Got Ants?

“Now is the time we start advising growers to look for ants,” says David A. Doll, Pomology Farm Advisor, Merced County. Depending on where you farm, you may need to be on the lookout for both pavement ants and southern fire ants. Typically, southern fire ants are found mainly in the south valley and in some of the sandier soils, while pavement ants are found more in the northern valley. According to Doll “right now, both species are active. It hasn’t gotten hot and dry enough for them to move deeper in the ground.”

Sometimes growers miss finding the ants. Typically, when touring their orchards almond growers are looking up, watching the crop and may miss what is crawling on the ground. There can be an ant problem even when one doesn’t see them on the surface of the ground.

While it may be expensive to treat for ants, they may be doing damage in your orchard that you can’t ignore. Ants eat the nutmeat out of the shells and reduce total yields of valuable nuts, cutting down on grower profits.

How do you know if you have ants?

Doll refers growers to the UC IPM Almond website for more in-depth information on ants, but shares this recommendation for sampling. “UC suggests growers set up 5 sampling areas throughout the orchard, with each of them covering 1,000 square feet. Total the number of problematic mounds in each sampling area. Problematic means that if you stomp on the mound and the ants swarm, you’ve probably got a seed-feeding ant that can reduce almond yields once nuts are on the ground.”

“The more beneficial ants are the ones that kind of run in different directions when disturbed. If you’ve got 15 problematic mounds in the total sampling area and nuts will be on the ground 10 days before being gathered, studies show that you can expect about a 2.1% yield reduction. If you’ve got 45 mounds, that increases to 3.2% in a 10-day period. Scouting now and taking into account how many days nuts will be on the ground at harvest is the best way to determine whether to treat about 6 weeks before shaking. Once it gets hot and ants go deep, you miss the scouting window. In this area, we figure that about 30% of our orchards have 30 to 45 mounds in a typical scouting situation.”

Who are these guys?

The pavement ant is 0.13 inch long, dark brown and covered with coarse hairs. It has ridges on its head, which can be viewed with a hand lens. It prefers to nest in sandy or loam soils. The southern fire ant is 0.07 to 0.25 inch long, has an amber head and thorax with a black abdomen. It has a painful sting that causes visible swelling. The ant hills often appear as small mounds or patches of loose soil. Fire ants vigorously swarm from the nest entrance when disturbed; nondamaging species do not. Nests in orchards with low-volume irrigation tend to be

Continued, page 2
May is time to decide on an approach to mite management. Some PCAs prefer to go with a preventative style of program by calendaring on a product in May, and then following that up with a hull split miticide. The main disadvantages to this program are that two sprays are often needed in fields where one would have been sufficient, and that biological control never gets a chance to do its job. This means that there is the potential for increased costs to the grower for pesticides and no reliance on biological control that occurs adventitiously for free. This is especially true with the use of abamectin-based products in May that not only kill mites (and therefore remove the food source beneficials need to get established), but also kill predatory thrips that often migrate into orchards in the spring and can assist in mite suppression throughout the year. The main advantage to this program is that it keeps trees clean, which can allow PCAs to sleep better, especially in a year where they might be seriously concerned over what deficit irrigation in a drought year may do to induce mites.

The other approach is to base treatment decisions on pest density. The recommendation is to do presence/absence sampling and avoid spraying until about 50% of the leaves have mites present on them (in the case that beneficials are found) or until about 25% of the leaves have mites (if there are no beneficials). The most important beneficials to watch for are sixspotted thrips, predatory mites, lacewings, minute pirate bugs, and mite destroyer beetles. More details of this program, including monitoring recommendations, treatment thresholds, and pest and beneficial identification are found at the UC IPM web site http://www.ipm.ucdavis.edu under the pest management guidelines for spider mites in almonds.

Following this IPM approach will often result in not needing to spray until some time between the middle of June and hull split when one application of products such as Envidor, Zeal or Fujimite that kill mites but preserve predatory insects will usually be sufficient for the remainder of the season. This way, mites show up early in the season, beneficials get established on them, beneficials can suppress the mites, and if they aren’t quite suppressing them enough, a miticide that kills mites but allows the beneficials to remain can keep the good guys and bad guys in balance such that flare-ups after hull split do not occur.

Got Ants, from page 1

located around the edges of the wetted areas. In flood-irrigated orchards with heavy soils, nests tend to be concentrated on the berms. Where lighter soils are present, nests are located both on the berms and in the middles. Frequently, southern fire ant nests are associated with clumps of weeds, such as nutseedge or spotted spurge. Activity of these pests peaks in the morning and again just before sunset. Do not confuse the southern fire ant with the pyramid ant, which is a beneficial species that is similar in size but active during mid-day and found in sandy, weed-free areas. The pyramid ant does not swarm.

What can they do?

Ants can completely hollow out nutmeats leaving only the pellicle. The southern fire ant has a wider distribution and generally causes more damage than the pavement ant. Ants are more prevalent in drip- or sprinkler-irrigated orchards than flood-irrigated orchards. Ants feed on other hosts and are principally a problem after almonds are on the ground. The longer nuts are on the ground the greater the problem ants pose. Nuts with a tight shell seal receive less damage.

When to look?

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. Unfortunately, cultural management of ants and navel orangeworm (NOW) differ. Where ants are a problem, nuts should be left on the trees to dry as long as possible there. To avoid damage, they should not remain on the ground for long periods. If NOW is the problem, early harvest (shaking) is important and the nuts are left on the ground for drying. Therefore, it is vital that growers know the pest that is causing damage.

How to treat?

If treatment is necessary, baits are the preferred method of ant control. When conventional sprays are used, only foraging workers are killed. Baits, however, 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 (see IPM Guidelines for ants in almonds). 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 irrigation or 48 hours before 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. Please go to the UC IPM Almond Pest Management website if you are interested in using a spray treatment. The timing and material are important choices and the website will help growers and their PCAs make an informed selection for the type of ant and cultural practices in each orchard.

Information for this article was taken from the UC IPM Almond website at http://www.ipm.ucdavis.edu/PMG/r3300411.html.

---

**Principal Worm Insecticides that are Registered or are Being Considered for Registration in Nut Crops in CA**

*David Haviland, Entomology Farm Advisor, UCCE Kern County*

(Note: Not all of these products are currently labeled. Please use this chart as a reference only and always consult labels before making official treatment recommendations)

<table>
<thead>
<tr>
<th>Group</th>
<th>Primary target site</th>
<th>Chemical sub-group or exemplifying active ingredient</th>
<th>Pesticides in this group</th>
<th>Active Ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acetylcholineesterase inhibitors</td>
<td>1A Carbamates</td>
<td>Sevin, Carbaryl</td>
<td>Carbaryl</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1B Organo-phosphates</td>
<td>Guthion, Lorsban, Nufos, others</td>
<td>Imidan, Azinphos-methyl, Chloropyrifos, Phosmet</td>
</tr>
<tr>
<td>3</td>
<td>Sodium channel modulators</td>
<td>Pyrethroids</td>
<td>Asana, Battalion, Baythroid, Brigade, Danitol, Leverage, Mustang, Warrior</td>
<td>Esfenvalerate, Deltamethrin, beta-Cyfluthrin, Bifenthrin, Fenpropathrin, Cyfluthrin + imidacloprid, Zeta-Cypermethrin, Lambda-Chyalothrin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pyrethrins</td>
<td>Ambush, Perm-Up, Permethrin, Pounce, others</td>
<td>permethrin</td>
</tr>
<tr>
<td>4</td>
<td>Nicotinic acetylcholine receptor agonists</td>
<td>Neonicotinoids</td>
<td>Assail, Leverage</td>
<td>Acetamiprid, Cyfluthrin + imidacloprid</td>
</tr>
<tr>
<td>5</td>
<td>Nicotinic acetylcholine receptor agonists (not group 4)</td>
<td>Spinosys</td>
<td>Success/Entrust, Delegate</td>
<td>Spinosad, Spinetoram</td>
</tr>
<tr>
<td>11B2</td>
<td>Microbial disrupters of insect midgut membranes</td>
<td>Bacillus thuringiensis</td>
<td>Agree, Condor, Crymax, Dipel, Javelin, Xentari, others</td>
<td>Bacillus thuringiensis subspecies Kurstaki, Dimilin, Diflubenzuron</td>
</tr>
<tr>
<td>15</td>
<td>Inhibitors of chitin biosynthesis</td>
<td>Benzoylureas</td>
<td>Dimilin</td>
<td>Diflubenzuron</td>
</tr>
<tr>
<td>18</td>
<td>Ecdysone receptor agonists</td>
<td>Diacylhydrazines</td>
<td>Intrepid, Confirm</td>
<td>Methoxyfenozide, Tebufenozide</td>
</tr>
<tr>
<td>22</td>
<td>Voltage-dependent sodium channel blockers</td>
<td>22B Metaflumizone</td>
<td>Alverde</td>
<td>Metaflumizone</td>
</tr>
<tr>
<td>28</td>
<td>Ryanodine receptor modulators</td>
<td>Diamides</td>
<td>Altacor, Voliam Xpress, Belt, Tourismo</td>
<td>Chlorantraniliprole, Chlorantraniliprole + λ-Cyhalothrin, Flubendiamide, Flubendiamide + Buprofezin</td>
</tr>
</tbody>
</table>

1 Insecticide Resistance Action Committee (IRAC) numbers used to denote different modes of action. Same number indicates same mode of action. For more information visit http://www.irac-online.org.

**Disclaimer:** Discussion of research findings necessitates using trade names. This does not constitute product endorsement, nor does it suggest products not listed would not be suitable for use. Some research results included involve use of chemicals which are currently registered for use, or may involve use which would be considered out of label. These results are reported but are not a recommendation from the University of California for use. Consult the label and use it as the basis of all recommendations.
Resistance management should be considered an integral portion of any integrated pest management program. In the case of worm pests in nut crops, many insecticide options are currently available and other registrations are pending. Historically it was common for almond growers to use one spray per season. However, the loss of Guthion for navel orangeworm, increased pressures to keep almonds free from aflatoxins, and documentation of off-site movement into waterways of pyrethroids from dormant treatments for peach twig borer have led to increased consideration of programs involving multiple in-season worm sprays. This has led to a need for increased vigilance regarding resistance management.

Several modes of action are available for worm control in almonds. The most common of these include the Diacylhydrazines (Intrepid), Spinosyns (Delegate and Success), Organophosphates (Lorsban), Pyrethroids (many products), and the Diamides (Belt that is registered, and Altacor, Voliam Xpress, and Tourismo that are in the process of being registered). When considering an insecticide treatment, it is important to make note of which products have been used on that orchard site and ensure that rotations are not only among insecticides, but that they are among pesticide modes of action.

Additionally, no resistance management plan is complete without considering cultural and biological control for worm pests. For example, winter sanitation programs should always form the backbone of any navel orangeworm program. Likewise, early harvest and the use of hard-shelled varieties can greatly alleviate the need for rescue from insecticide treatments. Degree-day models and tracking of crop phenology should also be used to properly time and therefore get the most out of insecticide treatments.