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SP 161

Imported Fire Ants

And Their Management In Florida

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Figure 1. Imported fire ant mound.



Figure 2. Pustules caused by fire ant stings.

Imported fire ants are aggressive, reddish brown to black ants that are $\frac{1}{8}$ " to $\frac{1}{4}$ " long. They construct nests that are often visible as dome-shaped mounds of soil, sometimes as large as 3 feet across and $1\frac{1}{2}$ feet in height (Figure 1). In sandy soils, mounds are flatter and less visible. Fire ants usually build mounds in sunny, open areas such as lawns, pastures, cultivated fields, and meadows, but they are not restricted to these areas. Mounds or nests may be located in rotting logs, around trees and stumps, under pavement and buildings, and occasionally indoors. When their nests are disturbed, numerous fire ants will quickly run out of the mound and attack any intruder. These ants are notorious for their painful, burning sting that results in a pustule and intense itching, which may persist for 10 days (Figure 2). Infections may occur if pustules are broken. Some people have allergic reactions to fire ant stings that range from rashes and swelling to paralysis, or anaphylactic shock. In rare instances, severe allergic reactions cause death.

First Aid For Fire Ant Stings

1. Immediately remove stinging ants by brushing or flicking them off the skin.
2. Persons exhibiting symptoms of dizziness, nausea, sweating, swelling of affected area, headache, and/or shortness of breath may be **hypersensitive**, and should **seek medical attention immediately**. Hypersensitive people may go into anaphylactic shock, which can be fatal.
3. For nonhypersensitive individuals, apply an ice cold compress to the affected area for temporary relief.
4. To prevent secondary infections, keep affected area clean and do not scratch or break pustules. Insect bite remedies may help reduce itching.

In addition to stinging humans, imported fire ants can sting pets, livestock, and wildlife. Crop losses are also caused by fire ants feeding on seedlings and even citrus trees. Harvesting machinery used on farms can be damaged by hitting hardened fire ant mounds found in clay soils. Electrical equipment and utility housings may serve as fire ant nest sites, sometimes resulting in short circuits. Other examples of damage caused by fire ants are discussed in the section on management options.

The name "imported fire ants" generally refers to two species of ants: the black imported fire ant, *Solenopsis richteri*, and the red imported fire ant, *Solenopsis invicta*. The black imported fire ant was acciden-

tally introduced from South America into Mobile, Alabama, around 1918, and now infests a small area in Alabama and northern Mississippi. The red imported fire ant probably entered the United States in the 1930s. It was most likely introduced with cargo or in the soil used as ballast in ships from South America that were unloaded in the Mobile area. In the 1940s and early 1950s, the red imported fire ant spread to Florida and other southern states in nursery stock and sod. Fire ants currently infest over 260 million acres in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Puerto Rico (Figure 3). They have the potential to become established in other areas where average minimum temperatures are above 10°F and rainfall is greater than 10 inches a year, or in irrigated areas. Localized infestations have also been reported in Arizona and Virginia.

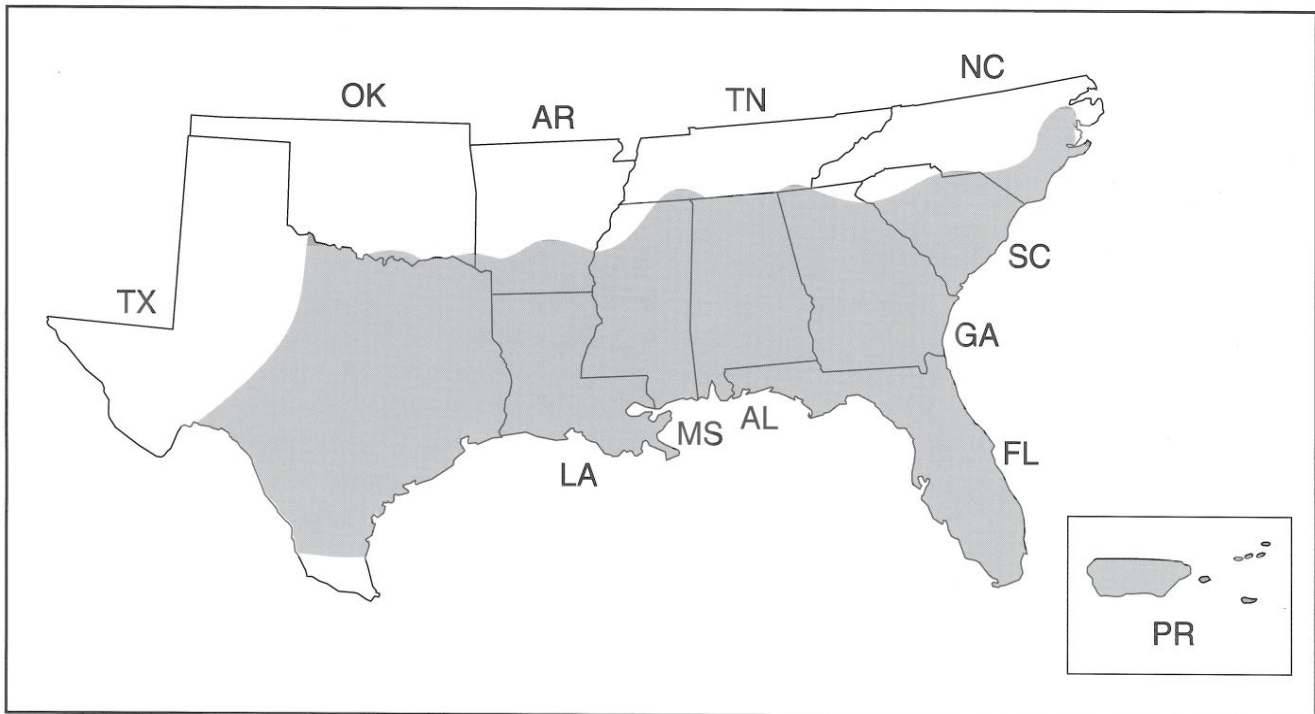


Figure 3. The distribution of well-established imported fire ant infestations in the United States includes 11 states and Puerto Rico.

To limit the spread of imported fire ants, a federal quarantine restricts the movement of soil, potted plants, plants with soil attached, grass sod, hay, and used soil-moving equipment to uninfested areas of the United States. These items must be certified as being free from infestation. While there are no restrictions on the movement of regulated articles *within* Florida and other quarantine areas, any shipments *outside* the quarantine areas require inspection and certification from the Florida Department of Agriculture and Consumer Services, Division of Plant Industry (FDACS-DPI). Information on specific laws and regulations may be obtained from any local office of the FDACS-DPI or the U.S. Department of Agriculture Animal and Plant Health Inspection Service/Plant Protection and Quarantine, (USDA-APHIS/PPQ).

Biology



Figure 4. *Immature stages of fire ants, clockwise from top: eggs, second and third instar larvae, fourth instar larva, pupa, late stage pupa.*



Figure 5. *Imported fire ant workers surrounding the much larger queen.*

Red imported fire ants live in colonies that contain cream-colored to white immature ants, often called brood. The brood is composed of eggs, larvae, and pupae (Figure 4). Also within the colonies are adult ants of different types, or castes. The castes include winged males, winged females (which are unmated queens), workers of varying size, and one or more mated queens (Figure 5). The winged males and females fly from nests, usually in the spring and early summer, to mate in flight. Upon landing, mated females will shed their wings after finding a suitable nesting site. All the males die after mating. While thousands of winged males and females can be produced per year in large colonies, they do not sting, and fewer than 10 percent of the females will survive to produce a colony. Newly mated queens can fly as far as 12 miles from the nest (or even farther in the wind), but most land within a mile.

New colonies do not make conspicuous mounds for several months. Once a colony is established, a single queen can lay over 2,000 eggs per day. Depending on temperature, it can take 20 to 45 days for an egg to develop into an adult worker. Workers can live as long as 9 months at 75°F, but life spans usually are between 1 and 6 months under warmer outdoor conditions. Queens live an average of 6 to 7 years.

Fire ants are omnivorous, feeding on carbohydrates (e.g., honeydew, plant exudates, sugars, syrups); proteins (e.g., insects, meats); and lipids (e.g., grease, lard, oils from seeds). Their food preferences change depending on the nutritional needs of the colony. In the spring and summer, when food is abundant, the colony produces new offspring and the protein needs of the colony increase. Adult ants require carbohydrates and/or lipids to sustain themselves throughout the year. Fire ants are able to ingest only liquids. Solid proteinaceous food is liquified by placing it on a depression in front of the mouths of the oldest larvae (the fourth instar stage), which then regurgitate digestive enzymes onto the food. Once the food is liquified, the fourth instar larvae suck up the protein and regurgitate it to the workers, which pass it on to the rest of the colony.

Workers will forage for food more than 100 feet from the nest. They can forage during both the day and the night, generally when air temperatures are between 70° and 90°F. When a large food source is found, fire ants recruit other workers to help take the food back to the colony. Liquids are ingested at the food source and stored within the ants until they are regurgitated to other ants within the colony. Liquids from solid foods are extracted at the source, or are carried back as solid particles. Large solids may be cut into smaller pieces so they can be carried back to the colony.

There are two types of fire ant colonies: 1) single-queen, or monogyne, colonies, and 2) multiple-queen, or polygyne, colonies. Single-queen colonies have only one egg-laying queen, and may contain as many as 100,000 to 240,000 workers. Multiple-queen colonies have many egg-laying queens (usually 20 to 60), with 100,000 to 500,000 workers. Single-queen colonies fight with other fire ant colonies. Because of this antagonistic behavior, colonies are farther apart, resulting in a maximum of 40 to 150 mounds per acre. Multiple-queen colonies generally do not fight with other multiple-queen colonies. Consequently, mounds are closer together, and can reach densities of 200 to 800 mounds per acre. Multiple-queen mounds may also be inconspicuous, often being clusters of small, flattened excavations, in contrast to the distinct dome-shaped mounds of single-queen colonies. Workers from single-queen colonies vary in size, ranging

in length from 1/8" to 1/4", and are usually reddish brown to black. Workers of multiple-queen colonies are generally smaller (1/8" to 3/16"), have only a few large workers, and are lighter in color (orangish brown) than single-queen colony workers.

Large colony sizes, and the presence of numerous queens make multiple-queen colonies more difficult to eliminate than single-queen colonies. Since 1973, multiple-queen colonies have been found in 8 of the 11 fire-ant infested states, including Florida. Multiple-queen colonies

Some Differences Between Single and Multiple-Queen Imported Fire Ant Colonies

Character	Single-Queen or Monogyne Colony	Multiple-Queen or Polygyne Colony
Number of viable egg-laying queens:	One	Many (usually 20 to 60)
Worker ant length:	Variable (1/8 to 1/4 inch), with several large workers	Uniform (1/8 to 3/16 inch), with a few large workers
Worker ant color:	Reddish brown to black	Orangish-brown
Number of ants per mature colony:	100,000 to 240,000	100,000 to 500,000
Different colonies fight:	Yes	No
Maximum number of mounds per acre:	40 to 150	200 to 800

produce fewer winged, or alate, queens that will start new colonies after a mating flight than single-queen colonies. However, multiple-queen colonies can establish new colonies through a process called budding, where a portion of the queens and workers splits off from a colony.

The spread of fire ants into new areas depends on many factors, such as climate, surrounding fire ant populations, and the native predators and competitors in the areas. Areas with an abundance of natural enemies and competing ant species may hinder colony establishment because the enemies prey upon newly mated queens and compete for resources. However, if an area is disturbed, for example, by clearing land for pastures or urban development, natural enemies or competitors may be adversely affected and fire ants may colonize the area more rapidly.

It may take as long as 11 years for single-queen fire ant colonies to become the dominant ant species in a new area that has been disturbed by urbanization and has not been treated with insecticides to control ants. Multiple-queen colonies may become dominant in new areas at a slower rate because they spread more by budding than by establishing numerous new colonies scattered throughout an area after mating flights.

In areas where native ants and fire ant populations have been reduced or eliminated with insecticides, reinfestation by fire ants may be noticeable within a month after treatment. Fire ants reinfest these areas more rapidly and outcompete other ant species because of their tremendous reproductive capacity and faster colony development. If fire ant control is not maintained, the subsequent reinfestation of an area may result in even greater fire ant populations than existed before the application of insecticides.

Control Strategies and Techniques

Imported fire ants have been the target of innumerable methods of control. Unfortunately, there are no control methods that will permanently eliminate fire ants from an area. Four strategies are currently being used to control fire ants:

1. **broadcast bait applications;**
2. **individual mound treatments;**
3. **a combination of broadcast baiting and individual mound treatments;**
4. **barrier and spot treatments.**

The following discussion provides general descriptions of these strategies and guidelines for employing them. Suggestions for using these strategies in specific situations are given in the section on managing fire ant problems.

1. Broadcast Bait Applications

This strategy attempts to reduce fire ant populations by applying insecticides incorporated into an attractant, or bait, on an areawide basis. Most bait products (eg., Amdro[®], PT[®]370 Ascend[™], Award[®] or Logic[®]) contain slow-acting toxicants dissolved in soybean oil, which is a food source for fire ants. The toxicant-laden oil is then absorbed into corn grits, which makes the product easier to handle and apply, and more available to the ants. The small size of the corn grit allows the ants either to carry the grit back to the colony and extract the toxic oil within the mound, or to extract the toxic oil from the grit immediately and carry it back to the colony internally. The slow action of the toxicants allows the ants to feed the toxic oil to other members of the colony before they die. When the toxicant is fed to the queen(s), she either dies or no longer produces new workers and the colony will eventually die.

There are four different toxicants, or active ingredients, that are used in commercially available broadcast bait products specifically registered for use against fire ants. Hydramethylnon, which is used in Amdro[®], is a slow-acting poison that kills all members of a colony that ingest it. After one to five weeks, 80 to 90 percent of the fire ant colonies in the treated area will be destroyed. However, these areas are subject to reinfestation.

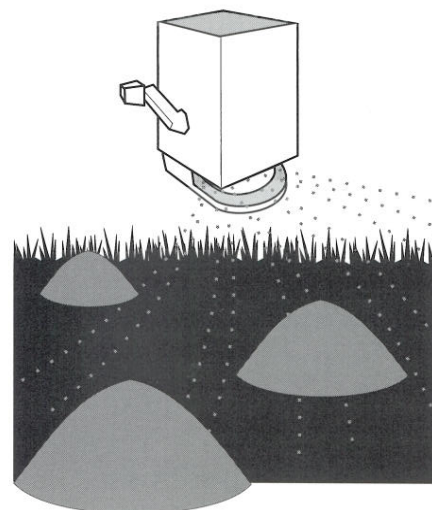
Because two of the other active ingredients interfere with reproduction, they are often referred to as insect growth regulators, or IGRs. The active ingredient in Ascend[™] is abamectin B₁ which, at broadcast application rates, prevents queens from laying eggs. Fenoxycarb, the active ingredient in Logic[®] and Award[®], prevents queens from laying worker eggs. Because workers are no longer being produced, colonies treated with IGRs will eventually be eliminated because the queen(s) will not be cared for and will die as workers die off naturally. Abamectin and fenoxycarb products may require 5 to 10 weeks to eliminate 90 percent of the colonies, and large treated areas (>1 acre) may have control for as long as a year. Control in smaller areas does not last as long because these areas are more easily reinfested from adjacent areas.

Another bait product, Bushwhacker[®], contains boric acid as the active ingredient. Boric acid will kill individual fire ants but its actual mode of action is not completely known. Published data on the effectiveness of this bait product under outdoor conditions are not available.

A broadcast bait application eliminates the need to locate mounds because it relies on foraging fire ants to find and feed the baits to the rest of the colony. Thus, large areas can be treated more efficiently. To ensure baits will be fed upon, follow the guidelines given in the box below.

Bait broadcasting equipment (Figure 6) suitable for small areas such as lawns and playgrounds includes hand-held seed spreaders (Scott's Handy Green®, Republic EZ Handsreader®, Ortho Whirlybird®) and chest spreaders (Plant Mates Canvas®, Spyker Poly® model 75, Earthway Canvas EV-N-SPRED® 2700A, Cyclone Poly® model 1A1). The spreader should be set at the smallest opening and the applicator should walk rapidly, to apply approximately 1 ounce of bait per 2,000 square feet. Electric spreaders, such as the Herd Model GT-77A®, Cyclone Spreader Model M-3®, or other similar spreaders, are suitable for broadcasting baits over larger areas (1 to 25 acres). These spreaders must be mounted onto vehicles that can maintain low speeds and be calibrated to apply 1 to 1½ pounds of

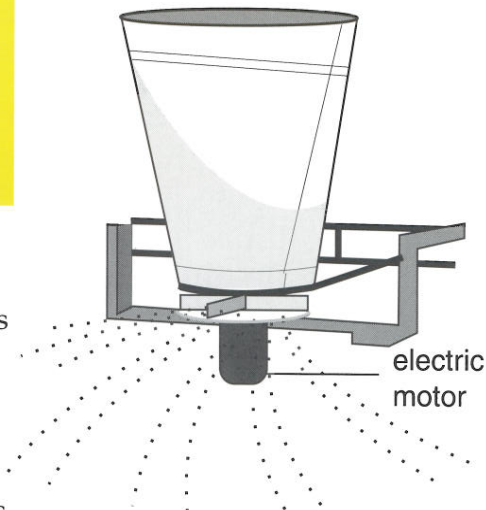
Figure 6. Bait broadcasting equipment:



A. hand-held seed spreader



B. chest spreader



C. electric spreader

Guidelines for Effective Bait Applications:

1. **Use fresh bait.** Most available fire ant baits use soybean oil as a feeding attractant. Baits that are old (over 2 years old in an air-tight container), left in unsealed bags, or stored at high temperatures may become rancid and will not be fed upon by foraging workers.
2. **Keep baits dry.** Wet baits are not attractive to fire ants. Apply baits when the grass and ground are dry or drying and rain is not expected, preferably for the next 24 hours.
3. **Apply baits when fire ants are actively foraging.** Foraging activity can be determined by spreading bait in a small pile in the area to be treated. If fire ants are actively foraging, you should see ants removing the bait within 10 to 30 minutes. This also will indicate that the bait is attractive, and not too old. Fire ants generally will forage when air temperatures are between 70° and 90°F. During hot, summer weather, apply baits in the late afternoon or evening because fire ants will forage at night under these conditions.
4. **Follow the directions on the label.** It is against the law to apply baits in areas not listed on the label.

bait per acre. Walk-behind rotary spreaders generally apply excessive amounts of bait and are not recommended. However, some manufacturers may provide separate attachments (Spyker® models 44-22, 24-22) that result in application rates of 1 to 1½ pounds per acre.

2. Individual Mound Treatments

This strategy attempts to eliminate colonies of fire ants by treating mounds individually. To eliminate a colony, the queen must be killed. If she is not

Figure 7. Application of bait to individual ant mound.

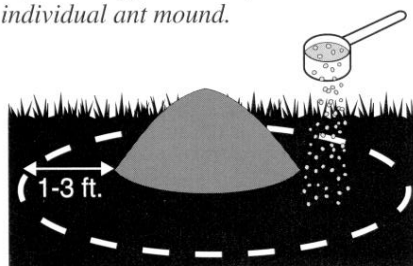
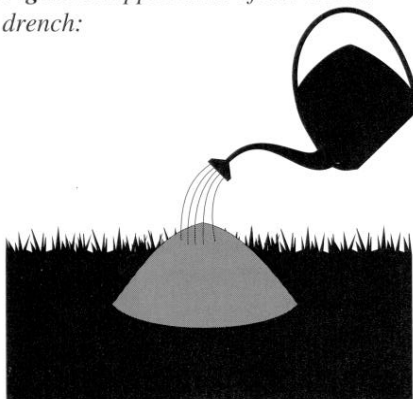
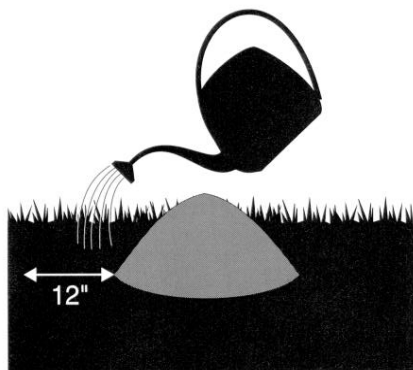


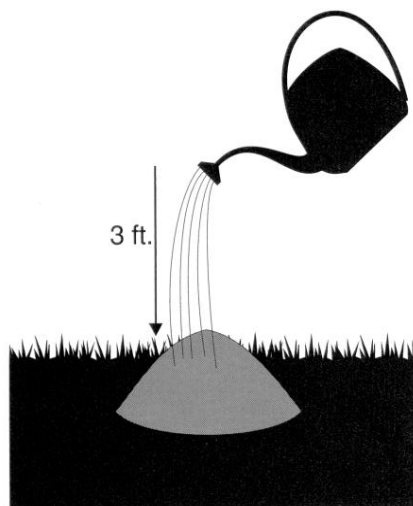
Figure 8. Application of ant mound drench:



First wet top of mound.



Next, soak 12" swath around mound base.



Finally, pour drench on top of mound from a height of 3 feet to penetrate the mound.

destroyed, she will continue to lay eggs and the colony will recover. In the case of multiple-queen colonies, all the queens must be killed, making effective treatments very difficult. Individual mound treatments are time consuming and labor intensive because the mounds must be located and treated one at a time. However, colonies treated individually may be eliminated faster than colonies treated with broadcast bait applications.

There are chemical and nonchemical methods of treating mounds individually. Chemical methods include insecticides that are formulated as baits, drenches, granules, dusts, aerosols, and liquid fumigants. Non-chemical methods include applying hot water and physically excavating the nest. All individual mound treatments may cause the ants to relocate and create a new mound. Even if the queen is killed, surviving ants may still inhabit the treated mound or make a new mound until they die off naturally, which may take over a month. Thus it may be necessary to retreat remaining mounds that still contain ants.

Methods used to treat mounds individually:

Baits: Bait products used for broadcast bait applications can be applied to individual mounds. Sprinkle the recommended amount of bait around the base of the mound up to 3 feet away (Figure 7). In addition, follow the guidelines for effective bait applications given previously. As with broadcast bait applications, the use of baits for individual mound treatments may take 1 to several weeks to eliminate colonies.

Drenches: These products are solutions consisting of insecticides and water that are applied to mounds. To be effective, the drench needs to contact a majority of the ants. This is best accomplished by applying the drench to an undisturbed mound on cool, sunny mornings. Under these conditions the ants, including the queen(s) and brood, are concentrated just under the top surface of the mound, where it is warm. If drenches are applied in hot, dry weather, most of the ants are deep within the mound, and the drench will not contact the ants. It is recommended that entire mounds be saturated by first wetting the top of a mound, then soaking a 12-inch swath around the base of the mound and, finally, pouring the remaining drench on top of the mound from a height of at least 3 feet to obtain penetration into the mound. Use about 1 gallon of drench per mound for mounds with bases up to 8 inches in diameter and 2 gallons for larger mounds (Figure 8). Colonies may be eliminated within a few hours to several days after treatment.

Granules: In general, these products contain an insecticide that is released and carried into the mound with water that is poured over the granules. As with the drenches, granules are effective only if the insecticide penetrates the mound and contacts a majority of the ants and the queen(s). To apply, evenly scatter a measured amount (follow label directions) of granules over the surface and around a mound, without disturbing the mound. With a sprinkler can, gently sprinkle 1 to 2 gallons of water over the granules, to avoid disturbing the colony and washing granules off the mound (Figure 9). Watering may not be necessary with some products (follow label directions). Treating mounds on cool, sunny mornings will help the treatment contact the colony. It may be several days before the entire colony is killed.

Dusts: Dusts are dry, powdered insecticidal products. The dusts stick to the bodies of ants as they walk through treated soil. Ants that contact the dust will eventually die. Dusts are applied by evenly sprinkling a measured amount of dust over the mound, following label directions. Avoid inhaling or touching the dust (Figure 10). Some dusts, such as those containing 75 percent acephate, should kill an entire colony within a week.

Aerosols: Some products are available in aerosol cans equipped with a probe and contain insecticides that quickly immobilize and kill ants on contact. As the probe is inserted into a mound, the insecticide should be injected into the mound for a specified amount of time (follow label directions). Depending on the size of the mound, several insertions may be needed to distribute the insecticide. Aerosols generally disperse throughout the mound more quickly than drenches. However, as with other individual mound treatments, application on cool, sunny mornings will help maximize contact with the colony (Figure 11). While aerosols are more convenient to use than drenches, they generally are more costly and do not provide significantly better control than some drenches.

Liquid Fumigants: This term refers to a liquid (methyl chloroform or 1,1,1 trichloroethane) that volatilizes to a gas that sinks into the mound. The gas will immediately kill ants in the mound but does not persist, and foraging ants that return to the mound will not be affected. The product may also injure plants. Following label directions, pour a measured amount of liquid into a small hole (about 1 inch in diameter) made at the top of the mound and around the top of large mounds. Try to minimize disturbance to the mound to keep ants within the mound. Effectiveness is reduced when the ground is excessively wet (saturated), dry, or cold (below 50°F). **Liquid fumigants are no longer registered for use in Florida, and should not be used.**

Organic Insecticides: Commercially available organic products containing ingredients such as boric acid and diatomaceous earth are known to kill ants. However, it has not been consistently demonstrated that they are effective in killing entire colonies when applied to mounds. There are also several products which contain plant derived, or botanical, insecticides such as rotenone, nicotine sulfate, and pyrethrins. As with the other mound treatments, the product must contact and kill the queen(s) to control colonies.

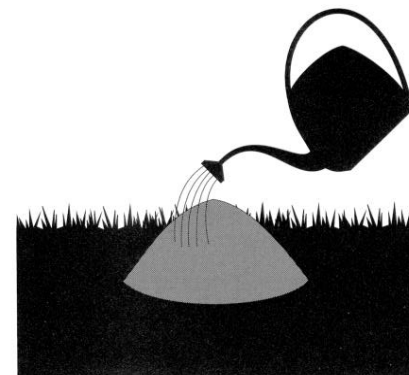
Hot Water: Scalding or boiling water (190° to 212°F) has been used to eliminate colonies. Slowly pour about 3 gallons of hot water onto the mound. The water should drain into the vertical tunnels of the mound and eventually collapse the entire mound structure. Treatments may be more effective if applied on cool, sunny mornings. It has been reported that 20 to 60 percent of the mounds treated by this method have been eliminated. Several applications may be needed, and hot water may injure plants adjacent to treated mounds. One must be very careful to avoid burning oneself when using hot water.

Excavation: Fire ant mounds may be dug up and removed from an area. Apply talcum or baby powder to the handle of a shovel and the inside of a

Figure 9. Application of granular insecticide:



First scatter granules over mound.



Second, water in with sprinkler can. Do not wash granules off the mound.

Figure 10. Sprinkle dust evenly over the entire mound. Avoid inhaling or touching the dust.

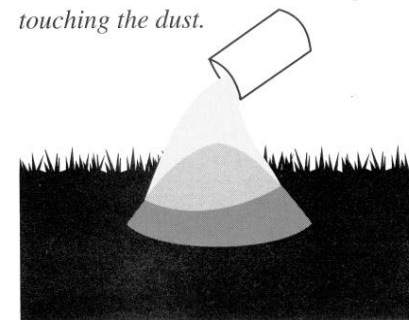


Figure 11. Inject pressurized insecticide into mound in several places, according to label directions.



bucket to deter the ants from crawling up the handle or escaping from the bucket. The best time to excavate a mound is on cool, sunny mornings, when a majority of the ants and brood are near the mound surface.

These Methods DO NOT Eliminate Fire Ant Colonies!!!
 Soap Solutions
 Wood Ashes
 Grits
 Shoveling Mounds Together

Other Home Remedies and Control Devices: Many home remedies and mechanical control devices have not been scientifically proven to consistently eliminate fire ant colonies. Often these “cures” will kill many ants and the colony will abandon the mound, giving the false impression that the colony was killed. In actuality, the colony most likely just established another mound elsewhere, and elimination of the entire colony, or the queen(s) did not occur. Some home remedies also are dangerous to apply and can seriously contaminate the environment. These remedies include gasoline or other petroleum products, battery acids, bleaches, ammonia, and other cleaning products. Such “remedies” should never be used.

Advantages and Disadvantages of Methods Used to Treat Mounds Individually

Method:	Advantages:	Disadvantages:
Baits	Can treat inaccessible colonies	Slow acting; moderately expensive
Drenches	Relatively fast acting; little surface residue after application	May handle insecticide concentrates; labor intensive
Granules	Relatively fast acting; no mixing required; little surface residue after watering in	Usually must be watered in; labor intensive
Dusts	Fast acting; no water needed	Leaves surface residue; may become airborne during application
Aerosols	Fast acting; little surface residue after application	May kill grass; expensive
Liquid fumigants	Fast acting; little surface residue after application	May injure plants; labor intensive; illegal to use in Florida
Hot water	No insecticide residues	Potential burn hazard; may kill grass; labor intensive
Excavation	No insecticide residues	Very labor intensive; creates holes in ground

Other **ineffective** home remedies include soaking soap solutions and wood ashes into a mound, with the hope of removing the wax layer that protects an ant's body; applying grits to fire ant mounds in an attempt to get ants to eat the grits, which will then supposedly swell inside the ants and make them explode (recall that ants can only ingest liquids, so they do not even eat grits); and shoveling mounds together to make different colonies fight and kill each other (this is not effective with either single or multiple-queen colonies).

3. Combining Broadcast Baiting and Individual Mound Treatments

This strategy utilizes the efficiency of broadcast baiting and the fast action of individual mound treatments. Baits must be broadcast **first** to efficiently reduce fire ant populations (see guidelines for effective bait applications). Wait a minimum of 3 days after broadcasting to allow fire ants to forage and distribute the bait before individually treating mounds. Treat mounds preferably with a dust, drench, granular, or aerosol insecticide specifically labeled for fire ant control. Treat only mounds that are causing immediate problems or are a potential hazard [e.g., mounds located in areas frequented by people or pets (Figure 12)]. Most mounds that receive the slower-acting baits will eventually be eliminated, and the presence of small populations of fire ants may help slow the reinfestation of an area.

4. Barrier and Spot Treatments

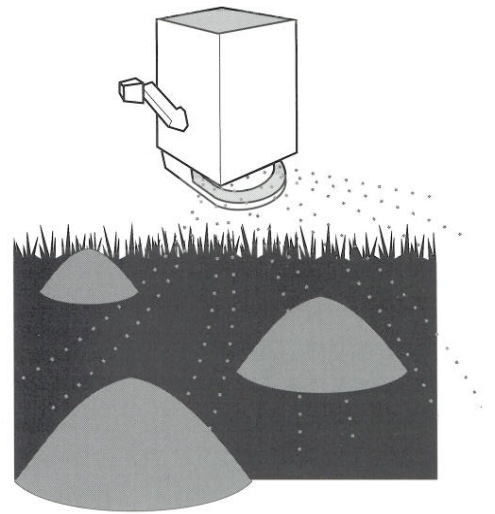
Products that contain active ingredients such as acephate, bendiocarb, carbaryl, chlorpyrifos, diazinon, isofenphos, propoxur, permethrin, and resmethrin immediately kill ants on contact. These products are usually sold as sprays or dusts, and some are latex paint mixtures. They may be applied in wide bands on and around building foundations, equipment, and other areas to create barriers that exclude ants. They also may be applied to ant trails to eliminate foraging ants. Barrier and spot treatments do not eliminate colonies. Follow label directions for specific uses and application procedures.

Natural and Biological Controls

Birds, lizards, toads, spiders, insects such as dragonflies or other ants, and other organisms kill newly mated queens. Ant-eating animals, such as armadillos, may disturb fire ant mounds, but do not eliminate colonies. Native ant species that compete with fire ants probably provide the most effective natural control. Broadcast bait applications kill many native ant species, and may allow fire ant populations to increase once baiting is discontinued.

Parasites and pathogens that feed on or infect fire ants are known to occur. However, their effectiveness in controlling fire ant populations has not been consistent. Direct applications of nematodes, mites, or fungi to fire ant mounds generally have caused colonies to move instead of eliminating them. The control potentials of other biological agents are currently being studied.

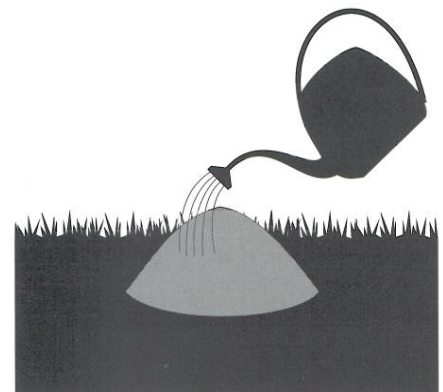
Figure 12. Combining broadcast baiting with individual mound treatments:



First, broadcast bait to reduce fire ant populations efficiently.



Wait 3 days to allow ants to feed on the bait and spread it to the rest of the colony.



Individually treat mounds to eliminate especially hazardous colonies quickly.

Options for Managing Fire Ant Populations

The following section lists treatment options for managing various kinds of fire ant problems. The methods mentioned here are described in detail in this publication. Because many combinations of control options are available, there may be no single best method of control. The options that follow are only suggestions, and are not intended to preclude the use of other effective methods.

Lawns and Ornamental Turf

Fire ants infest lawns, school yards, athletic fields and parks. In these places, they may pose a medical threat and affect human activity. Their mounds also detract from the aesthetic value of the landscape.

Treatment options:

Option 1: For small areas of ornamental turf (usually 1 acre or less) or where preservation of native ants is desired. This option selectively controls fire ants, but reinvasion should be expected. It requires more labor and monitoring than other options.

Step 1. Treat all unwanted fire ant mounds, using the individual mound treatment of choice.

Step 2. Selectively treat new or undesirable mounds as needed.

Option 2: For long-term ant suppression in ornamental turf and non-agricultural lands, including roadsides. This option is best suited to larger areas and will not eliminate all ant activity. Suppression of ants occurs slowly (in weeks to months) and the cost is moderate. This option is not suggested for areas with large numbers of native ants and few fire ant mounds (15 to 20 per acre or fewer).

Step 1. Make an annual or semiannual broadcast application of a bait-formulated insecticide (PT®370 Ascend™, Amdro®, or Award®) in the spring and/or fall.

Step 2. At least 3 days after broadcasting the bait, begin treating individual mounds in sensitive or high-traffic areas as needed.

In areas with excessively high numbers of mounds per acre (200 or more), two applications of bait may be needed within several months to reach a satisfactory level of ant suppression, since not all mounds may be affected by a single bait application. Reapply when the presence of ants justifies the cost of treatment.

If and when bait applications are terminated, fire ants can reinfest the area, sometimes with more mounds than were present initially. Mated queens may "seed" the treated area with new colonies and be unaffected by the earlier bait applications. Also, in areas susceptible to flooding, baits may be less effective because ants move in and out of these areas often.

Option 3: To eliminate all mound building and foraging activity in ornamental turf. Effects of this option are more rapid and dramatic than those

of option 2, but this option may be more expensive and requires more contact insecticide.

- Step 1. (Optional.)* Make an annual or semiannual broadcast application of a bait-formulated insecticide in areas where there are many mounds (more than 20), or individually treat fire ant mounds.
- Step 2.* Routinely broadcast or spray a contact insecticide every 8 weeks or so when ants are detected. Heed the re-entry or treatment-to-harvest intervals specified on product labels.

Option 4: For small areas (less than an acre) where minimal pesticide use is desired, such as areas frequented by young children. This option is very labor intensive, and may be practical if only a few mounds are present.

- Step 1. (Optional.)* Broadcast a bait-formulated insecticide. Note that relative rates of population reductions from fire ant baits are from fastest to slowest: Amdro[®], PT[®]370 Ascend[™], and Award[®]. However, while all baits have low mammalian toxicities, relative toxicities for the three baits from highest to lowest are Amdro[®], Ascend[™], and Award[®]. At the 1- to 1¹/₂-pound-per-acre application rate for the above products, bait particles are widely scattered and difficult to find.
- Step 2.* At least 3 days after baiting (if baits were applied), individually drench mounds with hot (scalding) water.
- Step 3.* Excavate and/or reapply hot water to mounds that are still active. Repeat when necessary.
- Step 4. (Optional.)* Make an annual or semiannual broadcast application of a bait-formulated insecticide in the spring and/or fall to suppress reinfestations.

Commercial Turf

Treatment options:

Option 1: To treat sod to be shipped **within** the quarantined area, use option 1, 2, or 3 listed for lawns and ornamental turf.

Option 2: To treat sod to be shipped **out** of the quarantined area (from Florida Imported Fire Ant Certification Procedure Manual, revised September 1992).

- Step 1.* A Compliance Agreement and required shipping permits must be obtained from the Florida Department of Agriculture and Consumer Services.
- Step 2.* Apply granular chlorpyrifos or chlorpyrifos wettable powder (for details see the *Florida Imported Fire Ant Certification Procedure Manual*).

Maintaining Fire Ant Control

What To Expect:

After fire ants in an area have been successfully controlled with insecticides, populations of other ant species that can compete with or prey upon newly invading fire ants will most likely be low. This may occur because the insecticides have killed the other ants, or because the other ants were already displaced by fire ants prior to treatment. Thus, new fire ant colonies may reinvade these areas after the next mating flight.

1. Within 6 weeks, new fire ant nests may be noticeable.
2. In 6 months, numerous small mounds 2 to 5 inches in diameter, perhaps as many as 400 per acre, may be found.
3. A year after treatment, mounds will be larger (4 to 6 inches in diameter), but fewer in number (perhaps 120 mounds per acre), if they are single-queen colonies.
4. After a few years, the number of single-queen colonies may stabilize at a minimum of five to 40 mounds per acre. However, the less territorial multiple-queen colonies will maintain higher mound densities.

What To Do to Maintain Control:

1. Re-treat when fire ant populations become intolerable.

- a. If many small mounds are present, broadcast bait applications are the most practical and effective treatment method. Locating and individually treating all mounds under these circumstances would be difficult.
- b. If only a few mounds are causing problems, individually treat those mounds.

2. Broadcast applications of IGR baits in the fall provide the most lasting control.

The duration of fire ant control usually depends on the reinfestation of an area by newly mated queens. Treating during the fall provides the longest time interval before mating flights become prevalent in the spring and summer. IGR baits reduce populations slowly and the small remnant colonies that survive through the spring and summer prevent reinvansion of an area by preying upon newly mated queens. In addition, IGR baits may be stored by large workers for several months and fed to adopted queens, thus inhibiting new colony development.

Homes and Structures

Fire ants sometimes forage inside homes and structures for food and moisture, particularly during the hot, dry summer months. Less frequently, entire colonies will nest in wall voids or rafters. Their presence is a nuisance and can threaten pets and sleeping or bedridden individuals. Colonies may also move into homes during flooding.

Treatment options:

Option 1. Use a bait-formulated insecticide (PT®370 Ascend™ and Maxforce® are registered for use against fire ants inside structures) where

fire ants are active, to eliminate colonies. As with any bait product, do not spot treat nests, ants, or ant trails with insecticides.

Option 2. Locate indoor colonies by following foraging ant trails back to the nesting area. If there is access to the entire colony, especially the queen(s), apply a dust or spray onto the colony. If baits are being used, do not spot treat nests for at least 3 days after baits are consumed.

Option 3. To treat foraging ants, spray ant trails or spot treat infested areas with products registered for this use. This will not eliminate fire ant colonies.

Option 4. If ants are entering the home from outdoor colonies, apply a residual insecticide containing chlorpyrifos or diazinon as an outside barrier around the base of the structure, and/or treat mounds in the proximity of the structure using one of the options described for lawns and ornamental turf. Filling cracks and crevices with a suitable sealant also may keep ants out.

Electrical Equipment and Utility Housings

Fire ants are often found near electrical fields. They build up in high numbers around contact points and can cause short circuits, damaging air conditioners, traffic boxes, and other devices. Fire ants often use housings around electrical and utility units as nesting sites. The ants move soil into these structures and chew on insulation and other soft materials.

Treatment option:

- Step 1.* Eliminate colonies in and around casings and housings. Around water meter casings, immediate control can be obtained with injectable aerosols containing pyrethrins. Amdro® applied to mounds around the installation will provide control in about 1 week.
- Step 2.* Clean out debris and nesting materials in the casing or housing.
- Step 3.* Where possible, tightly seal all sensitive electrical components, such as circuit breakers, to prevent ants from entering.
- Step 4.* Apply specifically labeled products to the housings (such products may contain resmethrin, chlorpyrifos, synergized pyrethrins, and silica gel, or granular chlorpyrifos). Some insecticides can harm some types of circuitry, wiring, or insulation. Be sure to follow the directions on the label.
- Step 5. (Optional.)* Carefully apply an insecticide barrier around the housing, making certain to avoid electric shock. Treat the area surrounding the installation, using one of the ornamental turf treatment options.

Home Gardens

Ants will occasionally feed on fruits and vegetables in home gardens. For example, fire ants tunnel into potatoes underground and feed on okra buds and developing pods, particularly during hot, dry weather. They can be a nuisance to gardeners during weeding and harvesting.

Treatment options:

Option 1. Products containing diazinon or chlorpyrifos that are registered for use against soil insects in home gardens can be applied before planting. They provide limited control of foraging ant activity.

Option 2. Mounds can be shoveled out of the garden or treated with hot water, taking care not to disturb or treat the garden plants.

Option 3. Baits are not registered for use in gardens, but they can be broadcast around the perimeter of the garden so that foraging ants will collect the bait and take it to the colony.

Option 4. A few products containing pyrethrins, rotenone, or carbaryl are registered for treating ants in vegetables.

Compost Piles, Mulched Flower Beds, Pavement Cracks, etc.

Fire ants invade compost piles and mulched flower beds seeking heat and moisture. They also nest underneath sidewalks, driveways, and roads, removing soil from underneath the pavement, which can cause cracking and other structural problems. In these sites the location of the colony may be unknown or inaccessible, making treatment difficult.

Treatment option:

When the exact location of a colony is unknown, treat in the vicinity of greatest ant activity. Use Amdro® at the individual mound treatment rate to obtain control in about a week. Other baits such as Ascend™ or Award® may be used, but these will reduce fire ant populations more slowly.

Field Crops and Commercial Vegetables

In cotton and sugarcane production, red imported fire ants are considered beneficial insects and no control is required. However, worker ants will feed on germinating seeds and seedlings of corn and sorghum during dry spring weather. They occasionally cause loss of stand. Fire ants also have been reported to feed on young watermelon, cucumber, and sunflower plants, and have damaged peanut and soybean plantings.

Treatment options:

Option 1. To prevent damage to corn seedlings, band an insecticide such as Lorsban® 15G over an open furrow at planting where there is a history of stand loss.

Option 2. No products are registered for fire ant control in watermelon, sunflower, and other crops. Insecticides registered for use against other pests on these crops (and known to be toxic to fire ants) are occasionally used to temporarily suppress foraging ants when damage is observed and the crop is threatened (see Home Gardens section).

Ornamental Plant Production

Federal quarantine regulations mandate treatment of plants to be shipped to areas free of fire ants. The following treatment suggestions are for commercially produced ornamental plants to be shipped out of a quarantined area (from the *Florida Imported Fire Ant Certification Manual*, September 1992). Producers must obtain a Compliance Agreement from the Florida Department of Agriculture and Consumer Services, Division of Plant Industry. Contact the FDACS/DPI for specific requirements.

Treatment options:

Option 1: For containerized nursery stock under the Imported-Fire-Ant-Free Nursery Program. Effective August 1, 1990, the use of granular chlorpyrifos (Dursban® 2.5G) as a potting and bench soil treatment is no longer approved as a stand-alone treatment for fire ants. The following procedure is now required:

- Step 1.* Treat all exposed soil surfaces (including sod and mulched areas) on property where plants are grown, potted, stored, handled, loaded, unloaded, or sold. Use a broadcast bait such as Amdro® or Award® at least once every 6 months, with the first application as early in the spring as possible.
- Step 2.* After broadcast treatments, treat individual mounds to eliminate remaining colonies.
- Step 3.* Inspect the area for new mounds twice a month and treat any that appear.
- Step 4.* Treat all potting media with bifenthrin (Talstar® T&O, or 10WP) prior to planting.
- Step 5.* Federal or state inspections of nurseries participating in this program will be conducted at least twice per year.
- Step 6 . (Optional.)* Immerse stock in chlorpyrifos solution, or apply chlorpyrifos or bifenthrin solutions to containerized stock until the point of saturation (one time only).

Option 2: For balled and burlapped stock. Immerse stock in chlorpyrifos until thoroughly saturated or drench stock until point of runoff, twice daily for 3 consecutive days.

Option 3: For field-grown woody ornamentals, preharvest treatment area must extend at least 10 feet beyond base of plants to be certified.

- Step 1.* Broadcast bait (Award®, Amdro®).
- Step 2.* Apply granular chlorpyrifos 3 to 5 days later.
- Step 3.* See option 2 for postharvest treatment.

Fruit and Nut Orchards, Vineyards, and Blueberry Plants

Although fire ants are mostly a nuisance to field workers in these crops, their overall economic and ecological impact remains unknown. In pecan orchards, fire ants prey on pests such as pecan weevils and hickory shuckworms in fallen pecans. But they encourage aphids by preying on their natural enemies. The ants' nest building aerates the soil of the orchard floor, which is beneficial. But they will feed on the meat of cracked pecans and can also damage irrigation systems. Ant mounds may interfere with some types of harvesting operations. Chemical control is warranted only if the cost of control is less than the potential economic loss ants may cause. In pick-your-own operations, the liability of ants attacking customers also should be considered.

Treatment options:

Option 1. No products are registered specifically for fire ant control in bearing peach orchards, vineyards, and blueberry plantings. Turf areas around such plantings can be treated using strategies listed for lawns and ornamental turf. (Also see Field Crops and Commercial Vegetables.)

Option 2. Lorsban® (chlorpyrifos) 4E, in pecan and citrus orchards, and 15G, in citrus orchards, can be used to treat the orchard floor to temporarily suppress foraging ants.

Option 3. Logic® (fenoxycarb) and Rotate® (bendiocarb) are registered for use against fire ants in nonbearing citrus, pecans, and blueberries.

Cattle, Pastures, and Rangeland

Yield losses related to fire ants have not been documented in pastures. However, their tall, hardened mounds occasionally break or interfere with cutting and harvesting machinery. Colonies frequently move into bales of hay left in the field for extended periods. Calves are sometimes attacked shortly after birth. Fire ants sting the eyes of newborn calves, causing temporary blindness. They also sting soft tissues around the nostrils, udder, and genitals. Sometimes the calves die. However, in most cases calves attacked by fire ants have been weakened by some other, more serious health problem(s). Consult your veterinarian for treatment if livestock are stung.

Treatment options:

Option 1: Chemical control for pastures. This option costs roughly \$10 or more per acre per year and may not provide a return on the investment.

Step 1. Follow Option 2 in the Lawns and Ornamental Turf section, and use products registered for pastures (broadcast application of Amdro® and individual mound treatments with 75 percent acephate or rotenone products; Logic® can be used in horse pastures only).

Step 2. Where feasible, and particularly if summer calving is desired, designate a calving pasture and treat it as described above. This will ensure that calving can occur without the threat of fire ant attacks.

Option 2: Nonchemical fire ant management for pastures and cattle. These suggestions can reduce various problems caused by fire ants while maintaining stable ant populations. When stable populations are maintained, they will help suppress lone star ticks, filth breeding flies and other pests, while also deterring the multiple-queen form. Use a combination of the following suggestions:

1. Schedule the cow fertility program to ensure that calving occurs during cold weather (soil temperature below 65°F), when fire ants are less active. This will reduce the probability of ant attacks.
2. Use disc-type (Kountz) cutters, designed to withstand the impact of fire ant mounds, to reduce equipment damage.
3. Use mechanized balers and bale movers to reduce human contact with ant-infested bales.
4. Store bales off the ground or in an area around which the ants have been treated.

Note: Baled hay and straw stored in direct contact with the ground is ineligible for shipment from Florida to uninfested areas.

Poultry Houses, Barns, and Feedlots

Red imported fire ants occasionally cause problems on poultry farms by attacking chickens and foraging on broken eggs. Fire ant stings cause blemishes that can reduce the quality of poultry. In animal feeding stations, barns and feedlots, fire ants can cause similar problems.

Treatment options:

Option 1: For poultry farms. Use a combination of these suggestions:

1. Remove food sources (trash, piled feed, broken eggs, and dead chickens) and nesting sites (pieces of lumber, old equipment, and manure piles).
2. Remove weeds and grass from around poultry houses with mowers or herbicides.
3. Treat litter with a registered product (carbaryl and others) if ants are nesting inside poultry houses. (Caution: Do not allow insecticides to come into contact with feed or water supplies; read the poultry section of labels for additional precautions.)
4. If fire ants are foraging inside the poultry house from outside, spray a barrier around the outside of the building with chlorpyrifos or diazinon, and/or use one of the ornamental turf options to control ants in the surrounding area. (Caution: Do not allow chickens access to fire ant bait or bait-treated areas.)

Option 2: For barns and feedlots. The option for poultry houses can be adapted to barns, provided products used are labeled for treating animal premises. Barns and other structures may be treated as described in Homes and Structures, provided the treated areas are inaccessible to animals and registered products are used.

Apiaries

Fire ants invade bee hives and feed on developing bee larvae, occasionally destroying weak colonies. Use chemicals with care because the bees will be affected by insecticides.

Treatment options. Use one or both of the following suggestions:

1. Treat areas around hives as described for lawns and ornamental turf. (Bait formulations are the safest to use; dust formulations should be avoided.)
2. Elevate the hives several inches on stilts, with the lower ends of the stilts submerged in a container of oil.

Wildlife Breeding Areas

Certain forms of wildlife are especially affected by ants during and soon after birth or hatching. The risk is greatest during the warm months. Fawns are vulnerable because they are born in June and because they instinctively remain motionless in their hiding places. Hatching quail and ground-nesting waterfowl chicks are also attacked. Fire ant control programs in wildlife areas are discouraged unless the benefits from such treatments have been documented. Fire ant baits will kill other ants besides imported fire ants, and may reduce populations of native ant species. Many pesticides are toxic to nontarget organisms (particularly aquatic organisms) and may directly or indirectly affect game species if not used properly.

Treatment options:

Option 1. Since wildlife breeding areas are considered nonagricultural lands, they can be treated with products registered for this kind of site, as described for lawns and ornamental turf.

Option 2. Exotic game ranches are considered commercial agriculture areas. Breeding areas may be treated as described for cattle, pastures, and rangeland.

