

## Management of Spider Mites

- Cultural practices that favor vigorous plants are key to minimizing damage from spider mites.
- Protect natural enemies as much as possible by choosing insecticides and miticides that are least harmful to beneficials.
- If necessary, supplement natural enemies by releasing predatory mites.

When treating for mites, choose the most selective miticide and alternate it with a miticide of a different chemistry or mode of action to avoid the development of resistance.

### Monitoring and Treatment Decisions

Vigorous plant growth during the first 4 months following fall transplant is a key factor in successful strawberry production. Monitor mid-tier leaves during this critical period when mite feeding is extremely damaging.

- Randomly select 10 leaflets per acre in small fields and 5 leaflets per acre in larger fields. When using a mite-brushing machine, the leaves from each acre can be brushed as one sample.
- Examine the undersurface of mid-tier leaflets with a hand lens to count the number of mites or use a mite-brushing machine.
- Record your observations on a sampling form.

The established economic threshold for this period is an average of five mites per mid-tier leaflet. Summer transplants have a higher threshold of an average of 10 mites per mid-tier leaflet during this same period.

### Miticide Resistance

Two-spotted spider mites have a history of rapidly developing resistance to miticides when a miticide is repeatedly applied to the same population.

- Alternating miticides that have different modes of action may reduce development of resistance to a specific miticide.
- Avoid unnecessary spraying and treat only infested portions of the field.
- Organophosphate, carbamate, and pyrethroid insecticide applications can induce two-spotted spider mite outbreaks. If possible, avoid early season insecticide applications or apply insecticides that are less disruptive to beneficial arthropods. Careful selection and use of insecticides early in the season can potentially reduce the number of miticide applications.



# Technical Information Bulletin



## Management of Ants

Survey your orchard for ant colonies in April or May to determine need for treatment. Application of baits before harvest is the best way to manage potentially damaging populations. To limit losses caused by ants at the processing plant, be sure to remove nuts from the orchard floor soon after shaking. A harvest sample for damage will help assess the effectiveness of your management program.

### Monitoring and Treatment Decisions

Survey the orchard floor for ant colonies 2 to 3 days after irrigation in April or May in the southern San Joaquin Valley or June in the northern San Joaquin Valley. Choose five survey areas per block of the orchard, each about 1000 sq. ft., including the soil area from mid-alley to mid-alley beneath trees. Count the number of active colonies in each area, sampling five different areas of the orchard. Total all the ant colonies to get the number in a 5000 square foot area (see table below). Damage increases the longer you leave nuts on the ground after shaking.

### Percent Damage by Ants to Almonds on Ground in an Almond Orchard

No. of Colony Entrances*	Days Nuts Are On Ground				
	4	7	10	14	21
15	0.9%	1.6%	2.1%	3.1%	4.9%
45	1.4%	2.3%	3.2%	4.7%	7.0%
185	2.0%	3.6%	5.0%	7.0%	11.1%

\* per 5,000 sq. ft. in April – May.

If treatment is necessary, baits are the preferred method of ant control. Baits are taken back to the nest and weaken and kill the whole colony. Bait products are slower acting than sprays so they must be applied several weeks before harvest. Ants switch

preference for food during the season, so a particular type of bait might only be effective during certain periods. Follow label directions for timing of applications.

Do not use baits within 24 hours after an irrigation or 48 hours before an irrigation with sprinklers or micro-sprinklers. The soil surface should be dry so that moisture is not absorbed by the bait, or its attractiveness to the ants will be reduced. *Bait products must be used within a few weeks of purchase.* Bags of bait product that have been stored for a few weeks or more should be turned over so that the soybean oil attractant remains evenly dispersed throughout the corn meal carrier. *Product in open bags must be used within a week or two so that the soybean oil does not turn rancid. Rancid oil is not attractive to ants. Do not purchase more bait than can be used in the current season.*

### Why Resistance is Not an Issue in Ants

The IRAC resistance database only cites two worldwide cases of ant colony resistance to an insecticide, neither in North America ([irac-online.org/teams/resistance-database](http://irac-online.org/teams/resistance-database)).

Ants are social insects, sharing resources (shelter, defense and food) and reproducing cooperatively. As social insect groups grow, they evolve more differentiation between members but reintegrate into a more closely organized system known as eusocial. Eusocial societies exhibit individual polymorphism, containing insects of various ages, sizes, and shapes. Only the queen reproduces and determines offspring sex; female workers do not contribute to egg production. Ants only produce one generation per year, and a very small percentage of the population can pass on heritable traits, such as a resistant gene.

Altrevin® fire ant bait insecticide is not metabolized by ants, so populations are less prone to develop resistance. The IRAC website states, “Metabolic resistance is the most common mechanism [of resistance] and often presents the greatest challenge” ([irac-online.org](http://irac-online.org)).

#### Always read and follow label directions.

Altrevin is a registered trademark of BASF Corporation.

Information cited from: Rust, M.K. *Managing Insecticide Resistance in Urban Insects*. Department of Entomology, UC Riverside, 1996., <http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>, and <http://encyclopedia2.thefreedictionary.com/social-insects>

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