Western IPM Center

Western Integrated Pest Management Center

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July 16, 2014

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Biological Scientist
USDA ARS Office of Pest Management Policy
1400 Independence Ave. S.W.
Room 3871 (Mail Stop 0314)
Washington DC 20250

Subject: Response to Request for Public Comment on Proposed Stipulated Injunction Involving Five Pesticides and Pacific Salmonid Species Listed as Threatened or Endangered Under the Endangered Species Act

Dear Teung Chin,

I am responding to your request for information on the proposed spray buffers for carbaryl, chlorpyrifos, diazinon, malathion, and methomyl near salmon-bearing waters. I have attached information from the Almond Board of California.

I was able to gather comments from only a few people in the affected areas. There was concern regarding the enviromapper feature on the EPA website. People were not able to locate their specific fields because of a lack of labeled landmarks and other identifying features. Therefore, they were not able to discern whether they were subject to the buffer-zones or not. Additional concerns were the 300 ft size of the aerial buffer being too large and the potential enforcement mechanisms of requirements that are not on the label but are court-ordered injunction.

If you have any further questions, please contact me.

Sincerely,

Jim Farrar, PhD
Director, Western IPM Center
University of California, Agriculture and Natural Resources
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Proposed No-Spray Buffer Zone Impact on the California Almond Industry

Overview

While it is difficult to assess the exact impact of this proposed action on a waterway by waterway basis, if implemented it will certainly affect pest management decisions by growers in 9 of the 16 almond producing counties in California. This includes almonds grown in Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Yolo, Solano, and San Joaquin counties. In the 2013/14 crop year, these counties produced 19% of the total almond crop.

So long as the restriction applies to only salmon bearing waters as defined by this legal action, and not to irrigation canals, then the impact will be limited other than for aerial applications. For most scenarios, a 60 foot buffer to the water way for ground applications is feasible. However, if the definition was to extend to irrigation canals that connect to salmon bearing waterways, then the use of the products in the Sacramento Valley would be significantly impacted as the entire Central Valley is riddled with irrigation canals. Furthermore, if this were to impact salmon bearing waters in the San Joaquin Valley, the impact would be acutely felt by the entire industry.

In the counties affected (listed above), the 5-year average almond acreage treated with each compound are listed below.

- carbaryl: 32 acres treated (5% of statewide 5-year average carbaryl application in almond)
- chlorpyrifos: 16,587 acres treated (12% of statewide 5-year average chlorpyrifos application in almond)
- diazinon: 719 acres treated (25% of statewide 5-year average diazinon application in almond),
- malathion: 32 acres treated (47% of statewide 5-year average malathion application in almond)
- methomyl: not registered for use in almond

Pesticide Compound Uses and Use Analysis in Almond

The five compounds in question are used to varying degrees in California Almond production. Below describes the University of California Integrated Pest Management Guidelines as they relate to pests treated by the five compounds (carbaryl, chlorpyrifos, diazinon, malathion, methomyl). It should be noted that all pest management options are important to maintain throughout the entire almond producing region for their utility as resistance management rotation tools. While newer and softer compounds are often available, maintaining alternative treatment option is a vital part of IPM. Also, below each compound are appropriate graphs indicating the compound's historic use rates in California through data provided by the California Department of Pesticide Regulation.

1. Carbaryl
    a. **Pests treated with carbaryl:** tree borer complex, San Jose scale
    b. **Pest summary**
        i. Tree borer complex: Prune limb borer and American plum borer are sporadic pests in young almond orchards and in bark injuries on mature trees. Larvae bore into trees, leaving reddish orange frass and gum pockets. The boring is most damaging to the

scaffold crotches or graft unions of young trees. Vigorous trees will heal over, but with heavy, prolonged infestations, scaffolds may break with wind or a heavy crop. Boring in callus formed under trunk-shaker bark injuries can greatly enlarge the initial injury, and also introduces spores of the Ceratocystis canker fungus, leading to subsequent trunk cankers that can girdle scaffolds and may ultimately lead to tree death.

ii. San Jose scale: Scales suck plant juices from twigs and limbs, and inject a toxin, resulting in loss of tree vigor, growth and productivity, and death of limbs. A red halo is produced around a feeding site on 1-year-old green wood. Untreated infestations can kill fruit spurs and scaffold wood within 1 to 3 years.

c. **When to treat**

i. Tree borer complex: Monitor young orchards in spring and summer for frass and gum pockets. If larvae are present, spray trees with a hand held sprayer from 1 foot above the scaffold crotch to 1 foot below, two to three times during the growing season. The first application should be in mid- to late April, and subsequent applications at 6-week intervals. Efficacy is improved if the trunk is painted with a latex paint to protect against sunburn immediately following a trunk spray. The paint helps to preserve the insecticide and give protection over a longer period of time. On mature trees, loose bark can be removed from trunk shaker injuries and wounds treated as described above for young trees.

ii. San Jose scale: Monitor San Jose scale during the dormant season by collecting spurs and examining them for live scale as well as for tiny emergence holes, which indicate parasite activity. For large-scale populations, a properly applied dormant spray is the most effective, and will eliminate the spring flight and suppress the infestation throughout the growing season. If infestation has affected over 60% of spurs, carbaryl can be applied with a narrow range oil dormant spray. Best time to apply this material is about 2–3 weeks before bloom. Because carbaryl is toxic to honey bees, do not apply when there is any bloom in the orchard or in neighboring orchards.

d. **Alternative treatment options**

i. Tree borer complex: Carbaryl is one of two effective options for treating tree borers. The other is chlorpyrifos.

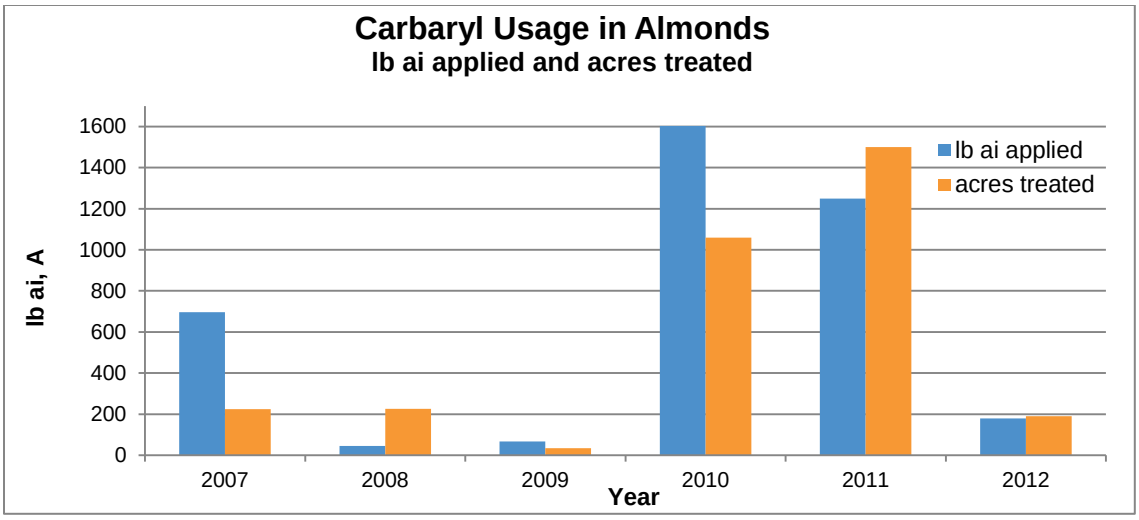
ii. San Jose scale: Natural enemies that feed on San Jose scale include two predaceous beetles: the twicestabbed lady beetle, *Chilocorus orbus*, and another small beetle *Cybocephalus californicus*. A number of small chalcid and aphelinid wasps, including *Aphytis spp.* and *Encarsia (Prospaltella)* sp., parasitize this scale. These predators and parasites are helpful in reducing scale populations, but insecticides used during the growing season for other pests disrupt this natural control, and scale populations can build as a result. Low winter mortality due to mild temperatures will also permit a buildup of scale populations. Spring treatment options include pyriproxyfen, buprofezin, chlorpyrifos, and methidathion.

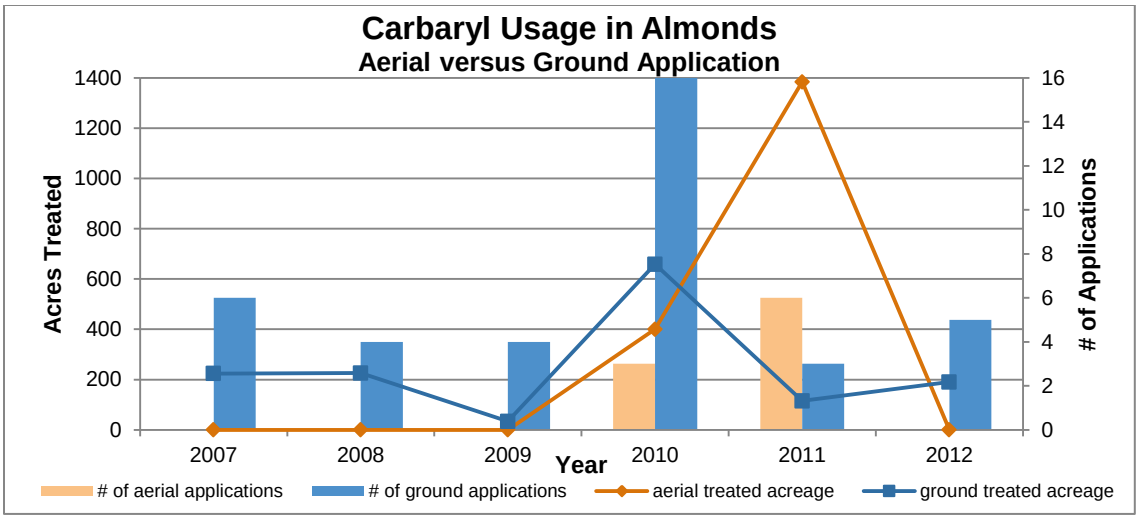
e. **UC-IPM recommended rate**

i. Tree borer complex: 2qt/A, not to exceed 15 lb/A/season

ii. San Jose scale (dilute application): 1 qt/A carbaryl *PLUS* 1.5-2 gal/A narrow range oil

f. **Carbaryl use analysis:** Carbaryl use in almond is relatively low but it is a valuable resistance management option. Carbaryl is applied both aerially and by ground so the impact of the respective 300 and 60 foot no-spray buffer will be felt with both application methods. See the three charts below for details on carbaryl application in almonds from 2007- 2012.



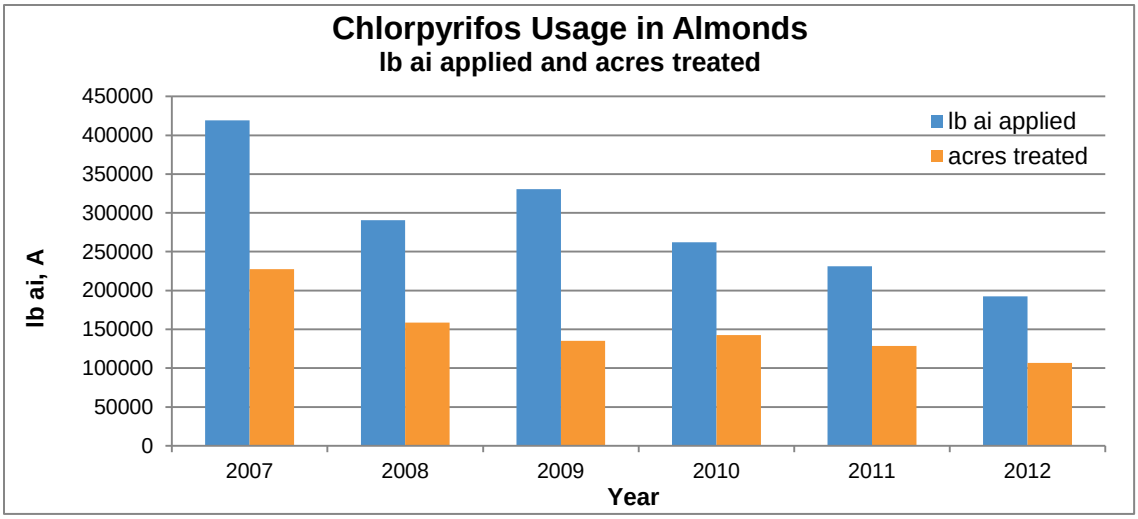


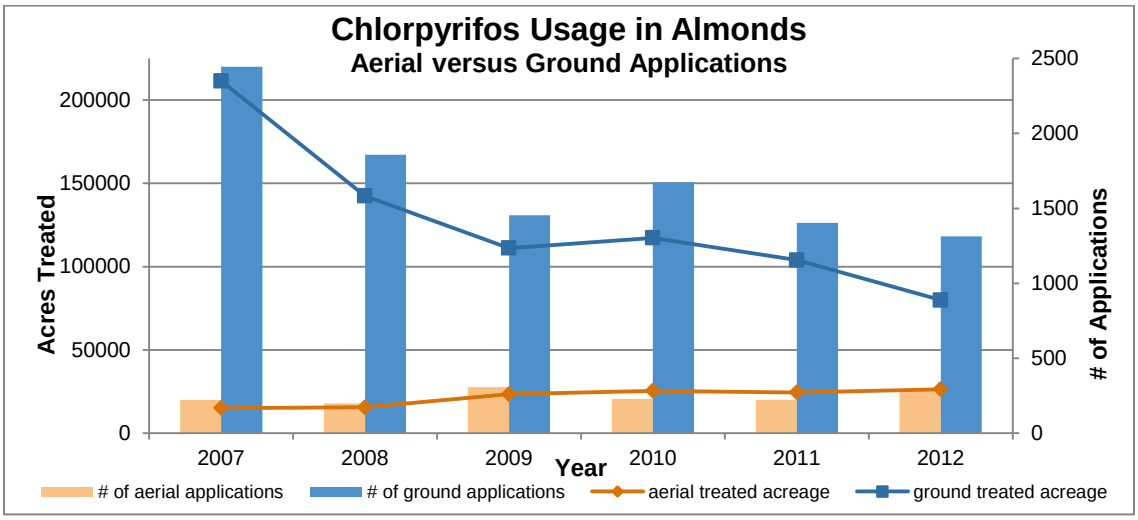
Annual Carbaryl Usage in Almond Contrasted with Total Acreage				
	Total Lb ai Applied	Total Acres Treated	Total Acreage	% Acreage Treated
2007	695.6311	224	765,000	0.03%
2008	45.19218	225.6	795,000	0.03%
2009	66.11097	33.82	810,000	0.00%
2010	1602.553	1058.92	825,000	0.13%
2011	1249.097	1499.5	835,000	0.18%
2012	178.8151	190	870,000	0.02%

Source: USDA-NASS, California DPR-PUR

2. Chlorpyrifos
   a. **Pests treated with chlorpyrifos:** Chlorpyrifos is critical for control of leaffooted bug and stink bug complex, but is also used as a pest management tool for a variety of other broad-spectrum applications.
   b. **Pest summary**
      i. Leaffooted bug: Species include *Leptoglossus clypealis* and *Leptoglossus occidentals.* Although it is an infrequent pest in almonds, in years when weather and other conditions are right, significant damage can occur, especially in the lower San Joaquin Valley. The leaffooted bug overwinters in the adult stage in aggregations in orchards, or near orchards on native host plants, from which it migrates into orchards in March or early April in search of nuts on which to feed. Feeding by adult leaffooted bugs on young nuts before the shell hardens can cause the embryo to wither and abort, or may cause the nut to gum internally, resulting in a bump or gumming on the shell. It can also cause nut drop. After the shell hardens, leaffooted bug feeding can still cause black spots on the kernel or wrinkled, misshapen nutmeats. In most cases, leaffooted bug damage occurs in March and April.
      ii. Stink bug complex: Stink bug pests in almond include green plant bug (*Chlorochroa uhleri*), green plant bug (*Acrosternum hilare*), redshouldered stink bug (*Thyanta pallidovirens*), and potentially, the recently introduced invasive brown marmorated stink bug (*Halyomorpha halys*). Damage by stink bugs usually occurs from May through July, when the bugs insert their strawlike mouthparts through the hull and into the kernel. This damage is almost identical to damage caused by leaffooted plant bugs, but occurs later in the season and does not result in nut abortion. Instead, damaged nuts can be recognized by strands of ooze, called gummosis, that exude from the puncture site. Kernels of damaged nuts either become wrinkled and misshapen, or if already hardened before bug damage, will contain a black spot at the puncture site.
   c. **When to treat**
      i. Leaffooted bug: Treatment thresholds have not been developed for this pest in almonds, but low numbers of bugs can cause substantial damage. If bugs and their damage are evident, treatment should be considered. Chemical control generally targets the overwintering adults that have migrated into the orchard with April or May applications.
      ii. Stink bug complex: There are currently no treatment thresholds for stink bugs. Where only reduced-risk products have been used and damage levels for stink bug become unacceptable, an in-season treatment is recommended
   d. **Alternative treatment options**
      i. Leaffooted bug: Egg parasites, *Gryon* spp., can keep populations of leaffooted bug below economically damaging levels. However, as egg parasites, they have no ability to control the overwintering adult leaffooted bugs that migrate into orchards in spring. Additionally leaffooted bug can be controlled with bifenthrin or esfenvalerate.
      ii. Stink bug complex: Stink bugs can also be treated with bifenthrin or lambda cyhalothrin.
   e. **UC-IPM recommended rate**
      i. Leaffooted bug: 2 qt/A; do not apply more than 3 foliar applications per season
      ii. Stink bug complex: 2 qt/A; do not apply more than 3 foliar applications per season
   f. **Chlorpyrifos use analysis:** Chlorpyrifos is a valuable tool for pest management in California almond orchards and that is reflected in its use reporting. In 2012, 12% of almond acreage was treated with chlorpyrifos. 75% of 2012 chlorpyrifos applications were ground applications, which under this proposal would see a 60 foot no-spray buffer zone from salmon supporting waters. 25% of 2012 chlorpyrifos applications were made aerially, which under this proposal would see a 300 foot no-spray buffer zone from salmon supporting waters. See the three charts below for details on chlorpyrifos application in almonds from

2007- 2012. The increase in 2010 is an example of the changed use due a leaffooted bug outbreak in the southern SJV.

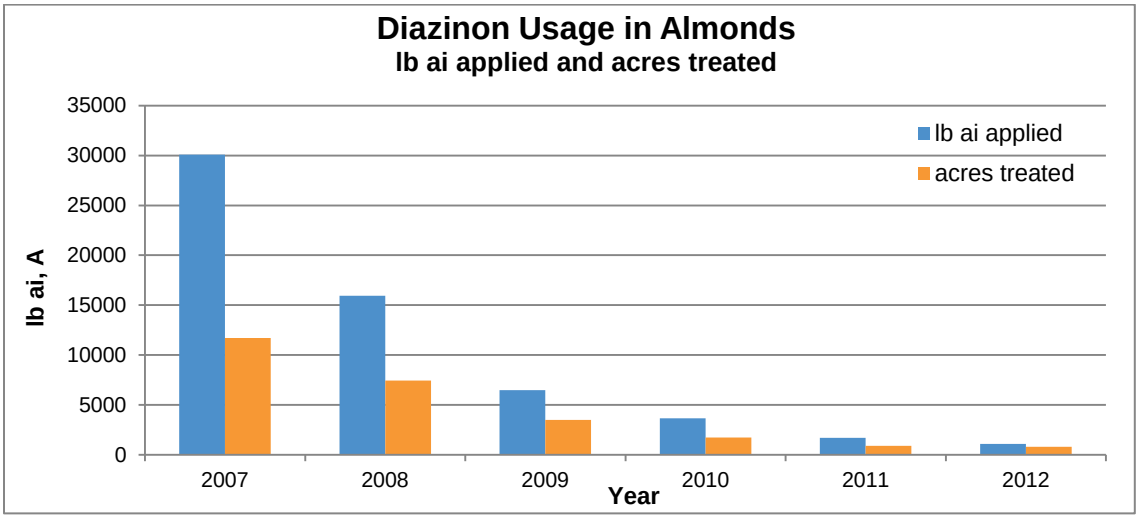


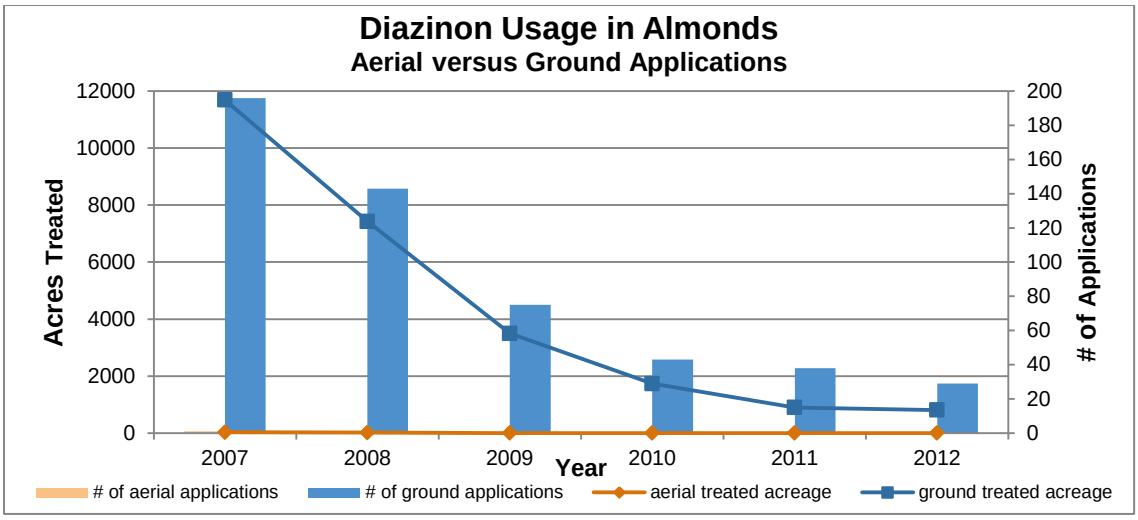


Annual Chlorpyrifos Usage in Almond Contrasted with Total Acreage				
	Total Lb ai Applied	Total Acres Treated	Total Acreage	% Acreage Treated
2007	419213.9	227329	765,000	30%
2008	290480.1	158512.2	795,000	20%
2009	330761.8	135164.9	810,000	17%
2010	262161.6	142738.2	825,000	17%
2011	231195.6	128658.9	835,000	15%
2012	192287.9	106674.1	870,000	12%

Source: USDA-NASS, California DPR-PUR

3. Diazinon
    a. **Pests treated with diazinon:** European fruit lecanium
    b. **Pest summary:** European fruit lecanium, also known as brown apricot scale, occurs throughout the Central Valley and is becoming an increasing problem as growers reduce dormant sprays. The chief injury is the production of honeydew that, in large amounts, can damage leaves and fruit. Sooty mold growing in the honeydew can cause blackened areas on leaves and fruit.
    c. **When to treat:** It is best to treat when leaves are off during the dormant or delayed dormant period. Oil alone is usually all that is required to manage this pest in the dormant season. However, the addition of an insecticide is necessary when infestations are severe.
    d. **Alternative treatment options:** Many natural enemies, and summer temperatures consistently over 100°F, help to control populations of European fruit lecanium. Common predators include lady beetles *(Chilocorus orbus, Hyperaspis* spp., *Rhyzobius lophanthae),* lacewings, the predaceous sap beetle (*Cybocephalus californicus*), and predatory seed bugs (*Phytocoris* spp.). Parasites include *Aphytis* spp., *Coccophagus* spp., *Encarsia* spp., and *Metaphycus* spp. Chlorpyrifos is the other recommended compound for mixing with dormant season oil application under severe infestation levels.
    e. **UC-IPM recommended rate**
        i. Dilute application: 1 lb/A diazinon *PLUS* 1-1.5 gal/A dormant flowable emulsion *or* 1.5 gal/A narrow range oil
        ii. Concentrate application: 3 lb/A diazinon *PLUS* 6 gal/A dormant flowable emulsion *or* 4 gal/A narrow range oil
    f. **Diazinon use analysis:** Diazinon use in almond is relatively low but its utilization varies with pest pressure. Diazinon label maximum number of applications is once per year and it can only be applied during the dormant season. Additionally diazinon dormant application in orchard crops are restricted to ground application equipment only. Diazinon is applied by ground application so the impact of the 60 foot no-spray buffer zone will be felt. See the three charts below for details on diazinon application in almonds from 2007- 2012.

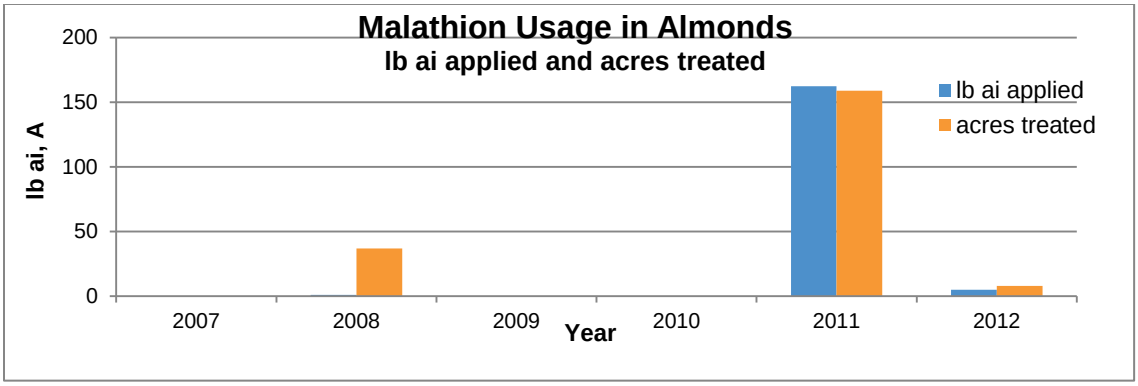




Annual Diazinon Usage in Almond Contrasted with Total Acreage				
	Total Lb ai Applied	Total Acres Treated	Total Acreage	% Acreage Treated
2007	30085.64	11716.57	765,000	1.53%
2008	15925.78	7444.38	795,000	0.94%
2009	6490.223	3498.86	810,000	0.43%
2010	3647.079	1733.68	825,000	0.21%
2011	1689.662	896.46	835,000	0.11%
2012	1089.583	810.5	870,000	0.09%

Source: USDA-NASS, California DPR-PUR

4. Malathion
   a. **Malathion use analysis:** Malathion is currently used at very low levels in almond in California. From 2012 to 2007, 168 pounds of malathion were applied to 204 acres of almonds.



5. Methomyl
   a. Methomyl is not registered for use in almond.