 3, Division 6, Chapter 3, Subchapter 2, Article 1], pest control operators must give farmers a written notice after every pesticide application that includes the pesticide applied, the location of the application, the date and time the application was completed, and the reentry and preharvest intervals.[2] This notice gives the farmer accurate information to help keep workers from entering fields prematurely, and also lets the farmer know the earliest date a commodity can be harvested.

DPR's Worker Health and Safety Branch also uses the data for worker exposure assessment as part of developing an overall risk characterization document. Use data help scientists estimate typical applications and how often pesticides are used.

Public Health

The expanded reporting system provides DPR, the State Department of Public Health, and the Office of Environmental Health Hazard Assessment with more complete pesticide use data for evaluating possible human illness clusters in epidemiological studies.

Endangered Species

DPR works with the county agricultural commissioners to combine site-specific use report data with geographic information system-based data on locations of endangered species. The resulting database helps commissioners resolve potential conflicts over pesticide use where endangered species may occur. DPR and the commissioners can also examine patterns of pesticide use near habitats to determine the potential impact of proposed use limitations. With location-specific data on pesticide use, restrictions on use can be better designed to protect endangered species while still allowing necessary pest control.

Water Quality

Since 1983, DPR has had a program to work with the rice industry and the Central Valley Regional Water Quality Control Board to reduce contamination of surface water by rice pesticides. Using PUR data to help in pinpointing specific agricultural practices, more precise alternative use recommendations can be made to assure protection of surface water.

The Pesticide Contamination Prevention Act requires site-specific records to help track pesticide use in areas known to be susceptible to ground water contamination.

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[2] A reentry interval is the time from which a pesticide application is made and when workers may enter a field. A preharvest interval is the time between an application and when a commodity can be harvested.

Determinations can also be made from the records on whether a contaminated well is physically associated with agricultural practices. These records also provide data to help researchers determine why certain soil types are more prone to ground water contamination.

DPR placed certain pesticide products containing pyrethroids into reevaluation on August 31, 2006. The reevaluation is based on recent studies revealing the widespread presence of synthetic pyrethroid residues in the sediment of California waterways at levels toxic to an aquatic crustacean.

Air Quality

Many pesticide products contain volatile organic compounds (VOCs) that contribute to the formation of smog. DPR worked with the state Air Resources Board to put together a State Implementation Plan under the federal Clean Air Act to reduce emissions of all sources of VOCs, including pesticides, in nonattainment areas of the state. DPR's contribution to the plan included accurate data on the amount of VOCs contained in pesticides and the ability to inventory the use of those pesticides through pesticide use reporting.

Beginning in January 2008, regulations went into effect to reduce emissions of VOCs from fumigant pesticides. To help DPR keep track of these smog-producing emissions, PURs are used to monitor fumigant use and methods of fumigant application. This information is then used to compare with targeted emission reduction goals designed to improve air quality.

Pest Management

The Department uses the PUR database to understand patterns and changes in pest management practices. This information can be used to determine possible alternatives to pesticides that are subject to regulatory actions and to help determine possible impacts of different regulatory actions on pest management.

The PUR is used to help meet the needs of FQPA, which requires pesticide use information for determining the appropriateness of pesticide residue tolerances. As part of this process many commodity groups have created crop profiles, which include information on the pest management practices and available options, both chemical and nonchemical. Pesticide use data is critical to developing these lists of practices and options.

The PUR data have been used to support and assess grant projects for a grant program conducted by DPR to develop, demonstrate, and implement reduced-risk pest management strategies from 1995 to 2003. The grants were temporarily suspended due to the statewide budget shortfall, but funds were again available in 2007 and 2008 to offer grants. The PUR data have been used in several projects that build on work conducted in the almond and stonefruit industries. In these and other projects, the PUR data are used to address regional pesticide use patterns and environmental problems such as water and air quality. The data are also used to better understand current changes in pesticide use.

DPR has published general analyses of statewide pesticide use patterns and trends. The first analysis covered the years 1991 to 1995, and the second more detailed analysis covered 1991 to 1996. These analyses identified high-use pesticides, the crops to which those pesticides were applied, trends in use, and the pesticides most responsible for changes in use. In addition, since 1997, the annual Summary of Pesticide Use Report Data include summary trends of pesticides in several different categories such as carcinogens, reproductive toxins, and ground water contaminants.

Processor and Retailer Requirements

Food processors, produce packers, and retailers often require farmers to submit a complete history of pesticide use on crops. DPR's use report form often satisfies this requirement.

II. COMMENTS AND CLARIFICATIONS OF DATA

The following comments and points should be taken into consideration when analyzing data contained in this report:

TERMINOLOGY

The following terminology is used in this report:

Number of agricultural applications – Number of applications of pesticide products made to production agriculture. More detailed information is given below under "Number of Applications."

Pounds applied – Number of pounds of an active ingredient.

Unit type – The amount listed in this column is one of the following:

A = Acreage
C = Cubic feet (of commodity treated)
K = Thousand cubic feet (of commodity treated)
P = Pounds (of commodity treated)
S = Square feet
T = Tons (of commodity treated)
U = Miscellaneous units (e.g., number of tractors, trees, tree holes, bins, etc.)

COMMODITY CODES

DPR's pesticide product label database is used to cross-check data entries to determine if the product reported is registered for use on the reported commodity. The DPR label database uses a crop coding system based on crop names used by the U.S. EPA to prepare official label language. However, this system caused some problems until DPR modified it in the early 1990s to account for U.S. EPA's grouping of certain crops under generic names. Problems occurred when the label language in the database called a crop by one name, and the use report used another. For example, a grower may have reported a pesticide use on "almonds," but the actual label on the pesticide product--coded into the database--stated the pesticide was to be used on "nuts." DPR modified the database to eliminate records being rejected as "errors" because the specific commodity listed on the use report is not on the label. A qualifier code is appended to the commodity code in the label database to designate a commodity not specifically listed on the label as a correct use. A qualifier code would be attached to the "almond" code when nuts are only listed on the label. This system greatly reduces the number of rejections.

Plants and commodities grown in greenhouse and nursery operations represented a challenge in use reporting because of their diversity. Six commodity groupings were suggested by industry in 1990 and incorporate terminology that are generally known and accepted. The six use reporting categories are: greenhouse-grown cut flowers or greens; outdoor-grown cut flowers or greens; greenhouse-grown plants in containers; outdoor-grown plants in container/field-grown plants; greenhouse-grown transplants/propagative material; and outdoor-grown transplants/propagative material.

Tomatoes and grapes were also separated into two categories because of public and processor interest in differentiating pesticide use. Tomatoes are assigned two codes to differentiate between fresh market and processing categories. One code was assigned to table grapes, which includes grapes grown for fresh market, raisins, canning, or juicing. A second code was assigned to wine grapes.

UNREGISTERED USE

The report contains entries that reflect the use of a pesticide on a commodity for which the pesticide is not currently registered. This sometimes occurs because the original use report was in error, that is, either the pesticide or the commodity was inaccurately reported. DPR's computer program checks that the commodity is listed on the label, but nonetheless such errors appear in the PUR, possibly because of errors in the label database. Also, the validation program does not check whether the pesticide product was registered at the time of application. For example, parathion (ethyl parathion) is shown reported on crops after most uses were suspended in 1992. (These records are researched and corrected as time and resources allow.) DPR continues to implement methods that identify and reduce these types of reporting errors in future reports. Other instances may occur because by law, growers are sometimes allowed to use stock they have on hand of a pesticide product that has been withdrawn from the market by the manufacturer or suspended or canceled by regulatory authorities.

Other reporting "errors" may occur when a pesticide is applied directly to a site to control a particular pest, but is not applied directly to the crop in the field. A grower may use an herbicide to treat weeds on the edge of a field, a fumigant on bare soil prior to planting, or a rodenticide to treat rodent burrows. For example, reporting the use of the herbicide glyphosate on tomatoes – when it was actually applied to bare soil prior to planting the tomatoes – could be perceived to be an error. Although technically incorrect, recording the data as if the application were made directly to the commodity provides valuable crop usage information for DPR's regulatory program.

ADJUVANTS

Data on spray adjuvants (including emulsifiers, wetting agents, foam suppressants, and other efficacy enhancers), not reported prior to full use reporting, are now included. Examples of these types of chemicals include the "alkyls" and some petroleum distillates. (Adjuvants are exempt from federal registration requirements, but must be registered as pesticides in California.)

ZERO POUNDS APPLIED

There are a few entries in this report in which the total pounds applied for certain active ingredients are displayed as zero. This is because the chemical (active ingredient) made up a very small percentage of the formulated product that was used. When these products are applied in extremely low quantities, the resulting value of the active ingredient is too low to register an amount.

ACRES TREATED

The summary information in this annual report cannot be used to determine the total number of acres of a crop. However, it can be used to determine the cumulative acres treated. The problem is that the same field can be treated more than once in a year with the same active ingredient. A similar problem occurs when the product used contains more than one active ingredient. (In any pesticide product, the active ingredient is the component that kills, or otherwise controls, target pests. A pesticide product is made up of one or more active ingredients, as well as one or more inert ingredients.)   For example, if a 20-acre field is treated with a product that contains three different pesticide active ingredients, a use report is filed by the farmer correctly recording the application of a single pesticide product to 20 acres. However, in the summary tables, the three different active ingredients will each have recorded 20 acres treated. Adding these values results in a total of 60 acres as being treated instead of the 20 acres actually treated.

NUMBER OF APPLICATIONS

The values for number of applications include only production agricultural applications. Applicators are required to submit one of two basic types of use reports, a production agricultural report or a monthly summary report. The production agricultural report must include information for each application. The monthly summary report, for all uses other than production agriculture, includes only monthly totals for all applications of pesticide product, site or commodity, and applicator. The total number of applications in the monthly summary reports is not consistently given so they are no longer included in the totals. In the annual PUR reports before 1997, each monthly summary record was counted as one application.

In the annual summary report by commodity, the total number of applications given for each commodity may not equal the sum of all applications of each active ingredient on that commodity. As explained above, some pesticide products contain more than one active ingredient. If the number of applications were summed for each active ingredient in such a product, the total number of applications would be more than one, even though only one application of the product was made.

ERRORS

In any database with millions of records there will almost certainly be errors. Most of the values in the PUR are checked for errors and where possible corrections are made. However, some errors will remain. If a value is completely unknown the value will either be left blank for numeric fields or replaced with a “?” or “UNKNOWN” in character fields.

If a reported rate of use (pounds of pesticide per area treated) was so large it was probably in error, the rate was replaced with an estimated rate equal to the median rate of all applications of the pesticide product on the same crop or other site treated. Since the error could have been in the pounds reported or the area or unit treated, the value that was most unusual was the one replaced with an estimate. In some cases, a reasonable estimate could not be made, for example, if there were no or few other reported applications of the product on the site. In these cases, the pounds value was set equal to 0.

Pesticide rates were considered outliers if (1) they were higher than 200 pounds of active ingredient per acre (or greater than 1,000 pounds per acre for fumigants); (2) they were 50 times larger than the median rate for all uses with the same pesticide product, crop treated, unit treated, and record type (that is, production agricultural or all other uses); or (3) they were higher than a value determined by a neural network procedure that approximates what a group of 12 scientists believed were obvious outliers. Although these criteria identified as outliers less than one percent of the rate values in the PUR, some rates were so large that if included in the sums, they would have significantly affected total pounds applied of some pesticides.

III. DATA SUMMARY

This report is a summary of data submitted to DPR. Total pounds may change slightly due to ongoing error correction. The revised numbers, when available, will more accurately reflect the total pounds applied.

PESTICIDE USE IN CALIFORNIA

In 2007, there were 172,163,465 pounds of pesticide active ingredients reported used in California. Annual use has varied from year to year since full use reporting was implemented in 1990. For example, reported pesticide use was 190 million pounds in 2006, 195 million pounds in 2005, and 180 million pounds in 2004.

Such variances are, and will continue to be, a normal occurrence. These fluctuations can be attributed to a variety of factors, including changes in planted acreage, crop plantings, pest pressures, and weather conditions. For example, extremely heavy rains result in excessive weeds, thus more pesticides may be used; drought conditions may result in fewer planted acres, thus less pesticide may be used.

As in previous years, the greatest pesticide use occurred in California's San Joaquin Valley (Table 1). Four counties in this region had the highest use: Fresno, Kern, Tulare, and San Joaquin.

Table 2 breaks down the pounds of pesticide use by general use categories: production agriculture, post-harvest commodity fumigation, structural pest control, landscape maintenance, and all others.

PESTICIDE SALES IN CALIFORNIA

Reported pesticide applications are only a portion of the pesticides sold each year. Typically, about two-thirds of the pesticide active ingredients sold in a given year are not subject to use reporting. Examples of non-reported active ingredients are chlorine (used primarily for municipal water treatment) and home-use pesticide products.

There were 679 million pounds sold in 2007, 743 million pounds sold in 2006, 611 million pounds sold in 2005, and 667 million pounds in 2004. Prior years data are posted on DPR’s web site at www.cdpr.ca.gov; click “A – Z Index”, “Sales of pesticides”.

In addition, it should be noted that the pounds of pesticides used and the number of applications are not necessarily accurate indicators of the extent of pesticide use or, conversely, the extent of use of reduced-risk pest management methods. For example, farmers may make a number of small-scale "spot" applications targeted at problem areas rather than one treatment of a large area. They may replace a more toxic pesticide used at one pound per acre with a less hazardous compound that must be applied at several pounds per acre. Either of these scenarios could increase the number of applications or amount of pounds used, respectively, without indicating an increased reliance on pesticides.

Table 1. Total pounds of pesticide active ingredients reported in each county and rank during 2006 and 2007.

	2006 Pesticide Use		2007 Pesticide Use	
County	**Pounds Applied**	**Rank**	**Pounds Applied**	**Rank**
Alameda	259,013	41	280,149	41
Alpine	64	58	1,033	58
Amador	88,362	45	99,692	44
Butte	3,446,387	13	3,088,889	14
Calaveras	49,205	50	45,509	48
Colusa	2,101,613	21	2,063,967	21
Contra Costa	874,352	31	632,000	34
Del Norte	307,890	39	333,059	38
El Dorado	113,741	43	193,053	42
Fresno	31,844,073	1	26,082,330	1
Glenn	2,476,704	20	2,311,729	20
Humboldt	70,769	46	58,002	46
Imperial	4,918,335	11	5,049,023	11
Inyo	16,839	52	2,328	56
Kern	30,659,418	2	25,988,123	2
Kings	6,326,724	9	5,651,830	10
Lake	525,120	36	571,885	35
Lassen	96,273	44	40,027	49
Los Angeles	2,645,608	17	2,517,364	18
Madera	9,737,405	5	8,966,231	5
Marin	58,341	49	46,887	47
Mariposa	8,318	54	8,984	54
Mendocino	1,094,588	29	1,946,646	22
Merced	7,330,745	7	7,081,365	7
Modoc	199,366	42	163,780	43
Mono	4,354	57	1,274	57
Monterey	8,208,057	6	8,680,918	6
Napa	1,508,329	25	1,648,765	25
Nevada	59,993	48	92,450	45
Orange	1,264,641	28	1,129,631	28
Placer	327,783	38	295,836	39
Plumas	7,047	55	21,902	51
Riverside	2,637,389	18	2,638,582	17
Sacramento	3,295,273	14	3,267,107	13
San Benito	751,581	34	653,828	33
San Bernardino	587,254	35	373,281	36
San Diego	2,012,682	23	1,474,494	26
San Francisco	64,089	47	14,935	52
San Joaquin	10,182,509	4	9,147,083	4

Table 1 (continued) Total pounds of pesticide active ingredients reported in each county and rank during 2006 and 2007.

	2006 Pesticide Use		2007 Pesticide Use	
County	**Pounds Applied**	**Rank**	**Pounds Applied**	**Rank**
San Luis Obispo	2,089,161	22	1,887,414	23
San Mateo	268,278	40	288,151	40
Santa Barbara	4,072,092	12	4,482,140	12
Santa Clara	1,388,264	27	931,916	31
Santa Cruz	1,730,935	24	1,843,886	24
Shasta	371,317	37	336,292	37
Sierra	6,661	56	8,338	55
Siskiyou	949,326	30	1,317,335	27
Solano	792,169	33	813,654	32
Sonoma	2,531,639	19	2,702,102	16
Stanislaus	5,592,085	10	5,843,733	9
Sutter	3,157,333	15	2,813,495	15
Tehama	823,095	32	1,089,763	30
Trinity	10,621	53	9,929	53
Tulare	16,994,050	3	15,319,425	3
Tuolumne	28,397	51	27,890	50
Ventura	6,862,390	8	6,214,628	8
Yolo	2,648,850	16	2,466,770	19
Yuba	1,390,990	26	1,102,630	29
Total	**187,867,887**		**172,163,465**	

Table 2. Pounds of pesticide active ingredients, 1995 – 2007, by general use categories.

Year	Production Agriculture	Post Harvest Fumigation	Structural Pest Control	Landscape Maintenance	All Others*	Total Pounds
1995	188,570,298	3,783,135	4,768,069	1,375,221	7,584,488	206,081,210
1996	183,255,121	2,359,266	4,672,859	1,251,981	7,625,128	199,164,354
1997	192,595,952	1,723,154	5,185,923	1,225,377	6,993,137	207,723,543
1998	200,873,938	1,709,003	5,930,252	1,396,236	6,901,455	216,810,885
1999	186,504,937	2,023,505	5,673,319	1,398,408	7,937,596	203,537,765
2000	173,123,640	2,118,779	5,184,686	1,402,846	6,829,218	188,659,169
2001	139,327,463	1,438,814	4,921,897	1,282,302	6,307,875	153,278,351
2002	154,667,259	1,844,281	5,469,435	1,440,565	6,727,888	170,149,427
2003	160,053,355	1,823,653	5,175,354	1,961,076	7,463,360	176,476,798
2004	164,823,724	1,904,512	5,129,734	1,600,601	7,049,159	180,507,730
2005	177,051,825	2,329,562	5,624,335	1,761,410	8,544,613	195,311,746
2006	167,751,378	2,196,632	5,289,950	2,269,888	10,360,038	187,867,887
2007	156,759,309	2,373,895	4,023,112	1,654,201	7,352,947	172,163,465

* This category includes pesticide applications reported in the following general categories: pest control on rights-of-way; public health which includes mosquito abatement work; vertebrate pest control; fumigation of nonfood and nonfeed materials such as lumber, furniture, etc.; pesticide used in research; and regulatory pest control used in ongoing control and/eradication of pest infestations.

IV. TRENDS IN USE IN CERTAIN PESTICIDE CATEGORIES

Reported pesticide use in California in 2007 totaled 172 million pounds, a decrease of nearly 16 million pounds from 2006. Production agriculture, the major category of use subject to reporting requirements, accounted for most of the overall decrease in use. Applications decreased by 11 million pounds for production agriculture. Similarly, there was a 1.3 million pound decrease in structural pest control, a decrease of 0.6 million pounds in landscape maintenance, and a 3 million pound decrease of other reported non-agricultural use. However, there was an increase of 0.2 million pounds in post-harvest treatments.

The active ingredients (AI) with the largest uses by pounds in 2007 were sulfur, petroleum and mineral oils, metam-sodium, 1,3-dichloropropene (1,3-D), glyphosate, and copper compounds. Sulfur was the most highly used non-adjuvant pesticide in 2007, both in pounds applied and acres treated. By pounds, sulfur accounted for 27 percent of all reported pesticide use. Sulfur is a natural fungicide favored by both conventional and organic farmers.

Most of the decline in all reported pesticide use was from petroleum and mineral oils, which decreased by 4.3 million pounds (13 percent). Other non-adjuvant pesticides that declined in use include copper fungicides (2.8 million pound decrease, 29 percent), metam-sodium (1.5 million pound decrease, 13 percent), sulfuryl fluoride (730,000 pound decrease, 25 percent), chromic acid (650,000 pound decrease, 98 percent), and glyphosate (570,000 pound decrease, 7 percent).

In contrast, some pesticide use increased. Non-adjuvant pesticides with the greatest increase in pounds applied were 1,3-D (860,000 pound increase, 10 percent), potassium n-methyldithiocarbamate (metam-potassium) (583,000 pound increase, 18 percent) and chloropicrin (459,000 pound increase, 9.1 percent).

Major crops or sites that showed an overall increase in pesticide pounds applied from 2006 to 2007 included wine grapes (2.6 million pounds increase), lumber treatment (978,000 pounds increase), pre-plant soil fumigations (586,000 pounds), and walnut (437,000 pounds). Major crops or sites with decreased pounds applied included fumigation of nonfood and nonfeed materials (3.7 million pounds decrease), cotton (2.1 million pounds), orange (2.0 million pounds), pistachio (1.8 million pounds), almond (1.7 million pounds), peach/nectarine (1.6 million pounds), processing tomatoes (1.6 million pounds), structural pest control (1.3 million pounds), and raisin and table grapes (1.1 million pounds).

DPR data analyses have shown that pesticide use varies from year to year depending upon pest problems, weather, acreage and types of crops planted, economics, and other factors. Of the different AI types, insecticides had the greatest decrease by pounds. Fungicides (other than sulfur) had the next largest decrease by pounds and the largest decrease by acres treated. Herbicide use decreased by pounds and acres treated.

Conversely, pounds of fumigants decreased but acres treated with fumigants slightly increased.

Pesticide use is reported as the number of pounds of AI and the total number of acres treated. The data for pounds include both agricultural and nonagricultural applications; the data for acres treated are primarily agricultural applications. The number of acres treated means the cumulative number of acres treated; the acres treated in each application are summed even when the same field is sprayed more than once in a year. (For example, if one acre is treated three times in a season with an individual AI, it is counted as three acres treated in the tables and graphs in Sections IV and V of this report.)

To provide an overview, pesticide use is summarized for eight different pesticide categories from 1997 to 2007 (Tables 3–10) and from 1994 to 2007 (Figures 1–8). These categories classify pesticides according to certain characteristics such as reproductive toxins, carcinogens, or reduced-risk characteristics. Use of most pesticide categories decreased from 2006 to 2007, except for increases in pounds of biopesticides and acres treated with oils or fumigants. Some of the major changes from 2006 to 2007 include:

- Chemicals classified as reproductive toxins decreased in pounds applied from 2006 to 2007 (down 1.9 million pounds or 10 percent) and decreased in acres treated (down 130,000 acres or 7.2 percent). The decrease in pounds was mostly from decreases in the fumigant metam-sodium and the decrease in acres was mostly from decreases in the fungicide myclobutanil. The pesticides in this category are ones listed on the State's Proposition 65 list of chemicals "known to cause reproductive toxicity."

- Use of chemicals classified as carcinogens decreased from 2006 to 2007 (down 2.7 million pounds or 10 percent and down 547,000 acres or 15 percent). The decrease in pounds was mainly due to a decrease in use of the fumigant metam-sodium and the fungicide/insecticide chromic acid. The decrease in acres treated was mostly from decreases in the herbicide diuron and fungicide mancozeb. The pesticides in this category are ones listed by U.S. EPA as B2 carcinogens or on the State's Proposition 65 list of chemicals "known to cause cancer".

- Use of cholinesterase-inhibiting pesticides (organophosphate (OP) and carbamate pesticides), which include compounds of high regulatory concern, continued to decline as they have for nearly every year since 1995. Use decreased form 2006 to 2007 both in pounds (down 1.1 million or 16 percent) and in acres treated (down 756,000 acres or 13 percent). The AIs with the greatest decreases in pounds were chlorpyrifos, phosmet and ethephon; the AIs with the greatest decreases in acres treated were chlorpyrifos, ethephon, and oxamyl. Use of most OPs and carbamates decreased; however, use of propamocarb hydrochloride (fungicide), malathion (insecticide) and EPTC (herbicide) increased.

- Use of all chemicals categorized as ground water contaminants decreased by pounds (down 303,000 pounds or 16 percent), and by acres treated (down 275,000 acres or 18 percent) in 2007 compared to 2006. The decreases in pounds and acres treated were mostly from decreases in the herbicides diuron and simazine. The use of most ground water contaminating pesticides decreased. However, both pounds and acres treated with the herbicides bromacil and bentazon increased.

- Chemicals categorized as toxic air contaminants, another group of pesticides of regulatory concern, decreased from 2006 to 2007 both in pounds (down 2.5 million pounds or 6.3 percent) and by acres treated (down 452,000 acres or 12 percent). By pounds, most toxic air contaminants are fumigants, which are used at high rates. By acres treated, the main decreasing AIs were the fungicides mancozeb and captan, and the herbicide trifluralin.

- Fumigant chemicals decreased in pounds applied from 2006 to 2007 (down 294,000 pounds or 0.8 percent) but marginally increased in cumulative acres treated (up 1,235 acres or 0.3 percent). Pounds of 3 of the 6 major fumigants decreased (metam-sodium, sulfuryl fluoride, and methyl bromide) and pounds of 3 fumigants increased (1,3-D, potassium n-methyldithiocarbamate, and chloropicrin). By acres treated, use of all major fumigants increased except for metam-sodium and methyl bromide.

- Pounds of oil pesticides decreased (down 4.3 million pounds or 13 percent) but increased by acres treated (up 118,000 acres or 3.7 percent). Oils include many different chemicals, but the category used here includes only ones derived from petroleum distillation. Some of these oils may be on the State's Proposition 65 list of chemicals "known to cause cancer" but most serve as alternatives to highly toxic pesticides. Oils are also used by organic growers.

- Biopesticide use decreased by pounds (down 173,000 pounds or 20 percent) and decreased by acres treated (down 153,000 acres or 6.5 percent) from 2006 to 2007. The most used biopesticide by pounds was *Bacillus thuringiensis* (*Bt*)(combining all subspecies) and the most used by acres treated was propylene glycol followed closely by *Bt* and gibberellins. *Bt* also had the largest increase by pounds. The AIs with the largest decrease in pounds were soybean oil and potassium bicarbonate. The AIs with the greatest decreases in acres treated were propylene glycol, gamma aminobutyric acid, and glutamic acid. AIs with the greatest increase in acres treated were azadirachtin and s-methoprene. Biopesticides include microorganisms and naturally occurring compounds, or compounds essentially identical to naturally occurring compounds not toxic to the target pest (such as pheromones).

Since 1993, the reported pounds of pesticides applied have fluctuated from year to year. An increase or decrease in use from one year to the next or in the span of a few years does not necessarily indicate a general trend in use; it simply may reflect variations related to various factors (e.g. climate or economic changes). Short periods of time (three to five years) may suggest trends, such as the increased pesticide use from 2001 to 2005 or the decreased use from 1998 to 2001. However, regression analyses on use from 1993 to 2007 do not indicate a significant trend of either increase or decrease in total pesticide use.

To improve data quality when calculating the total pounds of pesticides, DPR excluded values that were so large they were probably in error. The procedure to exclude probable errors involved the development of complex error-checking algorithms, a data improvement process that is ongoing.

Over-reporting errors have a much greater impact on the numerical accuracy of the database than under-reporting errors. For example, if a field is treated with 100 pounds of a pesticide AI and the application is erroneously recorded as 100,000 pounds (a decimal point shift of three places to the right), an error of 99,900 pounds is introduced into the database. If the same degree of error is made in shifting the decimal point to the left, the application is recorded as 0.1 pound, and an error of 99.9 pounds is entered into the database.

The summaries detailed in the following use categories are not intended to serve as indicators of pesticide risks to the public or the environment. Rather, the data supports DPR regulatory functions to enhance public safety and environmental protection. (See "How Pesticide Data are Used" on page 2.)

USE TRENDS OF PESTICIDES ON THE STATE'S PROPOSITION 65 LIST OF CHEMICALS THAT ARE "KNOWN TO CAUSE REPRODUCTIVE TOXICITY"

Table 3A. *The reported pounds of pesticides used which are on the State's Proposition 65 list of chemicals that are "known to cause reproductive toxicity." Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1080	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2,4-DB ACID	1,697	6,932	12,397	11,453	16,954	9,393	6,408	4,789	7,655	3,144	2,686
AMITRAZ	66,439	13,563	7,558	8,087	263	154	115	0	0	12	0
ARSENIC PENTOXIDE	64,372	50,899	245,238	91,267	259,400	194,650	129,889	12,705	180,505	474,517	7,805
ARSENIC TRIOXIDE	<1	1	1	<1	<1	<1	<1	<1	<1	<1	<1
BENOMYL	114,406	227,715	133,109	118,425	76,713	29,005	7,105	2,210	948	898	590
BROMACIL, LITHIUM SALT	9,141	4,686	4,162	4,478	3,217	4,016	3,025	1,801	1,059	2,529	1,172
BROMOXYNIL OCTANOATE	115,368	120,877	120,338	115,662	78,454	72,900	75,345	50,223	34,463	37,400	41,198
CHLORSULFURON	2,218	3,102	1,541	2,705	1,312	2,190	8,684	9,967	3,242	3,488	3,668
CYANAZINE	471,904	277,313	180,487	49,864	17,131	7,178	37	8	7	0	0
CYCLOATE	55,458	62,753	49,096	37,416	31,785	34,387	30,012	43,209	39,709	41,447	31,344
DICLOFOP-METHYL	41,130	24,783	18,710	21,696	11,765	5,058	9,309	5,988	1,413	174	157
DINOCAP	4	1	3	<1	<1	2	<1	2	2	2	2
DINOSEB	5,325	912	2,174	323	268	577	113	63	131	213	81
EPTC	579,245	393,031	448,883	323,624	276,724	253,634	141,552	182,532	181,825	108,209	152,707
ETHYLENE GLYCOL MONOMETHYL ETHER	8,357	4,371	1,993	2,024	2,248	3,009	1,782	2,729	2,476	4,186	2,653
ETHYLENE OXIDE	0	31	2	6	3	0	0	0	0	0	2
FENOXAPROP-ETHYL	3,895	1,504	2,048	979	366	106	53	64	161	196	153
FLUAZIFOP-BUTYL	2,028	1,211	516	205	149	166	31	34	41	26	5
FLUAZIFOP-P-BUTYL	13,224	13,514	13,860	11,595	9,489	9,985	8,759	10,298	11,638	11,103	10,192
HYDRAMETHYLNON	5,456	3,183	2,267	2,501	2,381	2,741	2,029	1,896	1,381	1,231	887
LINURON	84,621	82,170	78,046	65,526	58,173	62,006	60,117	69,289	72,031	59,164	58,592
METAM-SODIUM	15,401,098	14,120,788	17,273,325	13,143,954	12,562,799	15,116,768	14,822,689	14,698,228	12,991,279	11,422,382	9,897,299
METHYL BROMIDE	16,711,308	14,314,983	15,355,845	10,900,339	6,625,336	7,008,644	7,289,389	7,105,612	6,504,576	6,541,159	6,438,044
METIRAM	0	<1	0	0	2	0	1	5	0	<1	0
MYCLOBUTANIL	94,376	129,775	94,626	95,454	83,668	76,635	83,426	70,908	80,143	71,221	65,161
NABAM	0	50	2	1	8	0	0	10,693	30,440	23,414	9,073
NICOTINE	258	83	93	21	17	2	2	4	2	<1	<1
NITRAPYRIN	49	410	150	192	16	89	117	12	171	0	9
OXADIAZON	23,197	22,389	19,253	18,276	15,905	16,692	12,566	12,979	13,762	11,714	12,512

***Table 3A** (cont.). The reported pounds of pesticides used which are on the State's Proposition 65 list of chemicals that are "known to cause reproductive toxicity."*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
OXYDEMETON-METHYL	117,159	90,790	122,912	110,754	99,756	96,363	93,774	102,563	121,910	119,717	121,936
OXYTHIOQUINOX	2,709	1,576	2,705	411	145	117	34	27	8	90	166
POTASSIUM DIMETHYL DITHIO CARBAMATE	15	24,795	0	0	0	23	28	293	0	0	0
PROPARGITE	1,853,332	1,390,366	1,502,732	1,331,979	1,159,792	972,382	1,054,691	1,010,874	995,038	570,560	529,536
RESMETHRIN	687	796	695	676	542	661	1,561	245	958	676	452
SODIUM DIMETHYL DITHIO CARBAMATE	0	8,279	355	1,315	173	0	0	10,693	30,440	23,414	9,073
SODIUM TETRATHIOCARBONATE	799,092	900,991	688,701	596,028	375,487	352,342	212,308	259,542	330,886	171,194	386,876
STREPTOMYCIN SULFATE	9,626	14,950	9,405	10,455	7,554	5,989	8,463	4,702	7,790	7,582	5,808
TAU-FLUVALINATE	3,065	2,839	3,315	2,209	2,207	2,117	1,632	1,581	1,162	1,081	1,019
THIOPHANATE-METHYL	88,771	65,158	75,938	68,075	66,985	71,486	125,388	119,063	158,594	112,747	98,657
TRIADIMEFON	12,204	13,029	4,844	3,130	2,764	1,736	1,773	2,111	1,918	1,116	872
TRIBUTYLTIN METHACRYLATE	60	113	270	107	106	39	0	0	0	0	0
TRIFORINE	6,604	2,759	519	365	99	72	88	295	137	452	64
VINCLOZOLIN	46,929	54,719	52,731	35,728	32,208	22,170	18,581	14,863	3,574	402	390
WARFARIN	1	1	1	1	1	1	3	3	1	9	1
Grand Total	36,814,829	32,452,190	36,530,845	27,187,308	21,882,362	24,435,481	24,210,876	23,823,102	21,811,477	19,826,869	17,890,844

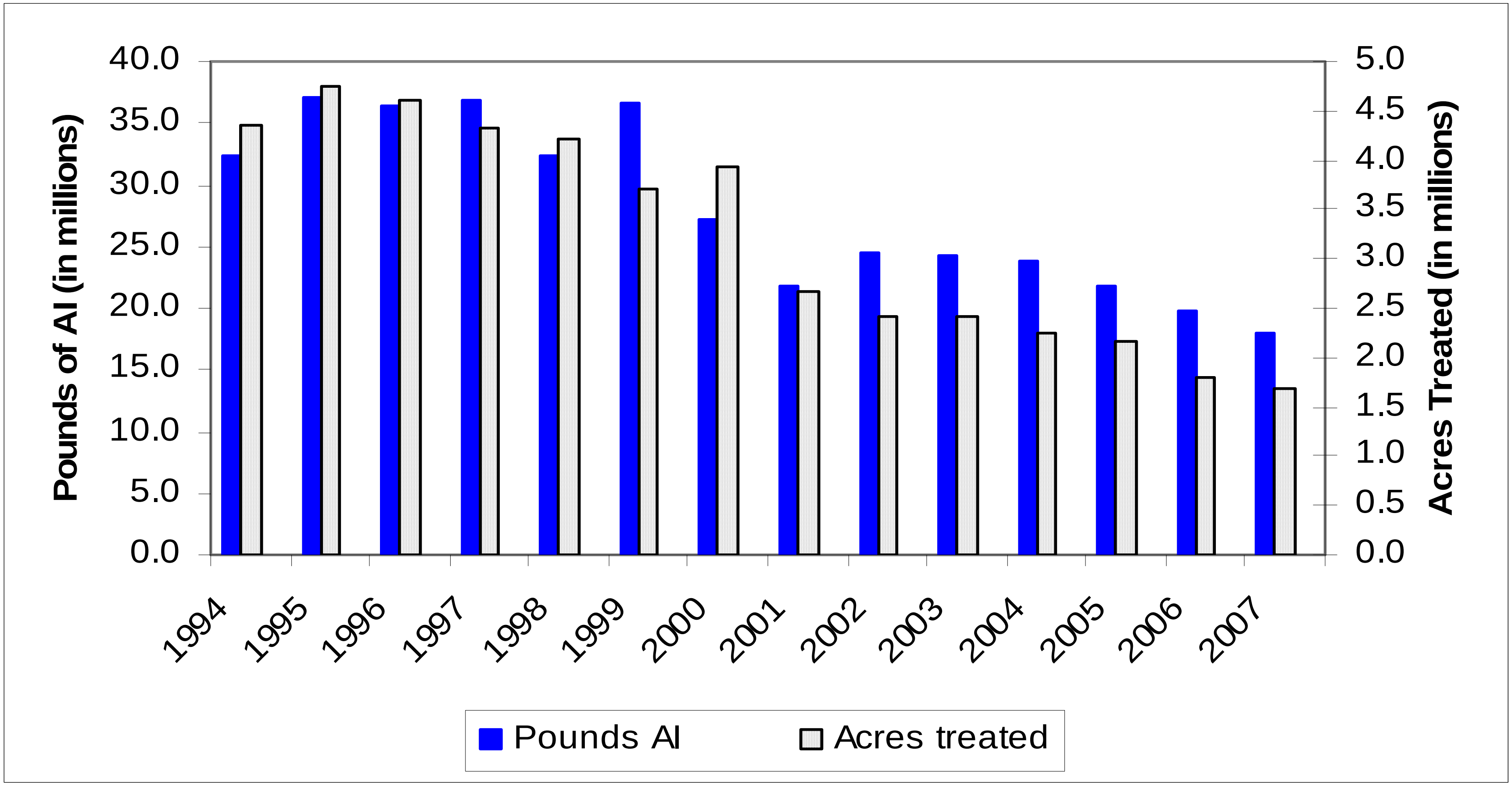
Table 3B. *The reported cumulative acres treated with pesticides that are on the State's Proposition 65 list of chemicals "known to cause reproductive toxicity." Use includes primarily agricultural applications. The grand total for acres treated may be less than the sum of acres treated for all active ingredients because some products contain more than one active ingredient. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1,080	0	0	0	42	30	301	50	0	41	22	170
2,4-DB ACID	2,599	12,167	20,063	19,496	25,843	15,584	10,384	8,873	11,777	5,221	4,822
AMITRAZ	161,651	28,945	14,684	16,011	1,269	605	379	0	0	0	0
ARSENIC PENTOXIDE	0	0	0	709,893	56	0	0	48	0	0	0
ARSENIC TRIOXIDE	0	0	0	0	0	1	<1	0	1	0	0
BENOMYL	245,687	434,729	242,796	217,613	135,929	47,879	13,340	3,983	2,789	1,674	568
BROMACIL, LITHIUM SALT	0	40	40	30	0	0	0	0	0	0	0
BROMOXYNIL OCTANOATE	224,250	240,997	257,417	313,362	251,527	239,110	218,281	162,572	120,175	134,283	136,766
CHLORSULFURON	27,628	39,873	30,691	34,538	29,079	18,836	26,280	25,745	21,903	26,345	12,653
CYANAZINE	288,087	185,082	129,547	56,059	19,708	8,763	25	5	8	0	0
CYCLOATE	25,986	29,761	24,555	18,495	15,918	17,228	16,713	20,699	19,319	19,886	15,601
DICLOFOP-METHYL	47,217	28,296	21,442	24,470	14,198	6,259	11,257	7,391	729	186	225
DINOCAP	33	2	6	4	1	3	<1	47	7	9	8
DINOSEB	1,043	369	822	74	166	167	59	98	310	73	17
EPTC	208,093	141,511	148,685	107,758	99,953	94,240	56,639	64,194	64,263	38,871	51,706
ETHYLENE GLYCOL MONOMETHYL ETHER	96,353	55,099	26,451	28,880	33,256	36,299	24,249	25,075	16,655	25,655	26,412
ETHYLENE OXIDE	0	194	31	41	0	0	0	0	0	0	0
FENOXAPROP-ETHYL	24,439	10,480	13,824	8,847	3,820	1,327	839	1,681	3,247	3,418	2,552
FLUAZIFOP-BUTYL	1,537	3,908	806	137	144	98	0	<1	3	0	0
FLUAZIFOP-P-BUTYL	52,656	51,826	50,308	41,780	34,283	40,967	28,325	31,739	35,348	34,591	31,920
HYDRAMETHYLNON	35	289	1,615	3,658	2,762	2,148	2,057	1,314	1,990	657	931
LINURON	110,067	112,122	111,009	86,376	81,801	86,942	85,412	95,565	101,987	81,535	81,041
METAM-SODIUM	198,395	154,309	186,300	146,847	125,417	141,415	142,406	128,427	97,562	102,451	77,909
METHYL BROMIDE	113,195	90,107	102,115	75,832	60,892	53,140	55,254	57,385	45,700	50,677	45,675
METIRAM	0	<1	0	0	7	0	<1	2	0	1	0
MYCLOBUTANIL	866,360	1,225,372	887,981	843,208	737,643	704,827	742,139	656,020	699,773	644,490	599,231
NABAM	0	55	20	0	60	0	0	0	0	0	2

***Table 3B** (cont.). The reported cumulative acres treated with pesticides that are on the State's Proposition 65 list of chemicals "known to cause reproductive toxicity."*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
NICOTINE	128	57	36	14	31	1	0	2	3	0	0
NITRAPYRIN	105	851	329	276	0	169	258	42	143	0	35
OXADIAZON	1,833	1,983	3,408	2,660	2,637	1,838	1,904	3,120	2,209	2,144	2,991
OXYDEMETON-METHYL	244,056	186,964	253,281	225,990	200,171	193,453	189,015	206,751	173,480	164,094	161,756
OXYTHIOQUINOX	5,896	5,306	2,152	817	250	182	71	137	14	10	9
POTASSIUM DIMETHYL DITHIO CARBAMATE	0	0	0	0	0	2	6	0	0	0	0
PROPARGITE	989,265	756,098	795,410	704,529	606,737	524,439	558,056	543,728	519,412	287,261	261,953
RESMETHRIN	182	160	84,044	33	35	32	66	209	1	1	18
SODIUM DIMETHYL DITHIO CARBAMATE	0	253	20	0	60	0	0	0	0	0	2
SODIUM TETRATHIOCARBONATE	35,473	34,488	24,947	21,002	13,574	11,559	6,832	8,497	7,977	6,170	11,485
STREPTOMYCIN SULFATE	89,336	147,617	76,414	97,024	62,184	52,180	63,445	37,461	52,061	57,295	38,467
TAU-FLUVALINATE	18,387	14,075	17,343	10,105	10,893	9,046	7,939	7,313	5,879	5,438	4,777
THIOPHANATE-METHYL	89,556	64,098	81,428	68,984	53,990	64,340	121,339	112,501	135,296	108,408	100,009
TRIADIMEFON	59,229	79,968	25,719	12,130	9,501	6,747	7,625	6,752	8,585	2,949	1,806
TRIBUTYLTIN METHACRYLATE	<1	1	1	1	<1	0	0	0	0	0	0
TRIFORINE	17,455	6,352	1,279	751	244	203	196	61	181	102	373
VINCLOZOLIN	67,373	69,067	63,931	43,702	38,570	27,795	21,692	18,207	3,899	440	258
WARFARIN	382	310	129	556	101	449	632	1,504	430	473	3,165
Grand Total	4,313,970	4,213,180	3,701,081	3,942,024	2,672,739	2,408,573	2,413,165	2,237,147	2,153,156	1,804,828	1,675,310

Figure 1. Use trends of pesticides that are on the State's Proposition 65 list of chemicals that are "known to cause reproductive toxicity." Reported pounds of active ingredient (AI) applied include both agricultural and non-agricultural applications. The reported cumulative acres treated include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.



USE TRENDS OF PESTICIDES LISTED BY U.S. EPA AS CARCINOGENS OR BY THE STATE AS "KNOWN TO CAUSE CANCER"

Table 4A. *The reported pounds of pesticides used that are listed by U.S. EPA as B2 carcinogens or that are on the State's Proposition 65 list of chemicals "known to cause cancer." Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1,3-DICHLOROPROPENE	2,457,690	3,011,057	3,321,147	4,465,422	4,141,173	5,413,807	7,003,873	8,945,145	9,355,308	8,733,270	9,594,517
ACIFLUORFEN, SODIUM SALT	29	<1	10	<1	1	3	<1	18	<1	0	0
ALACHLOR	51,259	46,264	29,789	36,468	29,057	28,666	24,913	27,229	21,052	13,740	3,911
ARSENIC ACID	59,835	52,558	48,029	11,906	12,023	4,976	318	223	68	3	0
ARSENIC PENTOXIDE	64,372	50,899	245,238	91,267	259,400	194,650	129,889	12,705	180,505	474,517	7,805
ARSENIC TRIOXIDE	<1	1	1	<1	<1	<1	<1	<1	<1	<1	<1
CACODYLIC ACID	26,060	17,381	15,930	16,091	3,981	1,792	207	115	131	20	41
CAPTAN	801,899	1,542,556	966,020	643,826	399,146	395,575	498,445	370,418	468,413	508,939	449,328
CHLOROTHALONIL	779,390	1,182,963	755,314	684,213	521,581	601,060	713,226	571,622	765,150	824,391	734,604
CHROMIC ACID	89,931	71,109	343,543	128,642	363,225	272,300	182,022	17,753	252,176	662,927	10,904
CREOSOTE	259,086	1,752	4,873	9,879	4,700	9,018	3,385	1,048	<1	0	3
DAMINOZIDE	11,028	10,406	9,411	9,079	11,309	10,077	10,111	9,586	8,793	7,805	7,095
DDVP	13,636	13,998	12,325	12,680	12,833	8,477	3,446	3,807	4,914	6,577	6,376
DIOCTYL PHTHALATE	1	318	1,076	595	640	604	521	397	583	1,016	484
DIPROPYL ISOCINCHOMERONATE	<1	<1	0	<1	1	0	1	<1	<1	52	2
DIURON	1,228,277	1,504,731	1,188,553	1,351,232	1,105,536	1,302,603	1,344,596	1,398,123	955,983	1,051,245	859,909
ETHOPROP	23,842	27,949	26,196	16,119	19,046	16,531	28,419	23,130	18,924	24,485	24,241
ETHYLENE OXIDE	0	31	2	6	3	0	0	0	0	0	2
FENOXYCARB	65	552	71	89	86	53	32	34	30	8	4
FOLPET	<1	<1	<1	<1	0	2	<1	0	<1	<1	0
FORMALDEHYDE	416,823	349,785	111,714	55,300	28,612	14,035	18,690	111,151	48,968	73,392	47,733
IPRODIONE	424,555	572,389	411,488	421,582	304,716	247,090	287,850	261,218	284,984	302,300	251,168
LINDANE	5,511	6,330	4,842	4,746	2,388	1,630	908	775	40	379	2
MANCOZEB	528,159	988,344	630,987	610,903	428,738	396,912	535,600	379,539	642,444	660,848	408,301
MANEB	1,082,071	1,596,466	1,045,567	1,202,545	816,548	851,819	1,026,804	954,085	1,122,684	1,175,939	1,055,347
METAM-SODIUM	15,401,098	14,120,788	17,273,325	13,143,954	12,562,799	15,116,768	14,822,689	14,698,228	12,991,279	11,422,382	9,897,299

***Table 4A** (cont.)**.** The reported pounds of pesticides used that are listed by U.S. EPA as B2 carcinogens or that are on the State's Proposition 65 list of chemicals "known to cause cancer."*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
METIRAM	0	<1	0	0	2	0	1	5	0	<1	0
ORTHO-PHENYLPHENOL	15,962	11,248	8,600	8,516	4,016	15,129	4,936	21,740	9,454	2,083	5,128
ORTHO-PHENYLPHENOL, SODIUM SALT	26,192	32,972	29,019	31,681	27,071	25,029	20,536	5,898	4,979	6,948	2,266
OXADIAZON	23,197	22,389	19,253	18,276	15,905	16,692	12,566	12,979	13,762	11,714	12,512
OXYTHIOQUINOX	2,709	1,576	2,705	411	145	117	34	27	8	90	166
PARA-DICHLOROBENZENE	3	219	86	4	11	1	25	10	139	0	15
PENTACHLOROPHENOL	8	33	92	466	14	17	3	2	3	27	22
POTASSIUM DICHROMATE	50	103	319	554	1	<1	11	71	40	0	0
PROPARGITE	1,853,332	1,390,366	1,502,732	1,331,979	1,159,792	972,382	1,054,691	1,010,874	995,038	570,560	529,536
PROPOXUR	1,760	1,604	1,735	2,145	611	450	306	223	220	211	190
PROPYLENE OXIDE	198,559	198,595	172,556	118,381	99,727	99,674	99,396	151,484	147,324	133,028	109,936
PROPYZAMIDE	101,267	106,368	104,484	103,702	108,987	107,663	104,222	118,952	116,132	121,005	114,401
SODIUM DICHROMATE	182,185	122,647	32,699	122	329	633	217	0	0	0	0
TERRAZOLE	38	21	8	2	25	6	575	1,099	750	946	750
THIODICARB	156,092	114,785	60,453	36,704	9,042	5,195	8,392	2,249	1,872	894	686
VINCLOZOLIN	46,929	54,719	52,731	35,728	32,208	22,170	18,581	14,863	3,574	402	390
Grand Total	26,332,901	27,226,274	28,432,921	24,605,217	22,485,427	26,153,603	27,960,438	29,126,826	28,415,727	26,792,143	24,135,073

Table 4B. *The reported cumulative acres treated with pesticides listed by U.S. EPA as B2 carcinogens or on the State's Proposition 65 list of chemicals "known to cause cancer." Use includes primarily agricultural applications. The grand total for acres treated is less than the sum of acres treated for all active ingredients because some products contain more than one active ingredient. Data are from the Department of Pesticide Regulation's Pesticide Use.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1,3-DICHLOROPROPENE	22,193	27,059	29,430	33,244	30,817	42,172	48,944	56,618	51,486	49,885	53,937
ACIFLUORFEN, SODIUM SALT	0	0	0	0	0	11	0	3	0	0	0
ALACHLOR	19,059	16,430	11,008	13,302	11,453	14,467	10,004	9,888	7,935	5,192	1,500
ARSENIC ACID	0	0	0	0	0	0	0	0	0	0	0
ARSENIC PENTOXIDE	0	0	0	709,893	56	0	0	48	0	0	0
ARSENIC TRIOXIDE	0	0	0	0	0	1	<1	0	1	0	0
CACODYLIC ACID	192,816	126,923	111,607	117,656	31,283	12,648	757	100	82	121	0
CAPTAN	347,631	602,684	404,731	309,989	215,969	215,412	271,140	211,028	252,040	262,936	215,787
CHLOROTHALONIL	492,219	796,672	456,007	430,128	312,726	347,736	361,203	331,710	418,600	438,373	389,509
CHROMIC ACID	0	0	0	709,893	56	0	0	0	0	0	0
CREOSOTE	0	126	11	45	1	0	0	0	0	0	1
DAMINOZIDE	3,512	4,510	3,107	3,416	6,146	5,417	3,103	2,667	2,376	2,220	2,288
DDVP	2,596	3,692	2,180	2,336	3,954	4,327	2,576	1,637	7,445	1,526	2,733
DIOCTYL PHTHALATE	14	6,250	24,270	11,195	10,776	6,649	3,880	6,249	13,858	13,231	13,258
DIPROPYL ISOCINCHOMERONATE	0	0	0	5	0	0	0	0	1	18	0
DIURON	819,993	865,246	849,482	865,974	788,559	796,904	843,897	971,628	894,073	886,032	701,845
ETHOPROP	3,213	3,784	3,610	3,477	3,542	4,152	6,078	4,917	4,296	4,815	4,283
ETHYLENE OXIDE	0	194	31	41	0	0	0	0	0	0	0
FENOXYCARB	<1	210	3,707	3,405	3,241	1,242	812	1,011	1,398	828	210
FOLPET	2	0	0	0	0	0	0	0	0	0	0
FORMALDEHYDE	12	126	123	47	53	33	18	23	2	265	57
IPRODIONE	666,336	1,348,382	933,982	1,194,578	501,033	364,809	445,511	409,250	450,354	468,465	412,684
LINDANE	36,573	32,650	20,930	14,640	13,832	8,010	8,828	9,437	557	9	1
MANCOZEB	284,136	683,756	387,300	363,305	228,275	197,196	276,093	194,219	370,266	348,360	212,353
MANEB	624,121	941,308	629,897	611,756	535,105	554,904	660,011	601,360	730,254	675,941	655,215
METAM-SODIUM	198,395	154,309	186,300	146,847	125,417	141,415	142,406	128,427	97,562	102,451	77,909

***Table 4B** (cont.). The reported cumulative acres treated with pesticides listed by U.S. EPA as B2 carcinogens or on the State's Proposition 65 list of chemicals "known to cause cancer."*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
METIRAM	0	<1	0	0	7	0	<1	2	0	1	0
ORTHO-PHENYLPHENOL	75	645	583	321	59	82	726	272	429	65	149
ORTHO-PHENYLPHENOL, SODIUM SALT	0	20	6,234	18,599	60	40	9	0	0	0	0
OXADIAZON	1,833	1,983	3,408	2,660	2,637	1,838	1,904	3,120	2,209	2,144	2,991
OXYTHIOQUINOX	5,896	5,306	2,152	817	250	182	71	137	14	10	9
PARA-DICHLOROBENZENE	0	10	0	0	0	0	0	0	0	0	0
PENTACHLOROPHENOL	4	190	0	59	38	0	0	20	3	1	10
POTASSIUM DICHROMATE	0	40	71	40	0	20	0	0	10	0	0
PROPARGITE	989,265	756,098	795,410	704,529	606,737	524,439	558,056	543,728	519,412	287,261	261,953
PROPOXUR	73	45	39	26	4	23	1	7	8	<1	0
PROPYLENE OXIDE	<1	0	573	0	0	<1	0	22	185	20	0
PROPYZAMIDE	140,791	144,864	142,194	137,337	145,325	140,803	132,819	147,631	148,376	153,045	148,246
SODIUM DICHROMATE	0	0	0	0	0	0	0	0	0	0	0
TERRAZOLE	40	78	44	126	132	47	266	253	495	884	879
THIODICARB	223,154	155,440	83,796	50,604	13,382	8,258	12,113	3,684	2,965	1,293	1,196
VINCLOZOLIN	67,373	69,067	63,931	43,702	38,570	27,795	21,692	18,207	3,899	440	258
Grand Total	5,141,327	6,748,098	5,156,146	6,503,992	3,629,493	3,421,030	3,812,918	3,657,305	3,980,588	3,705,830	3,159,261

Figure 2. *Use trends of pesticides that are listed by U.S. EPA as B2 carcinogens or that are on the State's Proposition 65 list of chemicals "known to cause cancer." Reported pounds of active ingredient (AI) applied include both agricultural and reportable non-agricultural applications. The reported cumulative acres treated include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

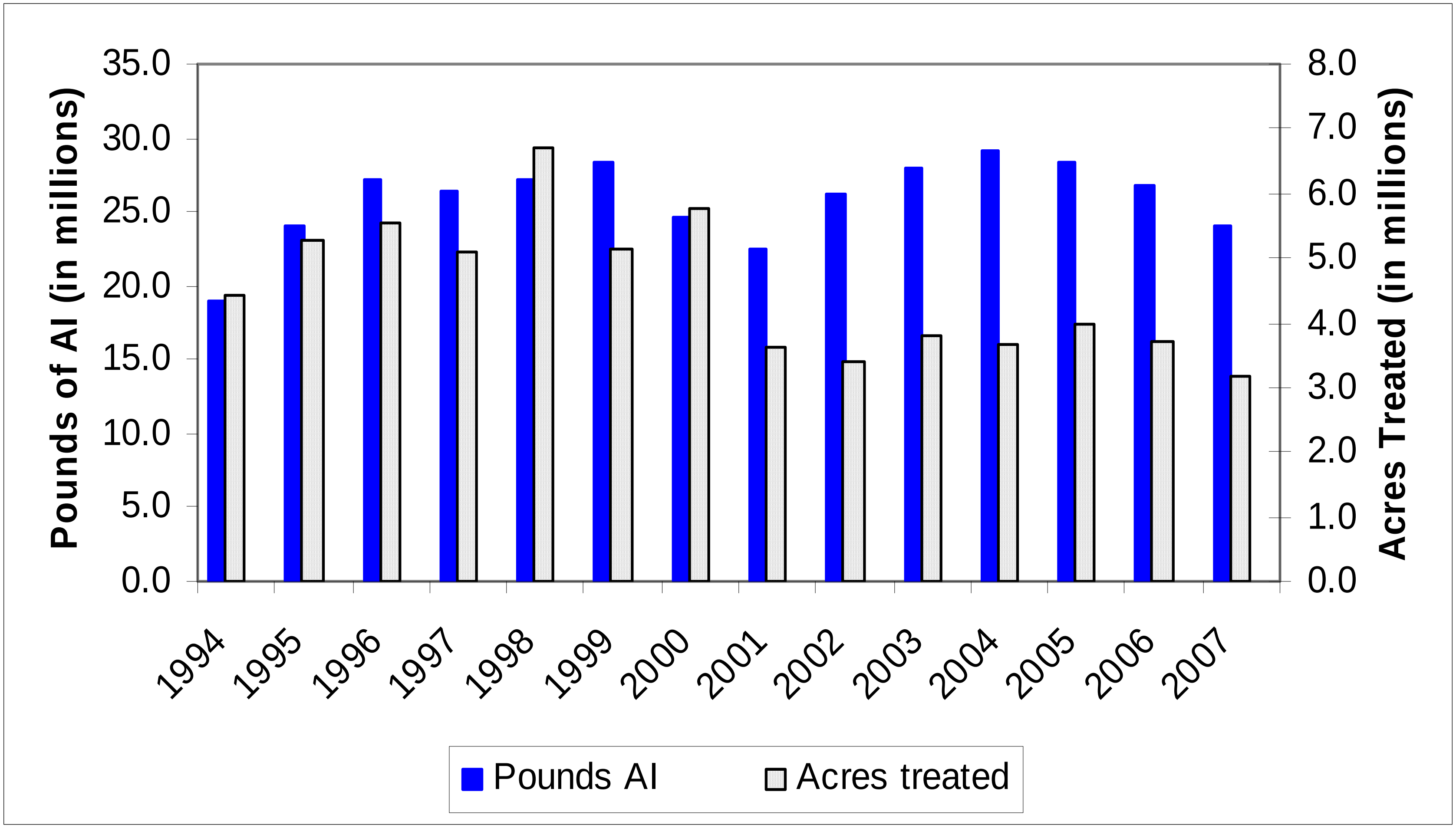


Table 5A. *The reported pounds of cholinesterase-inhibiting pesticides used. These pesticides are organophosphate and carbamate active ingredients. Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
3-IODO-2-PROPYNYL BUTYLCARBAMATE	0	1	<1	<1	<1	0	0	0	0	0	0
ACEPHATE	343,840	384,524	307,164	283,367	240,132	217,397	221,781	204,824	195,507	163,909	142,441
ALDICARB	530,066	534,665	280,585	329,319	297,244	244,786	262,103	231,012	230,409	176,624	115,031
AZINPHOS-METHYL	336,353	193,069	216,624	185,055	163,121	151,612	213,892	50,562	55,179	38,775	25,418
BENDIOCARB	259	125	108	593	62	32	23	9	6	2	8
BENSULIDE	130,046	192,500	242,460	216,120	186,908	192,220	228,739	237,290	246,396	284,533	258,164
BUTYLATE	84,268	69,805	71,071	32,658	27,640	19,412	26,826	20,323	9,923	2,671	945
CARBARYL	754,659	427,546	388,144	364,060	286,199	256,098	205,102	240,135	190,633	157,000	142,010
CARBOFURAN	183,321	161,588	138,665	132,427	95,863	81,486	49,276	30,354	28,093	25,790	24,306
CHLORPROPHAM	2,057	2,321	3,102	3,544	3,504	1,380	6,191	2,861	2,822	3,704	1,532
CHLORPYRIFOS	3,212,165	2,451,980	2,259,221	2,094,179	1,673,097	1,419,665	1,545,670	1,778,342	2,006,062	1,922,547	1,430,034
COUMAPHOS	0	0	15	152	97	62	64	63	1	3	<1
CYCLOATE	55,458	62,753	49,096	37,416	31,785	34,387	30,012	43,209	39,709	41,447	31,344
DDVP	13,636	13,998	12,325	12,680	12,833	8,477	3,446	3,807	4,914	6,577	6,376
DEMETON	0	3	5	2	3	42	<1	0	1	<1	1
DESMEDIPHAM	6,188	4,737	6,014	6,651	3,750	3,398	3,636	3,842	3,921	2,954	1,902
DIAZINON	956,267	901,388	983,628	1,058,311	999,578	690,375	523,957	492,148	398,620	385,923	350,640
DICROTOPHOS	0	11	122	0	2	27	41	0	2	6	0
DIMETHOATE	515,935	398,448	486,554	396,231	285,548	309,371	294,368	332,049	310,502	294,027	314,035
DISULFOTON	128,335	105,327	95,919	76,201	51,545	54,567	46,815	41,317	31,799	22,601	23,850
EPTC	579,245	393,031	448,883	323,624	276,724	253,634	141,552	182,532	181,825	108,209	152,707
ETHEPHON	882,802	762,217	734,263	734,838	620,075	538,403	574,377	637,205	642,137	584,613	427,247
ETHION	3	906	64	0	5	13	13	<1	261	13	0
ETHOPROP	23,842	27,949	26,196	16,119	19,046	16,531	28,419	23,130	18,924	24,485	24,241
FENAMIPHOS	156,280	125,459	107,745	104,517	66,330	70,939	59,421	58,691	46,336	33,511	39,677
FENTHION	176	29	22	33	61	79	3	36	15	2	4
FONOFOS	50,555	25,349	24,216	4,370	580	465	182	30	15	0	0

***Table 5A** (cont.). The reported pounds of cholinesterase-inhibiting pesticides used. These pesticides are organophosphate and carbamate active ingredients.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
FORMETANATE HYDROCHLORIDE	97,907	77,723	65,030	43,941	45,280	35,798	28,420	30,651	30,684	33,738	33,694
MALATHION	790,290	663,200	704,893	505,770	554,872	624,604	654,155	492,548	423,529	410,866	457,974
METHAMIDOPHOS	312,067	244,269	116,284	76,865	46,615	30,645	36,987	31,332	37,806	30,570	18,867
METHIDATHION	309,314	178,451	177,105	98,129	93,521	68,389	54,398	61,204	48,857	56,691	45,633
METHIOCARB	4,769	5,384	3,314	2,420	2,265	1,858	2,256	2,789	2,313	1,798	1,737
METHOMYL	824,048	666,694	551,115	554,142	378,132	295,237	359,050	262,195	347,010	317,302	304,879
METHYL PARATHION	153,737	158,248	157,439	75,075	59,620	53,955	73,365	71,525	78,821	84,785	75,368
MEVINPHOS	493	483	1,268	539	393	40	114	1	160	18	30
MEVINPHOS, OTHER RELATED	283	298	843	301	249	23	76	<1	107	12	20
MEXACARBATE	17	11	1	0	0	0	0	0	0	0	0
MOLINATE	1,170,699	1,006,025	911,376	1,025,786	733,534	877,572	539,871	367,155	171,362	141,421	75,241
NALED	616,577	260,291	302,708	246,548	276,651	177,102	185,611	152,479	223,725	185,444	132,050
O,O-DIMETHYL O-(4-NITRO-M-TOLYL) PHOSPHOROTHIOATE	0	0	0	0	0	0	0	0	0	<1	0
OXAMYL	119,441	161,042	128,662	137,522	76,971	80,315	93,781	112,603	153,167	116,639	44,843
OXYDEMETON-METHYL	117,159	90,790	122,912	110,754	99,756	96,363	93,774	102,563	121,910	119,717	121,936
PARATHION	5,187	5,762	4,041	3,581	2,589	3,205	611	240	855	1,542	479
PEBULATE	184,015	185,696	225,077	160,018	45,619	71,721	35,755	10,118	1,154	210	441
PHENMEDIPHAM	6,621	5,836	6,735	7,427	4,249	4,351	5,021	4,576	5,171	4,046	2,838
PHORATE	114,766	122,603	93,488	87,974	70,645	76,482	64,947	60,162	48,981	38,066	33,776
PHOSALONE	33	11	0	4	0	0	0	0	0	0	0
PHOSMET	568,933	645,380	638,704	580,522	482,481	405,236	341,541	658,087	547,813	628,892	421,109
POTASSIUM DIMETHYL DITHIO CARBAMATE	15	24,795	0	0	0	23	28	293	0	0	0
PROFENOFOS	150,575	40,433	49,575	43,879	22,011	24,452	12,871	15,620	23,924	20,885	3,638
PROPAMOCARB HYDROCHLORIDE	10,215	57,121	6,285	4,959	2,288	828	83	5	0	364	137,418
PROPETAMPHOS	17,338	9,970	6,074	4,583	3,991	2,464	721	315	148	207	136
PROPOXUR	1,760	1,604	1,735	2,145	611	450	306	223	220	211	190
S,S,S-TRIBUTYL PHOSPHOROTRITHIOATE	624,781	438,038	345,842	396,827	257,062	190,149	233,640	179,690	100,210	78,084	45,757

***Table 5A** (cont.). The reported pounds of cholinesterase-inhibiting pesticides used. These pesticides are organophosphate and carbamate active ingredients.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
SODIUM DIMETHYL DITHIO CARBAMATE	0	8,279	355	1,315	173	0	0	10,693	30,440	23,414	9,073
SULFOTEP	355	213	246	215	267	77	8	29	17	1	7
SULPROFOS	119	84	0	0	<1	0	0	0	0	0	0
TETRACHLORVINPHOS	6,044	5,831	3,975	4,687	4,746	3,285	1,262	722	788	1,203	667
THIOBENCARB	894,287	724,926	732,505	1,007,249	644,625	839,962	587,211	521,586	448,208	308,497	289,046
THIODICARB	156,092	114,785	60,453	36,704	9,042	5,195	8,392	2,249	1,872	894	686
TRICHLORFON	3,843	2,476	2,779	3,996	3,004	1,545	1,068	1,035	1,222	1,003	336
Grand Total	16,207,537	13,146,480	12,303,033	11,636,346	9,262,992	8,536,181	7,881,229	7,766,461	7,494,484	6,886,447	5,769,785

Table 5B. *The reported cumulative acres treated with cholinesterase-inhibiting pesticides. These pesticides are organophosphate and carbamate active ingredients. Use includes primarily agricultural applications. The grand total for acres treated is less than the sum of acres treated for all active ingredients because some products contain more than one active ingredient. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
3-IODO-2-PROPYNYL BUTYLCARBAMATE	0	150	0	0	40	0	0	0	0	0	0
ACEPHATE	372,566	403,545	370,111	295,383	266,278	232,949	223,408	211,892	198,982	172,119	148,865
ALDICARB	442,029	397,890	266,773	314,440	282,453	225,820	231,090	217,540	214,260	158,000	108,817
AZINPHOS-METHYL	233,406	134,334	140,226	118,805	117,544	94,035	117,060	38,622	37,622	25,534	16,636
BENDIOCARB	19	28	11	<1	2	0	9	<1	1	0	6
BENSULIDE	45,795	61,984	80,873	73,088	62,859	60,883	66,376	70,367	70,625	82,280	76,748
BUTYLATE	17,572	14,259	14,959	7,235	6,270	4,598	5,450	3,940	1,954	610	236
CARBARYL	292,721	197,664	216,991	196,464	147,612	106,616	97,811	103,261	99,086	87,791	97,016
CARBOFURAN	322,064	303,957	272,441	258,441	246,149	182,567	91,801	50,138	55,488	43,417	39,795
CHLORPROPHAM	26	106	151	127	112	80	124	166	88	115	178
CHLORPYRIFOS	2,223,551	1,669,859	1,420,414	1,441,956	1,355,172	1,235,816	1,478,783	1,323,331	1,681,634	1,538,958	1,154,624
COUMAPHOS	0	0	0	1,339	809	1,073	17	49	<1	3	0
CYCLOATE	25,986	29,761	24,555	18,495	15,918	17,228	16,713	20,699	19,319	19,886	15,601
DDVP	2,596	3,692	2,180	2,336	3,954	4,327	2,576	1,637	7,445	1,526	2,733
DEMETON	0	18	66	0	56	0	2	0	35	0	10
DESMEDIPHAM	61,368	56,272	71,977	60,248	34,738	32,344	35,435	37,152	35,795	30,883	24,780
DIAZINON	530,355	477,809	546,577	480,083	437,934	489,230	483,344	509,233	440,839	439,814	422,062
DICROTOPHOS	0	16	11	0	0	0	64	0	0	110	0
DIMETHOATE	1,097,752	872,311	1,078,024	877,751	639,271	681,367	621,074	701,470	672,935	613,479	608,787
DISULFOTON	124,319	100,935	86,332	69,067	45,258	48,723	39,182	34,481	25,320	18,926	20,315
EPTC	208,093	141,511	148,685	107,758	99,953	94,240	56,639	64,194	64,263	38,871	51,706
ETHEPHON	700,941	653,817	720,773	697,340	631,330	550,256	601,503	660,356	679,253	640,720	490,355
ETHION	2	621	53	0	5	0	1	0	66	32	0
ETHOPROP	3,213	3,784	3,610	3,477	3,542	4,152	6,078	4,917	4,296	4,815	4,283
FENAMIPHOS	97,013	72,102	66,100	60,340	36,999	38,397	36,293	34,142	29,314	18,918	22,618
FENTHION	0	0	0	0	0	0	0	18	0	0	0
FONOFOS	36,123	16,926	14,146	2,325	497	234	116	20	15	0	0
FORMETANATE HYDROCHLORIDE	95,544	77,965	63,047	42,880	45,234	36,131	29,411	33,167	31,775	35,293	35,383

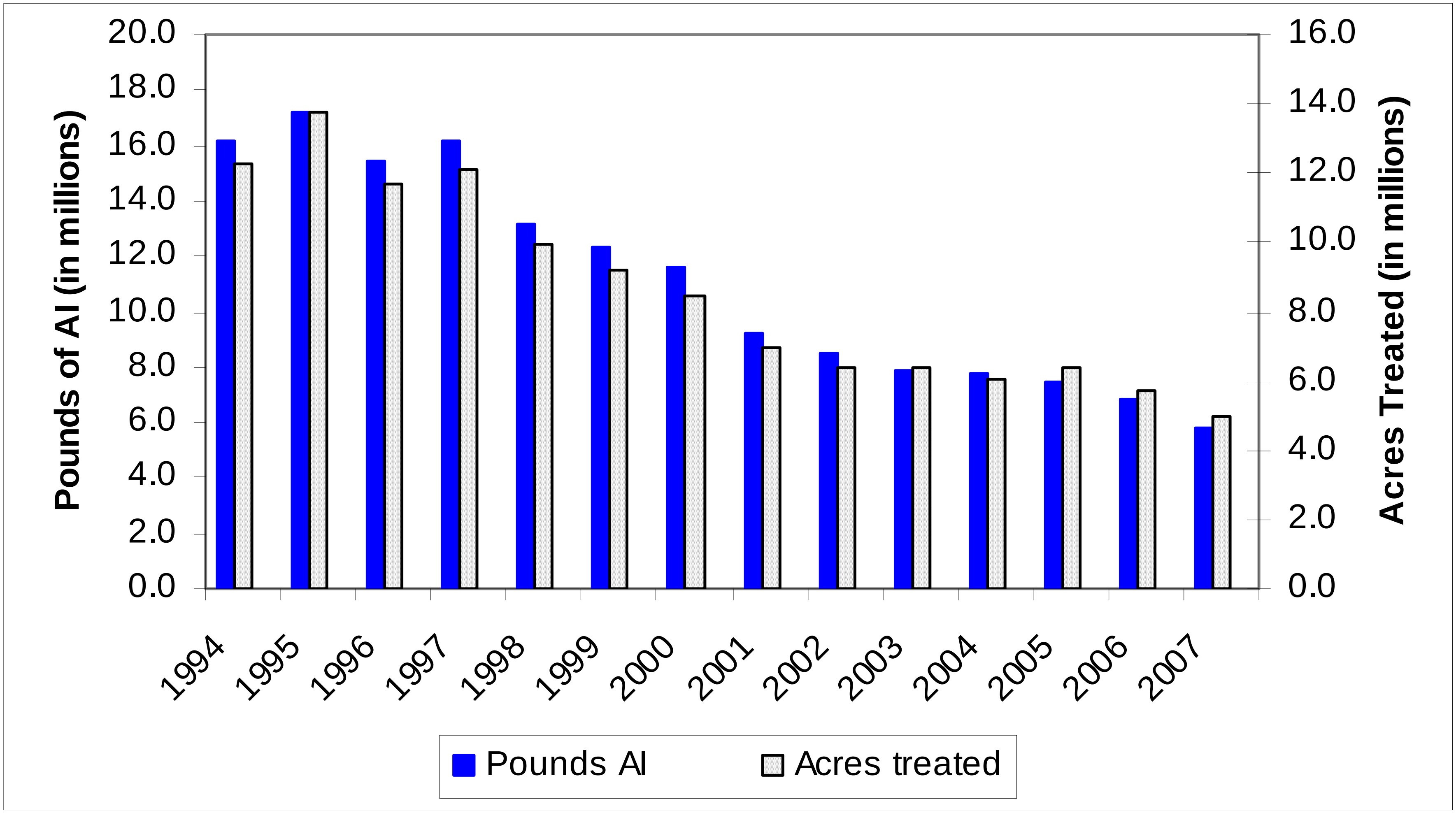
Table 5B *(cont.)***.** *The reported cumulative acres treated with cholinesterase-inhibiting pesticides. These pesticides are organophosphate and carbamate active ingredients.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
MALATHION	410,658	383,121	403,646	324,031	290,933	314,683	287,467	249,319	226,729	218,196	250,771
METHAMIDOPHOS	263,816	290,061	158,079	101,494	63,046	37,012	41,506	38,874	45,835	37,585	23,022
METHIDATHION	200,528	129,358	115,249	71,992	64,785	48,554	38,516	45,281	37,751	34,786	37,301
METHIOCARB	2,906	3,523	2,369	2,719	1,866	2,000	1,757	3,064	2,501	3,072	2,647
METHOMYL	1,376,868	1,118,188	880,910	893,568	627,264	510,006	615,669	437,673	612,989	529,347	502,016
METHYL PARATHION	125,638	128,675	119,315	43,773	39,449	37,514	51,252	48,640	49,771	51,184	45,173
MEVINPHOS	595	1,094	753	528	143	160	192	3	215	8	198
MEVINPHOS, OTHER RELATED	595	1,094	753	528	143	160	192	3	215	8	198
MEXACARBATE	19	15	1	0	0	0	0	0	0	0	0
MOLINATE	317,680	267,078	246,084	276,315	190,488	222,044	134,120	89,593	40,535	33,045	17,476
NALED	606,265	251,044	279,898	244,677	234,184	155,295	148,776	110,218	191,906	159,851	107,763
O,O-DIMETHYL O-(4-NITRO-M-TOLYL) PHOSPHOROTHIOATE	0	0	0	0	0	0	0	0	0	0	0
OXAMYL	176,793	225,380	177,183	179,048	100,294	98,313	115,275	135,832	178,893	137,541	60,773
OXYDEMETON-METHYL	244,056	186,964	253,281	225,990	200,171	193,453	189,015	206,751	173,480	164,094	161,756
PARATHION	2,071	2,592	1,976	4,025	2,977	7,026	1,006	392	717	713	413
PEBULATE	69,381	64,501	74,697	51,205	15,122	21,491	10,680	4,319	297	35	163
PHENMEDIPHAM	62,449	58,649	73,905	61,975	35,477	34,452	38,265	38,964	38,675	33,208	26,762
PHORATE	106,427	109,759	81,724	71,407	63,160	58,391	50,290	47,488	35,938	27,676	23,557
PHOSALONE	64	5	0	10	0	0	0	0	0	0	0
PHOSMET	236,611	312,707	253,234	219,707	189,517	159,065	128,037	209,843	170,683	200,531	142,712
POTASSIUM DIMETHYL DITHIO CARBAMATE	0	0	0	0	0	2	6	0	0	0	0
PROFENOFOS	162,204	44,641	46,250	46,617	23,700	25,997	13,599	11,657	25,096	20,563	4,509
PROPAMOCARB HYDROCHLORIDE	14,677	81,050	6,851	17,696	2,625	1,041	22	10	0	187	144,949
PROPETAMPHOS	0	0	0	0	0	0	0	0	0	0	0
PROPOXUR	73	45	39	26	4	23	1	7	8	<1	0
S,S,S-TRIBUTYL PHOSPHOROTRITHIOATE	437,505	305,306	245,470	282,844	187,153	129,570	158,604	133,535	74,538	52,330	31,408

***Table 5B** (cont.). The reported cumulative acres treated with cholinesterase-inhibiting pesticides. These pesticides are organophosphate and carbamate active ingredients.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
SODIUM DIMETHYL DITHIO CARBAMATE	0	253	20	0	60	0	0	0	0	0	2
SULFOTEP	251	241	224	168	314	57	3	8	9	0	5
SULPROFOS	83	80	0	0	0	0	0	0	0	0	0
TETRACHLORVINPHOS	356	3,109	1,543	575	232	125	6	291	1,518	1	200
THIOBENCARB	227,658	187,295	186,341	252,506	169,056	222,606	154,952	136,132	118,786	79,109	74,271
THIODICARB	223,154	155,440	83,796	50,604	13,382	8,258	12,113	3,684	2,965	1,293	1,196
TRICHLORFON	149	1,071	97	70	51	19	8	0	0	0	0
Grand Total	12,202,583	10,003,653	9,302,775	8,553,477	6,995,585	6,428,383	6,431,687	6,072,373	6,400,458	5,756,463	5,000,794

Figure 3. *Use trends of cholinesterase-inhibiting pesticides, which includes pesticides with organophosphate and carbamate active ingredients. Reported pounds of active ingredient (AI) applied include both agricultural and reportable non-agricultural applications. The reported cumulative acres treated include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*



USE TRENDS OF PESTICIDES ON DPR'S GROUND WATER PROTECTION LIST

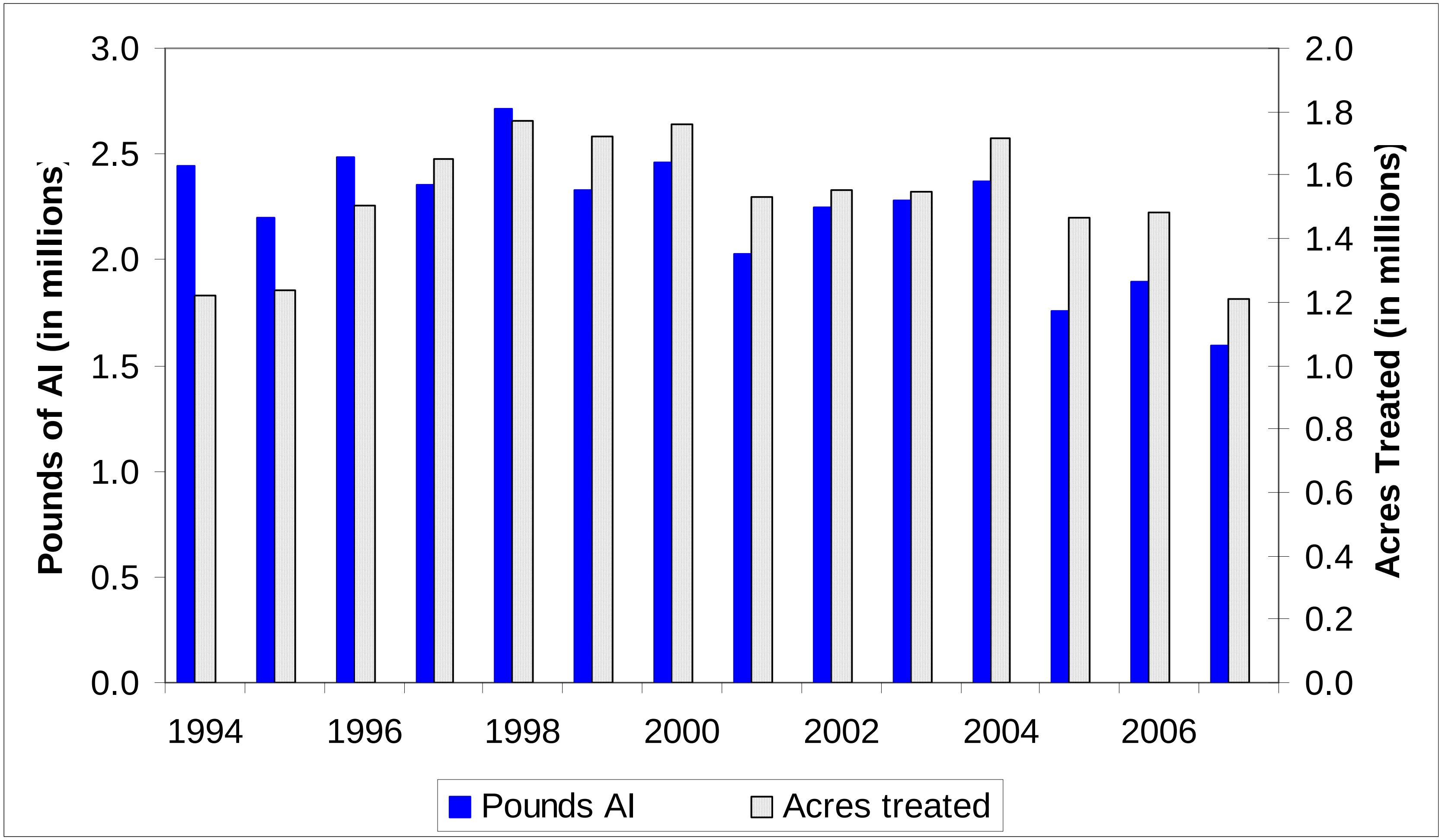
Table 6A. *The reported pounds of pesticides on the "a" part of DPR's groundwater protection list. These pesticides are the active ingredients listed in the California Code of Regulations, Title 3, Division 6, Chapter 4, Subchapter 1, Article 1, Section 6800(a). Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ATRAZINE	48,512	57,006	72,167	61,323	62,879	59,292	58,248	38,776	33,015	35,291	27,546
ATRAZINE, OTHER RELATED	1,025	1,289	1,509	1,282	1,314	1,237	1,213	812	695	732	571
BENTAZON, SODIUM SALT	1,907	1,757	1,876	1,210	393	1,045	1,216	1,370	2,272	2,633	4,485
BROMACIL	82,540	84,645	75,613	68,235	56,128	55,821	56,427	56,476	48,929	62,774	85,097
BROMACIL, LITHIUM SALT	9,141	4,686	4,162	4,478	3,217	4,016	3,025	1,801	1,059	2,529	1,172
DIURON	1,228,277	1,504,731	1,188,553	1,351,232	1,105,536	1,302,603	1,344,596	1,398,123	955,983	1,051,245	859,909
NORFLURAZON	212,621	265,886	286,214	259,328	208,667	187,927	146,408	139,960	94,037	107,763	77,615
PROMETON	20	22	4	28	2	21	2	20	3	8	3
SIMAZINE	766,185	795,103	696,768	713,757	585,400	632,901	670,916	729,850	623,806	635,486	538,627
Grand Total	2,350,228	2,715,125	2,326,865	2,460,873	2,023,534	2,244,862	2,282,050	2,367,187	1,759,800	1,898,460	1,595,024

Table 6B. *The reported cumulative acres treated with pesticides on the "a" part of DPR's groundwater protection list. These pesticides are the active ingredients listed in the California Code of Regulations, Title 3, Division 6, Chapter 4, Subchapter 1, Article 1, Section 6800(a). Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ATRAZINE	27,257	37,556	39,881	35,757	33,376	28,589	29,966	26,989	24,085	21,834	17,382
ATRAZINE, OTHER RELATED	27,257	37,529	39,876	35,757	33,376	28,589	29,966	26,989	24,085	21,834	17,382
BENTAZON, SODIUM SALT	2,010	1,904	1,968	1,502	432	1,094	987	1,279	2,218	2,217	4,215
BROMACIL	58,722	57,136	53,861	42,568	30,149	29,585	27,974	26,204	21,886	19,132	20,455
BROMACIL, LITHIUM SALT	0	40	40	30	0	0	0	0	0	0	0
DIURON	819,993	865,246	849,482	865,974	788,559	796,904	843,897	971,628	894,073	886,032	701,845
NORFLURAZON	186,991	214,144	217,178	230,848	192,305	161,746	125,619	125,802	81,589	91,035	74,085
PROMETON	8	85	18	51	0	174	49	171	6	168	4
SIMAZINE	613,237	647,117	611,626	620,696	515,419	561,349	546,678	588,016	463,244	480,142	411,719
Grand Total	1,735,475	1,860,757	1,813,930	1,833,183	1,593,616	1,608,031	1,605,137	1,767,075	1,511,185	1,522,393	1,247,088

Figure 4. *Use trends of pesticides on DPR's groundwater protection list. These pesticides are the active ingredients listed in the California Code of Regulations, Title 3, Division 6, Chapter 4, Subchapter 1, Article 1, Section 6800(a). Reported pounds of active ingredient (AI) applied include both agricultural and reportable non-agricultural applications. The reported cumulative acres treated include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*



USE TRENDS OF PESTICIDES ON DPR'S TOXIC AIR CONTAMINATS LIST

Table 7A. *The reported pounds of pesticides on DPR's toxic air contaminants list applied in California. These pesticides are the active ingredients listed in the California Code of Regulations, Title 3, Division 6, Chapter 4, Subchapter 1, Article 1, Section 6860. Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1,3-DICHLOROPROPENE	2,457,690	3,011,057	3,321,147	4,465,422	4,141,173	5,413,807	7,003,873	8,945,145	9,355,308	8,733,270	9,594,517
2,4-D	10,227	3,868	3,061	2,096	1,787	1,733	1,732	1,796	1,552	1,735	2,715
2,4-D, 2-ETHYLHEXYL ESTER	1,313	13,750	72,225	13,911	13,706	15,801	19,715	21,130	26,632	21,062	15,002
2,4-D, ALKANOLAMINE SALTS (ETHANOL AND ISOPROPANOL AMINES)	25,684	29,576	15,992	6,737	674	452	1,357	624	458	16	29
2,4-D, BUTOXYETHANOL ESTER	13,344	12,867	5,628	6,194	5,336	3,556	3,812	4,782	8,190	1,720	843
2,4-D, BUTOXYPROPYL ESTER	13	31	5	4	3	0	0	0	0	<1	0
2,4-D, BUTYL ESTER	0	2,180	8	0	<1	593	2	0	10	15	9
2,4-D, DIETHANOLAMINE SALT	24,809	14,939	5,843	13,004	6,667	8,080	8,831	5,022	3,961	2,947	4,025
2,4-D, DIMETHYLAMINE SALT	430,652	422,824	356,770	426,848	395,537	425,706	511,519	470,871	454,762	438,864	395,887
2,4-D, DODECYLAMINE SALT	58	75	730	0	257	322	0	0	0	0	0
2,4-D, HEPTYLAMINE SALT	0	0	46	0	0	<1	0	0	0	0	0
2,4-D, ISOOCTYL ESTER	60,356	47,016	17,387	8,505	15,828	12,380	12,366	10,039	10,314	10,627	11,572
2,4-D, ISOPROPYL ESTER	6,543	7,533	6,879	7,886	6,584	7,833	8,319	9,066	10,825	10,559	10,022
2,4-D, N-OLEYL-1,3-PROPYLENEDIAMINE SALT	0	3	7	11	0	0	0	0	0	0	0
2,4-D, PROPYL ESTER	1,575	999	1,822	783	391	634	326	472	382	398	212
2,4-D, TETRADECYLAMINE SALT	13	17	170	0	60	75	0	0	0	0	0
2,4-D, TRIETHYLAMINE SALT	34,610	5,688	2,344	1,102	634	426	435	386	203	1,614	383
2,4-D, TRIISOPROPANOLAMINE SALT	0	0	0	0	0	565	550	742	672	1,133	985
2,4-D, TRIISOPROPYLAMINE SALT	3	5	6	0	5	9	6	0	0	458	636

Table 7A *(cont.)****.*** *The reported pounds of pesticides on DPR's toxic air contaminants list applied in California.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ACROLEIN	341,245	264,207	328,238	290,180	233,928	282,590	272,733	211,014	257,189	246,659	201,112
ALUMINUM PHOSPHIDE	90,585	68,919	123,633	119,776	99,856	169,218	119,512	131,303	135,751	150,555	104,729
ARSENIC ACID	59,835	52,558	48,029	11,906	12,023	4,976	318	223	68	3	0
ARSENIC PENTOXIDE	64,372	50,899	245,238	91,267	259,400	194,650	129,889	12,705	180,505	474,517	7,805
ARSENIC TRIOXIDE	<1	1	1	<1	<1	<1	<1	<1	<1	<1	<1
CAPTAN	801,899	1,542,556	966,020	643,826	399,146	395,575	498,445	370,418	468,413	508,939	449,328
CAPTAN, OTHER RELATED	19,341	35,925	22,219	14,654	9,014	9,020	11,309	8,271	10,540	11,748	10,325
CARBARYL	754,659	427,546	388,144	364,060	286,199	256,098	205,102	240,135	190,633	157,000	142,010
CHLORINE	509,787	431,546	628,546	654,541	296,469	502,944	619,735	516,546	613,837	730,986	857,144
CHROMIC ACID	89,931	71,109	343,543	128,642	363,225	272,300	182,022	17,753	252,176	662,927	10,904
DAZOMET	15,884	15,246	12,409	10,981	44,299	45,020	34,848	58,492	48,263	34,310	37,537
DDVP	13,636	13,998	12,325	12,680	12,833	8,477	3,446	3,807	4,914	6,577	6,376
ETHYLENE OXIDE	0	31	2	6	3	0	0	0	0	0	2
FORMALDEHYDE	416,823	349,785	111,714	55,300	28,612	14,035	18,690	111,151	48,968	73,392	47,733
HYDROGEN CHLORIDE	129	762	11,067	3,316	4,276	4,256	3,222	2,529	14,755	2,464	1,470
LINDANE	5,511	6,330	4,842	4,746	2,388	1,630	908	775	40	379	2
MAGNESIUM PHOSPHIDE	3,931	4,132	3,540	3,550	2,492	4,824	2,844	2,621	3,156	3,931	4,984
MANCOZEB	528,159	988,344	630,987	610,903	428,738	396,912	535,600	379,539	642,444	660,848	408,301
MANEB	1,082,071	1,596,466	1,045,567	1,202,545	816,548	851,819	1,026,804	954,085	1,122,684	1,175,939	1,055,347
META-CRESOL	6	8	11	14	1	1	1	2	1	<1	<1
METAM-SODIUM	15,401,098	14,120,788	17,273,325	13,143,954	12,562,799	15,116,768	14,822,689	14,698,228	12,991,279	11,422,382	9,897,299
METHANOL	0	0	3	<1	0	0	0	0	0	0	0
METHIDATHION	309,314	178,451	177,105	98,129	93,521	68,389	54,398	61,204	48,857	56,691	45,633
METHOXYCHLOR	358	566	16	26	41	144	3	1	13	130	6
METHOXYCHLOR, OTHER RELATED	44	11	<1	0	<1	0	0	<1	<1	0	0
METHYL BROMIDE	16,711,308	14,314,983	15,355,845	10,900,339	6,625,336	7,008,644	7,289,389	7,105,612	6,504,576	6,541,159	6,438,044
METHYL ISOTHIOCYANATE	353	220	616	3,323	2,871	3,512	547	1,357	1,549	1,073	388
METHYL PARATHION	153,737	158,248	157,439	75,075	59,620	53,955	73,365	71,525	78,821	84,785	75,368
NAPHTHALENE	1	333	<1	0	0	<1	23	0	<1	0	0
PARA-DICHLOROBENZENE	3	219	86	4	11	1	25	10	139	0	15

***Table 7A** (cont.)**.** The reported pounds of pesticides on DPR's toxic air contaminants list applied in California.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PARATHION	5,187	5,762	4,041	3,581	2,589	3,205	611	240	855	1,542	479
PCNB	89,548	88,036	67,424	62,809	50,937	43,450	38,989	34,176	37,942	32,786	30,663
PCP, OTHER RELATED	1	2	11	54	2	2	<1	<1	<1	3	2
PCP, SODIUM SALT	0	2	0	0	<1	0	0	0	0	0	<1
PCP, SODIUM SALT, OTHER RELATED	0	0	0	0	0	0	0	0	0	0	<1
PENTACHLOROPHENOL	8	33	92	466	14	17	3	2	3	27	22
PHENOL	8	44	12	20	30	0	<1	9	71	<1	0
PHOSPHINE	0	0	0	0	44	901	1,141	1,664	2,688	2,774	5,262
PHOSPHORUS	14	12	9	22	3	1	1	1	<1	2	<1
POTASSIUM N-METHYLDITHIOCARBAMATE	2,283	9,143	0	105,364	464,882	1,175,168	1,911,698	851,181	1,994,072	3,202,884	3,785,436
POTASSIUM PERMANGANATE	0	243	0	0	0	0	0	0	0	0	0
PROPOXUR	1,760	1,604	1,735	2,145	611	450	306	223	220	211	190
PROPYLENE OXIDE	198,559	198,595	172,556	118,381	99,727	99,674	99,396	151,484	147,324	133,028	109,936
S,S,S-TRIBUTYL PHOSPHOROTRITHIOATE	624,781	438,038	345,842	396,827	257,062	190,149	233,640	179,690	100,210	78,084	45,757
SODIUM CYANIDE	2,176	3,263	1,098	2,178	2,437	2,542	2,808	2,865	3,086	2,853	2,670
SODIUM DICHROMATE	182,185	122,647	32,699	122	329	633	217	0	0	0	0
SODIUM TETRATHIOCARBONATE	799,092	900,991	688,701	596,028	375,487	352,342	212,308	259,542	330,886	171,194	386,876
SULFURYL FLUORIDE	1,938,835	2,173,338	2,790,343	2,428,345	2,585,680	3,047,882	3,138,687	3,270,698	3,394,126	2,880,853	2,151,450
TRIFLURALIN	1,193,924	1,220,106	1,261,482	1,162,157	934,018	1,091,597	1,061,631	1,023,142	1,027,804	1,041,805	898,976
XYLENE	8,511	5,362	4,847	4,292	9,544	2,680	4,349	2,109	1,598	1,418	1,173
ZINC PHOSPHIDE	2,343	1,200	5,447	1,609	1,116	981	1,253	1,924	2,371	3,794	3,215
Grand Total	45,490,123	43,435,036	47,076,920	38,280,647	32,016,805	37,569,402	40,185,748	40,208,334	40,536,097	39,785,069	37,260,805

Table 7B. *The reported cumulative acres treated in California with pesticides on DPR's toxic air contaminants list. These pesticides are the active ingredients listed in the California Code of Regulations, Title 3, Division 6, Chapter 4, Subchapter 1, Article 1, Section 6860. Use includes primarily agricultural applications. The grand total for acres treated is less than the sum of acres treated for all active ingredients because some products contain more than one active ingredient. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1,3-DICHLOROPROPENE	22,193	27,059	29,430	33,244	30,817	42,172	48,944	56,618	51,486	49,885	53,937
2,4-D	50,709	11,649	7,791	5,134	3,952	2,304	2,562	3,377	1,466	2,824	7,220
2,4-D, 2-ETHYLHEXYL ESTER	729	6,867	7,624	8,460	6,919	10,260	22,426	20,642	21,360	15,303	8,362
2,4-D, ALKANOLAMINE SALTS (ETHANOL AND ISOPROPANOL AMINES)	20,055	22,117	11,843	5,711	359	264	630	1,475	403	6	23
2,4-D, BUTOXYETHANOL ESTER	13,504	13,810	7,198	7,158	5,633	2,655	2,539	3,835	2,951	1,600	1,297
2,4-D, BUTOXYPROPYL ESTER	51	93	37	5	9	0	0	0	0	0	0
2,4-D, BUTYL ESTER	0	307	37	24	1	101	0	0	8	1	10
2,4-D, DIETHANOLAMINE SALT	88,149	58,239	23,884	49,377	27,705	36,290	39,046	22,729	18,739	13,826	13,339
2,4-D, DIMETHYLAMINE SALT	527,870	477,967	411,858	496,014	475,796	491,242	595,235	553,369	567,143	523,912	487,361
2,4-D, DODECYLAMINE SALT	76	82	1,481	0	262	276	0	0	0	0	0
2,4-D, HEPTYLAMINE SALT	0	0	29	0	0	0	0	0	0	0	0
2,4-D, ISOOCTYL ESTER	35,045	29,179	14,449	5,711	16,375	6,964	9,476	7,502	6,532	7,638	7,143
2,4-D, ISOPROPYL ESTER	87,492	101,141	100,837	103,938	88,849	108,908	116,840	117,870	144,377	146,090	137,043
2,4-D, N-OLEYL-1,3-PROPYLENEDIAMINE SALT	0	2	3	0	0	0	0	0	0	0	0
2,4-D, PROPYL ESTER	21,479	14,356	15,542	11,278	5,200	7,468	5,509	8,680	5,261	5,660	3,348
2,4-D, TETRADECYLAMINE SALT	76	82	1,481	0	262	276	0	0	0	0	0
2,4-D, TRIETHYLAMINE SALT	46,600	7,381	2,638	1,391	1,257	688	1,035	677	243	815	473
2,4-D, TRIISOPROPANOLAMINE SALT	0	0	0	0	0	0	5	209	396	393	108
2,4-D, TRIISOPROPYLAMINE SALT	0	0	0	0	0	0	0	0	0	0	204

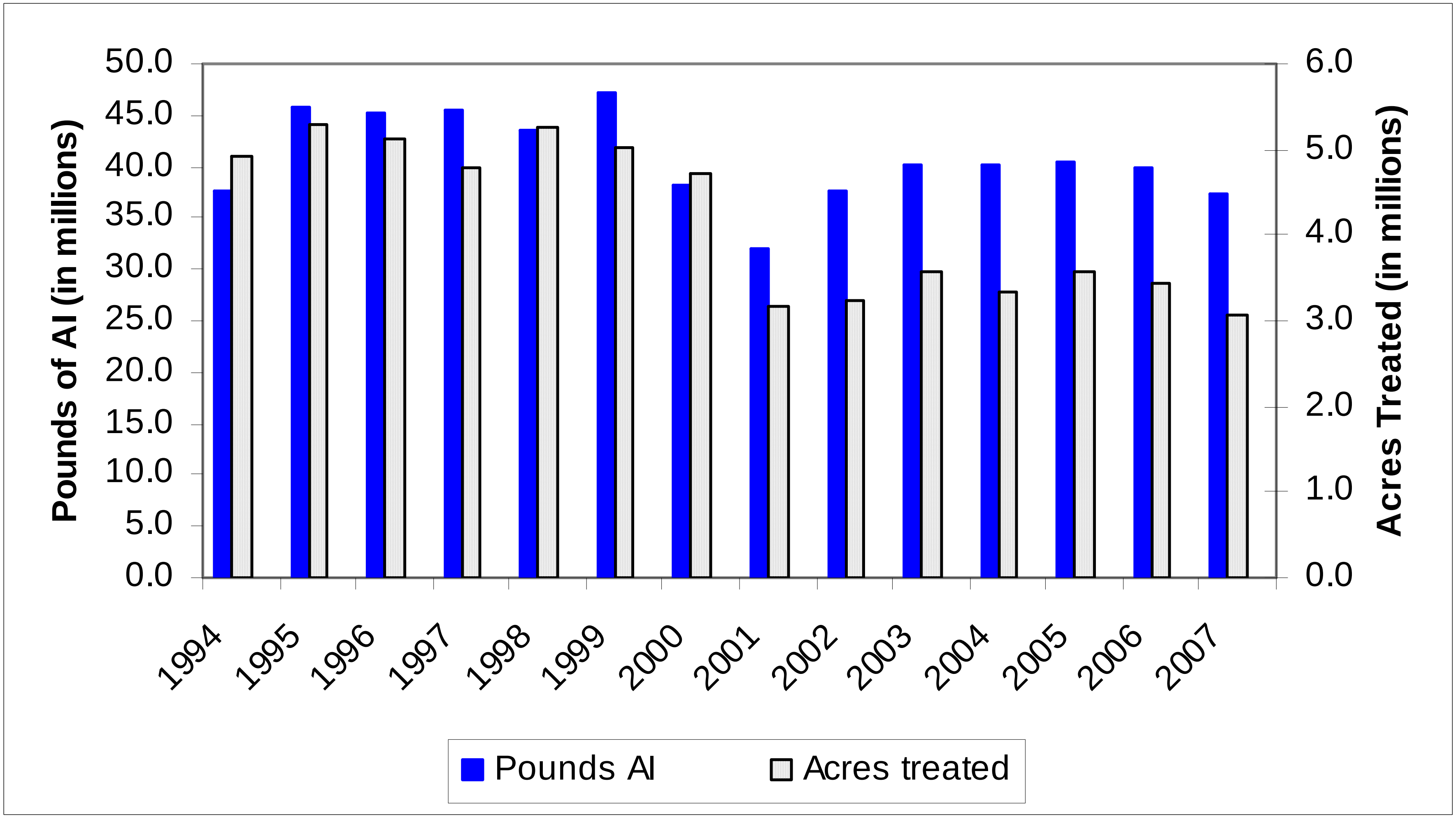
***Table 7B** (cont.)**.** The reported cumulative acres treated in California with pesticides on DPR's toxic air contaminants list.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ACROLEIN	1,514	292	3,981	873	1,409	2,206	642	575	73	18	141
ALUMINUM PHOSPHIDE	64,617	74,441	76,332	64,112	67,422	70,367	73,869	74,762	63,289	79,951	84,790
ARSENIC ACID	0	0	0	0	0	0	0	0	0	0	0
ARSENIC PENTOXIDE	0	0	0	709,893	56	0	0	48	0	0	0
ARSENIC TRIOXIDE	0	0	0	0	0	1	<1	0	1	0	0
CAPTAN	347,631	602,684	404,731	309,989	215,969	215,412	271,140	211,028	252,040	262,936	215,787
CAPTAN, OTHER RELATED	347,235	602,585	404,511	309,337	215,958	215,362	270,968	209,571	251,846	262,860	215,152
CARBARYL	292,721	197,664	216,991	196,464	147,612	106,616	97,811	103,261	99,086	87,791	97,016
CHLORINE	1,764	1,329	46,611	37,220	95	150	650	2,137	0	431	1,201
CHROMIC ACID	0	0	0	709,893	56	0	0	0	0	0	0
DAZOMET	1,099	3,589	243	223	224	136	326	298	113	124	700
DDVP	2,596	3,692	2,180	2,336	3,954	4,327	2,576	1,637	7,445	1,526	2,733
ETHYLENE OXIDE	0	194	31	41	0	0	0	0	0	0	0
FORMALDEHYDE	12	126	123	47	53	33	18	23	2	265	57
HYDROGEN CHLORIDE	0	16	0	0	27	590	273	1	17	18	4
LINDANE	36,573	32,650	20,930	14,640	13,832	8,010	8,828	9,437	557	9	1
MAGNESIUM PHOSPHIDE	26	184	616,017	46	373	7	167	1	23	29	6
MANCOZEB	284,136	683,756	387,300	363,305	228,275	197,196	276,093	194,219	370,266	348,360	212,353
MANEB	624,121	941,308	629,897	611,756	535,105	554,904	660,011	601,360	730,254	675,941	655,215
META-CRESOL	3,488	1,407	657	3,142	517	267	244	288	164	50	54
METAM-SODIUM	198,395	154,309	186,300	146,847	125,417	141,415	142,406	128,427	97,562	102,451	77,909
METHANOL	0	0	0	14	0	0	0	0	0	0	0
METHIDATHION	200527.6	129357.76	115248.61	71991.99	64784.66	48554.11	38516.35	45280.52	37751.03	34786.42	37300.54
METHOXYCHLOR	131	194	140	197	88	24	0	44	26	395	43
METHOXYCHLOR, OTHER RELATED	52	5	0	0	0	0	0	<1	0	0	0
METHYL BROMIDE	113,195	90,107	102,115	75,832	60,892	53,140	55,254	57,385	45,700	50,677	45,675
METHYL ISOTHIOCYANATE	0	47	100	0	0	0	0	0	0	0	0
METHYL PARATHION	125,638	128,675	119,315	43,773	39,449	37,514	51,252	48,640	49,771	51,184	45,173
NAPHTHALENE	0	0	0	0	0	20	0	0	2	0	0
PARA-DICHLOROBENZENE	0	10	0	0	0	0	0	0	0	0	0
PARATHION	2,071	2,592	1,976	4,025	2,977	7,026	1,006	392	717	713	413

***Table 7B** (cont.). The reported cumulative acres treated in California with pesticides on DPR's toxic air contaminants list.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PCNB	29,169	39,090	28,324	28,649	25,832	9,533	7,759	3,817	3,001	1,496	1,764
PCP, OTHER RELATED	4	15	0	59	38	0	0	20	3	1	10
PCP, SODIUM SALT	0	20	0	0	0	0	0	0	0	0	0
PCP, SODIUM SALT, OTHER RELATED	0	0	0	0	0	0	0	0	0	0	0
PENTACHLOROPHENOL	4	190	0	59	38	0	0	20	3	1	10
PHENOL	37	275	459	5	501	0	25	310	239	0	0
PHOSPHINE	0	0	0	0	0	0	0	349	22	23	3
PHOSPHORUS	790	965	5,113	2,847	252	0	0	0	23	0	10
POTASSIUM N-METHYLDITHIOCARBAMATE	21	50	0	534	2,321	9,073	12,887	10,229	19,670	27,299	42,988
POTASSIUM PERMANGANATE	0	20	0	0	0	0	0	0	0	0	0
PROPOXUR	73	45	39	26	4	23	1	7	8	<1	0
PROPYLENE OXIDE	<1	0	573	0	0	<1	0	22	185	20	0
S,S,S-TRIBUTYL PHOSPHOROTRITHIOATE	437,505	305,306	245,470	282,844	187,153	129,570	158,604	133,535	74,538	52,330	31,408
SODIUM CYANIDE	84,800	53,285	0	0	0	0	0	0	0	0	0
SODIUM DICHROMATE	0	0	0	0	0	0	0	0	0	0	0
SODIUM TETRATHIOCARBONATE	35,473	34,488	24,947	21,002	13,574	11,559	6,832	8,497	7,977	6,170	11,485
SULFURYL FLUORIDE	12	0	17	4	0	0	50	2	0	78	9
TRIFLURALIN	1,131,033	1,083,219	1,159,648	1,039,472	800,893	944,407	903,654	920,545	886,258	901,629	772,127
XYLENE	13,568	11,327	3,325	6,208	9,665	4,533	7,502	3,375	2,722	1,824	2,020
ZINC PHOSPHIDE	26,756	18,833	38,101	16,349	11,069	7,234	8,387	14,150	9,038	15,284	9,301
Grand Total	5,320,812	5,968,670	5,477,907	5,801,498	3,439,281	3,489,077	3,901,998	3,580,675	3,830,755	3,734,618	3,282,725

Figure 5. *Use trends of pesticides on DPR's toxic air contaminants list. These pesticides are the active ingredients listed in the California Code of Regulations, Title 3, Division 6, Chapter 4, Subchapter 1, Article 1, Section 6860. Reported pounds of active ingredient (AI) applied include both agricultural and reportable non-agricultural applications. The reported cumulative acres treated include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*



USE TRENDS OF FUMIGANT PESTICIDES

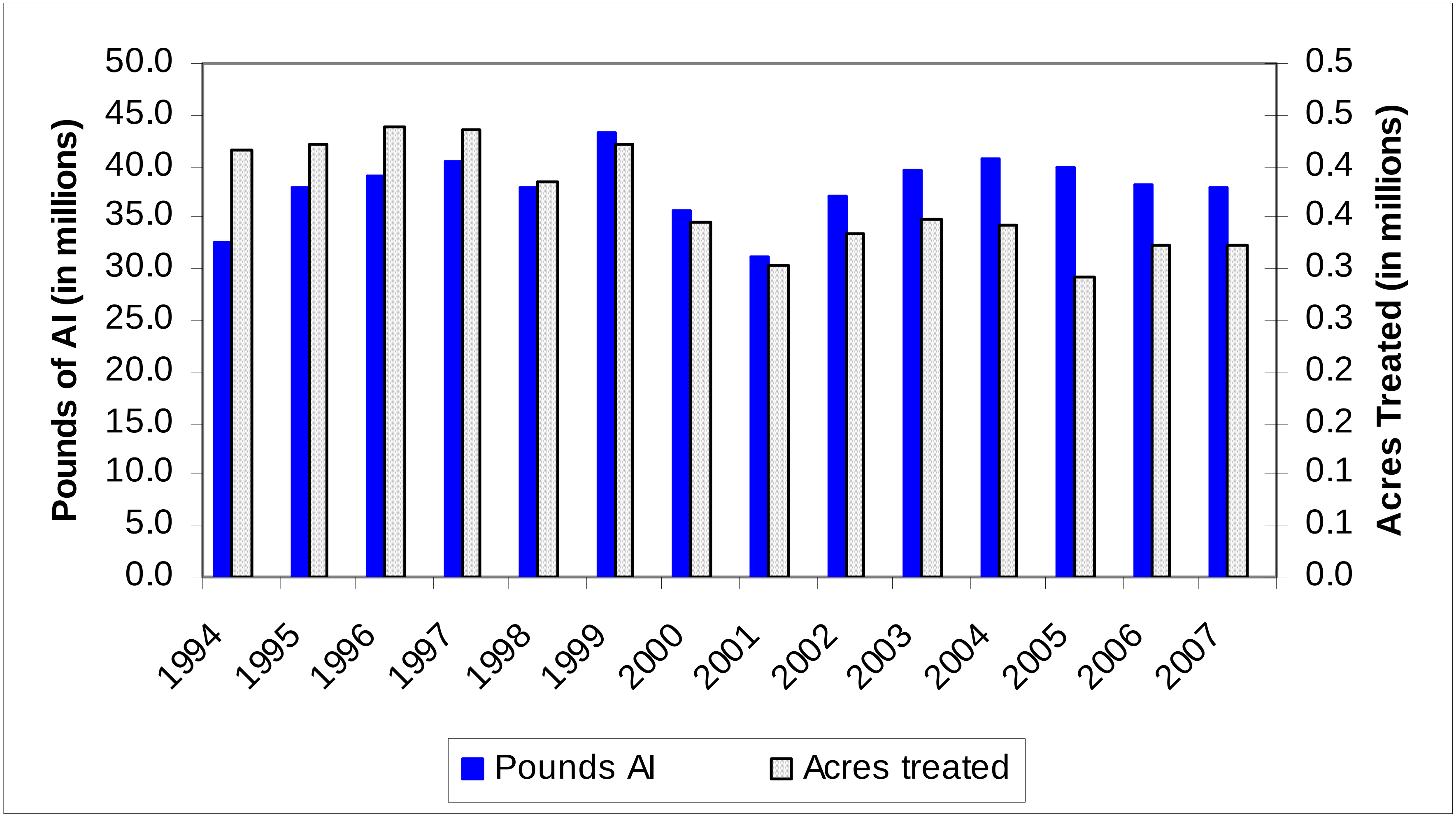
Table 8A. *The reported pounds of fumigant pesticides used. Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1,2-DICHLOROPROPANE, 1,3-DICHLOROPROPENE AND RELATED C3 COMPOUNDS	12,375	243	927	87	110	331	393	22	0	182	10,532
1,3-DICHLOROPROPENE	2,457,690	3,011,057	3,321,147	4,465,422	4,141,173	5,413,807	7,003,873	8,945,145	9,355,308	8,733,270	9,594,517
ALUMINUM PHOSPHIDE	90,585	68,919	123,633	119,776	99,856	169,218	119,512	131,303	135,751	150,555	104,729
CARBON TETRACHLORIDE	3	38	<1	111	2	5	1	<1	0	0	180
CHLOROPICRIN	2,781,188	3,070,641	3,657,187	3,799,025	4,276,413	4,670,246	4,926,181	5,139,168	4,869,572	5,035,246	5,494,541
DAZOMET	15,884	15,246	12,409	10,981	44,299	45,020	34,848	58,492	48,263	34,310	37,537
ETHYLENE DIBROMIDE	1	5	<1	147	2,593	<1	<1	3	0	0	3
ETHYLENE DICHLORIDE	8	1	<1	3	4	11	0	1	0	0	0
METAM-SODIUM	15,401,098	14,120,788	17,273,325	13,143,954	12,562,799	15,116,768	14,822,689	14,698,228	12,991,279	11,422,382	9,897,299
METHYL BROMIDE	16,711,308	14,314,983	15,355,845	10,900,339	6,625,336	7,008,644	7,289,389	7,105,612	6,504,576	6,541,159	6,438,044
POTASSIUM N-METHYLDITHIOCARBAMATE	2,283	9,143	0	105,364	464,882	1,175,168	1,911,698	851,181	1,994,072	3,202,884	3,785,436
PROPYLENE OXIDE	198,559	198,595	172,556	118,381	99,727	99,674	99,396	151,484	147,324	133,028	109,936
SODIUM TETRATHIOCARBONATE	799,092	900,991	688,701	596,028	375,487	352,342	212,308	259,542	330,886	171,194	386,876
SULFURYL FLUORIDE	1,938,835	2,173,338	2,790,343	2,428,345	2,585,680	3,047,882	3,138,687	3,270,698	3,394,126	2,880,853	2,151,450
Grand Total	40,408,910	37,883,987	43,396,073	35,687,963	31,278,361	37,099,116	39,558,976	40,610,880	39,771,157	38,305,064	38,011,080

Table 8B. *The reported cumulative acres treated with fumigant pesticides. Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1,2-DICHLOROPROPANE, 1,3-DICHLOROPROPENE AND RELATED C3 COMPOUNDS	164	70	207	136	370	44	45	9	0	32	108
1,3-DICHLOROPROPENE	22,193	27,059	29,430	33,244	30,817	42,172	48,944	56,618	51,486	49,885	53,937
ALUMINUM PHOSPHIDE	64,617	74,441	76,332	64,112	67,422	70,367	73,869	74,762	63,289	79,951	84,790
CARBON TETRACHLORIDE	0	23	0	20	0	0	0	0	0	0	0
CHLOROPICRIN	52,413	59,694	61,323	58,132	60,083	53,786	51,791	53,737	50,272	51,191	51,512
DAZOMET	1,099	3,589	243	223	224	136	326	298	113	124	700
ETHYLENE DIBROMIDE	0	20	<1	21	52	0	0	0	0	0	0
ETHYLENE DICHLORIDE	0	0	0	0	0	0	0	0	0	0	0
METAM-SODIUM	198,395	154,309	186,300	146,847	125,417	141,415	142,406	128,427	97,562	102,451	77,909
METHYL BROMIDE	113,195	90,107	102,115	75,832	60,892	53,140	55,254	57,385	45,700	50,677	45,675
POTASSIUM N-METHYLDITHIOCARBAMATE	21	50	0	534	2,321	9,073	12,887	10,229	19,670	27,299	42,988
PROPYLENE OXIDE	<1	0	573	0	0	<1	0	22	185	20	0
SODIUM TETRATHIOCARBONATE	35,473	34,488	24,947	21,002	13,574	11,559	6,832	8,497	7,977	6,170	11,485
SULFURYL FLUORIDE	12	0	17	4	0	0	50	2	0	78	9
Grand Total	487,582	443,849	481,486	400,106	361,174	381,693	392,404	389,985	336,254	367,877	369,112

Figure 6. *Use trends of fumigant pesticides. Reported pounds of active ingredient (AI) applied include both agricultural and reportable non-agricultural applications. The reported cumulative acres treated include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*



USE TRENDS OF OIL PESTICIDES

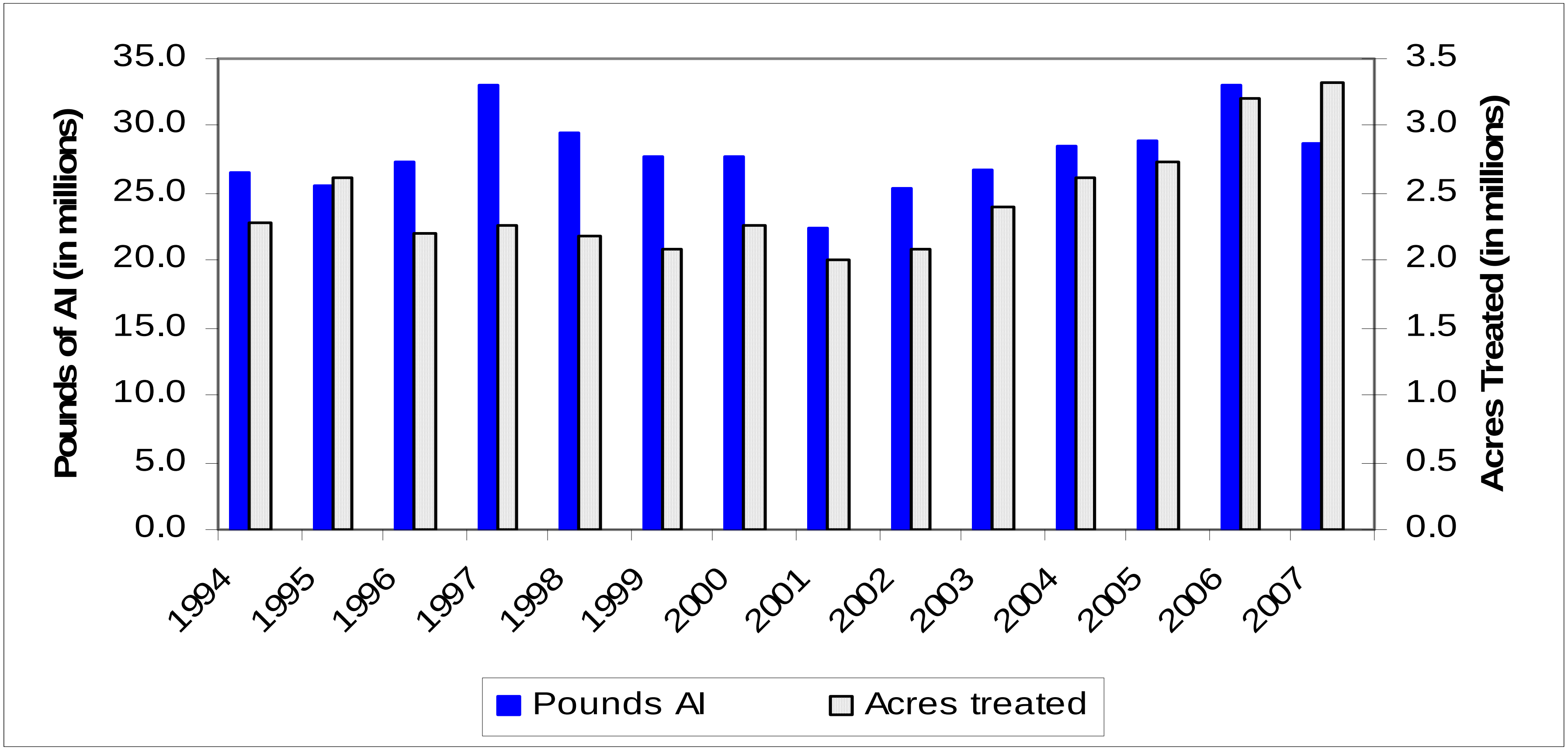
Table 9A. *The reported pounds of oil pesticides. As a broad group, oil pesticides and other petroleum distillates are on U.S. EPA's list of B2 carcinogens or the State's Proposition 65 list of chemicals "known to cause cancer." However, these classifications do not distinguish among oil pesticides that may not qualify as carcinogenic due to their degree of refinement. Many such oil pesticides also serve as alternatives to high-toxicity chemicals. For this reason, oil pesticide data was classified separately in this report. Use includes both agricultural and reportable non-agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
COAL TAR HYDROCARBONS	0	0	0	0	50	<1	0	0	0	0	0
HYDROTREATED PARAFFINIC SOLVENT	97,382	88,353	79,480	102,361	189,538	206,552	283,768	320,019	244,114	252,134	274,049
ISOPARAFFINIC HYDROCARBONS	39,007	81,780	75,575	65,032	45,763	22,479	23,707	30,125	31,183	18,997	16,859
KEROSENE	101,373	90,108	70,398	84,564	49,037	20,973	17,144	14,243	7,983	11,373	12,137
MINERAL OIL	7,817,478	6,920,065	6,015,658	5,866,268	5,405,244	6,934,964	8,200,682	9,056,464	9,186,328	11,260,780	11,664,723
MINERAL OIL, PETROLEUM DISTILLATES, SOLVENT REFINED LIGHT	0	0	0	0	0	0	0	0	0	169	139
NAPHTHA, HEAVY AROMATIC	83	0	0	0	29	0	2	53	0	0	0
PETROLEUM DERIVATIVE RESIN	15	6	1	3	1	<1	1	1	4	5	0
PETROLEUM DISTILLATES	1,816,628	1,625,537	2,421,987	2,289,723	1,730,640	1,526,848	1,878,407	1,597,605	2,036,864	1,422,093	1,516,512
PETROLEUM DISTILLATES, ALIPHATIC	0	0	0	<1	7	49,237	15,163	30,638	34,152	34,017	18,323
PETROLEUM DISTILLATES, AROMATIC	14,376	35,085	9,925	10,610	2,851	6,182	2,916	5,486	2,092	2,136	1,160
PETROLEUM DISTILLATES, REFINED	47,929	61,294	114,467	928,119	846,418	318,728	371,411	1,023,900	779,702	1,175,944	1,237,622
PETROLEUM HYDROCARBONS	87,646	24,333	7,278	8,063	3,185	1,019	985	642	956	1,574	1,407
PETROLEUM NAPHTHENIC OILS	1	9	2	3	91	325	208	24	48	158	240
PETROLEUM OIL, PARAFFIN BASED	267,704	270,998	310,791	371,155	418,474	281,516	364,770	433,848	405,894	558,255	504,837
PETROLEUM OIL, UNCLASSIFIED	22,700,273	20,334,019	18,541,147	17,998,487	13,668,208	15,929,777	15,527,171	15,932,497	16,232,606	18,241,502	13,417,789
PETROLEUM SULFONATES	1	<1	<1	1	<1	<1	0	0	0	<1	<1
Grand Total	32,989,896	29,531,588	27,646,708	27,724,387	22,359,538	25,298,602	26,686,335	28,445,546	28,961,925	32,979,137	28,665,799

Table 9B. *The reported cumulative acres treated in California with oil pesticides. (See qualifying comments on U.S. EPA B2 carcinogen and Proposition 65 listing with Table 8A.) Uses include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
COAL TAR HYDROCARBONS	0	0	0	0	0	0	0	0	0	0	0
HYDROTREATED PARAFFINIC SOLVENT	121,606	109,419	93,111	124,688	192,297	220,789	306,243	327,022	252,863	270,421	261,153
ISOPARAFFINIC HYDROCARBONS	72,279	164,561	139,939	134,149	92,768	53,847	56,120	67,795	55,920	39,757	27,903
KEROSENE	240,080	223,822	179,961	227,734	199,672	194,210	291,162	264,266	314,821	348,522	254,279
MINERAL OIL	240,507	226,710	204,895	204,621	226,195	246,310	337,986	407,046	478,445	596,338	815,915
MINERAL OIL, PETROLEUM DISTILLATES, SOLVENT REFINED LIGHT	0	0	0	0	0	0	0	0	0	959	522
NAPHTHA, HEAVY AROMATIC	0	0	0	0	11	0	0	0	0	0	0
PETROLEUM DERIVATIVE RESIN	50	13	1	0	0	0	0	0	10	0	0
PETROLEUM DISTILLATES	339,492	295,807	232,305	283,634	221,743	210,498	237,198	244,673	171,158	180,495	280,747
PETROLEUM DISTILLATES, ALIPHATIC	0	0	0	0	5,104	44,494	26,131	25,904	22,723	34,136	31,441
PETROLEUM DISTILLATES, AROMATIC	19,003	2,153	7,088	6,299	1,900	3,935	1,808	519	385	658	383
PETROLEUM DISTILLATES, REFINED	6,146	6,162	12,495	42,145	48,446	35,413	39,830	79,589	117,570	200,933	231,850
PETROLEUM HYDROCARBONS	7,105	2,970	3,993	2,790	4,029	3,269	2,869	108	430	260	546
PETROLEUM NAPHTHENIC OILS	0	50	37	0	5,119	13,241	11,314	2,484	358	11,125	17,950
PETROLEUM OIL, PARAFFIN BASED	443,059	432,587	470,300	466,132	448,032	417,941	488,928	555,670	605,289	724,671	737,379
PETROLEUM OIL, UNCLASSIFIED	763,348	710,417	734,320	771,049	572,825	657,135	615,742	653,743	717,903	807,931	674,508
PETROLEUM SULFONATES	<1	0	<1	10	0	0	0	0	0	0	<1
Grand Total	2,252,675	2,174,672	2,078,446	2,263,251	2,018,141	2,101,083	2,415,332	2,628,818	2,737,875	3,216,206	3,334,578

Figure 7. *Use trends of oil pesticides. As a broad group, oil pesticides and other petroleum distillates are on U.S. EPA's list of B2 carcinogens or the State's Proposition 65 list of chemicals "known to cause cancer." However, these classifications do not distinguish among oil pesticides that may not qualify as carcinogenic due to their degree of refinement. Many such oil pesticides also serve as alternatives to high-toxicity chemicals. For this reason, oil pesticide data was classified separately in this report. Reported pounds of active ingredient (AI) applied include both agricultural and reportable non-agricultural applications. The reported cumulative acres treated include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*



USE TRENDS OF BIOPESTICIDES

Table 10A. *The reported pounds of biopesticides applied in California. Biopesticides include microorganisms and naturally occurring compounds, or compounds essentially identical to naturally occurring compounds that are not toxic to the target pest (such as pheromones). Use includes both agricultural and non-agricultural applications. Zero values in early years likely indicate the pesticide was not yet registered for use. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
(3S, 6R)-3-METHYL-6-ISOPROPENYL-9-DECEN-1-YL ACETATE	0	0	0	0	0	0	1	<1	<1	<1	0
(3S, 6S)-3-METHYL-6-ISOPROPENYL-9-DECEN-1-YL ACETATE	0	0	0	0	0	0	<1	<1	<1	<1	0
(E)-4-TRIDECEN-1-YL-ACETATE	76	65	67	263	182	247	254	131	68	103	113
(E)-5-DECENOL	737	176	246	5	2	2	295	5	<1	4	2
(E)-5-DECENYL ACETATE	3,508	844	1,183	26	9	12	889	23	<1	17	7
(R,Z)-5-(1-DECENYL) DIHYDRO-2-(3H)-FURANONE	0	<1	0	<1	0	0	0	<1	<1	0	0
(S)-KINOPRENE	121	1,261	357	245	311	327	418	359	289	201	235
(Z)-11-HEXADECEN-1-YL ACETATE	0	0	0	0	0	35	10	10	5	6	2
(Z)-11-HEXADECENAL	0	0	0	0	0	35	10	10	5	6	2
(Z)-4-TRIDECEN-1-YL-ACETATE	2	2	2	9	6	8	8	4	2	3	4
(Z)-9-DODECENYL ACETATE	0	0	0	0	0	0	0	0	<1	<1	1
(Z,E)-7,11-HEXADECADIEN-1-YL ACETATE	1	46		3	13	2	0	0	0	0	0
(Z,Z)-11,13-HEXADECADIENAL	0	0	0	0	0	0	0	0	0	0	<1
(Z,Z)-7,11-HEXADECADIEN-1-YL ACETATE	1	46	242	3	<1	3	0	0	0	0	0
1,7-DIOXASPIRO-(5,5)-UNDECANE	0	0	0	0	0	0	<1	0	<1	<1	<1
1-DECANOL	<1	<1	<1	<1	<1	0	0	0	0	0	0
1-METHYLCYCLOPROPENE	0	0	0	0	<1	<1	<1	<1	<1	<1	<1
1-NAPHTHALENEACETAMIDE	115	283	333	217	213	88	119	113	55	30	49
ACETIC ACID	1	2	3	1	<1	<1	<1	<1	<1	0	1
AGROBACTERIUM RADIOBACTER	28	20	7	2	1	4	3	2	<1	4	4
AGROBACTERIUM RADIOBACTER, STRAIN K1026	0	0	0	<1	<1	1	<1	<1	<1	6	<1
ALLYL ISOTHIOCYANATE	<1	0	0	<1	<1	<1	<1	<1	<1	<1	0
AMINO ETHOXY VINYL GLYCINE HYDROCHLORIDE	0	8	1	<1	1	1	0	0	24	703	894

***Table 10A** (cont.). The reported pounds of biopesticides applied in California.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMPELOMYCES QUISQUALIS	9	40	4	4	2	<1	<1	<1	<1	<1	<1
ASPERGILLUS FLAVUS STRAIN AF36	0	0	0	0	0	0	0	0	<1	0	0
AZADIRACHTIN	843	654	16,770	1,215	1,523	1,474	1,366	2,915	1,340	2,407	2,220
BACILLUS PUMILUS, STRAIN QST 2808	0	0	0	0	0	0	<1	2	3,546	5,636	6,977
BACILLUS SPHAERICUS, SEROTYPE H-5A5B, STRAIN 2362	1,298	4,886	2,274	2,749	7,941	4,667	10,158	14,187	34,154	45,430	20,192
BACILLUS SUBTILIS GB03	<1	<1	<1	<1	1	4	5	7	15	14	6
BACILLUS THURINGIENSIS (BERLINER)	182	751	24	76	115	16	11	12	16	35	27
BACILLUS THURINGIENSIS (BERLINER), SUBSP. AIZAWAI, GC-91 PROTEIN	7,406	4,282	3,017	4,419	3,953	3,980	5,024	4,088	11,255	9,377	20,474
BACILLUS THURINGIENSIS (BERLINER), SUBSP. AIZAWAI, SEROTYPE H-7	14,210	10,854	10,427	9,067	5,511	3,889	7,548	3,014	2,335	1,752	2,877
BACILLUS THURINGIENSIS (BERLINER), SUBSP. ISRAELENSIS, SEROTYPE H-14	4,459	13,180	5,038	88,039	24,711	8,266	11,376	9,311	11,927	14,394	8,309
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI STRAIN SA-12	0	0	0	7,375	7,132	23,432	27,174	16,576	16,580	16,042	22,702
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, SEROTYPE 3A,3B	30,286	21,683	15,244	14,477	31,046	3,423	6,161	3,916	1,931	2,272	987
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, STRAIN EG 2348	1,467	5,207	2,191	2,140	2,743	1,481	222	107	211	281	147
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, STRAIN EG2371	2,752	1,633	213	139	58	19	39	2	5	1	0
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, STRAIN SA-11	11,682	9,616	8,730	10,548	13,540	22,282	19,683	20,348	53,051	54,234	63,851
BACILLUS THURINGIENSIS (BERLINER), SUBSP. SAN DIEGO	26	8	34	18	8	1	2	1	<1	2	2
BACILLUS THURINGIENSIS SUBSPECIES KURSTAKI STRAIN BMP 123	0	6	1	33	79	164	130	10	1	3	0
BACILLUS THURINGIENSIS SUBSPECIES KURSTAKI, GENETICALLY ENGINEERED STRAIN EG7841 LEPIDOPTERAN ACTIVE TOXIN	15,619	12,522	12,831	16,773	8,739	681	1,503	344	338	3,872	632
BACILLUS THURINGIENSIS VAR. KURSTAKI STRAIN M-200	0	0	0	<1	<1	0	<1	0	0	0	<1

***Table 10A** (cont.). The reported pounds of biopesticides applied in California.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
BACILLUS THURINGIENSIS VAR. KURSTAKI, GENETICALLY ENGINEERED STRAIN EG7826	0	0	0	6,482	14,734	439	1,527	930	1,919	1,384	154
BACILLUS THURINGIENSIS, SUBSP. AIZAWAI, STRAIN ABTS-1857	0	0	0	0	0	10,540	21,956	27,075	33,336	28,878	32,526
BACILLUS THURINGIENSIS, SUBSP. AIZAWAI, STRAIN SD-1372, LEPIDOPTERAN ACTIVE TOXIN(S)	0	0	3	158	498	1,322	562	347	315	432	563
BACILLUS THURINGIENSIS, SUBSP. ISRAELENSIS, STRAIN AM 65-52	0	0	0	0	271	9,485	29,326	23,001	41,734	59,018	40,376
BACILLUS THURINGIENSIS, SUBSP. KURSTAKI, STRAIN ABTS-351, FERMENTATION SOLIDS AND SOLUBLES	0	0	0	0	3,021	15,491	38,034	46,754	57,985	53,346	70,042
BACILLUS THURINGIENSIS, SUBSP. KURSTAKI, STRAIN HD-1	835	21,037	23,660	22,309	17,828	10,655	7,173	4,731	3,185	6,139	2,261
BACILLUS THURINGIENSIS, VAR. KURSTAKI DELTA ENDOTOXINS CRY 1A(C) AND CRY 1C (GENETICALLY ENGINEERED) ENCAPSULATED IN PSEUDOMONAS FLUORESCENS (KILLED)	29,895	12,634	8,055	7,166	2,211	258	54	5	3	<1	1
BEAUVERIA BASSIANA STRAIN GHA	573	1,250	923	915	678	1,041	715	863	824	570	704
CANDIDA OLEOPHILA ISOLATE I-182	726	216	55	0	0	0	0	0	0	0	0
CANOLA OIL	0	0	0	1	5	<1	1	4	1	4	29
CAPSICUM OLEORESIN	2	17	104	3	73	3	5	49	2	2	10
CASTOR OIL	40	174	24	557	297	504	1,281	363	79	37	4
CHITOSAN	0	0	0	0	0	0	0	<1	0	0	0
CINNAMALDEHYDE	<1	<1	6,764	10,334	4,704	806	238	326	34	12	3
CLARIFIED HYDROPHOBIC EXTRACT OF NEEM OIL	14,316	55,528	94,591	110,342	83,664	301,512	60,498	84,880	111,921	95,441	108,259
CODLING MOTH GRANULOSIS VIRUS	0	0	0	0	0	0	0	0	0	<1	<1
CONIOTHYRIUM MINITANS STRAIN CON/M/91-08	0	0	0	0	0	103	171	198	6	11	6
CYTOKININ	0	<1	0	<1	<1	0	<1	0	0	0	0
DIHYDRO-5-HEPTYL-2(3H)-FURANONE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
DIHYDRO-5-PENTYL-2(3H)-FURANONE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
E,E-8,10-DODECADIEN-1-OL	431	848	21,029	7,090	6,390	5,107	1,802	1,113	2,195	2,126	2,204
E-11-TETRADECEN-1-YL ACETATE	3	163	548	397	65	122	132	91	79	99	2,397
E-8-DODECENYL ACETATE	49	57	66	92	73	61	113	122	110	225	230

***Table 10A** (cont.). The reported pounds of biopesticides applied in California.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ENCAPSULATED DELTA ENDOTOXIN OF BACILLUS THURINGIENSIS VAR. KURSTAKI IN KILLED PSEUDOMONAS FLUORESCENS	44,554	35,129	28,435	17,792	6,442	2,948	445	114	7	6	32
ENCAPSULATED DELTA ENDOTOXIN OF BACILLUS THURINGIENSIS VAR. SAN DIEGO IN KILLED PSEUDOMONAS FLUORESCENS	0	34	1	6	1	6	0	2	1	0	0
ESSENTIAL OILS	<1	11	<1	<1	<1	<1	<1	1	<1	4	<1
ETHYLENE	0	1	5,073	6	6	3	24	32	0	0	0
EUCALYPTUS OIL	0	0	0	0	0	0	0	0	50	<1	0
EUGENOL	0	3	0	<1	0	0	0	3	<1	<1	0
FARNESOL	38	30	36	37	15	10	9	7	10	4	2
GAMMA AMINOBUTYRIC ACID	0	0	0	0	23	3,102	6,077	8,402	8,081	4,201	1,739
GARLIC	8,989	10,203	7,113	904	1,490	667	295	174	203	89	142
GERANIOL	0	0	0	0	0	0	0	0	0	<1	0
GERMAN COCKROACH PHEROMONE	0	0	0	0	0	<1	<1	<1	<1	<1	<1
GIBBERELLINS	23,404	23,085	19,775	20,956	19,435	24,946	20,415	20,372	23,443	22,916	22,694
GIBBERELLINS, POTASSIUM SALT	1	1	15	<1	1	<1	<1	1	<1	15	<1
GLIOCLADIUM VIRENS GL-21 (SPORES)	156	104	86	60	314	110	48	30	19	1	152
GLUTAMIC ACID	0	0	0	0	23	3,102	6,077	8,402	8,081	4,201	1,739
HYDROGEN PEROXIDE	0	1	15	82	1,754	2,713	2,618	2,822	5,552	17,524	11,860
HYDROPRENE	9,305	1,486	1,609	1,703	1,380	1,656	1,043	1,309	2,910	11,970	2,282
IBA	16	43	9	12	18	16	13	19	11	31	20
LAGENIDIUM GIGANTEUM (CALIFORNIA STRAIN)	134	859	499	0	1	0	0	58	<1	0	<1
LAURYL ALCOHOL	207	463	7,287	941	302	249	256	295	872	386	465
LINALOOL	358	631	229	197	173	274	280	174	176	170	111
METARHIZIUM ANISOPLIAE, VAR. ANISOPLIAE, STRAIN ESF1	3	37	15	18	15	22	<1	<1	<1	<1	<1
METHOPRENE	29,905	3,030	10,285	14,312	2,483	5,117	7,875	8,874	9,900	6,941	3,357
METHYL ANTHRANILATE	184	49	57	50	37	85	34	534	151	449	152
METHYL SALICYLATE	0	0	0	0	<1	0	0	0	0	<1	<1
MUSCALURE	4	2	2	3	2	1	11	10	14	15	22
MYRISTYL ALCOHOL	42	94	1,502	191	62	51	52	60	176	78	94
MYROTHECIUM VERRUCARIA, DRIED FERMENTATION SOLIDS & SOLUBLES, STRAIN AARC-0255	1,097	8,496	18,824	20,869	45,917	36,104	47,037	39,789	27,977	25,039	29,951
NAA	21	240	14	24	10	6	5	9	13	9	4

***Table 10A** (cont.)**.** The reported pounds of biopesticides applied in California.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
NEROLIDOL	31	24	29	30	12	8	7	6	8	3	2
NITROGEN, LIQUIFIED	430,214	1,003,749	424,897	391,469	478,466	561,505	321,182	79,369	82,298	57,121	15,741
NONANOIC ACID	14,713	11,729	13,303	12,580	14,890	11,559	7,886	7,224	8,845	11,136	10,949
NONANOIC ACID, OTHER RELATED	774	617	700	662	784	608	415	380	466	586	576
NOSEMA LOCUSTAE SPORES	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
OIL OF ANISE	0	0	0	0	<1	<1	<1	<1	<1	<1	<1
OIL OF BERGAMOT	0	0	0	0	0	0	0	0	0	<1	0
OIL OF CEDARWOOD	0	0	0	0	0	0	0	0	0	0	0
OIL OF CITRONELLA	13	5	11	1	33	0	10	0	<1	<1	<1
OIL OF LEMONGRASS	0	0	0	0	0	0	2	0	<1	<1	0
OXYPURINOL	0	0	0	<1	<1	0	0	0	<1	0	<1
PAECILOMYCES FUMOSOROSEUS APOPKA STRAIN 97	0	0	0	0	5	0	0	0	0	0	0
PERFUME	0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
POLYHEDRAL OCCLUSION BODIES (OB'S) OF THE NUCLEAR POLYHEDROSIS VIRUS OF HELICOVERPA ZEA (CORN EARWORM)	0	0	0	0	0	0	1	1	0	0	0
POTASSIUM BICARBONATE	28	65,909	92,785	130,446	121,796	180,072	283,920	159,772	388,854	162,836	114,150
PROPYLENE GLYCOL	61,414	68,506	54,833	63,611	56,899	60,567	50,356	44,235	47,765	42,348	28,153
PSEUDOMONAS FLUORESCENS, STRAIN A506	3,639	3,660	2,084	103	1,102	1,361	1,972	841	896	1,004	614
PSEUDOMONAS SYRINGAE STRAIN ESC-11	0	34	0	0	0	<1	0	20	<1	<1	0
PSEUDOMONAS SYRINGAE, STRAIN ESC-10	<1	<1	0	0	0	0	0	0	0	<1	0
PUTRESCENT WHOLE EGG SOLIDS	15	19	136	112	140	184	186	110	60	69	20
QST 713 STRAIN OF DRIED BACILLUS SUBTILIS	0	0	0	882	7,201	18,957	17,323	16,619	14,039	17,135	16,975

***Table 10A** (cont.)**.** The reported pounds of biopesticides applied in California.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
S-METHOPRENE	1,806	2,652	409	371	366	867	762	530	1,138	1,391	1,726
SODIUM BICARBONATE	0	0	5	22	230	2,063	0	126	0	0	0
SODIUM LAURYL SULFATE	6	14	8	2	9	<1	<1	3	15	274	400
SOYBEAN OIL	44,702	18,578	59,695	40,963	27,651	31,726	33,006	50,301	20,587	70,398	14,747
STREPTOMYCES GRISEOVIRIDIS STRAIN K61	2	5	2	5	2	1	1	<1	<1	1	<1
STREPTOMYCES LYDICUS WYEC 108	0	0	0	0	0	0	0	0	0	<1	<1
SUCROSE OCTANOATE	0	0	0	0	0	0	0	0	0	2	0
THYME	0	0	0	0	0	0	0	0	0	171	485
TRICHODERMA HARZIANUM RIFAI STRAIN KRL-AG2	39	60	121	125	116	55	43	37	16	24	38
XANTHINE	0	0	0	<1	<1	0	0	0	<1	0	<1
Z,E-9,12-TETRADECADIEN-1-YL ACETATE	0	0	0	0	0	<1	0	0	0	0	1
Z-11-TETRADECEN-1-YL ACETATE	<1	18	85	61	9	18	19	14	12	14	228
Z-8-DODECENOL	8	10	12	16	13	11	20	22	19	41	40
Z-8-DODECENYL ACETATE	818	888	1,009	1,435	1,127	935	1,737	1,874	1,692	3,398	3,541
Z-9-TETRADECEN-1-OL	0	0	0	0	0	<1	0	0	0	0	0
Grand Total	818,342	1,440,509	986,295	1,044,751	1,033,109	1,383,681	1,067,462	719,329	1,045,241	866,561	693,692

Table 10B. *The reported cumulative acres treated in California with each biopesticide. Biopesticides includes microorganisms and naturally occurring compounds, or compounds essentially identical to naturally occurring compounds that are not toxic to the target pest (such as pheromones). Use includes primarily agricultural applications. The grand total for acres treated is less than the sum of acres for all active ingredients because some products contain more than one active ingredient. Zero values in early years likely indicate the pesticide was not yet registered for use. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
(3S, 6R)-3-METHYL-6-ISOPROPENYL-9-DECEN-1-YL ACETATE	0	0	0	0	0	0	15	86	1,604	1,484	0
(3S, 6S)-3-METHYL-6-ISOPROPENYL-9-DECEN-1-YL ACETATE	0	0	0	0	0	0	15	86	1,604	1,484	0
(E)-4-TRIDECEN-1-YL-ACETATE	3,574	2,886	3,132	12,571	9,159	11,739	10,902	5,555	3,226	4,870	5,193
(E)-5-DECENOL	2,187	1,414	1,034	784	1,316	1,206	1,360	809	71	385	737
(E)-5-DECENYL ACETATE	2,187	1,414	1,034	784	1,316	1,206	1,360	809	71	385	737
(R,Z)-5-(1-DECENYL) DIHYDRO-2-(3H)-FURANONE	0	1	0	0	0	0	0	15	0	0	0
(S)-KINOPRENE	179	2,610	888	600	847	872	755	1,864	494	440	453
(Z)-11-HEXADECEN-1-YL ACETATE	0	0	0	0	0	1,053	476	365	164	183	116
(Z)-11-HEXADECENAL	0	0	0	0	0	1,053	476	365	164	423	72
(Z)-4-TRIDECEN-1-YL-ACETATE	3,574	2,886	3,132	12,571	9,159	11,739	10,902	5,555	3,226	4,870	5,193
(Z)-9-DODECENYL ACETATE	0	0	0	0	0	0	0	0	570	96	5,342
(Z,E)-7,11-HEXADECADIEN-1-YL ACETATE	279	82	148	171	128	87	0	0	0	0	0
(Z,Z)-11,13-HEXADECADIENAL	0	0	0	0	0	0	0	0	0	0	200
(Z,Z)-7,11-HEXADECADIEN-1-YL ACETATE	279	82	148	171	128	87	0	0	0	0	0
1,7-DIOXASPIRO-(5,5)-UNDECANE	0	0	0	0	0	0	313	0	49	4	55
1-DECANOL	0	0	0	0	0	0	0	0	0	0	0
1-METHYLCYCLOPROPENE	0	0	0	0	3	<1	9	4	8	2	6
1-NAPHTHALENEACETAMIDE	1,820	5,211	5,418	4,135	3,690	1,705	2,355	2,201	1,100	666	927
ACETIC ACID	5,776	9,038	13,693	3,618	1,182	1,146	734	290	60	0	10
AGROBACTERIUM RADIOBACTER	1,284	5,954	1,517	1,072	514	500	365	493	306	698	555
AGROBACTERIUM RADIOBACTER, STRAIN K1026	0	0	0	4	325	355	716	524	292	335	366
ALLYL ISOTHIOCYANATE	2	0	0	0	1	0	36	0	20	0	0

***Table 10B** (cont)**.** The reported cumulative acres treated in California with each biopesticide.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AMINO ETHOXY VINYL GLYCINE HYDROCHLORIDE	0	75	142	1	6	10	0	0	229	6,453	9,238
AMPELOMYCES QUISQUALIS	18,628	15,039	8,363	7,156	2,193	540	332	697	247	10	15
ASPERGILLUS FLAVUS STRAIN AF36	0	0	0	0	0	0	0	0	258	0	0
AZADIRACHTIN	70,086	64,239	103,078	71,386	73,876	92,145	79,581	64,488	55,657	68,244	91,275
BACILLUS PUMILUS, STRAIN QST 2808	0	0	0	0	0	0	1	4	34,748	64,333	79,765
BACILLUS SPHAERICUS, SEROTYPE H-5A5B, STRAIN 2362	104	84	39	0	0	0	0	0	0	0	0
BACILLUS SUBTILIS GB03	0	0	0	0	0	0	0	379	23	3	2
BACILLUS THURINGIENSIS (BERLINER)	6,109	4,437	301	533	644	535	2	441	100	2,939	1,129
BACILLUS THURINGIENSIS (BERLINER), SUBSP. AIZAWAI, GC-91 PROTEIN	146,197	82,473	60,262	74,287	71,531	73,992	90,283	63,504	62,244	39,077	53,040
BACILLUS THURINGIENSIS (BERLINER), SUBSP. AIZAWAI, SEROTYPE H-7	109,951	86,430	85,564	65,943	41,378	31,487	54,037	24,160	19,190	15,784	24,379
BACILLUS THURINGIENSIS (BERLINER), SUBSP. ISRAELENSIS, SEROTYPE H-14	4,289	5,242	3,221	2,435	931	824	2,114	1,048	3,480	543	833
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI STRAIN SA-12	0	0	0	9,474	11,773	43,337	54,540	28,485	34,533	29,505	35,513
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, SEROTYPE 3A,3B	486,699	342,525	249,709	245,114	141,868	56,879	65,654	69,454	31,406	42,279	16,522
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, STRAIN EG 2348	11,768	22,097	14,541	14,702	21,987	10,416	1,931	737	1,625	2,913	1,271
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, STRAIN EG2371	19,739	11,015	1,684	849	439	134	338	19	54	7	0
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, STRAIN SA-11	175,772	161,858	152,834	143,664	168,496	180,621	158,448	123,796	156,026	125,390	119,045
BACILLUS THURINGIENSIS (BERLINER), SUBSP. SAN DIEGO	100	6	20	18	7	2	3	1	0	0	<1
BACILLUS THURINGIENSIS SUBSPECIES KURSTAKI STRAIN BMP 123	0	87	7	687	1,913	6,279	3,013	268	20	93	0
BACILLUS THURINGIENSIS SUBSPECIES KURSTAKI, GENETICALLY ENGINEERED STRAIN EG7841 LEPIDOPTERAN ACTIVE TOXIN	87,123	81,541	83,094	118,628	55,515	5,061	8,479	1,766	1,160	6,684	1,225

***Table 10B** (cont)**.** The reported cumulative acres treated in California with each biopesticide.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
BACILLUS THURINGIENSIS VAR. KURSTAKI STRAIN M-200	0	0	0	2	0	0	1	0	0	0	0
BACILLUS THURINGIENSIS VAR. KURSTAKI, GENETICALLY ENGINEERED STRAIN EG7826	0	0	0	30,603	76,935	2,571	8,493	6,457	8,724	3,021	479
BACILLUS THURINGIENSIS, SUBSP. AIZAWAI, STRAIN ABTS-1857	0	0	0	0	0	13,835	34,164	38,718	47,071	41,546	43,209
BACILLUS THURINGIENSIS, SUBSP. AIZAWAI, STRAIN SD-1372, LEPIDOPTERAN ACTIVE TOXIN(S)	0	0	32	1,561	4,718	10,897	4,989	3,465	3,025	4,235	4,766
BACILLUS THURINGIENSIS, SUBSP. ISRAELENSIS, STRAIN AM 65-52	0	0	0	0	0	5	1	3	313	4,809	25
BACILLUS THURINGIENSIS, SUBSP. KURSTAKI, STRAIN ABTS-351, FERMENTATION SOLIDS AND SOLUBLES	0	0	0	0	6,938	33,146	75,373	94,559	109,681	100,697	133,257
BACILLUS THURINGIENSIS, SUBSP. KURSTAKI, STRAIN HD-1	2,718	202,653	217,136	199,385	170,574	110,540	62,367	44,536	29,129	23,346	20,045
BACILLUS THURINGIENSIS, VAR. KURSTAKI DELTA ENDOTOXINS CRY 1A(C) AND CRY 1C (GENETICALLY ENGINEERED) ENCAPSULATED IN PSEUDOMONAS FLUORESCENS (KILLED)	43,741	23,196	14,779	14,742	4,622	546	111	7	<1	0	<1
BEAUVERIA BASSIANA STRAIN GHA	1,459	2,991	25,510	3,405	2,853	3,702	2,887	4,019	3,531	2,743	2,448
CANDIDA OLEOPHILA ISOLATE I-182	0	0	0	0	0	0	0	0	0	0	0
CANOLA OIL	0	0	0	2	2	2	2	<1	2	5	33
CAPSICUM OLEORESIN	443	2,762	1,799	261	254	149	318	379	71	247	277
CASTOR OIL	<1	0	<1	1	0	0	0	0	0	2	0
CHITOSAN	0	0	0	0	0	0	0	<1	0	0	0
CINNAMALDEHYDE	<1	<1	2,418	4,139	1,534	295	105	137	18	10	2
CLARIFIED HYDROPHOBIC EXTRACT OF NEEM OIL	13,537	22,092	45,247	49,142	36,602	34,157	38,357	51,009	69,051	73,386	71,183
CODLING MOTH GRANULOSIS VIRUS	0	0	0	0	0	0	0	0	0	1,479	2,141
CONIOTHYRIUM MINITANS STRAIN CON/M/91-08	0	0	0	0	0	935	1,301	1,781	26	63	120

***Table 10B** (cont)**.** The reported cumulative acres treated in California with each biopesticide.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CYTOKININ	0	82	0	3	0	0	0	0	0	0	0
DIHYDRO-5-HEPTYL-2(3H)-FURANONE	20	0	0	0	0	0	0	0	0	0	0
DIHYDRO-5-PENTYL-2(3H)-FURANONE	20	0	0	0	0	0	0	0	0	0	0
E,E-8,10-DODECADIEN-1-OL	3,696	4,300	4,514	10,407	10,381	11,841	21,255	17,383	21,896	20,728	27,784
E-11-TETRADECEN-1-YL ACETATE	13	2,171	54,460	38,834	14,063	16,870	10,335	8,836	7,351	6,637	6,189
E-8-DODECENYL ACETATE	9,932	11,791	23,549	22,721	33,383	33,602	39,198	41,752	33,419	37,412	49,086
ENCAPSULATED DELTA ENDOTOXIN OF BACILLUS THURINGIENSIS VAR. KURSTAKI IN KILLED PSEUDOMONAS FLUORESCENS	96,678	83,238	59,905	32,372	15,188	7,529	1,160	143	33	9	35
ENCAPSULATED DELTA ENDOTOXIN OF BACILLUS THURINGIENSIS VAR. SAN DIEGO IN KILLED PSEUDOMONAS FLUORESCENS	0	19	7	6	4	0	0	1	1	0	0
ESSENTIAL OILS	0	0	0	6	268	0	0	1	0	0	1
ETHYLENE	0	0	2	0	0	0	0	7	0	0	0
EUCALYPTUS OIL	0	0	0	0	0	0	0	0	150	0	0
EUGENOL	0	1	0	0	0	0	0	15	0	0	0
FARNESOL	16,837	12,543	43,212	25,673	8,495	6,584	5,451	4,294	4,369	1,246	652
GAMMA AMINOBUTYRIC ACID	0	0	0	0	320	43,682	87,153	117,477	114,189	58,586	24,697
GARLIC	24,333	12,403	7,376	4,725	2,407	2,756	828	259	513	363	346
GERANIOL	0	0	0	0	0	0	0	0	0	0	0
GERMAN COCKROACH PHEROMONE	0	0	0	0	0	0	0	0	6	0	0
GIBBERELLINS	455,572	487,195	439,529	464,780	387,488	423,337	431,001	414,093	462,231	458,764	454,509
GIBBERELLINS, POTASSIUM SALT	184	70	1,429	8	188	22	59	170	65	348	32
GLIOCLADIUM VIRENS GL-21 (SPORES)	14	29	12	8	768	6	0	0	18	<1	5
GLUTAMIC ACID	0	0	0	0	320	43,682	87,153	117,477	114,189	58,586	24,697
HYDROGEN PEROXIDE	0	0	5	21	485	636	802	1,057	985	9,952	7,744
HYDROPRENE	0	1	1	<1	1	0	0	<1	<1	7	2
IBA	410	1,319	1,236	266	124	244	252	1,566	79	27,670	44,093
LAGENIDIUM GIGANTEUM (CALIFORNIA STRAIN)	0	0	0	0	0	0	0	24	2	0	0
LAURYL ALCOHOL	2,858	2,886	2,666	8,038	6,429	4,635	4,791	6,009	6,719	5,488	9,358
LINALOOL	0	0	0	0	0	0	0	0	0	0	0

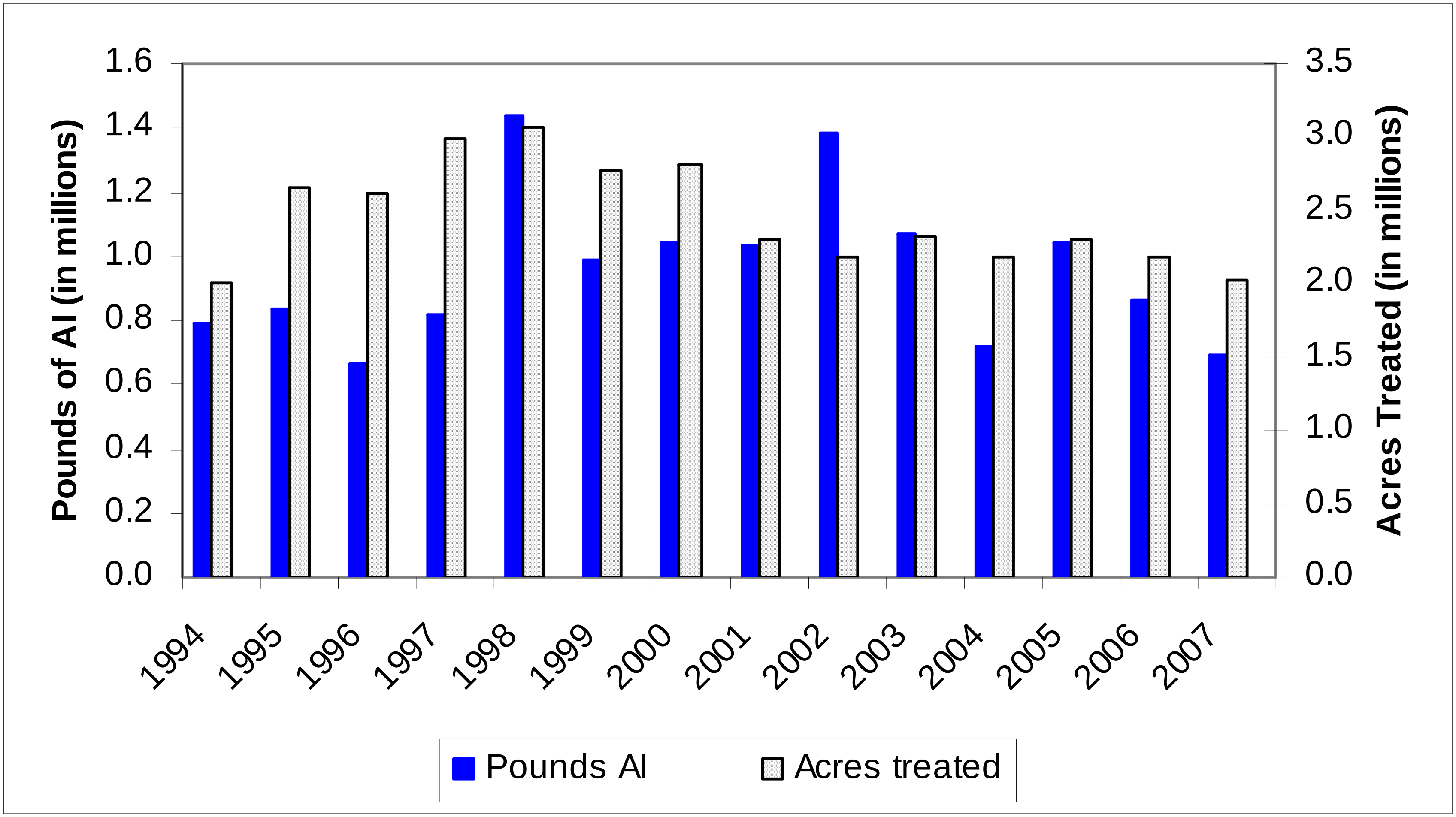
Table 10B (cont). *The reported cumulative acres treated in California with each biopesticide.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
METARHIZIUM ANISOPLIAE, VAR. ANISOPLIAE, STRAIN ESF1	0	0	0	0	0	0	0	0	0	0	0
METHOPRENE	11	23	58	38	50	0	359	1	0	157	51
METHYL ANTHRANILATE	0	0	0	0	0	81	56	1,458	448	1,557	298
METHYL SALICYLATE	0	0	0	0	0	0	0	0	0	0	1
MUSCALURE	699	979	292	473	189	121	2,283	307	2,715	476	1,179
MYRISTYL ALCOHOL	2,858	2,886	2,666	8,038	6,429	4,635	4,791	6,009	6,719	5,488	9,358
MYROTHECIUM VERRUCARIA, DRIED FERMENTATION SOLIDS & SOLUBLES, STRAIN AARC-0255	104	1,514	3,348	3,173	4,392	3,926	4,390	8,348	4,680	4,478	5,097
NAA	364	542	788	172	102	72	75	1,096	49	26,799	43,507
NEROLIDOL	16,837	12,543	43,212	25,673	8,495	6,584	5,451	4,294	4,369	1,246	652
NITROGEN, LIQUIFIED	0	0	0	0	0	0	0	0	0	0	0
NONANOIC ACID	294	645	573	496	495	443	476	1,075	675	877	1,275
NONANOIC ACID, OTHER RELATED	294	645	573	496	495	443	476	1,075	675	877	1,275
NOSEMA LOCUSTAE SPORES	0	7	14	2	9	0	35	37	1	0	254
OIL OF ANISE	0	0	0	0	0	0	0	0	0	0	0
OIL OF BERGAMOT	0	0	0	0	0	0	0	0	0	0	0
OIL OF CEDARWOOD	0	0	0	0	0	0	0	0	0	0	0
OIL OF CITRONELLA	6	80	24	1	0	0	0	0	0	0	0
OIL OF LEMONGRASS	0	0	0	0	0	0	36	0	20	0	0
OXYPURINOL	0	0	0	0	0	0	0	0	0	0	1
PAECILOMYCES FUMOSOROSEUS APOPKA STRAIN 97	0	0	0	0	13	0	0	0	0	0	0
PERFUME	0	0	0	70	0	0	0	0	0	0	0
POLYHEDRAL OCCLUSION BODIES (OB'S) OF THE NUCLEAR POLYHEDROSIS VIRUS OF HELICOVERPA ZEA (CORN EARWORM)	0	0	0	0	0	0	293	742	0	0	0
POTASSIUM BICARBONATE	11	34,010	52,110	60,330	52,654	74,151	106,988	64,994	143,968	61,465	47,285
PROPYLENE GLYCOL	1,116,317	1,208,619	961,979	1,057,786	812,714	746,000	763,898	778,321	754,665	738,448	520,324
PSEUDOMONAS FLUORESCENS, STRAIN A506	26,617	29,656	15,760	1,443	11,668	13,126	16,945	6,559	7,176	11,929	4,801

***Table 10B** (cont)**.** The reported cumulative acres treated in California with each biopesticide.*

AI	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSEUDOMONAS SYRINGAE STRAIN ESC-11	0	17	0	0	0	0	0	0	0	0	0
PSEUDOMONAS SYRINGAE, STRAIN ESC-10	0	0	0	0	0	0	0	0	0	0	0
PUTRESCENT WHOLE EGG SOLIDS	0	0	0	0	0	0	0	0	0	0	0
QST 713 STRAIN OF DRIED BACILLUS SUBTILIS	0	0	0	2,154	15,205	40,786	54,547	58,871	56,342	64,606	67,542
S-METHOPRENE	0	505	<1	567	951	166	21	49	2,395	9,552	30,635
SODIUM BICARBONATE	0	0	8	0	0	0	0	100	0	0	0
SODIUM LAURYL SULFATE	0	48	0	16	0	29	0	0	0	0	0
SOYBEAN OIL	22,476	10,427	13,609	12,837	11,254	18,627	15,359	9,870	6,344	3,675	3,277
STREPTOMYCES GRISEOVIRIDIS STRAIN K61	115	34	27	83	50	17	14	5	20	29	12
STREPTOMYCES LYDICUS WYEC 108	0	0	0	0	0	0	0	0	0	50	96
SUCROSE OCTANOATE	0	0	0	0	0	0	0	0	0	4	0
THYME	0	0	0	0	0	0	0	0	0	0	0
TRICHODERMA HARZIANUM RIFAI STRAIN KRL-AG2	69	369	456	885	1,048	293	466	833	406	286	311
XANTHINE	0	0	0	0	0	0	0	0	0	0	1
Z,E-9,12-TETRADECADIEN-1-YL ACETATE	0	0	0	0	0	13	0	0	0	0	44
Z-11-TETRADECEN-1-YL ACETATE	13	2,171	54,460	38,834	14,063	16,870	10,335	8,836	7,351	6,637	6,166
Z-8-DODECENOL	9,932	11,791	23,549	22,721	33,383	33,602	39,198	41,752	33,419	37,412	49,086
Z-8-DODECENYL ACETATE	9,932	11,791	23,549	22,721	33,383	33,602	39,198	41,752	33,419	37,412	49,086
Z-9-TETRADECEN-1-OL	0	0	0	0	0	13	0	0	0	0	0
Grand Total	3,037,120	3,109,776	2,934,883	2,961,477	2,412,710	2,334,813	2,533,142	2,410,286	2,516,739	2,375,419	2,222,046

Figure 8. *Use trends of biopesticides. Biopesticides include microorganisms and naturally occurring compounds, or compounds essentially identical to naturally occurring compounds that are not toxic to the target pest (such as pheromones). Reported pounds of active ingredient (AI) applied include both agricultural and reportable non-agricultural applications. The reported cumulative acres treated include primarily agricultural applications. Data are from the Department of Pesticide Regulation's Pesticide Use Reports.*



V. TRENDS IN PESTICIDE USE IN CERTAIN COMMODITIES

This summary describes possible reasons for changes in pesticide use from 2006 to 2007 for the following commodities: (1) almonds, (2) wine grapes, (3) cotton, (4) table and raisin grapes, (5) alfalfa, (6) processing tomatoes, (7) oranges, (8) rice, (9) head lettuce, (10) peaches and nectarines, (11) strawberries, and (12) carrots. These 12 commodities were chosen because each were treated with more than 5 million pounds of active ingredients (AIs) or cumulatively treated on more than 2 million acres. Collectively, this represents 68 percent of all reported pesticide pounds used (75 percent of all pounds used on agricultural fields) and 70 percent of the acres treated in 2007.

Information used to develop this section was drawn from several publications and phone interviews with pest control advisors, growers, University of California Cooperative Extension farm advisors and specialists, researchers, and commodity association representatives. DPR staff analyzed the information, using their knowledge of pesticides, California agriculture, pests, and pest management practices to draw conclusions about possible explanations for changes in pesticide use. However, it is important to note these explanations are based on anecdotal information, not rigorous statistical analyses.

Reported pesticide use in California in 2007 totaled 172 million pounds, a decrease of 16 million pounds from 2006 (8.4 percent). The AIs with the largest uses by pounds were sulfur, petroleum and mineral oils, metam-sodium, 1,3-dichloropropene (1,3-D), and glyphosate. By pounds, sulfur accounted for 27 percent of all reported pesticide use in 2007. Sulfur use was close to that in 2006, with only a 0.2 percent decrease. Sulfur is a natural fungicide favored by both conventional and organic farmers and is used mostly to control powdery mildew on grapes. The pesticide that accounted for most of the decrease in pounds applied was oil, which decreased by 4.3 million pounds (13 percent). Other pesticides that declined in use include copper fungicides (2.8 million pound decrease, 29 percent), the fumigant metam-sodium (1.5 million pound decrease, 13 percent), the fumigant sulfuryl fluoride (730,000 pound decrease, 25 percent), the wood preservative chromic acid (650,000 pound decrease, 98 percent), and the herbicide glyphosate (570,000 pound decrease, 7 percent). Oils are used mostly as insecticides in orchards; copper is used mostly in grapes, walnuts, rice, orange, and walnuts; and metam-sodium is used in carrots, processing tomatoes, and potatoes.

In contrast, some pesticide use increased. Pesticides with the greatest increase in pounds applied were the fumigants 1,3-D (860,000 pound increase, 10 percent), potassium n-methyldithiocarbamate (also called metam-potassium) (580,000 pound increase, 18 percent), and chloropicrin (460,000 pound increase, 9 percent). The increase in use of these fumigants was balanced by decreases in other fumigants. Therefore, total fumigant use decreased by 290,000 pounds (0.8 percent). Fumigants are mostly used in strawberries, carrots, processing tomatoes, and for structural pest control.

Different pesticides are used at different rates. In California, most pesticides are applied at rates of around 1 to 2 pounds per acre. However, fumigants are usually applied at rates of hundreds of pounds per acre. Thus, comparing use by pounds will emphasize fumigants. Comparing use among different pesticides using acres treated gives a different picture.

Total acres treated with all pesticides in 2007 was 68 million, a decrease from 2006 of 7 million (10 percent). By acres treated, the non-adjuvant pesticides with the greatest use in 2007 were sulfur, glyphosate, oils, copper compounds, and oxyfluorfen. Most of the decrease in total acres treated was from decreases in copper, indoxacarb, paraquat dichloride, chlorpyrifos, and glyphosate. Most of the increase in acres treated was from flonicamid, pendimethalin, beta-cyfluthrin, imidacloprid, and propamocarb hydrochloride. Glyphosate, oxyfluorfen, and pendimethalin are herbicides used mostly in almond, cotton, and grapes; flonicamid is a new insecticide mostly used in cotton; beta-cyfluthrin is another new insecticide mostly used in alfalfa and orange, however, its increase was matched by equal decrease in use of the similar pesticide cyfluthrin; imidacloprid is an insecticide used mostly in grapes and lettuce; and propamocarb hydrochloride is a fungicide used mostly in lettuce.

DPR data analyses have shown that pesticide use varies from year to year depending upon pest problems, weather, acreage and types of crops planted, economics, and other factors. The winter and spring of 2007 was relatively dry which probably resulted in less weed and disease pressure. There were generally less insect problems in 2007 as well. These conditions explain most of the decreases in pesticide use of all kinds. The main exception to this pattern was a slight increase in miticides possibly due to more mites from especially high temperatures in July and August. Also, there were some increases in the use of several newer, reduced-risk pesticides.

In the following tables, use is given by pounds of AI applied and by acres treated. Acres treated means the cumulative number of acres treated; the acres treated in each application are summed even when the same field is sprayed more than once in a year. (For example, if the same acre is treated three times in a calendar year with an individual AI, it is counted as three acres treated).

Almonds

Almonds are California's largest tree nut crop in total dollar value and acreage. They are the largest horticultural export from the United States. A record crop of 1.38 billion pounds of almonds, 24 percent more than the previous year was harvested in 2007. Almond shipments to overseas markets increased to 866.4 million pounds, up 24 percent over the previous year, led by strong growth in Europe, Asia and the Middle East.

Table 11A. *Total reported pounds of all active ingredients (AIs), acres treated, acres planted, and prices for almond each year from 2003 to 2007. Planted acres from 2003 to 2006 are from CDFA 2007; planted acres in 2007 are from NASS, May 2008a; marketing year average prices from 2003 to 2007 from NASS, July 2008b.*

	2003	2004	2005	2006	2007
Lbs AI	13,361,117	16,205,443	17,178,634	21,302,599	19,587,562
Acres Treated	6,353,573	7,316,371	8,898,987	11,227,103	10,464,016
Acres Planted	610,000	640,000	690,000	730,000	740,000
Price $/lb	$1.57	$2.21	$2.81	$2.06	$1.55

Table 11B. *Percent difference from previous year for reported pounds of all AIs, acres treated, acres planted, and prices for almond from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	12	21	6	24	-8
Acres Treated	15	15	22	26	-7
Acres Planted	1	5	8	6	1
Price $/lb	41	41	27	-27	-25

Figure 9. *Acres of almond treated by all AIs in the major types of pesticides from 1995 to 2007.*

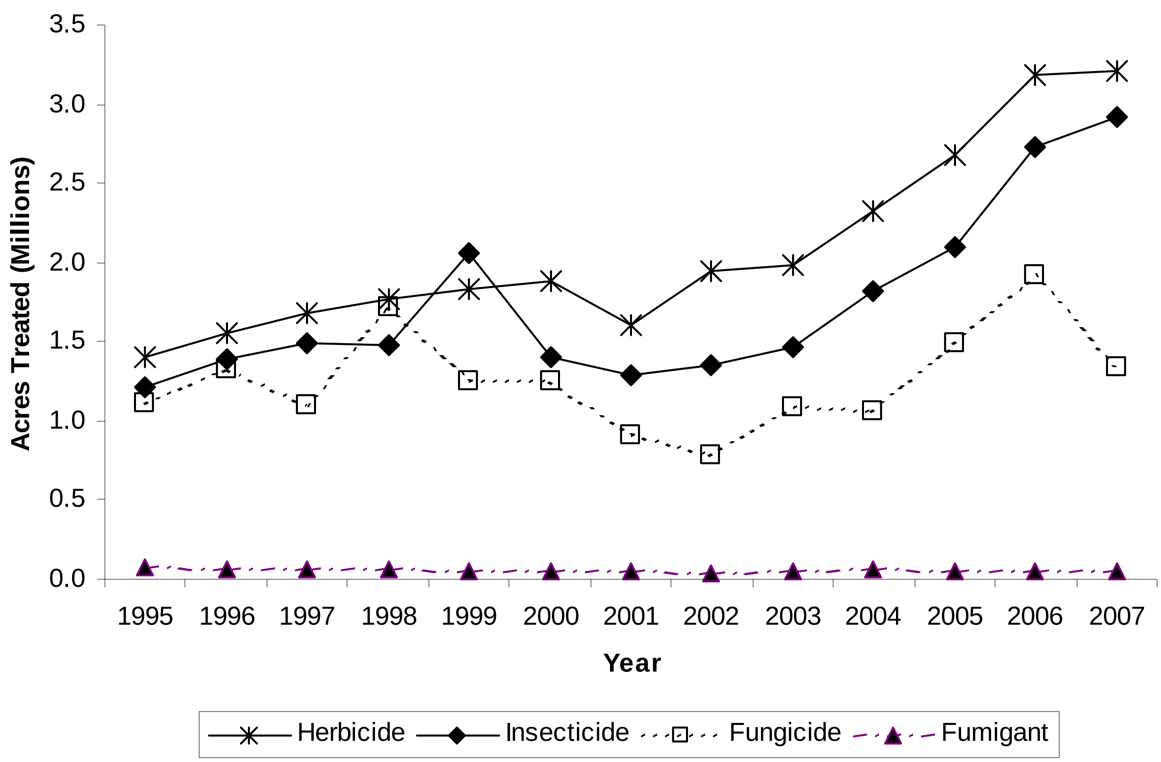


Table 11C. *The non-adjuvant pesticides with the largest change in acres treated of almond from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
PYRACLOSTROBIN	FUNGICIDE		74,064	266,613	473,272	271,130	-202,142	-43
BOSCALID	FUNGICIDE		74,064	266,613	473,272	271,143	-202,129	-43
AZOXYSTROBIN	FUNGICIDE	171,443	100,953	255,380	219,046	79,259	-139,787	-64
ABAMECTIN	INSECTICIDE	261,299	342,920	426,347	514,773	625,930	111,156	22
CYPRODINIL	FUNGICIDE	213,608	266,987	268,997	234,041	151,630	-82,411	-35
COPPER	FUNGICIDE	150,598	180,138	171,807	221,267	146,403	-74,864	-34
PENDIMETHALIN	HERBICIDE	9,061	23,781	49,610	92,147	161,485	69,338	75
OXYFLUORFEN	HERBICIDE	498,675	585,731	631,310	696,050	629,076	-66,974	-10
CHLORPYRIFOS	INSECTICIDE	120,255	153,321	155,355	293,689	227,409	-66,280	-23
GLUFOSINATE-AMMONIUM	HERBICIDE	4,115	7,986	30,358	62,777	129,008	66,231	106
ZIRAM	FUNGICIDE	101,140	61,926	104,207	155,830	90,259	-65,572	-42
BIFENTHRIN	INSECTICIDE				32,456	96,955	64,499	199
PYRIMETHANIL	FUNGICIDE				57,081	113,795	56,715	99
ETOXAZOLE	INSECTICIDE			2,275	32,879	87,512	54,633	166
OIL	INSECTICIDE	381,802	483,367	544,607	680,308	730,564	50,256	7

There are three distinct almond growing regions in California: the Sacramento Valley, Central San Joaquin Valley and Southern San Joaquin Valley. Weather conditions and pest pressure can vary greatly from the northern to the southern region. Overall, pesticides applied in 2007 were down compared with 2006. This was due in large part to a relatively dry spring and a corresponding reduction in fungicide sprays. 2007 also saw a reduction in some insecticide sprays and an increase in others particularly, to protect the crop from insect damage that could compromise compliance with European Union (EU) aflatoxin standards. Also noted in 2007 was a continuing shift to more reduced risk insecticides. This is part of a trend where growers are moving away from older, more broad-spectrum pesticides to newer, reduced-risk materials.

Key pests in almonds are navel orangeworm (NOW), San Jose scale (SJS), peach twig borer (PTB), web-spinning mites, and ants. The best program to control NOW is winter sanitation. Growers are becoming more conscious about removing mummy nuts down to less than two per tree. Other essential elements of a successful NOW strategy include a May spray and hull split sprays using materials such as methoxyfenozide, chlorpyrifos, and bifenthrin. Acres treated with oil increased 7 percent in 2007. Dormant sprays with oil alone were applied to control low to moderate populations of SJS. Other insecticides were added with the oil to control high populations of SJS, PTB, and oblique-banded leafroller, particularly in the southern regions.

Spring 2007 was quite dry in comparison to 2006. As a result, acres treated with most fungicides were down. Acres treated with azoxystrobin were down 64 percent. Part of the decease is due to resistance to the strobilurins that has developed with alternaria and almond scab. Use of pyrimethanil was one material that increased in 2007. One explanation for the increase in pyrimethanil could have been an attempt to address the resistance issue.

In-season use of chlorpyrifos in 2007 was down due in large part to the lack of leaffooted bugs, which were a problem statewide in 2006. In general, worms were not a big problem in 2007. Acres treated with bifenthrin were up in 2007 primarily for navel orangeworm control. A new bifenthrin product that has been shown to be effective against NOW, but that does not flare mites like esfenvalerate and some of the older pyrethroids. Use of bifenthrin is expected to continue to increase in 2008, primarily because it is reportedly working well in trials and due to the concern for aflatoxin. One bifenthrin treatment for NOW and a reduced-risk methoxyfenozide spray to control PTB, when necessary, are replacing azinphos methyl and phosmet at hull split.

Acres treated with abamectin, which is used for mites, increased in 2007. Mites were a problem in some areas due to the drier weather. Abamectin is also used for ants. Growers reported treatment for ants in all growing regions using abamectin or pyriproxyfen. The use of abamectin for both mites and ants may have been a partial factor in the increased use. Also, some growers reportedly prefer to use abamectin as a prophylactic treatment for mites to avoid late season flair ups. In addition, the price of abamectin was down. Acres treated for mites with etoxazole and spirodiclofen also increased in 2007. Both materials are relatively new and seem to be gaining favor with growers. Use of etoxazole is expected to increase, in proportion to the decrease in propargite and bifenazate. Use of another new material, s-methoprene, is starting to show up and reportedly will increase in 2008.

Acres treated with herbicides and pounds applied in 2007 increased slightly but overall were pretty close to 2006. Use of herbicides increased because there was a greater proportion of young orchards, and thus greater exposure of the ground to sunlight, which results in more weed growth. The use of carfentrazone-ethyl went down and use of glufosinate-ammonium increased. Glufosinate-ammonium and paraquat are reportedly used as alternatives to control weeds resistant to glyphosate. Acres treated with pendimethalin nearly doubled in 2007.

Total pounds applied and acres treated with the fumigants 1,3-dichloropropene, methyl bromide and sodium tetrathiocarbonate increased in 2007. Use of these fumigants is closely tied to the recent spurt of newly planted acreage and replanted orchards. Newly planted acreage normally requires a one-time preplant fumigation. Almonds planted on old orchard or vineyard ground are usually fumigated at the maximum or close to the maximum rate.

Wine Grapes

In 2007, roughly 62 percent of California vineyards produced wine grapes. There are four major wine grape production regions: 1) North Coast (Lake, Mendocino, Napa, Sonoma, and Solano counties); 2) Central Coast (Alameda, Monterey, San Luis Obispo, Santa Barbara, San Benito, Santa Cruz, and Santa Clara counties); 3) Northern San Joaquin Valley (San Joaquin, Calaveras, Amador, Sacramento, Merced, Stanislaus, and Yolo counties); and 4) Southern San Joaquin Valley (Fresno, Kings, Tulare, Kern, and Madera counties). Factors that influence changes in pesticide use on wine grapes include weather, topography, pest pressures (which vary by region), competition from newer pesticide products, application restrictions, efforts by growers to reduce costs, and increasing emphasis on sustainable farming. The pooled figures in this report may not reflect differences in pesticide use patterns between production regions.

Table 12A. *Total reported pounds of all active ingredients (AIs), acres treated, acres planted, and prices for wine grapes each year from 2003 to 2007. Planted acres from 2003 to 2006 are from CDFA 2007; planted acres in 2007 are from NASS, March 2008; marketing year average prices from 2003 to 2007 from NASS, July 2008b.*

	2003	2004	2005	2006	2007
Lbs AI	28,411,810	27,644,412	33,749,192	23,993,654	24,330,255
Acres Treated	7,513,582	7,273,330	8,723,754	7,843,017	7,865,714
Acres Planted	529,000	513,000	522,000	527,000	523,000
Price $/ton	$530.00	$570.00	$582.00	$582.00	$564.00

Table 12B. *Percent difference from previous year for reported pounds of all AIs, acres treated, acres planted, and prices for wine grapes from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	-2	-3	22	-29	1
Acres Treated	-1	-3	20	-10	0
Acres Planted	-5	-3	2	1	-1
Price $/ton	-1	8	2	0	-3

Figure 10. *Acres of wine grapes treated by all AIs in the major types of pesticides from 1995 to 2007.*

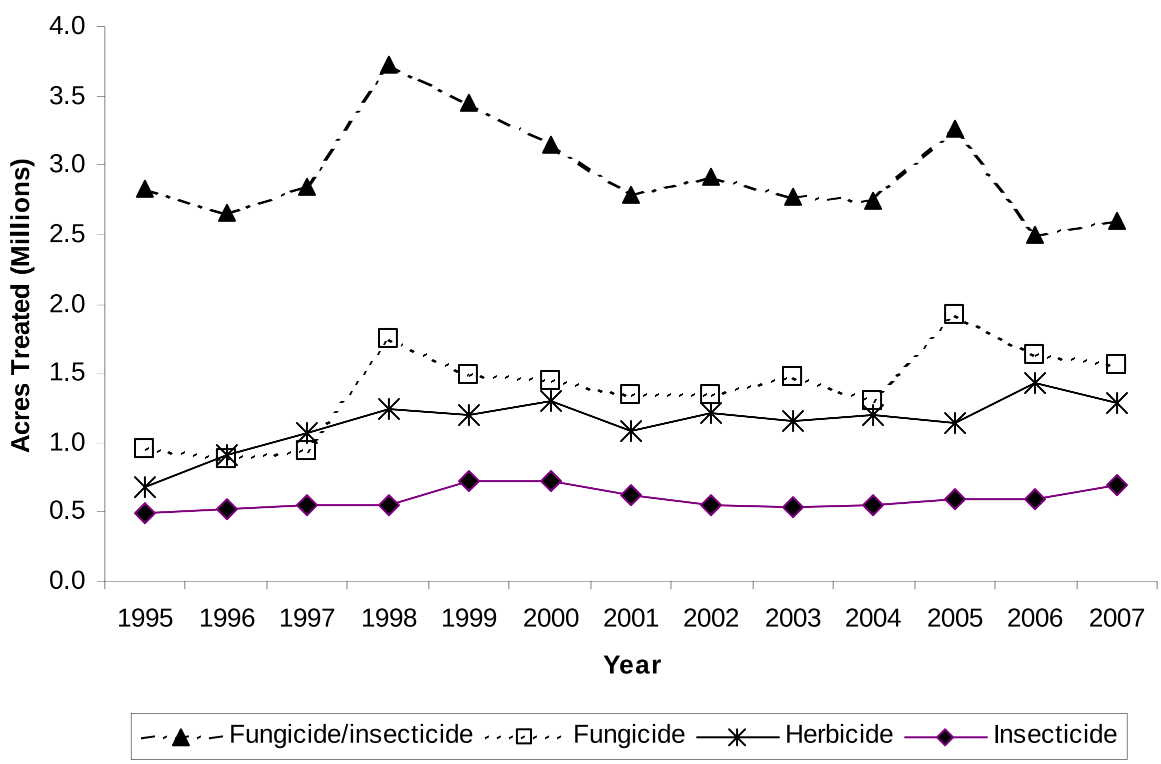


Table 12C. *The non-adjuvant pesticides with the largest change in acres treated of wine grapes from 2005 to 2006. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
SULFUR	FUNGICIDE/ INSECTICIDE	2,759,570	2,721,270	3,178,353	2,320,783	2,388,071	67,288	3
OIL	FUNGICIDE/ INSECTICIDE	68,313	89,318	134,231	232,686	292,787	60,101	26
PARAQUAT DICHLORIDE	HERBICIDE	167,001	155,644	146,912	177,339	128,737	-48,602	-27
SIMAZINE	HERBICIDE	132,368	145,260	118,378	143,447	96,437	-47,010	-33
MYCLOBUTANIL	FUNGICIDE	297,900	281,995	293,425	269,688	224,483	-45,205	-17
COPPER	FUNGICIDE	325,373	299,725	420,595	368,455	329,157	-39,298	-11
IMIDACLOPRID	INSECTICIDE	132,229	121,932	126,757	113,430	151,444	38,014	34
TEBUCONAZOLE	FUNGICIDE	140,774	130,382	177,130	103,719	137,225	33,506	32
DINOTEFURAN	INSECTICIDE	0	0	0	10,218	36,260	26,042	255
FLUMIOXAZIN	HERBICIDE	0	0	35,746	86,011	111,439	25,428	30
OXYFLUORFEN	HERBICIDE	247,029	257,953	204,253	223,591	202,004	-21,587	-10
ORYZALIN	HERBICIDE	49,015	60,408	62,194	80,378	59,240	-21,138	-26
TRIFLOXYSTROBIN	FUNGICIDE	172,908	146,112	219,998	162,553	142,758	-19,796	-12
MANCOZEB	FUNGICIDE	38,923	20,858	56,829	49,092	30,423	-18,669	-38
FENPROPATHRIN	INSECTICIDE	38,459	48,472	50,122	44,928	26,715	-18,213	-41

Total wine grape acres treated with pesticides remained nearly constant from 2006 to 2007, while total pounds of pesticide applied increased by 1 percent.

In 2007, sub-freezing temperatures in January were a major cause of concern, but the following mild temperatures aided vine recovery. Warm temperatures in April stimulated vigorous vine growth. High temperatures in early July and August caused some concern, with some fruit shriveling reported in Madera County. Overall, the warm temperatures in early August led to early harvest start dates. Grape harvesting started in early August, continuing through mid-November. Minor amounts of precipitation were reported in various regions in late September, but there were minimal crop damages.

The major insecticides applied in 2007 by acres treated were imidacloprid, methoxyfenozide, oils, chlorpyrifos, bifenazate, abamectin, dinotefuran, and buprofezin. The acres treated with insecticides increased by 17 percent from 2006. Factors that may have contributed to the increased insecticide use were spreading infestations of vine mealybug and increased use of reduced-risk products, which sometimes require more frequent and better-timed applications to be effective. Vine mealybug is known to infest 17 counties, with an additional 4 counties of questionable status (CDFA, 2008). Methoxyfenozide and *Bt* products control various moths. Dinotefuran is applied for control of sharpshooters and mealybugs. In 2007, acreage treated with oils increased greatly (Table 12C). Oils have many attractive, broad-spectrum properties and are low-risk. Increasingly mixed with fungicides, oils can replace a surfactant and eradicate mildew growth, as well as suppressing mites and insects such as grape leafhoppers. Bifenazate is a selective alternative to older, higher-risk miticides, which have longer worker re-entry periods.

Acres treated with sulfur increased by 4 percent but acres treated with all other fungicides decreased by 4 percent. Sulfur, copper products, myclobutanil, boscalid, pyraclostrobin, and trifloxystrobin were the most-used fungicides in terms of acres treated. Acres treated with lime sulfur in early 2007 against overwintering disease inoculum decreased by 31 percent. Copper, used to treat downy mildew and botrytis bunch rot, was applied to 11 percent fewer acres compared to 2006. Acres treated with sulfur increased slightly from 2006 (Table 12C). Some materials applied for phomopsis or *Botrytis* infections early in the year also control mildew.

The acres treated with herbicides decreased by 11 percent in 2007 compared to 2006. This decrease was most likely due to the relatively dry conditions in mid-winter, which resulted in lower weed pressure in February and March. Herbicides used most in wine grapes by acres treated were glyphosate products, oxyfluorfen, paraquat, flumioxazin, and simazine. The acres treated with simazine and paraquat decreased dramatically, by 33 percent and 27 percent respectively. In contrast, flumioxazin-treated acreage increased by about 30 percent from 2006; this recently registered herbicide, presents less risk of ground water contamination than simazine or paraquat, due to relatively short environmental half-lives (CDPR, 2008).

Fumigants applied for wine grape production decreased by 14 percent in 2007 compared to 2006 in terms of acres treated. The decrease was due to less use of aluminum phosphide and 1,3-dichloropropene. Field applications of the general-purpose soil fumigant methyl bromide, that is being phased out, was decreased by 38 percent.

Plant growth regulators (PGR) are not widely used in wine grapes. Acres treated with PGR decreased by -4 percent in 2007 to about 9100 acres compared to 2006. The most common PGRs were gibberellins, which are applied in early spring in order to lengthen and loosen grape clusters. Less compact clusters may be less vulnerable to berry splitting and bunch rot.

Cotton

Cotton is grown for fiber, oil, and animal feed and is one of the five most widely grown crops in California. Two main kinds of cotton are grown: upland and Pima. For the past few years Pima cotton acreage has been increasing and upland cotton decreasing but from 2006 to 2007 acreage of both decreased although Pima had a smaller decline. In 2007, for the first time, there were more Pima acres than upland acres. Total cotton acreage decreased by 19 percent. Some upland cotton has also been genetically modified to be tolerant to the herbicide glyphosate (Roundup); acres planted with Roundup Ready cotton decreased by 13 percent from 2006 to 2007. Most cotton is grown in the southern San Joaquin Valley, but a small percentage is grown in Imperial and Riverside counties and several counties in the Sacramento Valley.

Table 13A*. Total reported pounds of all active ingredients (AIs), acres treated, acres planted, and prices for cotton each year from 2003 to 2007. Planted acres from 2003 to 2006 are from CDFA 2007; planted acres in 2006 are from NASS, June 2008; Roundup Ready acres from NASS, June 2008; marketing year average prices from 2003 to 2005 are from NASS, July 2004 - 2006; 2006 and 2007 prices are from NASS July 2008b.*

	2003	2004	2005	2006	2007
Lbs AI	7,285,168	7,175,673	7,010,023	5,581,509	3,459,075
Acres Treated	10,529,041	10,422,661	11,416,289	9,767,050	6,305,415
Acres Planted Upland Cotton	550,000	560,000	430,000	285,000	195,000
Acres Planted Pima Cotton	150,000	215,000	230,000	275,000	260,000
Acres Planted Roundup-Ready	148,500	218,400	172,000	114,000	99,450
Acres Planted Total	700,000	775,000	660,000	560,000	455,000
Price Upland $/lbs	$0.745	$0.516	$0.604	$0.582	$0.701
Price Pima $/lbs	$1.230	$0.882	$1.260	$0.951	$1.000
Price All	$0.849	$0.618	$0.833	$0.763	$0.872

Table 13B*. Percent difference from previous year for reported pounds of all AIs, acres treated, acres planted, and prices for cotton from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	0	-2	-2	-20	-38
Acres Treated	22	-1	10	-14	-35
Acres Planted Upland Cotton	15	2	-23	-34	-32
Acres Planted Pima Cotton	-29	43	7	20	-5
Acres Planted Roundup-Ready	19	47	-21	-34	-13
Acres Planted Total	1	11	-15	-15	-19
Price Upland $/lbs	30	-31	17	-4	20
Price Pima $/lbs	43	-28	43	-25	5
Price All	29	-27	35	-8	14

Figure 11*. Acres of cotton treated by all AIs in the major types of pesticides from 1995 to 2007.*

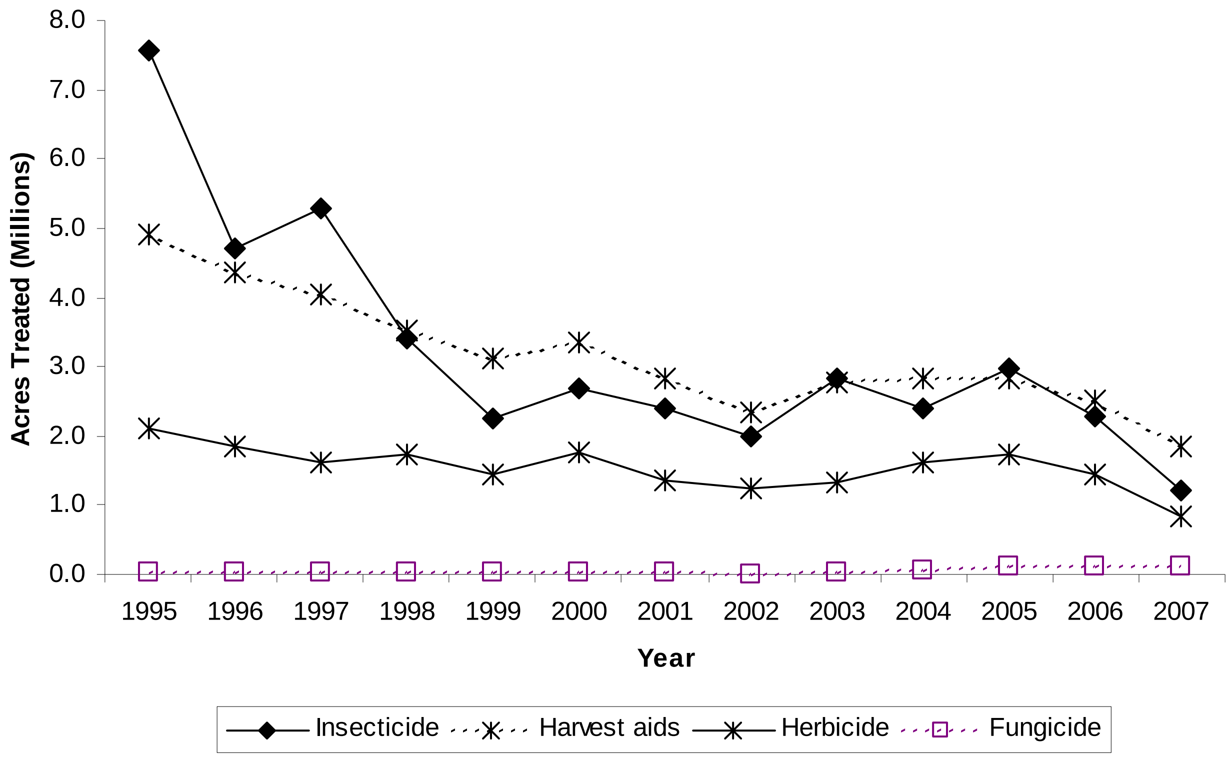


Table 13C*. The non-adjuvant pesticides with the largest change in acres treated of cotton from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
MEPIQUAT CHLORIDE	HARVEST AID	711,204	553,951	653,612	583,147	338,665	-244,482	-42
CHLORPYRIFOS	INSECTICIDE	313,248	223,129	390,194	256,851	46,862	-209,989	-82
ACETAMIPRID	INSECTICIDE	295,867	348,107	372,307	289,300	98,057	-191,244	-66
FLONICAMID	INSECTICIDE					184,070	184,070	
INDOXACARB	INSECTICIDE	335,642	137,503	307,177	244,855	63,422	-181,433	-74
GLYPHOSATE	HERBICIDE	487,283	583,138	613,245	431,057	263,930	-167,127	-39
PARAQUAT DICHLORIDE	HARVEST AID	479,522	434,773	381,290	424,408	264,366	-160,043	-38
THIAMETHOXAM	INSECTICIDE	224,453	181,915	222,692	173,601	40,494	-133,107	-77
DIURON	HARVEST AID	407,442	524,547	511,547	477,647	373,126	-104,522	-22
ETHEPHON	HARVEST AID	476,805	572,142	563,771	487,576	385,164	-102,412	-21
THIDIAZURON	HARVEST AID	405,489	526,341	503,099	465,903	370,884	-95,018	-20
NALED	INSECTICIDE	74,980	39,757	120,884	92,270	7,699	-84,571	-92
SODIUM CHLORATE	HARVEST AID	382,872	341,291	243,709	187,968	109,314	-78,654	-42
OXYFLUORFEN	HERBICIDE	170,894	174,150	231,272	159,224	83,130	-76,094	-48
OXAMYL	INSECTICIDE	75,540	93,895	138,340	92,916	17,904	-75,012	-81

Acres planted with cotton decreased 19 percent from 2006 to 2007, continuing the yearly decreases seen since 2004. However, Pima acres decreased only by 5 percent. For the first time ever there were more Pima acres than upland acres. Total pesticide use on cotton decreased from 2006 to 2007, partly because acres planted decreased. However, even measured as use per acre planted, pesticide use still decreased. Acres treated decreased by 35 percent and pounds of AI decreased by 38 percent. Acres treated and pounds of AI of the main AI types decreased. The use of harvest aids, which are chemicals used to defoliate or desiccate cotton plants before harvest, decreased by 27 percent in acres treated and 29 percent by pounds of AI; insecticide use decreased by 46 percent in acres and 61 percent in pounds, and herbicide use decreased by 42 percent in acres and 40 percent in pounds. Although acres treated with fungicides remained nearly the same in 2007 as in 2006, the pounds of fungicides decreased by 34 percent. The decrease in most pesticides occurred because 2007 had few pest problems. The winter of 2006 – 2007 was dry and cool and this probably kept overwintering pest populations low.

The most used insecticide by acres treated in 2007 was abamectin followed by flonicamid, aldicarb, imidacloprid, and acetamiprid. Use of nearly all the top insecticides decreased, except for flonicamid, which was used for the first time in 2007, and imidacloprid, with treated acres increasing by 15 percent, although pounds decreased. All the organophosphate pesticides decreased. The miticides abamectin and dicofol had only relatively small decreases (each decreased 16 percent). Two newer miticides, etoxazole and spiromesifen, which increased in 2006, decreased in 2007 (by 45 percent and 61 percent, respectively).

The decrease in insecticide use was primarily due to few pest problems in most areas in 2007 and fewer acres planted. Lygus bug populations started the season at low levels, probably because the dry winter kept their overwintering host plants down. However, later in the season lygus increased, possibly because of increased acres of safflower and corn, which can be good alternative lygus hosts. Aphid populations were higher in 2007 than 2006 but less than other years. Other arthropod populations were relatively low.

The herbicides with most acres treated in 2007 were glyphosate, pyrithiobac-sodium, trifluralin, oxyfluorfen, and pendimethalin. The herbicides with greatest decrease were paraquat dichloride (85 percent in acres treated), pyraflufen-ethyl (57 percent), and oxyfluorfen (48 percent). Some of these AIs are used both as harvest aids and herbicides; here it is assumed if use occurred between August and November it was used as a harvest aid, otherwise as an herbicide. Herbicide use decreased probably because the relatively dry winter kept weeds down.

The major harvest aids in 2007 were ethephon, thidiazuron, diuron, mepiquat chloride, and pyraflufen-ethyl. Although mepiquat chloride is included here among the harvest aids, it is actually a growth regulator and is typically used mid-season. Use of nearly all harvest aids and growth regulators decreased from 2006 to 2007, except for cyclanilide. The largest percent decreases were mepiquat chloride (48 percent), sodium chlorate (42 percent), and S,S,S-tributyl phosphorotrithioate (41 percent). These are mostly older harvest aids and are being replaced somewhat by newer chemicals, such as pyraflufen-ethyl, carfentrazone-ethyl, and especially some new cyclanilide products, which have more predictable results. Reduced use of harvest aid and plant growth regulators were also indirectly related to the relatively low insect and mite pest pressure in 2007. When insect pressure is lower and fruit are set more evenly on the plants, there generally is less need for growth regulators due to fruit competition with vegetative growth for nutrients and carbohydrates. Preparation for harvest is also typically easier in plants where vigor is more balanced due to good fruit distribution and more even and less vigorous growth.

Fungicides are not widely used in cotton, but their use has been increasing most years between 2002 and 2007 because of increased problems with seedling diseases. The most commonly used fungicide both by pounds and acres treated is azoxystrobin and its use increased by 3 percent, both by pounds and acres treated. By pounds, the only other fungicide to increase was metalaxyl (6 percent); pounds of all the other main fungicides decreased by 50 to 65 percent. By acres treated, azoxystrobin was practically the only fungicide applied. Nearly all other fungicides are used as seed treatments and are not applied to the field. Azoxystrobin is applied to cotton fields at planting to control seedling diseases. Azoxystrobin use increased in 2007 and in recent years because the cool spring weather was conducive to seedling diseases and because of other factors that made re-planting fields nearly cost-prohibitive. These factors include: (1) the increasing cost of planting seed, particularly the transgenic varieties; and (2) difficulties in maintaining soil moisture for replanting, or excessive costs of additional water needed if problems with soil moisture availability are apparent after replanting. *Rhizoctonia* was the most common seedling disease and was worse in 2007 than most other years.

Table and raisin grapes

Table and raisin grapes comprised approximately 38 percent of California's total grape crop in 2007, the rest being wine grapes. These categories shift depending on market conditions, since some grape varieties can be used for more than one purpose. Thompson Seedless is the leading raisin grape variety, while Flame Seedless is the leading table grape variety. California produced about 1,947,000 tons of raisin grapes and 754,000 tons of table grapes in 2007. Despite reported vine stunting caused by sub-freezing temperatures in January, statewide table grape and raisin tonnage increased by 37,000 tons and 114,000 tons, respectively, relative to 2006 production.

Table 14A. *Total reported pounds of all active ingredients (AIs), acres treated, acres planted, and prices for table and raisin grapes each year from 2003 to 2007. Planted acres from 2003 to 2006 are from CDFA 2007; planted acres in 2007 are from NASS, March 2008; marketing year average prices from 2003 to 2007 from NASS, July 2008b.*

	2003	2004	2005	2006	2007
Lbs AI	16,532,873	17,558,351	19,395,692	15,245,751	16,367,410
Acres Treated	5,092,394	4,984,244	5,927,808	5,731,725	5,522,678
Acres Planted Raisin	260,000	248,000	246,000	240,000	233,000
Acres Planted Table	93,000	92,000	93,000	93,000	92,000
Acres Planted Total	353,000	340,000	339,000	333,000	325,000
Price Raisin $/ton	$170	$306	$261	$277	$282
Price Table $/ton	$601	$695	$442	$898	$787
Price All	$284	$411	$311	$450	$425

Table 14B. *Percent difference from previous year for reported pounds of all AIs, acres treated, acres planted, and prices for raisin and table grapes from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	-9	6	10	-21	7
Acres Treated	-1	-2	19	-3	-4
Acres Planted Raisin	3	-5	-1	-2	-3
Acres Planted Table	-4	-1	1	0	-1
Acres Planted Total	1	-4	0	-2	-2
Price Raisin $/ton	12	80	-15	6	2
Price Table $/ton	-2	16	-36	103	-12
Price All	1	45	-24	45	-100

Figure 12. *Acres of raisin and table grapes treated by all AIs in the major types of pesticides from 1995 to 2007.*

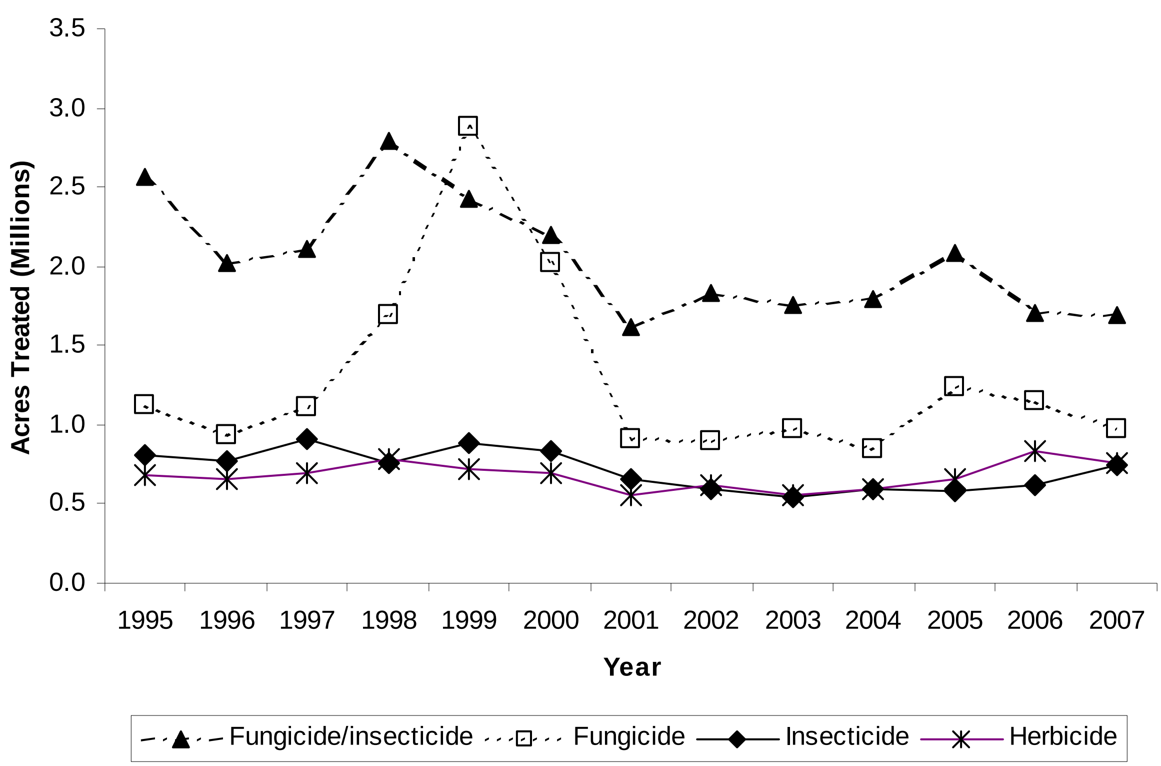


Table 14C. *The non-adjuvant pesticides with the largest change in acres treated of raisin and table grapes from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
COPPER	FUNGICIDE	321,504	244,870	331,330	366,782	262,204	-104,578	-29
PARAQUAT DICHLORIDE	HERBICIDE	117,569	106,879	128,530	156,655	119,499	-37,156	-24
MYCLOBUTANIL	FUNGICIDE	193,745	162,020	169,882	155,368	124,965	-30,404	-20
IMIDACLOPRID	INSECTICIDE	93,595	104,883	63,043	83,349	113,083	29,734	36
OIL	INSECTICIDE	29,252	31,206	29,819	41,165	69,092	27,928	68
SULFUR	FUNGICIDE/ INSECTICIDE	1,823,162	1,820,909	2,120,638	1,742,570	1,714,658	-27,912	-2
MANCOZEB	FUNGICIDE	35,527	33,457	59,879	57,522	30,530	-26,992	-47
GLYPHOSATE	HERBICIDE	195,632	193,209	208,348	249,602	223,523	-26,079	-10
SIMAZINE	HERBICIDE	93,564	98,273	76,110	95,866	75,931	-19,935	-21
BACILLUS THURINGIENSIS	INSECTICIDE	61,951	58,970	54,790	56,731	38,339	-18,392	-32
BUPROFEZIN	INSECTICIDE	6,995	14,281	22,888	25,899	43,536	17,637	68
FLUMIOXAZIN	HERBICIDE	0	0	30,825	40,506	57,488	16,982	42
GLUFOSINATE-AMMONIUM	HERBICIDE	3,473	8,644	15,447	46,364	63,141	16,777	36
KRESOXIM-METHYL	FUNGICIDE	24,975	6,054	37,950	46,512	31,938	-14,573	-31
SPIRODICLOFEN	INSECTICIDE	0	0	0	0	14,059	14,059	N/A

Two percent fewer acres were planted to table and raisin grapes in 2007. Total acres treated with the major categories of pesticides decreased by 4 percent, while total pounds of applied pesticides increased by 7 percent. The increase in pesticide use can be attributed to increased applications of insecticides, fumigants, and fungicide/insecticides.

In 2007, sub-freezing temperatures in January were a major cause of concern, but the following mild temperatures in subsequent months, aided vine recovery. Warm temperatures in April stimulated vigorous vine growth. Record high temperatures in early July caused some concern, but little fruit shriveling was reported. Table grape harvests began in the Central Valley in early July, continuing into early November for the late ripening varieties. Raisin grape harvesting began in late August, with the majority of the crop dried and removed from the field by late September. Minor amounts of precipitation were measured in the Central Valley in the last week of September, but the damage to the raisin crop was minimal. In general, table and raisin grapes were of good size and quality and the harvest was about 3 percent larger in 2007 than 2006.

Insecticides that experienced a significant increase in use in 2007 include imidacloprid, oils, spirodiclofen, and buprofezin. Factors that may have contributed to the increased insecticide use were spreading infestations of vine mealybug and increased use of reduced-risk products, which sometimes require more frequent and better-timed applications to be effective. Both imidacloprid and buprofezin are used to control vine mealybug. In 2007, acreage treated with oils increased greatly (Table 14C). Oils have many attractive, broad-spectrum properties and are low-risk. Increasingly mixed with fungicides, oils can replace a surfactant and eradicate mildew growth, as well as suppressing mites and insects such as grape leafhoppers. The active ingredient spirodiclofen was registered for use in California, in 2007. Spirodiclofen is a miticide in the tetronic acid class of chemicals (USEPA, 2005). In its first year of registration, 3,815 pounds of the active ingredient was applied to 14,059 acres.

Disease pressure was fairly light in 2007 compared to 2006, resulting in a decrease in fungicide use. Acres treated with sulfur decreased by 2 percent, due to reduced powdery mildew pressure. Fungicides most used for table and raisin grape production in 2006 by acres treated were sulfur, copper, myclobutanil, boscalid, pyraclostrobin, trifloxystrobin and tebuconazole. Most of these as well as potassium bicarbonate, triflumizole, and fenarimol provide good to excellent control of powdery mildew, which is the main reason for fungicide use in San Joaquin and Coachella Valley vineyards. Table 14C shows decreases in acres treated with several of those fungicides and cyprodinil, which is effective against *Botrytis* bunch rot. Copper use decreased dramatically in 2007, down 40 percent from 2006; this was likely due to reduced disease pressure from downy mildew and summer bunch rot. Use of sulfur dioxide, the major postharvest fungicide applied to table grapes, was up by 26 percent by weight.

Decreased herbicide use reflected a relatively dry winter season, resulting in reduced weed pressure in early spring. The most-used herbicides by acres treated were glyphosate, paraquat dichloride, simazine, oxyfluorfen, oryzalin, and glufosinate-ammonium. Table 14C lists several of these chemicals as herbicides with significant decreases in acres treated in 2007. Flumioxazin and glufosinate-ammonium applications increased in 2007 by 42 and 36 percent, respectively. Flumioxazin is a pre-emergent herbicide with a lower potential to contaminate ground water than simazine, while glufosinate-ammonium is a post-emergent with properties similar to glyphosate.

Total vineyard acres treated with fumigants increased by 140 percent in 2007 compared to 2006. The two most-used soil fumigants by pounds of active ingredients, are the preplant nematicide 1,3-dichloropropene and sodium tetrathiocarbonate for nematodes and phylloxera . Methyl bromide applied for postharvest treatment of grapes for export was nearly unchanged from 2006, amounting to about 9000 pounds. By pounds of active ingredient, use of aluminum phosphide, the main postharvest fumigant for raisins, increased by 53 percent. This represents an increase of roughly 1,200 pounds from 2006, placing the year’s use close to that of 2005 and below the five-year average.

Raisin and table grape acres treated with plant growth regulators (PGR) were roughly the same as in 2006, with a marginal decrease of 0.3 percent. Total pounds of PGR applied increased by 19 percent, which is directly attributable to an increase in hydrogen cyanimide applications in Coachella Valley (>77 percent of all hydrogen cyanimide uses both in pounds and acres treated was done in Coachella Valley). Hydrogen cyanimide is sprayed during the dormant period to promote increased and uniform budbreak in areas that have warmer winters. Total acres treated with hydrogen cyanimide increased by 10 percent. By acres treated, gibberellin was the most-used PGR. It is a low-dose compound, sprayed between mid-May and early June to reduce fruit set and increase fruit size. By acres treated, forchlorfenuron, which is more expensive but used in the same way as gibberellin, was used in only 2% of the acres. Forchlorfenuron is mainly used on grape varieties that are not tolerant of gibberellins.

Alfalfa

Alfalfa hay is produced for animal feed in California. Most counties produce some alfalfa hay, but more than half of the state's production comes from Fresno, Kern, Imperial, Merced, and Tulare counties. Harvested alfalfa acres decreased by 6 percent in 2007 compared to 2006, but the price per ton increased by 41 percent from 2006 to 2007. The dairy industry remains the biggest market for alfalfa hay. The increased price for hay was due to higher milk prices, premium paid for corn in ethanol production and low hay supplies from other western states that usually ship large quantities of alfalfa into California to augment local production. The total pounds of pesticide active ingredient applied decreased by 4 percent in 2007 compared to 2006. Similarly, the acres treated with pesticides decreased by 20 percent in 2007 relative to 2006.

Table 15A*. Total reported pounds of all active ingredients (AIs), acres treated, acres harvested, and prices for alfalfa each year from 2003 to 2007. Harvested acres from 2003 to 2006 are from CDFA 2007; harvested acres in 2007 are from NASS, June 2008; marketing year average prices from 2003 to 2005 are from NASS, July 2004, July 2005, and July 2006; 2005; 2006 and 2007 prices from NASS July 2008b.*

	2003	2004	2005	2006	2007
Lbs AI	2,936,900	2,673,263	2,862,543	3,021,455	2,907,322
Acres Treated	4,867,186	4,170,614	5,170,898	5,559,141	4,439,829
Acres Harvested	1,090,000	1,050,000	1,040,000	1,050,000	990,000
Price $/ton	$93.00	$116.00	$136.00	$116.00	$163.00

Table 15B*. Percent difference from previous year for reported pounds of all AIs, acres treated, acres harvested, and prices for alfalfa from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	-4	-9	7	6	-4
Acres Treated	5	-14	24	8	-20
Acres Harvested	-6	-4	-1	1	-6
Price $/ton	-5	25	17	-15	41

Figure 13*. Acres of alfalfa treated by all AIs in the major types of pesticides from 1995 to 2007.*

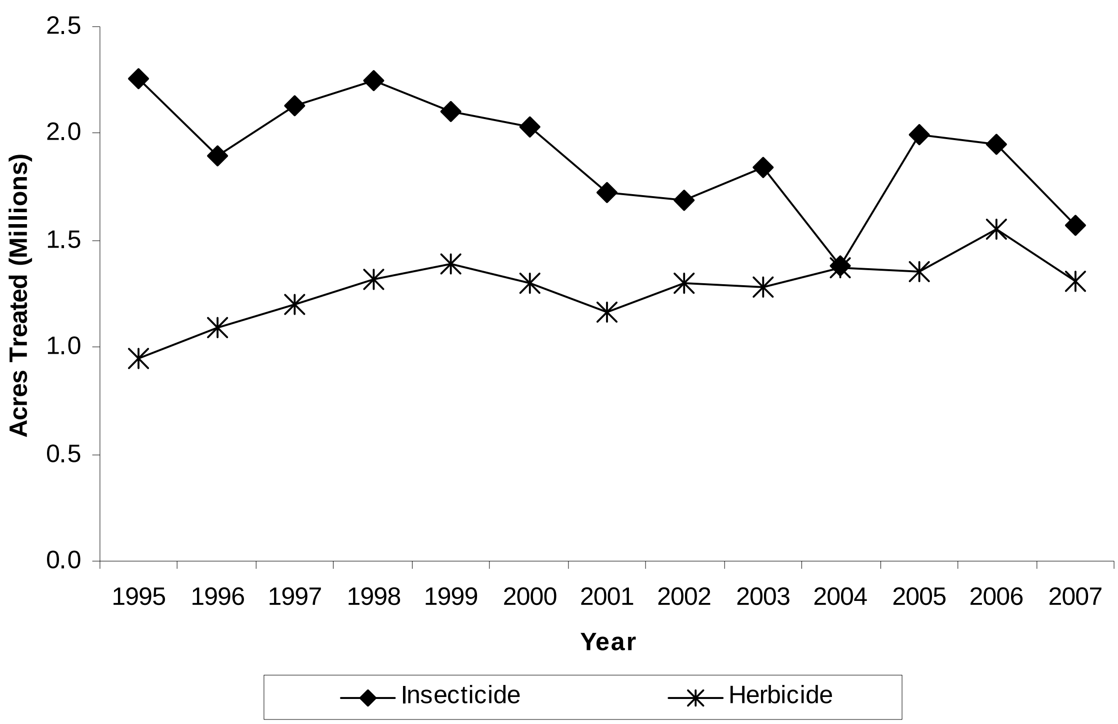


Table 15C*. The non-adjuvant pesticides with the largest change in acres treated of alfalfa from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
INDOXACARB	INSECTICIDE	253,988	122,368	337,267	481,660	246,318	-235,342	-49
CYFLUTHRIN	INSECTICIDE	171,018	145,508	144,550	133,029	53,054	-79,975	-60
BETA-CYFLUTHRIN	INSECTICIDE	0	0	0	2,137	66,102	63,965	2,994
CHLORPYRIFOS	INSECTICIDE	540,581	378,147	547,172	443,628	386,498	-57,130	-13
(S)-CYPERMETHRIN	INSECTICIDE	23,480	64,852	134,612	139,030	82,439	-56,591	-41
PARAQUAT DICHLORIDE	HERBICIDE	221,728	258,297	216,114	251,477	195,013	-56,464	-22
TRIFLURALIN	HERBICIDE	307,198	282,948	303,796	317,191	276,815	-40,376	-13
PENDIMETHALIN	HERBICIDE	2,330	3,982	4,578	5,820	46,062	40,242	691
IMAZAMOX, AMMONIUM SALT	HERBICIDE	58,935	71,896	98,113	120,149	80,631	-39,518	-33
METHOMYL	INSECTICIDE	137,236	48,062	135,197	79,002	39,901	-39,101	-49
DIURON	HERBICIDE	197,645	204,643	157,109	186,563	147,695	-38,869	-21
HEXAZINONE	HERBICIDE	154,445	159,010	133,672	159,994	123,196	-36,797	-23
GLYPHOSATE	HERBICIDE	20,609	17,292	19,930	52,114	84,867	32,753	63
4-(2,4-DB), DIMETHYLAMINE SALT	HERBICIDE	31,037	50,436	64,028	85,443	52,879	-32,564	-38
IMAZETHAPYR, AMMONIUM SALT	HERBICIDE	6,749	9,947	54,651	99,473	68,361	-31,112	-31

Statewide, insecticide use on alfalfa decreased by 11 percent in pounds of AI and by 20 percent in acres treated in 2007 compared to 2006, which were greater declines than the 6 percent decrease of alfalfa acres harvested. The decrease in acres treated with insecticides was mainly from declines in chlorpyrifos (13 percent), methomyl (49 percent), cyfluthrin (60 percent), (s)-cypermethrin (41 percent), and indoxacarb (49 percent). In contrast, acres treated with beta-cyfluthrin increased by about 30 times in 2007 compared to 2006; this increase was probably due to a switch from cyfluthrin to beta-cyfluthrin. Due to growers' awareness, uses of products (e.g. chlorpyrifos) with surface water quality concerns are expected to decline over time.

The decrease in chlorpyrifos and methomyl was mainly in the San Joaquin Valley. Decreased use of in indoxacarb was mainly in the San Joaquin Valley, and Imperial Valley. Insecticide use is a reflection of the intensity of pest pressure during the season. The statewide decrease for insecticide use in pounds and acres treated may be due to less insect pressure of western yellow striped armyworm, beet armyworm, alfalfa caterpillar, and Egyptian alfalfa weevil in 2007 relative to the preceding years.

Statewide, herbicide use in pounds and acres treated decreased by 7 percent and 16 percent respectively, in 2007 compared to uses in 2006. This decrease may be due to less weed pressure because of the relatively dry spring in 2007 compared to 2006 and because there were fewer acres planted. Use of most of the top 20 high use herbicides decreased, except for glyphosate, pendimethalin, EPTC, and benefin.

The decrease in herbicide use occurred mainly in the Sacramento and San Joaquin Valleys. The increase in glyphosate use may be attributed to the brief introduction of genetically modified Roundup Ready (glyphosate) alfalfa varieties. A court mandate in 2007 halted planting of new acreage of Roundup Ready alfalfa but allowed existing acres to continue producing. Since growers could not plant new Roundup Ready alfalfa, they returned to the use of pre-plant herbicides benefin and EPTC.

Processing Tomato

Processing tomato growers planted 301,000 acres in 2007, a six percent increase over 2006. The highest concentration of processing tomatoes continues to be located in the southern San Joaquin Valley, with Fresno County leading state production with 40 percent of the crop—or 119,000 acres—followed by Yolo County (37,600 acres), San Joaquin County (30,100 acres), and Kings County (24,800 acres).

Table 16A. *Total reported pounds of all active ingredients (AIs), acres treated, acres planted, and prices for processing tomatoes each year from 2003 to 2007. Planted acres from 2003 to 2006 are from CDFA 2007; planted acres from 2007 are from NASS, May 2008b; marketing year average prices from 2003 to 2004 from NASS, January 2005; from 2005 to 2007 from NASS, January 2008.*

	2003	2004	2005	2006	2007
Lbs AI	10,972,636	11,532,213	11,297,717	12,269,869	10,679,621
Acres Treated	2,662,371	2,505,256	2,777,416	2,962,484	2,683,031
Acres Planted	289,000	301,000	267,000	283,000	301,000
Price $/ton	$57.20	$57.40	$59.60	$65.40	$70.30

Table 16B. *Percent difference from previous year for reported pounds of all AIs, acres treated, acres planted, and prices for processing tomatoes from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	3	5	-2	9	-13
Acres Treated	29	-6	11	7	-9
Acres Planted	-2	4	-11	6	6
Price $/ton	1	0	4	10	7

Figure 14. *Acres of processing tomatoes treated by all AIs in the major types of pesticides from 1995 to 2007.*

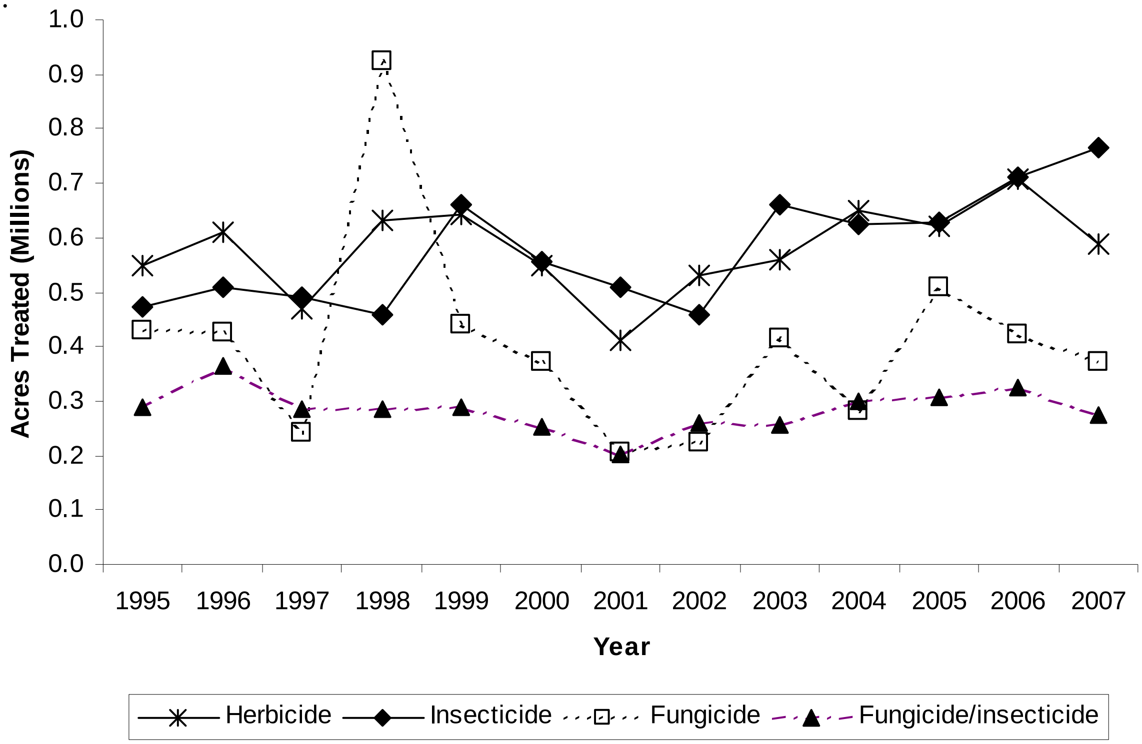


Table 16C. *The non-adjuvant pesticides with the largest change in acres treated of processing tomatoes from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
COPPER	FUNGICIDE	99,683	21,096	136,762	74,214	26,846	-47,368	-64
GLYPHOSATE	HERBICIDE	89,765	97,571	101,177	118,161	76,016	-42,146	-36
ETHEPHON	PLANT GROWTH REGULATOR	33,124	8,307	27,950	54,475	12,976	-41,499	-76
SULFUR	FUNGICIDE/ INSECTICIDE	255,651	288,779	292,697	303,982	267,344	-36,638	-12
DIMETHOATE	INSECTICIDE	53,374	87,967	91,100	92,309	121,219	28,909	31
CHLOROTHALONIL	FUNGICIDE	108,230	94,490	101,997	114,304	140,933	26,629	23
MANCOZEB	FUNGICIDE	36,316	9,433	63,256	48,129	21,975	-26,154	-54
IMIDACLOPRID	INSECTICIDE	21,660	30,045	23,559	42,070	66,478	24,407	58
RIMSULFURON	HERBICIDE	119,809	146,534	122,692	113,644	96,173	-17,471	-15
CARBARYL	INSECTICIDE	6,666	10,174	7,312	12,302	28,164	15,862	129
INDOXACARB	INSECTICIDE	100,577	69,751	77,468	85,314	70,068	-15,247	-18
KAOLIN	FUNGICIDE/ INSECTICIDE	2,580	11,230	12,934	21,054	6,707	-14,347	-68
METAM-SODIUM	FUMIGANT	56,644	43,035	29,155	39,641	25,695	-13,945	-35
S-METOLACHLOR	HERBICIDE	81,643	142,195	145,364	168,950	155,503	-13,447	-8
METHOXYFENOZIDE	INSECTICIDE	0	33,893	71,046	93,152	106,233	13,081	14

Total processing tomato production increased by 20 percent from 2006 while total pounds of AI decreased by 13 percent, from 12 million pounds in 2006 to 11 million pounds in 2007. Acres treated decreased by 9 percent, from 3.0 million acres in 2006 to 2.7 acres in 2007. This decrease was attributable to a very dry spring and lack of seedling and spring foliar diseases, such as bacterial speck. This is the lowest pesticide use (by pounds) since 2002. Sulfur and metam-sodium (and potassium forms) accounted for a large percentage of pesticide AI applied—nearly 85 percent of the total pounds applied to tomatoes in 2007.

The number of acres treated with insecticides increased from 2006 to 2007, partly due to pressure from aphids, lepidopterous pests (tomato pinworm, armyworms), and concerns about tomato spotted wilt virus—vectored by western flower thrips. Dimethoate remains the highest use insecticide in pounds AI in 2007, increasing nearly 31 percent from 42,235 pounds in 2006 to 55,161 pounds in 2007. In terms of acres treated, dimethoate increased from 92,309 acres (2006) to 121,219 acres in 2007. Dimethoate is inexpensive, and works well for aphid control. Bifenthrin had the largest percentage increase in use, going from only 4 pounds in 2006 to 4,140 pounds in 2007 and from 38 to 7,144 acres treated. Registered on tomatoes in 2007, bifenthrin is being used to control mites, stinkbugs, and in an attempt to manage virus diseases—spotted wilt particularly. Emamectin benzoate use remained the same compared to 2006, 59,650 acres treated or 6th largest among insecticides, but pounds of use was low, only, 609 total pounds in 2007. Lepidopteran pests and stinkbugs were, again, a major concern that led to similar overall use of worm materials as 2006, though methoxyfenozide seemed to be the preferred insecticide (an increase from 2006 of over 2,000 pounds) while indoxacarb, lambda-cyhalothrin, and tebufenozide all decreased in pounds applied and acres treated. The only other insecticide of note was carbaryl. Carbaryl use increased significantly in 2007 due to an outbreak of ground beetles during transplanting and seedling emergence, increasing 150 percent from 2006 to 25,255 pounds AI applied—trailing only dimethoate in total insecticide pounds used in 2007.

Despite the increase in acres planted, acres treated with herbicides dropped by 119,000 acres in 2007 compared to the year before. Likewise, total pounds of herbicides also decreased in 2007; mostly due to a dry winter and spring that allowed cultivation. Transplant tomato acres continue to increase over direct-seeded acres, contributing to decreases in pounds of s-metalochlor (down 5 percent), metam sodium, and potassium N-methyldithiocarbamate (combined pounds, down 12 percent). Many of the fallow bed herbicides were down in pounds and acres treated due to dry weather conditions (pounds of glyphosate, down 13 percent; pounds of oxyfluorfen, down 68 percent; and pounds of paraquat, down 65 percent).

Sulfur, used for russet mite and powdery mildew during May, June, July and August decreased over 883,000 pounds compared to 2006 (down 11 percent). Acres treated with sulfur decreased similarly, (12 percent) from 304,000 acres in 2006 to 267,000 acres in 2007. Acres treated with chlorothalonil increased, up 27,000 acres or 23 percent, as did pounds of AI applied, also increasing from 2006—from 195,000 to 255,000 pounds, over a 30 percent increase in one year. Chlorothalonil, used to control black mold primarily, but also to limit defoliation and resulting sunburn, was the most used non-sulfur fungicide in 2007, surpassing mancozeb, in second place by pounds, with 25,000 pounds applied. Copper and mancozeb, together, decreased from 128,000 pounds in 2006 to 42,000pounds in 2007, mainly because spring weather did not favor the development of bacterial spot and bacterial speck.

Oranges

Oranges are the eighth highest value crop grown in California (California Agricultural Resource Directory 2007). Eighty-six percent of California oranges are grown in the San Joaquin Valley (Fresno, Kern and Tulare counties) with over half of the total in Tulare county alone. The rest are grown in the interior region (five percent, in Riverside and San Bernardino counties) and on the south coast (about seven percent of the state's acreage, mostly in Ventura and San Diego).

***Table 17A**. Total reported pounds of all active ingredients (AIs), acres treated, bearing acres, and prices for oranges each year from 2003 to 2007. Bearing acres from 2002-03 to 2005-06 are from CDFA 2007; bearing acres in 2006-07 are from NASS, September 2007; marketing year average prices (equivalent P.H.D.) in prices in 2001-02 to 2003-04 are from NASS, July 2005; prices from 2004-05 to 2006-07 are from NASS, July 2008b. A box is about 75 pounds of oranges. "P.H.D." is an abbreviation for per hatch per day.*

	2003	2004	2005	2006	2007
Lbs AI	7,244,992	9,612,556	12,341,386	12,215,178	10,221,547
Acres Treated	2,067,977	2,249,087	2,627,278	2,520,099	2,396,445
Acres Bearing	189,500	184,000	182,000	181,000	179,000
Price $/box	$7.51	$10.72	$9.36	$10.38	$11.98

***Table 17B**. Percent difference from previous year for reported pounds of all AIs, acres treated, bearing acres, and prices for oranges from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	4	33	28	-1	-16
Acres Treated	7	9	17	-4	-5
Acres Bearing	-3	-3	-1	-1	-1
Price $/box	-31	43	-13	11	15

Figure 15*. Acres of oranges treated by all AIs in the major types of pesticides from 1995 to 2007.*

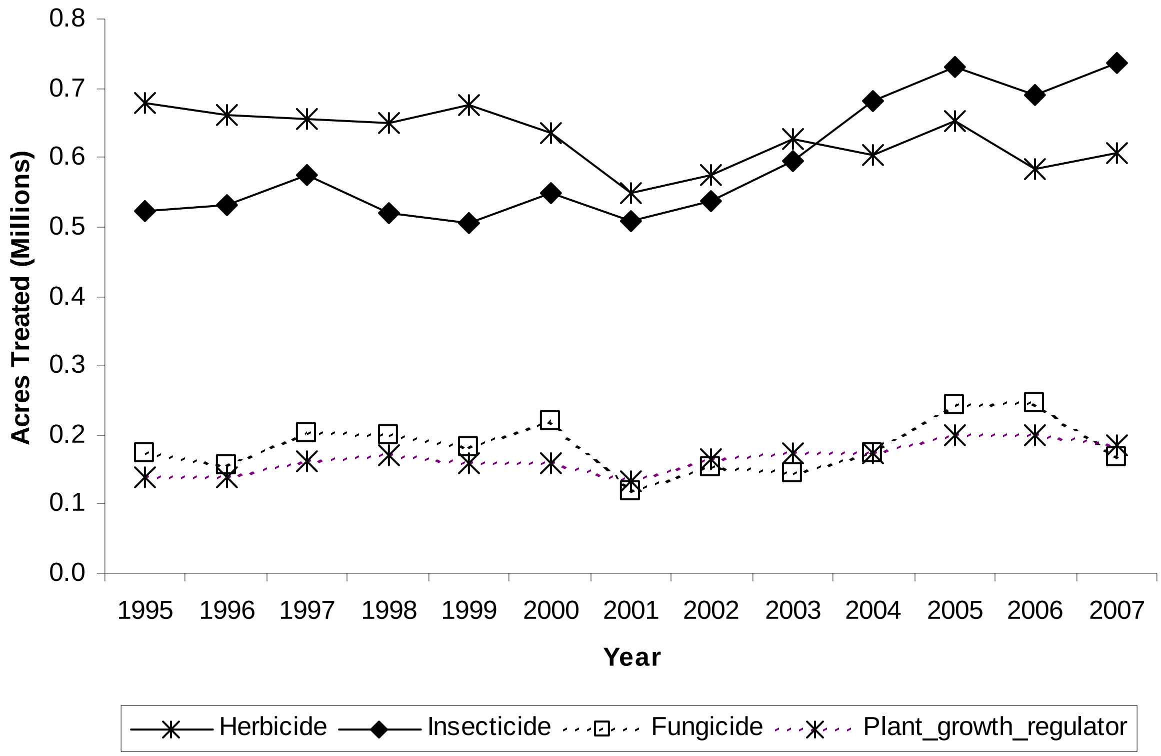


Table 17C*. The non-adjuvant pesticides with the largest change in acres treated of oranges from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
COPPER	FUNGICIDE	135,245	163,517	234,484	240,070	163,984	-76,086	-32
BETA-CYFLUTHRIN	INSECTICIDE					41,872	41,872	
CYFLUTHRIN	INSECTICIDE	54,012	55,794	66,775	71,400	30,098	-41,302	-58
CHLORPYRIFOS	INSECTICIDE	48,447	106,658	102,810	77,852	46,149	-31,703	-41
ACETAMIPRID	INSECTICIDE	44,244	8,881	5,938	3,767	23,303	19,536	519
BACILLUS THURINGIENSIS	INSECTICIDE	24,049	31,601	42,872	27,834	44,851	17,017	61
SPINOSAD	INSECTICIDE	76,570	95,971	106,022	102,534	119,383	16,848	16
PYRIPROXYFEN	INSECTICIDE	36,568	44,364	41,263	43,323	57,139	13,816	32
PENDIMETHALIN	HERBICIDE	1,922	3,474	4,459	16,073	29,535	13,462	84
DIPHACINONE	OTHER	30,610	44,803	25,865	31,547	18,561	-12,986	-41
GLYPHOSATE	HERBICIDE	388,946	366,938	398,359	351,848	364,382	12,534	4
DIMETHOATE	INSECTICIDE	24,357	21,497	22,008	25,209	34,785	9,576	38
SPIRODICLOFEN	INSECTICIDE				17	8,202	8,185	48,720
PYRIDABEN	INSECTICIDE	10,877	5,888	17,097	10,453	3,214	-7,239	-69
SIMAZINE	HERBICIDE	95,349	93,651	101,451	81,151	74,535	-6,616	-8

Total pounds of pesticides used decreased significantly (16 percent) from 2006 to 2007. The total acres treated decreased by 5 percent while the price per box increased 15 percent. The most significant decrease was in the amount of fungicides used. The number of bearing acres continued to decrease, a trend since 2001. The year began with a hard freeze, causing substantial damage to the crop before growers were able to harvest. Preliminary freeze damage to citrus in Fresno County alone was assessed at over $100 million dollars. The effects of the freeze were seen throughout the year with fruit going to juice rather than fresh market, tree removal, extra pruning to remove frost-damaged limbs and in some areas, loss of flowering and fruit set. The summer saw record-breaking high temperatures and extremely low humidity in the citrus-growing regions. As a result, mite populations increased and growers sprayed more miticides.

Overall, acres treated with insecticides increased by 7 percent, up to 2005 levels. Oil, spinosad, pyriproxyfen, chlorpyrifos, *Bacillus thuringiensis (Bt)*, and beta-cyfluthrin were the most widely used insecticides by acres treated. Oil is a broad-spectrum insecticide for mites and scales and is also used as an adjuvant in pesticide treatments. The majority of the increased use came from increases in the use of beta-cyfluthrin, acetamiprid, *Bt*, pyriproxyfen, and spinosad. There were also increases in use of dimethoate and spirodiclofen. The increase in beta-cyfluthrin was almost exactly balanced by a decrease in cyfluthrin. Acetamiprid was not used in great amounts or on large acreages in 2006 but use patterns increased significantly in 2007. This is probably due to growers replacing chlorpyrifos with this insecticide and also because it was used in an areawide treatment program for the glassywinged sharpshooter. *Bt* is used for caterpillar pests and its increased use is tied to higher pest pressure from lepidopterans. In 2007, growers saw a significant increase in citrus cutworm and responded by using *Bt*. Pounds of pyriproxyfen increased by 29 percent. It is used for scale control. Resistance could be increasing, leading to the need for greater amounts of the insecticide. Spinosad is used for citrus thrips. Pounds used and acres treated with this insecticide both increased significantly (17 percent and 16 percent, respectively). 2007 appears to have been a heavy year for thrips. Spiridoclofren and pyridaben are both miticides. The increase in spiradoclofren use, a newly registered product, coupled with the decrease in pyridaben use, is due to growers switching in order to try out the newer AI.

In contrast, use of some insecticides decreased. Use of chlorpyrifos, a broad-spectrum insecticide, declined significantly. It is used primarily for citricola scale control but resistance has been documented. Growers are shifting to other insecticides such as imidacloprid and acetamiprid.

Acres treated with fungicides decreased by 32 percent between 2006 and 2007. That decrease was due to the decrease in use of copper. Copper is the most widely used fungicide on oranges. It is used to prevent *Phytophthora gummosis*, *Phytophthora* root rot, and fruit diseases such as brown rot and Septoria spot. These diseases are exacerbated by wet weather. 2007 was a dry year and fungal diseases were not as severe as in an average rainfall year.

Acres treated with herbicides slightly increased (by 4 percent) between 2006 and 2007 but use did not go back up to 2005 levels. Glyphosate was used the most both in pounds and acres treated, followed by diuron and simazine. The herbicide glyphosate is used to control weeds post-emergence and 4 percent more was used in 2007. Diuron and simazine are used for pre-emergent weed control. Pounds of simazine and diuron used decreased by 11 percent and 6 percent respectively in 2007. The use of pendimethalin almost doubled. Decreased use of simazine and diuron is partially due to ground water regulations.

Rice

California's Sacramento Valley contains more than 95 percent of the state's rice acreage. The remainder is in north to central San Joaquin Valley. The leading rice-producing counties are Colusa, Sutter, Butte, Glenn, and Yolo. Approximately 500,000 acres in the Sacramento Valley are of a soil type restricting the crops to rice or pasture. The remainder of the acreage has greater crop flexibility.

Table 18A. *Total reported pounds of all active ingredients (AIs), acres treated, acres planted, and prices for rice each year from 2003 to 2007. Planted acres from 2003 to 2006 are from CDFA 2007; planted acres in 2007 are from NASS, June 2008; marketing year average prices from 2003 to 2005 are from NASS, July 2004 and July 2006; 2006 and 2007 prices are from NASS, July 2008b. "cwt"stands for 100 pounds.*

	2003	2004	2005	2006	2007
Lbs AI	6,498,573	6,632,438	5,135,455	5,459,723	4,839,890
Acres Treated	2,229,602	2,756,203	1,996,823	2,100,371	2,292,905
Acres Planted	509,000	595,000	528,000	526,000	534,000
Price $/cwt	$9.65	$7.34	$10.50	$13.00	$13.30

Table 18B. *Percent difference from previous year for reported pounds of all AIs, acres treated, acres planted, and prices for rice from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	9	2	-23	6	-11
Acres Treated	2	24	-28	5	9
Acres Planted	-5	17	-11	0	2
Price $/cwt	53	-24	43	24	2

Figure 16. *Acres of rice treated by all AIs in the major types of pesticides from 1995 to 2007.*

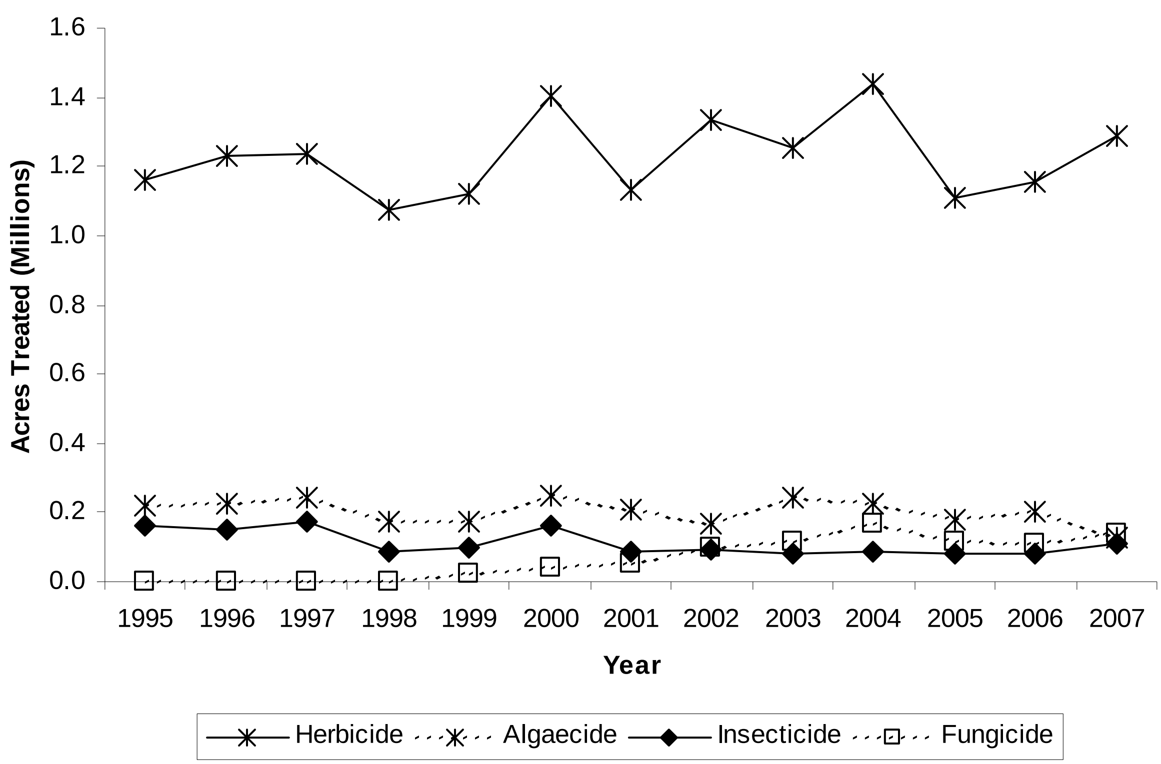


Table 18C*. The non-adjuvant pesticides with the largest change in acres treated of rice from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
COPPER	ALGAECIDE	242,588	227,054	179,268	199,927	126,477	-73,450	-37
PROPANIL	HERBICIDE	312,139	376,499	307,673	317,521	377,903	60,382	19
TRICLOPYR, TRIETHYLAMINE SALT	HERBICIDE	242,478	309,007	236,598	245,837	295,644	49,807	20
CLOMAZONE	HERBICIDE	56,629	85,850	71,315	119,166	159,161	39,996	34
AZOXYSTROBIN	FUNGICIDE	113,931	167,917	108,844	105,448	139,787	34,340	33
LAMBDA-CYHALOTHRIN	INSECTICIDE	54,979	49,901	54,627	39,618	59,505	19,887	50
CARFENTRAZONE-ETHYL	HERBICIDE	70,814	45,883	25,749	33,442	16,090	-17,352	-52
MOLINATE	HERBICIDE	134,120	89,593	40,535	33,044	17,471	-15,572	-47
CYHALOFOP BUTYL	HERBICIDE	93,349	201,215	78,238	107,917	119,979	12,062	11
(S)-CYPERMETHRIN	INSECTICIDE	22,924	30,535	21,814	38,257	48,412	10,155	27
2,4-D	HERBICIDE	22,914	20,960	17,914	12,893	19,946	7,053	55
BISPYRIBAC-SODIUM	HERBICIDE	70,442	94,653	58,923	56,586	62,019	5,433	10
PENOXSULAM	HERBICIDE	0	0	73,058	77,151	82,492	5,341	7
GLYPHOSATE	HERBICIDE	31,081	26,961	17,271	11,070	6,135	-4,935	-45
THIOBENCARB	HERBICIDE	154,928	136,132	118,786	79,109	74,251	-4,858	-6

Pesticide use increased approximately 9 percent from 2006 to 2007 in terms of acres treated, but decreased approximately 11 percent in terms of pounds AI applied. Pounds of AI decreased while acres increased primarily because copper use decreased and copper is applied at high pounds per acre treated and because use of most other AIs increased. Rice acres planted increased by 2 percent. In 2007, there were no major shifts in pest pressure. Herbicides accounted for most of the pesticide use; approximately 77 percent of non-adjuvant pesticide acres treated has been with herbicides. Herbicide use increased by approximately 12 percent from 2006 to 2007. Insecticide use has been decreasing generally and fungicide use increasing since 1993; from 2006 to 2007, acres treated with insecticides increased 38 percent and fungicides increased 27 percent. Major pesticides with the largest percent increases in acres treated include 2,4-D, lambda-cyhalothrin, clomazone, azoxystrobin, and s-cypermethrin. Pesticides with the largest percentage decreases in acres treated include carfentrazone-ethyl, molinate, glyphosate, copper, and thiobencarb.

Lambda-cyhalothrin is the most widely used insecticide by acres treated and its use increased 50 percent in 2007 due to price. Lambda-cyhalothrin is off patent, and with the passage of AB1011, the price dropped to $3.00 per acre. The price of s-cypermethrin was initially lowered to compete with lambda-cyhalothrin. Both insecticides are used primarily for rice water weevil control and secondarily for armyworm and tadpole shrimp control. Insect pressure is low for California rice and these insecticides are used on approximately 10 percent of all rice planted in California. Copper sulfate is also used to control tadpole shrimp,, however, copper sulfate prices were up this year. Also, the product binds to straw residue making it less effective, so growers turn to pyrethroids to control tadpole shrimp soon after flooding.

Copper sulfate is the only algaecide registered for use on California rice, and one of the few products acceptable for organic rice production. The product doubles as a control for tadpole shrimp, which is very important to organic rice growers. Copper sulfate is only used early season when algae mats cover the field before the rice breaks the water surface. Factors that contributed to the 37 percent decrease in use of copper sulfate include: 1) algae pressure was less due to the unusual weather patterns in 2007 (wet in early winter, with excessively hot July) resulting in less algal pressure at planting; and 2) an increase in the price of copper sulfate.

Azoxystrobin is a reduced-risk foliar fungicide. Disease pressure is low for California rice, which is the reason azoxystrobin is used on only approximately one-fifth the total acres planted. In addition, some growers used the product as a preventative for disease control and to increase yield.

The major herbicides by acres treated in rice in 2007 were propanil, triclopyr, clomazone, cyhalofop-butyl, penoxsulam, thiobencarb and bispyribac-sodium. Use of nearly all the major herbicides increased slightly, except for molinate, carfentrazone, and thiobencarb. Reasons for this include the decreased use of molinate for watergrass control (it is being phased-out) and the decreased use of thiobencarb for sprangletop control (due to its narrow timing window for effectiveness, and watergrass resistance). Control of ricefield bulrush with carfentrazone has had difficulties and penoxsulam has emerged as a good control for this weed. Resistance to molinate, carfentrazone and thiobencarb also accounts for the increases in use of clomazone and propanil. Loss of into-the-water molinate and the reduced use of thiobencarb prompts the use of foliar herbicides (cyhalofop, propanil, bispyribac-sodium, and the liquid formulation of penoxsulam); these herbicides require draining the field or lowering the water level, which in turn increases sprangletop incidence and growers' increased use of cyhalofop-butyl. Glyphosate is used as a preplant herbicide in rice. The 45 percent decrease in glyphosate use probably reflects a more normal planting season allowing for adequate timing of spring tillage operations. However, glyphosate use can be expected to increase in the future as stale-seedbed systems become adopted for herbicide resistance management. A stale-seedbed consists of early spring seedbed preparation with no soil disturbance

Head Lettuce

Head lettuce is grown in four regions in the state: the central coastal area (Monterey, San Benito, Santa Cruz, and Santa Clara counties); the southern coastal area (Santa Barbara and San Luis Obispo counties); the San Joaquin Valley (Fresno, Kings, and Kern counties); and the southern deserts (Imperial and Riverside counties). In 2004, 59 percent of all California head lettuce was planted in the central coastal area, 17 percent in the southern coastal area, 12 percent in the San Joaquin Valley, and 11 percent in the southern deserts. California produces 70 to 75 percent of the head lettuce grown in the United States annually. In this analysis, the central and southern coastal areas are combined unless noted.

Table 19A. *Total reported pounds of all active ingredients (AIs), acres treated, acres planted, and prices for head lettuce each year from 2003 to 2007. Planted acres from 2003 to 2005 are from CDFA 2008; planted acres in 2006 and 2007 are from NASS, January 2008; marketing year average prices from 2003 to 2007 from NASS, July 2008b.*

	2003	**2004**	**2005**	**2006**	**2007**
Lbs AI	1,731,680	1,619,139	1,826,746	1,882,444	1,713,050
Acres Treated	2,043,869	2,227,683	2,361,120	2,314,357	2,189,716
Acres Planted	132,000	131,000	130,000	131,000	138,000
Price $/lb	$21.00	$15.10	$15.80	$17.80	$22.30

Table 19B. *Percent difference from previous year for reported pounds of all AIs, acres treated, acres planted, and prices for head lettuce from 2003 to 2007.*

	2003	**2004**	**2005**	**2006**	**2007**
Lbs AI	3	-6	13	3	-9
Acres Treated	1	9	6	-2	-5
Acres Planted	2	-1	-1	1	5
Price $/lb	41	-28	5	13	25

Figure 17. *Acres of head lettuce treated by all AIs in the major types of pesticides from 1995to 2007.*

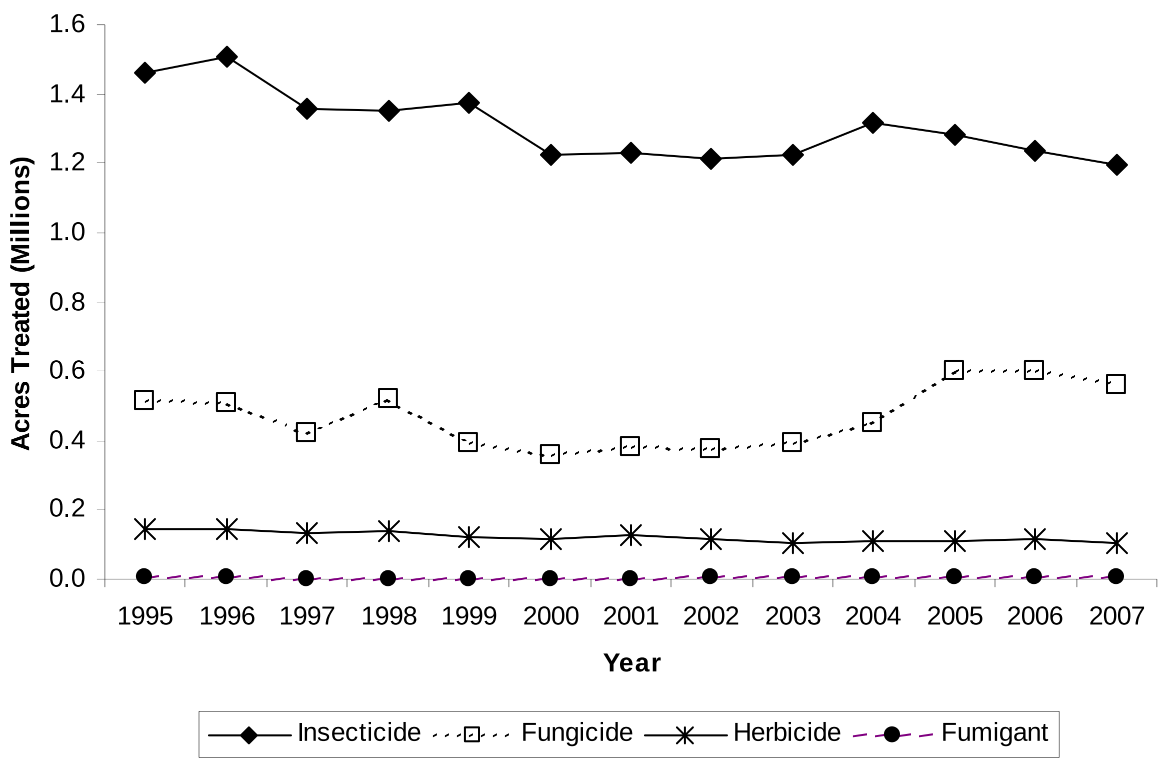


***Table 19C**. The non-adjuvant pesticides with the largest change in acres treated of head lettuce from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
PROPAMOCARB HYDROCHLORIDE	FUNGICIDE				28	74,240	74,212	267,913
DIMETHOATE	INSECTICIDE	59,728	69,680	61,097	49,872	15,627	-34,245	-69
DIMETHOMORPH	FUNGICIDE	9	64,832	98,433	94,852	67,596	-27,256	-29
MANEB	FUNGICIDE	230,529	232,101	234,446	226,113	203,081	-23,031	-10
IMIDACLOPRID	INSECTICIDE	87,894	102,833	86,047	82,863	100,953	18,089	22
SPINOSAD	INSECTICIDE	126,958	125,190	128,716	124,997	107,120	-17,876	-14
PERMETHRIN	INSECTICIDE	145,723	123,483	130,178	119,665	103,428	-16,237	-14
FAMOXADONE	FUNGICIDE			45,541	30,001	17,024	-12,977	-43
CYMOXANIL	FUNGICIDE			45,541	30,001	17,024	-12,977	-43
ACETAMIPRID	INSECTICIDE	14,954	33,428	29,910	35,889	48,838	12,949	36
PYRACLOSTROBIN	FUNGICIDE				24,268	12,316	-11,952	-49
FOSETYL-AL	FUNGICIDE	53,472	32,107	52,593	47,078	36,477	-10,601	-23
MEFENOXAM	FUNGICIDE	3,159	7,263	21,175	24,085	14,027	-10,058	-42
(S)-CYPERMETHRIN	INSECTICIDE	78,417	92,837	107,410	114,210	104,169	-10,040	-9
ESFENVALERATE	INSECTICIDE	26,709	32,367	34,763	24,222	14,246	-9,976	-41

Pesticide use on head lettuce fluctuated from 2003 through 2007 (Table 19A). Use of all classes of pesticide declined from 2006 to 2007 (Figure 17). There was a 4 percent increase from 2006 to 2007 in acres of head lettuce harvested. Yield per acre dropped about one percent, but overall production increased by over 2 percent.

The major pesticides with the largest increase in acres treated were propamocarb hydrochloride, a newly registered fungicide, and the insecticides imidacloprid and acetamiprid (Table 19C). Major pesticides with the largest decrease were dimethoate, spinosad, permethrin, (s)-cypermethrin, esfenvalerate, dimethomorph, maneb, famoxadone, cymoxanil, pyraclostrobin, fosetyl-al, and mefenoxam. During 2007, the top insecticides used (by acres treated) were diazinon, spinosad, (S)-cypermethrin, permethrin, and imidacloprid. The main fungicides used were maneb, propamocarb hydrochloride, dimethomorph, boscalid, and fosetyl-al. Three herbicides dominated—propyzamide (pronamide), bensulide, and benefin. Metam-potassium (potassium n-methyldithiocarbamate) was the main fumigant used, followed by metam sodium. Fewer than 0.2 percent of planted acres were treated with chloropicrin, 1,3–dichloropropene, or methyl bromide.

From 2006 to 2007, insecticide use—as measured by acres treated—declined by 3 percent overall. Insecticide-treated acres rose by 6 percent in the coastal areas, but decreased by 14 percent in the southern deserts, and 16 percent in the San Joaquin Valley. The neonicotinoid insecticides imidacloprid and acetamiprid are used mostly to suppress lettuce and foxglove aphids. Use of imidacloprid in the coastal area increased by 45 percent, peaking in July; however, use actually decreased in other lettuce-growing regions. Use of acetamiprid increased in all regions, but primarily in the San Joaquin Valley where it was used on almost three times more acres in 2007 than in 2006. Throughout California from 2006 to 2007, use of dimethoate and acephate, traditionally used for aphid control, declined in all regions.

The insecticides spinosad and (S)-cypermethrin are used to manage larvae of beet armyworm and cabbage looper, primarily pests in the southern deserts. Use of these insecticides, as measured by acres treated, decreased in the southern deserts in 2007. Methomyl, used for worms, increased by 30 percent in the coastal area, but decreased by 32 percent in the southern deserts. Emamectin benzoate, used for worm pests, is a synthetically modified form of abamectin. Its use increased by 23 percent in the coastal area, but decreased in other regions. Use of permethrin, which is primarily used for controlling seedling pests in the southern deserts such as crickets, earwigs, cutworms, and sowbugs, decreased in that area by 44 percent. Diazinon use also decreased in the southern deserts, where it is often used for stand-establishment pests such as crickets, darkling ground beetles, earwigs, and sowbugs.

Diazinon is a preplant treatment applied for soil pests, and until 2005 was recommended for symphylans, which show up in some coastal fields. A recent trial showed better control by the pyrethroids lambda-cyhalothrin and (S)-cypermethrin. Use of diazinon increased by 9 percent in the coastal area, and use of lambda-cyhalothrin and S-cypermethrin decreased by 4 percent and 10 percent, respectively. Insecticides such as abamectin have replaced permethrin to manage leafminers. Abamectin use in 2007 increased by 9 percent in the coastal area due to mounting leafminer pressure.

Fungicide use by acres decreased by 7 percent from 2006 to 2007. Several active ingredients—both old chemistry and reduced risk, are rotated for downy mildew, a disease that has many pathovars. Maneb, used primarily to control downy mildew and prevent anthracnose, was again the dominant fungicide, as it has been every year since the early 1990s. In general, use of maneb declined from 2006 to 2007, as did that of dimethomorph, fosetyl-al, and famoxidone/cymoxanil. Use of fosetyl-al decreased in all lettuce-growing regions. A new reduced-risk product for downy mildew registered in 2005 contains equal amounts of the active ingredients cymoxanil and famoxadone. After 2005, use of this product declined in all lettuce-growing regions. (See Sulfur below for powdery mildew.)

In 2007, a new active ingredient for lettuce, propamocarb, was introduced for downy mildew. Although used on a few acres in the southern deserts in 2006, its use in 2007 in the central coast and San Joaquin Valley was second only to maneb's.

Lettuce drop (Sclerotinia drop) is another fungal disease with a shift in popular active ingredients. Use of iprodione fell in the coastal area and southern deserts from 2006 to 2007, but rose by 2 percent in the San Joaquin Valley. Use of boscalid, a reduced-risk material, continued to rise in all lettuce-growing regions except the southern deserts. Dicloran use also rose, except in the San Joaquin Valley. (See also chloropicrin below.) Sulfur is applied as a foliar treatment for powdery mildew, and along with the reduced-risk fungicide, azoxystrobin, is the only labeled product used to manage this disease. Use of sulfur and azoxystrobin decreased from 2006 to 2007 in all regions.

Herbicide use by acres treated decreased by 8 percent from 2006 to 2007. Use of propyzamide (pronamide), applied as a postplant–preemergence herbicide, decreased statewide by 8 percent from 2006 to 2007. As consistent with its use for the past ten years, propyzamide was applied to many more acres than the preemergent, bensulide, which targets small-seeded annual grasses and is not as effective as propyzamide in the coastal areas. Use of benefin, a pre-plant herbicide popular in the San Joaquin Valley, decreased statewide from 2006 to 2007.

Nematodes are not economic pests of head lettuce, so soil is primarily fumigated to control soil-borne diseases and suppress weeds. In 2007, fumigants, mostly metam-potassium, were used on about 3 percent of all planted lettuce acreage. Metam-potassium, like its cousin metam-sodium, is a broad-spectrum contact soil sterilant used on a handful of crops. Along with metam-sodium, it was used almost exclusively in the San Joaquin Valley. Used primarily in the desert, use of 1,3–dichloropropene fell 76 percent. Use of methyl bromide, used entirely in the coastal area, decreased by 75 percent. Chloropicrin is used to reduce soil populations of Verticillium wilt and lettuce drop alone or when combined with methyl bromide or 1,3–dichloropropene. In 2007, chloropicrin was used only in the coastal area, and use decreased by 77 percent.

Peaches and Nectarines

California ranks first in the United States in peach and nectarine production. In 2007 the state grew 84 percent of all peaches (including 70 percent of fresh market peaches and all of the processed peaches) and 92 percent of nectarines. Most freestone peaches and nectarines are produced in the central San Joaquin Valley, and are sold on the fresh market. Clingstone peaches, largely grown in the Sacramento Valley, are used exclusively for processing into canned and frozen products including baby food and juice. Nectarine and freestone peach acreages remained unchanged in 2007, while clingstone peach acreage decreased slightly. Peaches and nectarines are discussed together because pest management issues for the two crops are very similar.

Table 20A*. Reported total pounds applied, total acres treated, bearing acres, and crop prices for peaches and nectarines each year from 2003 to 2007. Bearing acres for peaches and nectarines from 2003 to 2006 are from CDFA 2007; bearing acres in 2007 are from NASS, July 2008a; marketing year average prices for fresh (freestone) peach from 2003 to 2005 are from NASS July 2004 and July 2006; 2006 and 2007 prices are from NASS July 2008b.*

	2003	2004	2005	2006	2007
Lbs AI applied	6,484,692	6,439,437	6,514,894	6,793,883	5,153,455
Acres Treated	1,513,195	1,519,265	1,581,849	1,698,392	1,407,660
Acres Bearing Peach	68,000	69,000	66,400	63,000	62,500
Acres Bearing Nectarine	36,500	36,500	35,500	35,500	35,500
Acres Bearing Total	104,500	105,500	101,900	98,500	98,000
Price $/ton Peach	$406	$341	$540	$597	$498
Price $/ton Nectarine	$436	$342	$504	$522	$340
Price $/ton Total	$416	$341	$527	$570	$441

Table 20B*. Percent difference from previous year for reported total pounds applied, total acres treated, bearing acres, and crop prices for peaches and nectarines from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI applied	-3	-1	1	4	-24
Acres Treated	-7	0	4	7	-17
Acres Bearing Peach	0	1	-4	-5	-1
Acres Bearing Nectarine	0	0	-3	0	0
Acres Bearing Total	0	1	-3	-3	-1
Price $/ton Peach	-3	-16	58	11	-17
Price $/ton Nectarine	14	-22	47	4	-35
Price $/ton Total	3	-18	55	8	-23

Figure 18*. Acres of peaches and nectarines treated with all AIs in the major groups of pesticides from 1995 to 2007.*

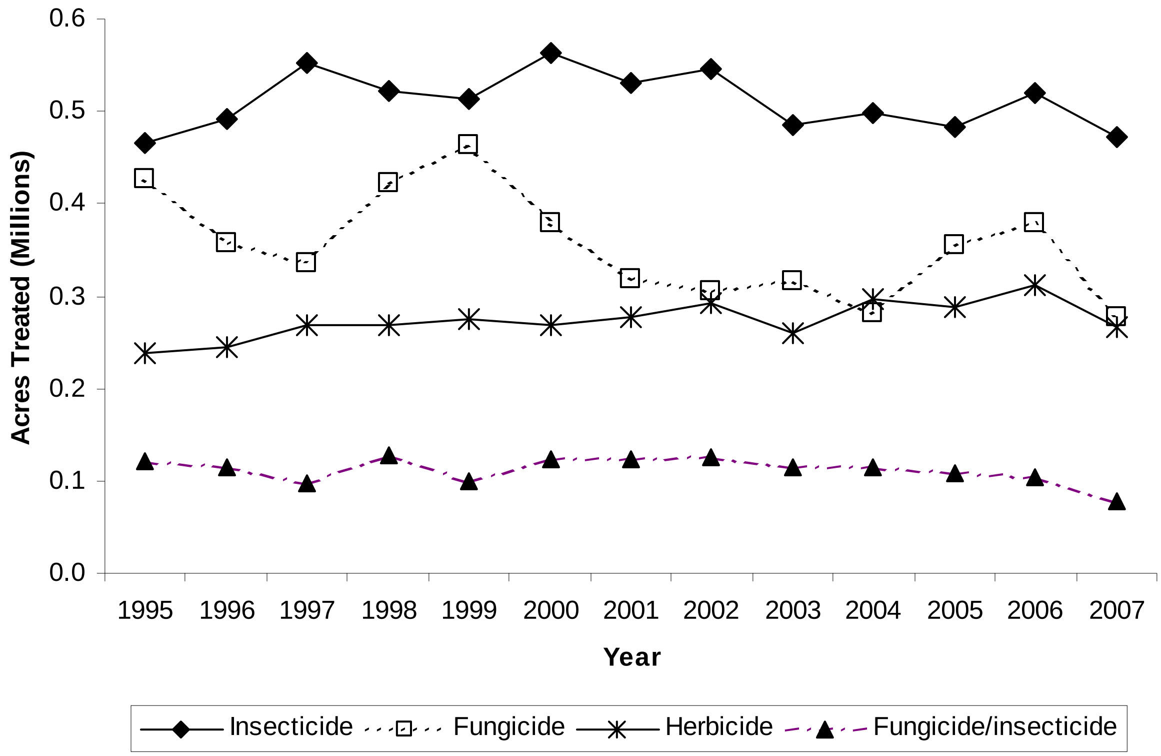


Table 20C*. The non-adjuvant pesticides with the largest change in peach and nectarine acres treated from 2006 to 2007. This table shows acres treated with each AI each year from 2003 to 2007, the change in acres treated, and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
COPPER	FUNGICIDE	88,582	84,728	79,751	70,637	43,875	-26,763	-38
GLYPHOSATE	HERBICIDE	119,709	141,044	143,569	152,461	126,486	-25,975	-17
SULFUR	FUNGICIDE/ INSECTICIDE	110,256	105,605	104,838	102,168	76,428	-25,739	-25
ESFENVALERATE	INSECTICIDE	92,192	98,028	95,817	101,673	80,572	-21,101	-21
OIL	INSECTICIDE	107,352	106,449	110,464	116,893	99,352	-17,541	-15
PROPICONAZOLE	FUNGICIDE	44,169	42,514	72,555	81,578	64,695	-16,883	-21
PENDIMETHALIN	HERBICIDE	2,194	3,297	1,622	3,471	20,194	16,723	482
OXYFLUORFEN	HERBICIDE	44,310	47,648	45,598	51,189	35,172	-16,017	-31
SPIRODICLOFEN	INSECTICIDE					12,066	12,066	
TEBUCONAZOLE	FUNGICIDE	37,337	27,073	30,755	29,394	17,920	-11,473	-39
CYPRODINIL	FUNGICIDE	28,753	26,944	32,409	30,767	21,195	-9,571	-31
IPRODIONE	FUNGICIDE	38,073	33,952	34,197	36,395	27,132	-9,263	-25
PYRACLOSTROBIN	FUNGICIDE	0	7,336	19,967	29,696	20,502	-9,194	-31
BOSCALID	FUNGICIDE	0	7,336	19,967	29,696	20,502	-9,194	-31
DIFLUBENZURON	INSECTICIDE	54	613	1,981	1,927	10,993	9,066	471

Peach and nectarine acreage treated with the major categories of pesticides has fluctuated from year to year since 1995 without substantial increasing or decreasing trends (Figure 18). In 2007, total acres treated with pesticides and total pounds of pesticide AI applied decreased from 2006 levels by 17 percent and 23 percent respectively, even though there were only 1 percent fewer bearing acres in 2007. This decrease in pesticide use was chiefly due to few problems with insect and mite pests, and a warm, dry spring in the San Joaquin Valley (the major production area) that suppressed pest fungi and weed growth. Plenty of wintertime chill hours left trees “well rested” before spring bloom. Mild spring weather promoted strong, uniform bloom and heavy fruit set. Conditions for freestone peach and nectarine development were ideal: temperatures were high enough to prevent flesh corking and ensure good sugar content and excellent taste, but not hot enough to decrease fruit size. A cooler spring in the Sacramento Valley reduced the size of clingstone peaches, but not fruit quality. 2007 saw a bumper crop of high quality peaches and nectarines, with per acre yields 33 and 23 percent above 2006 levels, respectively. The price per ton of peaches was 17 percent lower than in 2006, however, and the nectarine price 35 percent lower, for an aggregate price decrease of 23 percent (Table 20B).

Total peach and nectarine acres treated with insecticides decreased by about 9 percent in 2007, due to relatively light pest pressure. The major insecticides used in peaches and nectarines were: oils; esfenvalerate; phosmet; the Oriental fruit moth (OFM) mating disruption pheromones E–8–dodecenyl acetate, Z–8–dodecenyl acetate, and Z–8–dodecenol; and spinosad. Spirodiclofen, a contact miticide newly registered for stone fruit, made a strong market debut (Table 20C). Oils are applied during the dormant season to forestall outbreaks of scales, mites, and moth pests. Esfenvalerate is a broad-spectrum chemical that may be used in dormant applications or during the growing season, including as an alternative to OFM pheromones. Spinosad and phosmet control moths and katydids, and spinosad is also effective against thrips. Acres treated with the major insecticides decreased except for OFM pheromones and spinosad. Acres treated with diflubenzuron, a broad spectrum insect growth regulator that controls moths, beetles, and katydids, increased sharply (Table 20C). These data suggest a trend toward reduced-risk insecticides. They are not more expensive than organophosphate insecticides, and have shorter re-entry periods. Other possible reasons for the trend include the declining effectiveness of phosmet for moth control and a reduction in the cost of mating disruption for OFM management because longer-lasting pheromone dispensers have become available. Acres treated with chlorpyrifos and pounds applied decreased by about 31 percent and 40 percent, respectively. Growers are being encouraged to use alternative chemicals to protect water and air quality.

In 2007, peach and nectarine acres treated with fungicides decreased by about 28 percent because most of the growing area experienced a warm, dry spring that inhibited disease development. The most-used fungicides by acres treated were sulfur, propiconazole, ziram, copper, iprodione, cyprodinil, pyraclostrobin/boscalid, and tebuconazole. Sulfur is the standard treatment for powdery mildew. Propiconazole is a low-dose chemical applied against fungi and powdery mildew. Ziram and copper are effective for leaf curl and shot hole disease, and ziram also controls scab. Cyprodinil is used against brown rot of blossoms and fruit. Pyraclostrobin and boscalid are reduced risk alternatives for mildew and fungus control. Tebuconazole is effective against brown rots, and to a lesser extent against powdery mildew, rust, and scab. Treatments with almost all of these chemicals decreased substantially (Table 20C).

There was a 15 percent decrease in total peach and nectarine acres treated with herbicide in 2007. The dry spring in the San Joaquin Valley limited weed growth, and low fruit prices may have motivated growers to cut costs where possible. Most-used herbicides by acres treated were glyphosate, oxyfluorfen, 2,4-D, paraquat, and pendimethalin. Among those herbicides, only pendimethalin registered an increase in use, which was large (Table 20C). Grass weeds can be more important during a dry spring, and pendimethalin is an effective grass herbicide with good residual control.

Total acres treated with preplant fumigants declined by 18 percent. Total pounds of preplant fumigants applied fell even more, by about 32 percent. Growers may be applying lower rates and/or moving from broadcast application to spot or row treatments. Those changes save money, and also respond to regulatory encouragement to reduce emissions of volatile organic compounds (VOCs), which are precursors to ground level ozone formation. 1,3-D accounted for 76 percent of peach and nectarine acres treated. Methyl bromide and chloropicrin were applied to 15 and 9 percent of acres treated, respectively. Methyl bromide use decreased partly because it has become relatively expensive. Changing relationships between nematode infestations, rootstock choices, and application patterns also affect fumigant selection and use from year to year.

Pounds of methyl bromide used for postharvest treatment of peaches and nectarines fell by 42 percent in spite of the bumper crop in storage. New export protocols adopted by several countries allow alternative methods of postharvest pest control. Notably, in 2007 Mexico allowed more fruit to be imported without fumigation provided it was produced under a systems protocol program involving a farm plan with mandated pesticide treatments.

Strawberries

California produces 86 percent of the total U.S. production of 2,499 million pounds of strawberries. California produced 2,154 million pounds valued at more than $1,338 million. Strawberries are grown mostly for fresh market. Depending on market prices, some are processed. California strawberry production occurs primarily along the central and southern coast, with small but significant production occurring in the Central Valley.

Table 21A. *Total reported pounds of all active ingredients (AIs), acres treated, acres harvested, and prices for strawberries each year from 2003 to 2007. Harvested acres from 2003 to 2006 are from CDFA 2007; harvested acres in 2007 are* from *NASS, July 2008a; marketing year average prices from 2003 to 2007 from NASS, July 2008b. "cwt"stands for 100 pounds.*

	2003	2004	2005	2006	2007
Lbs AI	9,192,267	9,565,451	9,227,498	9,380,340	9,641,506
Acres Treated	1,266,617	1,241,172	1,279,092	1,291,122	1,357,402
Acres Harvested	29,600	33,200	34,300	35,800	35,500
Price $/cwt	$72.80	$62.20	$62.60	$65.10	$71.50

Table 21B. *Percent difference from previous year for reported pounds of all AIs, acres treated, acres harvested, and prices for strawberries from 2003 to 2007.*

	2003	2004	2005	2006	2007
Lbs AI	12	4	-4	2	3
Acres Treated	26	-2	3	1	5
Acres Harvested	4	12	3	4	-1
Price $/cwt	8	-15	1	4	10

Figure 19. *Acres of strawberries treated by all AIs in the major types of pesticides from 1995 to 2007.*

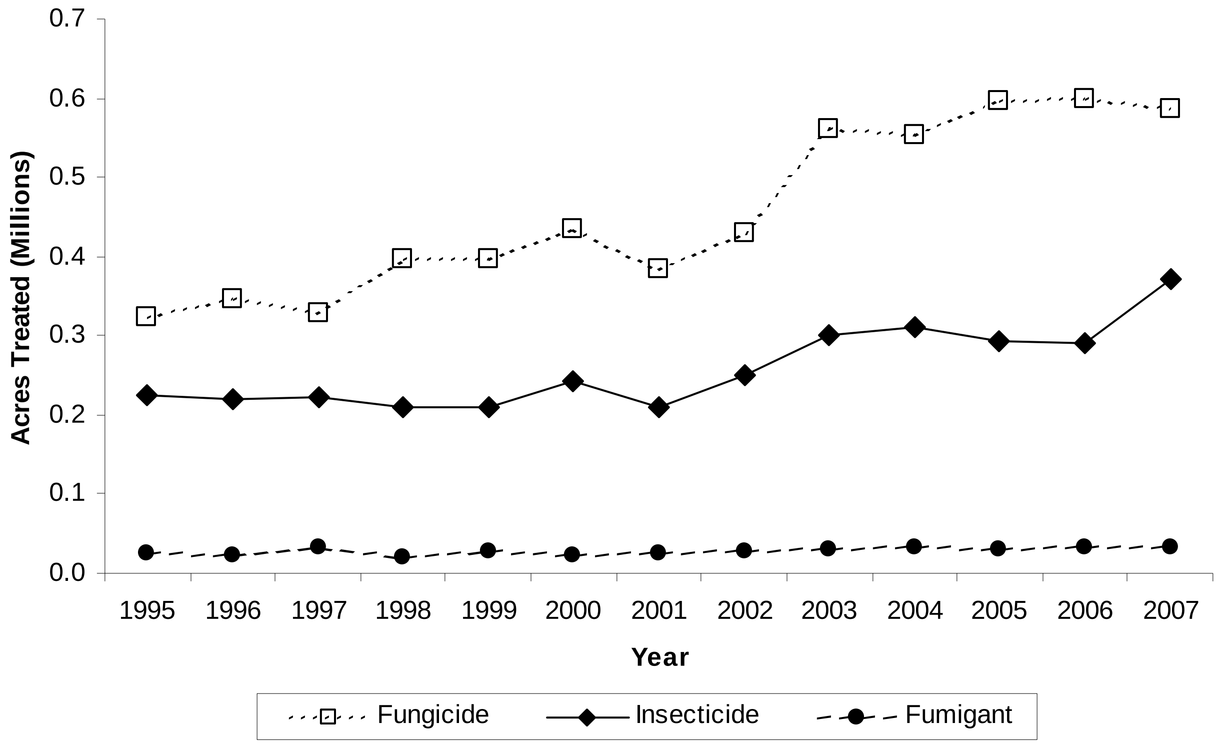


Table 21C. *The non-adjuvant pesticides with the largest change in acres treated of strawberries from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
CAPTAN	FUNGICIDE	182,297	149,227	174,707	151,742	127,029	-24,713	-16
BACILLUS THURINGIENSIS	INSECTICIDE	54,141	46,042	49,546	33,783	57,842	24,059	71
QUINOXYFEN	FUNGICIDE					14,859	14,859	
PYRIMETHANIL	FUNGICIDE				30,419	16,080	-14,339	-47
FENHEXAMID	FUNGICIDE	53,579	51,805	56,844	54,234	40,011	-14,223	-26
SULFUR	FUNGICIDE	108,330	130,906	124,754	129,069	139,486	10,418	8
POTASSIUM BICARBONATE	FUNGICIDE	5,477	11,034	9,682	5,098	13,768	8,670	170
MYCLOBUTANIL	FUNGICIDE	52,863	41,156	42,506	43,221	51,487	8,266	19
PYRETHRINS	INSECTICIDE	2,740	3,840	1,749	2,688	9,743	7,055	262
MALATHION	INSECTICIDE	41,134	48,708	37,523	28,460	34,528	6,068	21
BIFENTHRIN	INSECTICIDE	16,622	13,469	14,428	19,184	25,163	5,979	31
OIL	INSECTICIDE	1,689	1,378	289	477	6,431	5,954	1,247
SPIROMESIFEN	INSECTICIDE			4,417	10,375	16,225	5,850	56
NALED	INSECTICIDE	19,563	22,209	20,666	18,681	23,819	5,138	28
FLUDIOXONIL	FUNGICIDE	25,470	21,213	33,324	28,606	33,582	4,975	17

The amount of strawberry acres treated with pesticides increased 5 percent while acres harvested declined. This can in part be explained by a 4 percent increase in acres planted during this same period, thus accounting for pesticides used on those acres including some not harvested until the following year. Pounds of pesticide applied increased 3 percent from 2006 to 2007. Pounds of pesticide per acre treated decreased 2 percent from 2006 to 2007. Fungicides, followed by insecticides, account for the largest proportion of pesticides applied by acres treated. By acres treated, use of fungicides remained about the same, while insecticides increased by 28 percent, and herbicides increased by 45 percent. The major pesticides with greatest increase in acres treated from 2006 to 2007 were *Bacillus thuringiensis (Bt),* quinoxyfen, sulfur, *potassium carbonate*, pyrethrins, malathion, bifenthrin, oil, and spiromesifen. The major pesticides with decreased use by acres treated were captan, pyrimethanil, and fenhexamid.

Fungicides continue to be the most used pesticides, as measured by acres treated. The most important fungal diseases of strawberries are Botrytis and powdery mildew. The major fungicides by acres treated in 2007 were sulfur, captan, pyraclostrobin, boscalid, myclobutanil, fenhexamid, fludioxonil, and cyprodinil. In general, fungicides effective against Botrytis fruit rot decreased, and those effective against powdery mildew increased in 2007. Dryer conditions in January and February decreased Botrytis risk. The older registered fungicides (captan, thiram, thiophanate-methyl, and benomyl) and the newly registered pyrimethanil, fenhexamid, and boscalid are generally used to control Botrytis fruit rot. Acres treated with all of these products decreased in 2007.

Less free moisture on leaves but high humidity favored powdery mildew in 2007. Conventional strawberry growers primarily used sulfur, myclobutanil, boscalid, pyraclostrobin, azoxystrobin, and quinoxyfen to control powdery mildew. Sulfur is inexpensive and is also used by organic growers. Sulfur, myclobutanil, azoxystrobin, and quinoxyfen use increased. Pyraclostrobin is frequently used in combination with boscalid. Both acres treated with these two products and pounds of active ingredient decreased in 2007. Use of mefenoxam, effective against *Phytophthora fragariae* (red stele) and *P. cactorum* (leather rot and crown rot), decreased 3 percent in 2007.

The major insect pests in strawberries are lygus bugs in the central coast. Worms (various moth and beetle larvae) especially cutworms and beet armyworms continue to be particularly troublesome in the southern coast. The major insecticides used in 2007 by acres treated were *Bt*, spinosad, malathion, bifenazate, bifenthrin, naled, fenpropathrin, methomyl, abamectin, spiromesifen, hexythiazox, pyrethrins, and methoxyfenozide. Acres treated with all of these major insecticides increased except methoxyfenozide (down 14 percent) and hexathiazox on mites (down 8 percent). *Bt* and spinosad, both biological pesticides, continued in 2007 to be the primary pesticides used to control worms. Spinosad is also effective against thrips. *Bt* use (all forms) increased by 71 percent percent while spinosad use increased by 6 percent. Increases of both were greater in the South Coast region than in the Middle Coast region. Spinosad has a longer residual action and is generally more effective so does not need to be applied as frequently as *Bt*. Methoxyfenozide and spiromesifen (up 56 percent), both newly registered, continue to be widely used to control cutworm and beet armyworm. Increased use of malathion (up 22 percent) and bifenthrin (up 31 percent) may have increased in part because of increased problems with lygus bug resistance. Fenpropathrin (up 5 percent), malathion, spiromesifen, bifenthrin and pyriproxyfen (up 37 percent) are effective against whiteflies. Pyriproxyfen is an insect growth regulator registered in 2002. *Bt* and spinosad, as well as pyrethrins (up 262 percent), are available for use by organic growers. Like *Bt*, pyrethrins have short residual activity and so may require multiple sprays. Perhaps due to recent reductions in cost, imidacloprid use increased by 166 percent as generic products have become available.

Increased two-spotted spider mite and red spider mite pressure resulted in 20 percent increased use of bifenazate, which is effective and has low toxicity to predatory mites. Also increased in use for mite control, in terms of acres treated, were abamectin (up 30 percent) and the newly registered spiromesifen and etoxazole (up 49 percent), while hexythiazox use decreased by 8 percent and acequinocyl decreased 24 percent. Most conventional growers continue to use bifenazate since its introduction in 2003. Acequinocyl is effective against cyclamen mite which is not controlled by bifenazate.

Strawberry production relies on several fumigants. Acres treated with fumigants decreased by 3 percent, including both chloropicrin (down 2 percent) and methyl bromide (down 18 percent), while 1,3-dichloropropene (1,3-D), and metam-sodium use increased by 20 percent and 30 percent respectively. Fumigants usually are applied at higher rates than other pesticide types, such as fungicides and insecticides. Fumigants are applied at high rates, in part, because they treat a volume of space rather than a surface area such as leaves and stems of plants. Thus, the pounds applied are large relative to other pesticide types even though the number of applications or number of acres treated may be relatively small. Fumigants accounted for about 86 percent of all pesticide AIs by pounds applied in strawberries in 2007. Metam-sodium is generally more effective in controlling weeds, but less effective than 1,3-D or 1,3-D plus chloropicrin against soil-borne diseases and nematodes. Because chloropicrin is used in higher concentrations when used in combination with methyl bromide than in combination with 1,3-D, overall use of chloropicrin has decreased despite an increased use of 1,3-D plus chloropicrin.

Carrots

California is the largest producer of carrots in the United States accounting for about 78 percent of the U.S. production of 1,358,068 tons of fresh market and 18 percent of the 345,150 tons of processing carrots in 2007. California produced more than 1.13 million tons of carrots with a total crop value of more than $495 million. California has four main production regions for carrots: the San Joaquin Valley (Kern County), with significant production along the central coast in San Luis Obispo and Santa Barbara counties (Cuyama Valley) and Monterey County; the low desert (Imperial and Riverside counties); and the high desert (Los Angeles County). The San Joaquin Valley accounts for more than half the state’s acreage.

Table 22A. *Total reported pounds of all active ingredients (AIs), acres treated, acres harvested, and prices for carrots each year from 2003 to 2007. Harvested acres of all carrots from 2003 to 2006 are from CDFA 2007; harvested acres in 2007 are from NASS, January 2008; marketing year average prices from 2003 to 2007 from NASS, July 2008b. "cwt"stands for 100 pounds.*

	2003	**2004**	**2005**	**2006**	**2007**
Lbs AI	8,615,089	8,076,983	9,029,203	7,835,999	7,939,720
Acres Treated	446,590	503,062	535,967	453,099	523,184
Acres Harvested	71,500	70,800	71,100	73,500	72,900
Price $/cwt	$20.40	$21.50	$21.70	$21.10	$23.00

Table 22B. *Percent difference from previous year for reported pounds of all AIs, acres treated, acres harvested, and prices for carrots from 2003 to 2007.*

	2003	**2004**	**2005**	**2006**	**2007**
Lbs AI	10	-6	12	-13	1
Acres Treated	2	13	7	-15	15
Acres Harvested	1	-1	0	3	-1
Price $/cwt	0	5	1	-3	9

Figure 20. *Acres of strawberries treated by all AIs in the major types of pesticides from 1995 to 2007.*

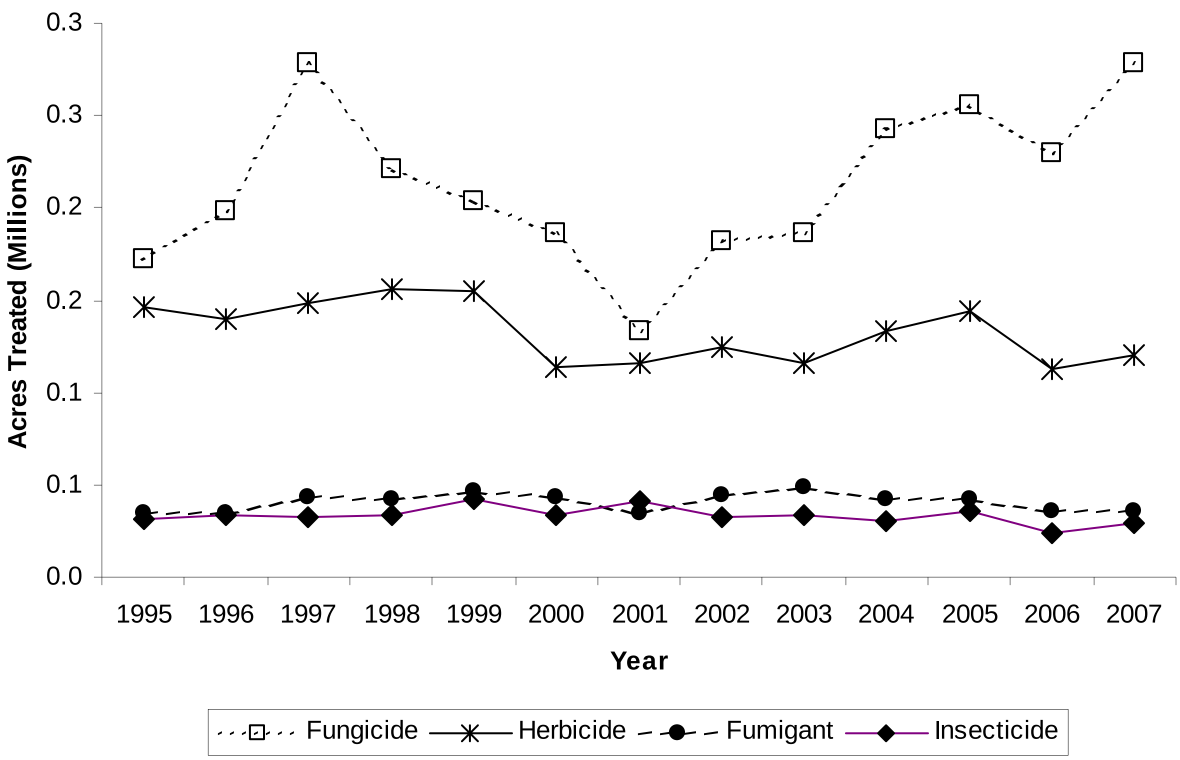


Table 22C. *The non-adjuvant pesticides with the largest change in acres treated of carrots from 2006 to 2007. This table shows acres treated with AI each year from 2003 to 2007, the change in acres treated and percent change from 2006 to 2007.*

AI	AI TYPE	2003	2004	2005	2006	2007	Change	Pct Change
SULFUR	FUNGICIDE	16,985	28,092	46,235	32,527	78,327	45,799	141
PENDIMETHALIN	HERBICIDE		5		75	17,574	17,499	23,333
TRIFLURALIN	HERBICIDE	39,194	39,934	41,228	33,670	18,324	-15,346	-46
FENAMIDONE	FUNGICIDE				2,758	11,872	9,114	330
COPPER	FUNGICIDE	20,808	28,330	26,907	29,298	22,423	-6,875	-23
MEFENOXAM	FUNGICIDE	80,555	102,374	97,866	82,459	77,159	-5,300	-6
IPRODIONE	FUNGICIDE	29,199	30,054	34,159	29,414	33,657	4,243	14
FLUAZIFOP-P-BUTYL	HERBICIDE	7,418	11,179	15,475	12,287	15,846	3,559	29
BOSCALID	FUNGICIDE	151	2,574	3,431	4,145	6,922	2,777	67
PYRETHRINS	INSECTICIDE	275		142	90	2,544	2,454	2,726
AZOXYSTROBIN	FUNGICIDE	8,262	8,414	6,276	8,315	6,087	-2,228	-27
ESFENVALERATE	INSECTICIDE	11,696	6,421	14,202	10,102	12,130	2,029	20
CHLOROTHALONIL	FUNGICIDE	18,863	18,948	20,793	18,319	20,181	1,862	10
1,3-DICHLOROPROPENE	FUMIGANT	12,646	13,354	9,002	8,339	9,866	1,527	18
METAM POTASSIUM	FUMIGANT		558	822	2,857	1,470	-1,387	-49

While total acres of carrots harvested decreased by 1 percent, pesticide use (as acres treated) in carrots increased by 15 percent in 2007 after a comparable decrease in 2006, thus returning acres treated nearly to the 2005 level. Pounds of AI applied increased by 1 percent from 2006 to 2007. All major pesticide types increased in terms of acres treated except for fumigants. Pesticides used most (as measured by acres treated) were sulfur, mefenoxam, linuron, iprodione, metam-sodium, pyraclostrobin, copper compounds, chlorothalonil, and trifluralin. The major pesticides with increased acres treated were sulfur, pendamethalin, fenamidone, iprodione, fluazifop-p-butyl, boscalid, pyrethrins, esfenvalerate, chlorothalonil, and 1,3 dicloropropene. The major pesticides with decreased acres treated were trifluralin, copper compounds, mefenoxam, azoxytrobin, and metam-potassium.

Cumulatively, the most used pesticide category for carrots, as measured by acres treated, was fungicides. From 2006 to 2007 acres treated with fungicides increased 21 percent while pounds AI increased by 13 percent. The most applied fungicides in 2007 by acres treated were sulfur, mefenoxam, iprodione, pyraclostrobin (registered in 2003), copper compounds, and chlorothalonil. Alternaria leaf blight, a foliar disease, is generally controlled by iprodione, chlorothalonil, pyraclostrobin, or azoxystrobin. Azoxystrobin and pyraclostrobin are strobilurins with the same mode of action. In terms of acres treated, iprodione increased 14 percent and chlorothalonil increased in use 10 percent while azoxystrobin decreased 27 percent and pyraclostrobin use remained about the same as in 2006. Alternaria leaf blight has become less of a problem recently because of the introduction of resistant carrot varieties. Cavity spot is a major, troublesome soilborne fungal disease that is commonly controlled by applying mefenoxam or metam sodium (a soil fumigant). Growers used less mefenoxam (16 percent) and metam-sodium (2 percent) by acres treated as fenamidone became available since 2006 for control of cavity spot. Powdery mildew is primarily controlled by sulfur, which is inexpensive and especially popular with organic growers. Except for Imperial and Yolo counties, sulfur use increased in all counties in 2007 because weather conditions favored powdery mildew infection.

In terms of acres treated, the main herbicides used in carrot production were linuron, trifluralin, pendimethalin (registered for carrots in 2006), and fluazifop-p-butyl. Linuron, a postemergence herbicide that provides good control of broadleaf weeds and small grasses increased 2 percent. Trifluralin, a preemergence herbicide, used by carrot growers to complement linuron for weed management, declined by 46 percent as pendimethalin has become an effective replacement with less inhibition of carrot root development. In addition, fluazifop-p-butyl, a selective postemergence phenoxy herbicide used for control of annual and perennial grasses increased 29 percent.

Carrot production relies on the fumigants metam sodium, 1,3-D, potassium n-methyldithiocarbamate (metam-potassium), and to a lesser extent, chloropicrin. These fumigants are used at high rates in terms of pounds per acre treated to control soil-borne pests. Methyl bromide is rarely used in carrot production. In 2007, fumigants accounted for about 76 percent of the total pounds of pesticide AIs applied to carrots. This is a 3 percent decline from 2006. Also acres treated with fumigants declined by 4 percent. Use of metam sodium, metam potassium, and chloropicrin declined (2, 49, and –71 percent acres treated, respectively). 1,3 dichloropropene use increased by 18 percent. These fumigants are used to manage nematodes and may provide other benefits such as weed and soil borne disease control. At low to moderate levels of nematode infestation, metam sodium or metam-potassium is usually used. If nematode levels are high, 1,3-D is preferred. 1,3-D usage increased in 2007 probably because of nematode problems and as partial replacement of metam-sodium and metam-potassium which have become more difficult to apply through chemigation due to new regulations, and they are not as effective when shanked in.

Insects are not generally a major problem in carrot production, except for whiteflies that are controlled with esfenvalerate and methomyl. The major insecticides used in 2007 in terms of acres treated were esfenvalerate, diazinon, methomyl, pyrethrins, oil, spinosad, and methoxyfenozide. Acres treated with esfenvalerate increased by 20 percent in 2007. Although generally used against whitefly, it is also used to control flea beetle, leafhoppers and cutworms. Methomyl use by acres treated remained relatively constant after a 92 percent increase in 2006. This carbamate pesticide is effective against cutworms and leafhoppers as well as whiteflies. Diazinon use against cutworms and wireworms remained relatively constant as well. Spinosad use against armyworms, loopers, saltmarsh caterpillars, and cutworms increased by 10 percent. Oil, used both as an insecticide and an insecticide adjuvant, increased by 52 percent. Cyfluthrin, a pyrethroid used to control cutworm and crown root aphids, decreased by 37 percent while pyrethrins used against a wide range of pests increased 2,726 percent. Higher usage may be due to its short half-life in the field, thus requiring multiple applications. Carbaryl use was nearly absent in 2007 as it was in 2006.

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