

# Managing Fire Ants in Lawns and Turf

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

- (1) broadcast bait applications,
- (2) individual mound treatments,
- (3) a combination of broadcast baiting and individual mound treatments, and,
- (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 lawns and ornamental turf follow this section. Introduction of biological control agents for suppression of fire ants is discussed at the end.

## 1. Broadcast Bait Applications

This strategy attempts to reduce fire ant populations by applying insecticides incorporated into an attractant, or bait, on an area-wide basis. Most bait products (Table 1 and 2) 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 to either carry the grit back to the colony and extract the toxic oil within the mound, or 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 different toxicants, or active ingredients, that are used in commercially available broadcast bait products specifically registered for use against fire ants. Some active ingredients interfere with reproduction, and are often referred to as insect growth regulators, or

IGRs. The active ingredient in Ascend is abamectin B<sub>1</sub> which, at broadcast application rates, prevents queens from laying eggs. Fenoxycarb is the active ingredient in Logic® and Award®, and it 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. In single-queen areas, ants from IGR-treated colonies will continue to eliminate newly-mated queens that land in the area, thus preventing reseedling. Abamectin and fenoxycarb products may take 5 to 10 weeks to eliminate 90% of the colonies, and large treated areas (>1 acre) may have control for as long as a year. Control in smaller areas is not as long lasting because these areas are more easily reinfested from adjacent areas.

New fire ant baits, Varsity or Clinch (abamectin), Distance®(pyriproxyfen) and Extinguish®(methoprene) were introduced in 1999. Pyriproxyfen and methoprene are also insect growth regulators and act similarly to fenoxycarb. Although methoprene may act slower than the other IGRs, it is labeled for food crops.

Hydramethylnon, another active ingredient used in Amdro®, Amdro Pro®, and Seige®, is a slow-acting poison that kills all members of a colony that ingest it. After 1 to 5 weeks, 80 to 90% of the fire ant colonies in the treated area will be killed. However, these areas are subject to reinfestation.

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 these guidelines for effective bait applications.**

**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.

**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.

**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 90F. During hot, summer weather, apply baits in the late afternoon or evening because fire ants will forage at night under these conditions.

**Broadcast the bait, or apply it as directed around, NOT ON, the mound.**

**Avoid disturbing the ants right before applying the bait.**

**Do not contaminate baits with fertilizer or other pesticides.**

**Follow the directions on the label.** It is against the law to apply baits in areas not listed on the label.

## **Broadcasting equipment**

Bait broadcasting equipment suitable for small areas such as lawns and playgrounds include hand-held seed spreaders (Scott's Handy Green®, Republic EZ Handsreader®, or 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 1.5 pounds of 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 1.5 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 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, thus making effective treatments very difficult. We do not have any documentation to indicate that multiple-queen fire ant colonies are found in Tennessee. 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, and aerosols. 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.

### **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 three feet away. Fire ants usually do not

forage on the mound, their foraging tunnels radiate from the mound and entrance holes to the surface may occur as close as 1-3 ft. from the edge of the mound. There is some concern that baits applied directly to the mound will be ignored or incorporated into the structure of the mound. 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 one 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. 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, sprinkle 1 to 2 gallons of water over the granules, gently, to avoid disturbing the colony and washing granules off the mound. 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 insecticidal products that are dry powders. 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 (follow label directions) over the mound. Avoid inhaling or touching the dust. Some dusts, such as those containing 75% 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. While aerosols are more convenient to use than drenches, they generally are more costly and do not provide significantly better control than some drenches.

## **Botanical and Other Insecticides**

Commercially available organic products that contain ingredients such as boric acid and diatomaceous earth are known to kill ants. However, their effectiveness in killing entire colonies when applied to mounds has not been consistently demonstrated. 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 212F) has been used to eliminate colonies. Slowly pour about three 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% 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. **Be very careful when using hot water to avoid burns.**

### **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 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.

### **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.

### **Other Home Remedies and Control Devices**

Many home remedies and mechanical control devices have not been scientifically proven to consistently eliminate fire ant colonies. Oftentimes these cures will kill many ants and the colony will abandon the mound, thus 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 the use of gasoline or other petroleum products; battery acids; bleaches, ammonia, and other cleaning products. Such remedies should never be used.

Other **ineffective** home remedies include:

1. soap solutions and wood ashes soaked into a mound, which supposedly remove the wax layer that protects an ant's body;

2. applying grits to fire ant mounds in an attempt to get ants to eat the grits, which will then supposedly swell inside them and explode the ants (recall that ants can only ingest liquids, so they do not even eat grits); and,

3. shoveling mounds together in an attempt to have different colonies fight and kill each other (this is not effective with either single or multiple-queen colonies).

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). 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, bifenthrin, bendiocarb, carbaryl, chlorpyrifos, cyfluthrin, deltamethrin, diazinon, lambda cyhalothrin, propoxur, permethrin, resmethrin, and others can 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.

## **OPTIONS FOR MANAGING FIRE ANT POPULATIONS IN LAWNS AND 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**

For small areas (usually 1 acre or less) of ornamental turf 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 Suppression**

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 (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 semi-annual broadcast application of an IGR or other bait-formulated insecticide 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 result in a satisfactory level of ant suppression, since all mounds may not be affected by a single bait application. Reapply when the presence of ants justifies the cost of treatment. At this time, high population densities in Tennessee have been observed at about 40 mounds per acre.

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. Use of IGR baits may reduce the reseeded of newly-mated queens. Also, in low-lying flood prone areas, baits may be less effective because ants move in and out of these areas often.

## **Option 3: To Eliminate Mound Building and Foraging Activity**

To eliminate all mound building and foraging activity in ornamental turf. Effects of this option are more rapid and dramatic than with Option 2, but this option may be more expensive and requires more contact insecticide.

**Step 1.** (Optional). Make an annual or semi-annual broadcast application of an IGR or other 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: Small Areas Needing Minimal Pesticide Use**

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.

**Step 2.** At least three days after baiting, individually drench mounds with hot (scalding) water. **Be very careful to avoid burns.** If pesticides are allowed, a synthetic pyrethroid, such as bifenthrin or lambda cyhalothrin, may be used as a drench, but should be applied when children are not present. Allow the pesticide to dry before children have access to the area. Refer to the label for other precautions.

**Step 3.** Excavate and/or reapply hot water to mounds that are still active (if hot water was used). Repeat when necessary.

**Step 4.** (Optional) Make an annual or semi-annual broadcast application of an IGR or other insecticide bait-formulation in the spring and/or fall to suppress reinfestations.

### **Commercial Turf Treatment Options**

#### **Option 1: Shipping Sod Within Quarantined Area**

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

#### **Option 2: Shipping Sod Out of Quarantined Area**

To treat turf to be shipped out of the quarantined area - contact local Tennessee Department of Agriculture personnel to obtain current requirements. Federal

quarantine regulations can be found at <http://gpo.lib.purdue.edu/bin/GPOAccess.cgi> or <http://ceris.purdue.edu/napis/pests/ifa/>

### **BIOLOGICAL CONTROL**

Fire ants were introduced into the U.S. in the first half of the 20th century without their natural enemy complex. It has been speculated that the imported fire ants' success is due to this lack of natural enemies. Last year, two biological control agents, a microsporidian and a phorid fly, were released against imported fire ants. This work is supported by grants from the USDA Southern Region IPM, National Biological Control Institute and the Tennessee Nurseryman's Association and is conducted in cooperation with the USDA,ARS, CMAVE; USDA, APHIS, PPQ; The University of Tennessee Agricultural Extension Service and Experiment Station; Tennessee State University; Tennessee Department of Agriculture; Tennessee farmers; and universities in 10 other southern states. The microsporidium, *Thelohania solenopsae*, infects fire ant colonies and chronically weakens them. Workers transmit the pathogen to the queen and the disease slowly reduces her weight causing fewer and fewer eggs to be laid, all of which are infected with the pathogen. This further weakens the colony. Colony elimination has been shown to take from nine to 18 months in Florida. *Pseudacteon tricuspis*, a decapitating phorid fly, oviposits in an imported fire ant worker's thorax. The larva migrates into the ant's head, the ant's head eventually falls from the body and the fly pupa completes development 18 days later. In addition to killing the ants, these phorid flies reduce foraging by causing the ants to assume a defensive posture when under attack and by causing them to remain in the nest to avoid the fly.

Once established, these biological control agents should provide a more permanent solution than insecticides. While these biological control agents are not expected to eliminate imported fire ants, they are expected to reduce populations, control spread and tip the ecological balance in favor of other ant species.

## **ACKNOWLEDGEMENTS**

Excerpted and modified from Imported Fire Ants on Lawns and Turf, David H. Oi and Philip G. Koehler University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS) downloaded 5 October 1998.

## **PRECAUTIONARY STATEMENT**

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store, or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

## **DISCLAIMER STATEMENT**

Pesticides recommended in this publication were registered for the prescribed uses when printed. Pesticide registrations are continuously being reviewed. Should registration of a recommended pesticide be canceled, it would no longer be recommended by The University of Tennessee.

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others which may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product.

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Agricultural Extension Service, Charles L. Norman, Dean

Table 1. Summary of the registered uses for fire ant insect growth regulator baits. See the product label for details.

| <i>active ingredient</i><br>Trade names                    | type of<br>active<br>ingredient | home<br>lawns                         | commercial<br>or public turf<br>areas;<br>athletic<br>fields, golf<br>courses, etc. | noncropped<br>and non-<br>grazed<br>areas,<br>roadsides | pastures and<br>hayfields | vegetable<br>gardens and<br>crops                | indoor use | commercial<br>nurseries | sod farms |
|------------------------------------------------------------|---------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------------------------------|------------|-------------------------|-----------|
| 0.011% <i>abamectin</i><br>Varsity™                        | IGR                             | x                                     | x                                                                                   | x                                                       |                           |                                                  |            | x                       |           |
| Clinch™                                                    | IGR                             |                                       |                                                                                     | around<br>barns,<br>equipment                           |                           | potatoes,<br>citrus,<br>almonds,<br>walnuts only |            |                         |           |
| PT370 Ascend™                                              | IGR                             | for pest control operators (PCO) only |                                                                                     |                                                         |                           |                                                  |            |                         |           |
| 1% <i>fenoxycarb</i><br>Award                              | IGR                             | applied<br>by PCO                     | x                                                                                   | x                                                       |                           |                                                  |            | x                       | x         |
| Logic                                                      | IGR                             |                                       |                                                                                     | x                                                       | horse<br>pastures         | non-bearing<br>fruits and<br>nuts <sup>a</sup>   |            |                         |           |
| 0.5% (s)-<br><i>methoprene</i><br>(Precor®)<br>Extinguish™ | IGR                             | x                                     | x                                                                                   | x                                                       | x                         | x                                                |            | x                       | x         |
| <i>pyriproxyfen</i><br>Distance® (0.5%)                    | IGR                             | x                                     | x                                                                                   | x                                                       | non-grazed                |                                                  | x          | x                       | x         |
| Spectracide Fire<br>Ant Bait® (0.05%)                      | IGR                             | x                                     |                                                                                     |                                                         |                           |                                                  |            |                         |           |

<sup>a</sup> nonbearing means that crops will not bear fruit for one year after application.

Logic, Award, Clinch and Varsity are marketed by Novartis (704-341-5500, [www.cp.us.novartis.com](http://www.cp.us.novartis.com)).

Distance is marketed by Valent (800-682-5368, 901-753-0303, [www.valent.com](http://www.valent.com)).

PT370 Ascend is made by Whitmire Research Laboratories, 800-777-8570.

Spectracide Fire Ant Bait is marketed by the spectrum Group, 800-332-5553.

Extinguish is marketed nationally by Universal Cooperatives, Inc. 612-814-7256, ([www.ucoop.com](http://www.ucoop.com)).

Table 2. Summary of the registered uses for fire ant metabolic inhibitor and other baits. See the product label for details.

| <i>active ingredient</i><br>Trade names | type of active ingredient | home lawns                            | commercial or public turf areas; athletic fields, golf courses, etc. | noncropped and non-grazed areas, roadsides | pastures and hayfields | vegetable gardens and crops | indoor use | commercial nurseries | sod farms |
|-----------------------------------------|---------------------------|---------------------------------------|----------------------------------------------------------------------|--------------------------------------------|------------------------|-----------------------------|------------|----------------------|-----------|
| <i>0.73% hydramethylnon</i><br>Amdro®   | Metabolic inhibitor       | x                                     | x                                                                    | x                                          | x                      |                             |            | x                    |           |
| Amdro® Pro                              | Metabolic inhibitor       | x                                     | x                                                                    | x                                          | x <sup>a</sup>         |                             | x          | x                    | x         |
| Seige®                                  | Metabolic inhibitor       | for pest control operators (PCO) only |                                                                      |                                            |                        |                             |            |                      |           |
| <i>0.015% spinosad</i><br>Conserve      | Other                     | x                                     |                                                                      |                                            |                        |                             |            |                      |           |

<sup>a</sup> Amdro Pro has a 7 day harvest/grazing restriction in pastures and hayfields. This does not apply to land used solely to support companion animals.

Amdro, Amdro Pro and Seige are marketed by American Cyanamid (901-755-4000, [www.cyanamid.com](http://www.cyanamid.com))

Conserve may be on the market soon. It is marketed by Dow AgroSciences (800-258-3033, [www.dowagro.com](http://www.dowagro.com))

Modified from Flanders, K. 1999. Auburn University.