The red imported fire ant (*Solenopsis invicta*) (Figure 1) infests most of 11 southern states and Puerto Rico and officially arrived in California in 1998, where it was found infesting numerous residential and commercial areas in Orange, Los Angeles, Riverside, San Bernardino, and to a lesser extent, San Diego counties. The initial spread of these ants resulted from the movement of infested soil and container plants to uninfested areas. The ant was also found in almond groves in the Central Valley, apparently brought in with honey bee hives from Texas. Once established, the ant spread rapidly by flight of the reproductives.

**IDENTIFICATION**

Red imported fire ant workers (Figure 2) are variable in size (1/16 to 1/5 inch long) and are dark reddish brown. Our native southern fire ant (*Solenopsis xyloni*) is about the same size and color as the red imported fire ant. On the other hand, California harvester ant (*Pogonomyrmex californicus*) workers are all the same size (1/5 inch long) and are red in color (many people refer to these as red ants). The most common ant found around homes in southern California is the Argentine ant, *Linepithema humile*, a small grayish black ant that is uniform in size (1/10 inch long) and is seen moving along in long trails.

There are several physical characteristics that distinguish red imported fire ants from most other common ant species found in California, including the number of nodes on its narrow waist and segments on the antennae (see Figures 2 and 3 and also the Key to Identifying Common Household Ants at http://www.ipm.ucdavis.edu/PDF/TOOLS/antkey.pdf). The characteristic that definitively separates the red imported fire ant from other fire ants is the number of clypeal teeth on its head, a feature that is best viewed under a microscope (Figure 4). The red imported fire ant has 3 clypeal teeth whereas the native fire ant, *Solenopsis xyloni*, only has two lateral teeth. However, the quickest way to recognize this pest is to observe its aggressive behavior when its nest is disturbed. Red imported fire ants will quickly climb onto and sting anything touching their mound or food source.

Undisturbed red imported fire ant mounds are frequently dome shaped and can be 1 ft high (Figure 5). In California red imported fire ant mounds frequently resemble gopher mounds because they consist of a circular upwelling of loose soil (Figures 6 and 7), but they may not extend as far above the surface. This flattened appearance results from the fact that their mounds are frequently on irrigated turf where mowing cuts off the raised part of the mound. These mounds readily distinguish red imported fire ant colonies from other California ant species. Nests of the native southern fire ant, for instance, are usually irregular in shape and consist of scattered soil with multiple obscure entrances. In some instances red imported fire ants do not build mounds but nest in places such as rotten logs, walls of buildings, under sidewalks, and in outdoor electric and water utility boxes.

**LIFE CYCLE**

The red imported fire ant life cycle, like that of other social Hymenoptera (ants, bees, and wasps), consists of four main stages: egg, larva, pupa, and adult (Figure 1). The egg, larval, and pupal stages occur within the underground nest and are only seen when nests are disturbed or when they are being carried to a different location by workers.

The eggs are almost too small to be seen with the unaided eye. They hatch into the grublike larvae that are fed by the workers. There are four larval instars (stages); the fourth larval instar is particularly important because it is the only stage that can ingest solid food. Once the larvae finish their growth, they molt into pupae, which look like adults except that their legs and anten-
December 2013

Red Imported Fire Ant

nae are held tightly against the body. These pupae are initially white but begin to turn darker as they mature. In the final molt the pupa becomes an adult.

Most larvae develop into sterile worker ants, all of them female and wingless. However, some larvae in the colony receive extra food during their development and become much larger than the larvae destined to become workers. These larger larvae will develop into reproductives. In California reproductives are produced throughout the year, with the greatest number in the spring. Mating flights can occur any time conditions are favorable. The female reproductives are future queens and have wings. Male larvae develop into winged adults that are black in color and have a smaller head with antennae that are not elbowed as in the females. During a mating flight, the winged males and females fly and mate in mid-air before falling back to the ground. Males die shortly afterward; the mated queens remove their wings and dig a small hole in the soil and seal themselves inside. In the nest, the queens begin to lay eggs that develop into small worker ants in about one month.

Some fire ant colonies have only one queen per nest and are called monogyne colonies. Others can have many queens and are called polygyne colonies. The polygyne colony may be more difficult to control because all the queens must be killed to prevent the colony from surviving. Polygyne colonies frequently expand by budding; i.e., some of the queens and workers start a new mound nearby. This process accounts for much higher mound densities for polygyne colonies than for monogyne colonies, sometimes approaching 1,000 mounds per acre in pastures in the southeastern United States.

DAMAGE

The red imported fire ant's sting is a serious concern to people and their pets. Venom injected into the skin causes a burning sensation (hence the name fire ant). Both southern fire ants and red imported fire ants become very agitated when their nests are disturbed, but red imported fire ants are much more aggressive and can quickly climb onto the object or person causing the disturbance and begin stinging. A single red imported fire ant can bite and sting its victim repeatedly. Symptoms start as a burning and itching sensation followed by the formation of a white pustule (Figure 8), which takes several weeks to disappear. The pustules can become infected if not kept clean and may leave permanent scarring.

A small percentage of the human population is allergic to these stings. If a person experiences chest pains, nausea, dizziness, or shock, he/she should seek emergency medical assistance immediately after a stinging incident. Avoid medical emergencies by teaching children and visitors about fire ants.

Fire ants feed on almost any plant or animal material, including other insects, ticks, ground-nesting animals, young trees, seedlings, plant buds, developing fruits, and seeds. In addition to their stings, the red imported fire ant causes problems by building its nests around trees, yard plants, pipes, and in the walls of structures. Colony-building can damage plants, lawns, and outdoor electrical fixtures.

MANAGEMENT

Because fire ants can sting en masse, most people will want to keep them off their property. This contrasts with other common ant species, such as the Argentine ant, where the primary goal is to keep them out of homes. For management of household ants, see Pest Notes: Ants.

The red imported fire ant is a quarantined pest in California. If you suspect that the ant is on your property, you can call a statewide toll free number staffed by the California Department of Food and Agriculture (CDFA) (1-888-4fireant or 1-888-434-7326) to help get the pest identified by someone in your area. There is also an informative website http://www.cdfa.ca.gov/phpps/pdep/rifa/. If you are in an area where the fire ant has not been previously established, contact CDFA or the local Agricultural Commissioner for help and do not attempt your own control program. In Southern California’s Orange County and in the Coachella Valley, the Vector Control Districts have active fire ant control programs and will assist residents with treatment. In Los Angeles County, the county Agricultural Commissioner may provide treatment in some areas. In other areas and in Riverside County, residents may be responsible for their own treatment. Hiring a licensed pest control operator is strongly recommended because licensed professionals have access to the most effective management products and experience in controlling this pest.

For professionals and residents carrying out their own management programs, fire ant baits are recommended because they are inexpensive, highly

Figure 3. Head of a red imported fire ant worker showing the inverted black triangle (A) sometimes seen on the front of the head of these ants, and which is lacking on the native fire ant species. The 10-segment antenna with a two-segment antennal club (B) is found in all fire ant species.

Figure 4. Head of a red imported fire ant queen with mandibles removed to show the 3 clypeal teeth diagnostic for this species. The native fire ant, Solenopsis xyloni, only has the two lateral teeth. These characteristics can be seen with the mandibles intact if you know what to look for.
effective, and safe for the environment. Using bait allows the foraging ants to carry the poison back to the nest and the rest of the colony. Spraying insecticide on foraging ants will not control a colony and spraying a nest may cause the colony to disperse, which could make control more difficult.

Most fire ant baits consist of a yellow matrix of de-gelled corn grits that are coated with soybean oil containing the toxicant. Baits should be put out when ants are seen walking on the ground (temperatures from 70° to 90°F are best). You can check if fire ants are active by putting out a piece of greasy food (potato chip or Spam) and checking it in about 30 minutes. In hotter weather baits are best applied in the evening. The ants will then forage overnight on the bait. Baits lose their effectiveness quickly with extreme heat, water, and sunlight. Fresh bait from an unopened container works best; an opened package may remain fresh for only a couple of weeks. Furthermore, the ground should be dry to avoid further deterioration of the baits. On watered turf, in most cases, a couple of hours without irrigation should be sufficient to allow the ants to take the baits to their nests. Also, do not apply baits if rain is expected. Most fire ant baits are broadcast at 1.5 lbs per acre (about 20 bait particles per square foot) and are unlikely to pose a threat to people or animals at these rates. Labels should be carefully followed with regard to where and when these baits should be applied and special care taken to avoid application on hard surfaces or other areas where baits can be washed into storm drains.

For long term control, bait containing an insect growth regulator (IGR), such as Distance, is recommended. However, IGRs are slow acting, requiring 4 to 6 weeks for maximum efficacy. If quicker results are desired, a corn-grit bait containing hydramethylnon, such as Amdro Pro, can be used. It will give good results within one week or less. Table 1 lists some of the common bait products available for controlling ants. To ensure you are using a bait optimized for fire ants, check the product label for the words fire ant bait. Many of these products are available only to licensed professionals. Not listed in Table 1 are plastic bait stations containing various insecticides. These small stations are generally more useful for indoor use against other ant species and are not likely to have much effect on large outdoor infestations of fire ants.

Products not labeled as fire ant baits such as mound treatments and broadcast granules containing cyfluthrin, deltamethrin, pyrethrin, acephate, d-limonene, permethrin, bifenthrin and lambda-cyhalothrin are not recommended. These products may give a quick reduction in visible ants, but they generally kill only foraging workers and do not give good long-term results.
Table 1. Common Bait Insecticides for Fire Ant Control Available in California 2013. These Baits are Applied as Broadcast Applications—Not in Bait Stations.

<table>
<thead>
<tr>
<th>Active Ingredients (a.i.)</th>
<th>Product Name</th>
<th>Availability</th>
<th>Speed of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>hydramethylnon</td>
<td>Amdro Pro Fire Ant Bait</td>
<td>Professional Use Only</td>
<td>moderate to slow</td>
</tr>
<tr>
<td>hydramethylnon</td>
<td>Amdro Fire Ant Bait</td>
<td>Homeowners</td>
<td>moderate to slow</td>
</tr>
<tr>
<td>abamectin</td>
<td>Ascend Award II</td>
<td>Professional Use Only</td>
<td>moderate to slow</td>
</tr>
<tr>
<td>fipronil</td>
<td>Maxforce FC Fire Ant Bait</td>
<td>Professional Use Only</td>
<td>moderate to slow</td>
</tr>
<tr>
<td>pyriproxyfen</td>
<td>Distance, Esteem</td>
<td>Professional Use Only</td>
<td>slow</td>
</tr>
<tr>
<td>spinosad</td>
<td>Conserve</td>
<td>Professional Use Only</td>
<td>moderate to slow</td>
</tr>
<tr>
<td>methoprene</td>
<td>Extinguish</td>
<td>Professional Use Only</td>
<td>slow</td>
</tr>
<tr>
<td>methoprene + hydramethylnon</td>
<td>Extinguish Plus</td>
<td>Professional Use Only</td>
<td>moderate to slow</td>
</tr>
<tr>
<td>indoxacarb</td>
<td>DuPont Advion Fire Ant Bait</td>
<td>Professional Use Only</td>
<td>moderate to fast</td>
</tr>
<tr>
<td>indoxacarb</td>
<td>Spectracide Fire Ant Killer Plus Preventer Bait Once and Done!</td>
<td>Homeowners</td>
<td>moderate to fast</td>
</tr>
</tbody>
</table>

in reducing the colony. Many of these products also have greater potential of running into groundwater than do the baits, and all the pyrethroid products have been found in urban creeks at levels toxic to aquatic wildlife. If you hire a pest control operator, the merits of the different treatments with respect to efficacy and safety for the environment should be discussed before treatments are applied. (See Pest Note: Hiring a Pest Control Company for information on hiring a professional.)

REFERENCES


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This and other Pest Notes are available at www.ipm.ucanr.edu.

For more information, contact the University of California Cooperative Extension office in your county. See your telephone directory for addresses and phone numbers, or visit http://ucanr.org/ice.cfm.

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original, labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Pesticides applied in your home and landscape can move and contaminate creeks, rivers, and oceans. Conform chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down the sink or toilet. Either use the pesticide according to the label, or take unwanted pesticides to a Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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