

# Assessing dormant organophosphate and pyrethroid sprays in almond orchards

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## Introduction

Dormant organophosphate (OP) and pyrethroid uses have raised concerns in California due to their detection in surface water. This study assesses dormant OP and pyrethroid use and provides suggestions on alternatives to reduce the environmental impact of these uses. The Pesticide Use Report (PUR) database is the basic source of information for the analysis. This study also incorporates information from the almond industry, US EPA, and California Department of Pesticide Regulation. Dormant OP use declined dramatically from 1992 to 2002 and dormant pyrethroid use increased from 1992-1999. Since 1999, pyrethroid use has declined. Use intensity was generally higher in the southern San Joaquin Valley, than in the northern San Joaquin and Sacramento Valleys. The percent of low use growers was higher in the Sacramento Valley in 1993.

## Objectives

1. To assess the use of OP and pyrethroid insecticides in almond orchards.
2. To determine percent of high and low use growers.
3. To use data in targeting areas for outreach on reduced-risk alternatives.



## Materials and Methods

Data source and measures:

PUR was used as data source. Measures used included

- a. Pounds of active ingredient (AI) per acre planted,
- b. Percent of the planted acres treated with the chemicals,
- c. Percent of the dormant insecticide use growers in each region who were low use (<25% of the mean lbs AI/acre planted in their region) and high users (> mean lbs AI/acre planted).

Dormant period was defined as Dec. 1 of previous year through Feb. 28 of the year.

Methods: a. Trends assessment; b. GIS (Geographic Information System).

Figure 1. Diazinon dormant use in 2002 in almond orchards

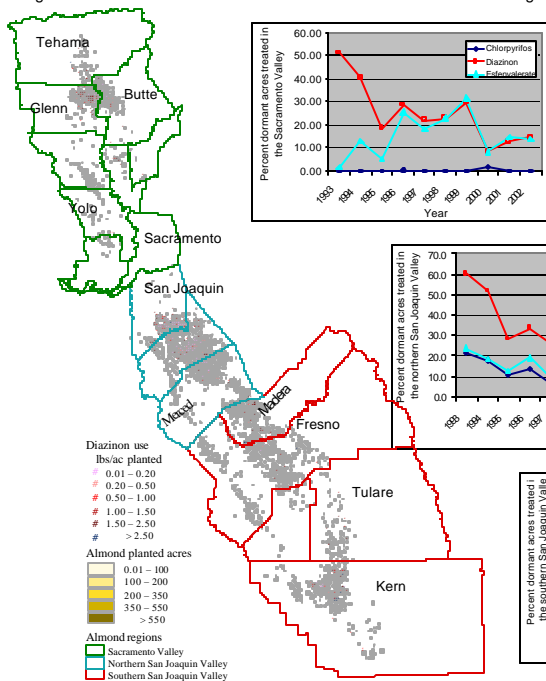


Figure 2. Esfenvalerate dormant use in 2002 in almond orchards

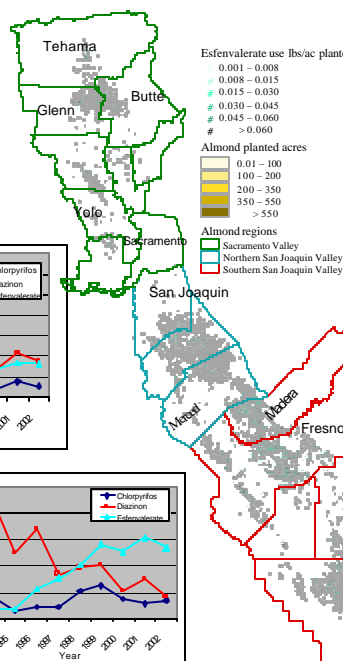


Figure 3. Chlorpyrifos dormant use in 2002 in almond orchards

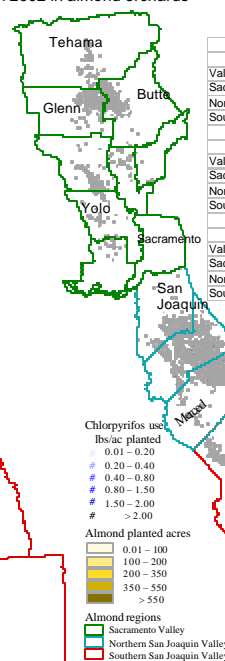
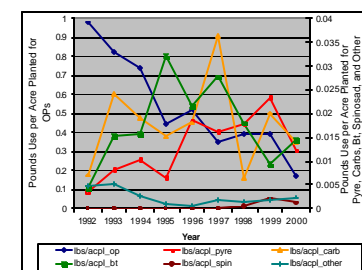


Table. Percent of growers in each use category and the average pounds AI per acre planted in 1993 and 2002 dormant seasons.

	Low use in 1993		High use in 1993		Low use in 2002		High use in 2002		% Growers no diazinon	
	lbs/acplanted	% grower	lbs/acplanted	% grower	lbs/acplanted	% grower	lbs/acplanted	% grower	1993	2002
Valley										
Sacramento Valley	0.14	19	2.01	54	0.20	10	1.89	53	65	90
Northern San Joaquin	0.19	6	2.07	58	0.18	9	2.02	57	66	94
Southern San Joaquin	0.27	9	2.55	58	0.12	13	2.07	54	60	95
Chlorpyrifos										
Valley										
Sacramento Valley									100	100
Northern San Joaquin	0.08	9	1.71	59	0.21	21	1.58	54	95	99
Southern San Joaquin	0.18	2	2.06	60	0.14	7	1.86	50	91	95
Esfenvalerate										
Valley										
Sacramento Valley	0.0000	20	0.0340	40	0.0004	12	0.0414	56	99	92
Northern San Joaquin	0.0044	9	0.0436	53	0.0025	14	0.0396	57	95	95
Southern San Joaquin			0.0083	33	0.0062	5	0.0492	49	100	76

Figure 4. Pounds of AI per acre planted used on all California almonds for dormant OPs, pyrethroids, carbamates, Bts, spinosad and other insecticides from 1992 through 2000.



## Results

1. Use of diazinon decreased from 1993 to 2002 in all regions (37% decrease in Sacramento Valley, 43% in northern San Joaquin Valley, and 35% in southern San Joaquin Valley), use of dormant chlorpyrifos decreased in northern San Joaquin Valley, while the use of dormant pyrethroids increased in southern San Joaquin Valley.
2. Higher pounds per acre planted of dormant OPs were found in southern San Joaquin Valley.
3. Percent of growers who did not use any diazinon or chlorpyrifos increased in all regions from 1993 to 2002. Percent of growers who used pyrethroid increased from 1993 to 2002 in the Sacramento and the southern San Joaquin Valleys.
4. The reduced use of insecticides may be accompanied by applying insecticides during the growing season, or by employing local ecological knowledge for managing insects.

## Conclusions

1. Diazinon use decreased in all three regions, while esfenvalerate use increased.
2. Other chemical alternatives fluctuated over time while OP use decreased.
3. Chlorpyrifos was not used in the Sacramento Valley in the 2002 dormant season.
4. Suggested alternatives include: a. applying chemicals in season, b. applying lower risk chemicals such as oils, *Bacillus thuringiensis*, and spinosad, c. applying no dormant insecticides. Whether or not and when chemicals should be used depends on monitoring pests and beneficial arthropods.

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