

Imported Fire Ants (IFA)

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Imported Fire Ants (IFA) were accidentally introduced into the United States from South America, beginning in about 1918. The first confirmed sighting of IFA in Tennessee was an isolated infestation in Shelby County in 1948, which was quickly eradicated. Natural migration of IFA was first documented in Tennessee in Hardin County in 1987. Now, much of southern Tennessee is infested with IFA. Over half of Cumberland County is recorded as infested.

Imported Fire Ants look very much like ordinary ants. They are between a tenth and a fourth of an inch in size and reddish brown to black in color. Imported Fire Ants are very aggressive when disturbed and cause a painful

sting that produces a small white pustule about 8-24 hours following the sting.

Fire Ant Biology

Let's learn more about their biology. This will help you understand both how to control them and why they always come back. Fire ants are social, colony-forming insects. In addition to the queen, an established colony contains many thousands of workers, many hundreds of virgin male and female reproductives, and many thousands of eggs and immature ants. A mature fire ant colony may contain over 200,000 individuals.

Life Cycle: The eggs, which are only produced by the queen, hatch into legless larvae that must be constantly cared for by the workers. The larvae undergo four molts before entering the pupal stage, and ultimately emerging as adults. Despite their helpless condition, the larvae make an important contribution to the welfare of the colony—older larvae are the only individuals in the colony capable of digesting solid food. Workers bring all solid food particles to the older larvae, and, after this solid food is digested by the larvae, the resulting liquid is distributed to all members of the colony. Unlike honeybee colonies, fire ant colonies do not contain any physical structures for storing food. Food is stored inside the ants themselves, especially in the crops of larger workers.

Fire ant workers vary greatly in size. There is some task specialization, with larger workers more commonly performing certain tasks such as foraging and food storage, while smaller workers most commonly tend brood, but there is also considerable overlap, especially among medium sized workers. Reproductive females and males are considerably larger than even the largest workers. Reproductive males are darker than females and have much smaller heads.

Mound Construction: Workers build mounds by tunneling through the soil to form a honeycombed maze of tunnels. They pile the excavated soil immediately above the soil line and form tunnels in this soil as well. This results in an above ground mound that can collect warmth from the sun and provide drier conditions and an underground series of galleries that provide cooler, moister conditions. Fire ants use this to their advantage by continually moving brood to the area of the nest that provides the most suitable environment. During cool wet periods this may be the above ground portion of the nest, while during hot dry periods the brood and the majority of the colony members will remain in the deeper underground galleries.

The height and visibility of fire ant mounds varies with weather and temperature. Typically, fire ant colonies build mounds that may be 10 inches or more in height, 15 inches or more in diameter, and 3 feet or more in depth. During cool wet periods the workers will build the mound high above the soil, so they can keep the

brood warm and dry. During hot dry periods they tend to stay deeper in the soil, so they can keep the brood cool and moist, and even large colonies may not be visible above the grass.

Where is the door? Normally, there are no external openings in the top of the mound. Foraging ants enter and exit the nest through an array of foraging tunnels that are located slightly below the soil surface and extend in all directions from the mound. These forage tunnels eventually exit to the soil surface several feet away from the nest.

Swarming: An exception to the absence of external openings in the top of the mound occurs when a colony swarms. Swarming is the way fire ant colonies reproduce themselves. Workers break openings through the crust of soil on top of the mound and winged, unmated male and female reproductives exit the mound. These unmated males and females take flight and mate in the air, often several hundred feet above the ground. Swarming occurs from spring through late fall. Swarms are especially common one to two days after a rain event that has been preceded by a dry period. During the mating flight, air currents can carry winged ants considerable distances from their original colony and this is one of the main ways fire ants expand their range. Sometimes man unwittingly helps transport newly mated queens or established colonies of fire ants over long distances. That's how fire ants got here in the first place. They were brought to the Port of Mobile by boat, probably in soil used as ballast.

After they have mated the young queens settle back to the ground, shed their wings, and begin to establish a new colony. They do this by digging a small tunnel a couple of inches into the soil, sealing the opening, and beginning to lay eggs. During this time the queen subsists on nutrients derived from the breakdown of her wing muscles. The workers that emerge from the first eggs are unusually small, but they are able to assist the queen in producing more brood, and they also begin foraging for food and expanding the nest. Most young queens attempting to establish new colonies are unsuccessful. They are eaten by a variety of predators, including foraging workers from fire ant colonies, and many simply perish due to inadequate resources. A successful colony can grow to over 100,000 individuals, and begin producing swarms of its own, in six to nine months. In heavily infested areas single queen colonies can reach densities of 20-50 mounds per acre.

Feeding and Foraging Behavior: Fire ants are omnivorous and feed on a wide variety of plant and animal material. They are active predators and scavengers, eating any live insects they are able to capture as well as dead insects. They also 'tend' aphids, scale insects, and other homopterous insects for the honeydew they produce.

Fire ants also prey on small, ground-dwelling vertebrates, including mammals, such as mice, ground-nesting birds, and ground dwelling reptiles and amphibians. In most cases it is the hatching eggs or helpless, immobile young that are attacked. Several studies have shown the abundance of ground-dwelling animals declines significantly when there are high densities of imported fire ants. Fire ants also opportunistically feed on carcasses of larger animals and will attack sick or injured animals that have become immobile. Although fire ants rarely feed on plant foliage, they do feed on plant exudates, and they actively forage for fruit and seed, and occasionally feed on the inner bark of shrubs and trees. Seed are an especially favored food source, because of their high protein and oil content.

It's the older workers that do the foraging, leaving the colony through tunnels that radiate from the mound. These tunnels usually run just below the soil surface and exit to the surface some distance away from the colony, usually within five to 20 feet. Upon exiting, foraging workers fan out in search of food. When traveling along the surface, workers use chemicals exuded from the tip of their abdomen to lay a chemical trail they can follow back to the mound. Workers that are successful in locating a large food source recruit other workers by exchanging bits of the food with them and by laying a return trail from the source. As additional workers follow this trail they enhance it with scent of their own, and this recruits even more workers. Thus, a substantial food source can attract a large, steady stream of foraging workers in a relatively short period of time.

Adult fire ants are not capable of eating solid foods; they have a sieve-like structure in their throat that prevents them from swallowing solids. Solid food particles are carried back to the colony and fed to the older larvae, which are capable of converting them to liquids. The larvae then regurgitate this liquid food to the tending workers who pass it to other workers, as well to the queen and younger larvae. This process is known as trophalaxis, and it is also common in other social insects, like termites and honeybees. This habit of sharing food among all members of the colony is the main reason baits are such an effective way to control fire ants.

Fire Ant Danger

Imported Fire Ants cause harm and economic losses in a variety of ways. Stings from fire ants inflict intense pain to millions of Americans each year with thousands requiring medical treatment. A small number of people develop a life-threatening allergic reaction to IFA stings. The number of human fatalities resulting from IFA stings is not known due to lack of documentation. However, there have been confirmed deaths due to IFA in Texas, Louisiana, Mississippi, Alabama, Georgia, and Florida. Imported Fire Ants also attack and kill domestic animals and wildlife as well as destroy seedling corn, soybeans, and other crops. Fire ant mounds can damage farm equipment and lawn mowers. IFA are attracted to electrical equipment and chew on insulation, resulting in short circuits and interference with switching mechanisms. Fire ants can shut down air conditioners, traffic signal boxes, and even airport runway lights. Approximately \$2 billion in damage, including costs for insecticide for fire ant suppression and eradication, is caused by IFA in the United States each year.

Imported Fire Ant Quarantine

In 1958, the United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA, APHIS), enacted a Federal Imported Fire Ant Quarantine (7CFR301.81) to slow the artificial spread of Imported Fire Ants from fire ant infested (quarantined) areas to non-infested (non-quarantined) areas. The Imported Fire Ant Quarantine includes all of Alabama, Florida, Georgia, Louisiana, Mississippi, Puerto Rico, and South Carolina and parts of and parts of Arkansas, California, New Mexico, North Carolina, Oklahoma, Tennessee and Texas. In Tennessee, all or parts of 56 counties, including Cumberland, are quarantined for Imported Fire Ants. For more information about the quarantine, go to the Tennessee Department of Agriculture website on fire ants, www.tennessee.gov/agriculture/regulatory/importedfireants.html.

Controlling Fire Ants

If you know that you have fire ants on your property, there are steps you can take to keep your lawn and landscape relatively free of these troublesome pests. The easiest, cheapest, most effective thing you can do to control fire ants is to use baits. Learn to use baits properly and preventatively, and you will reduce the number of mounds in your yard by 80 to 90 percent. If you want even better control, you can supplement your baiting program with some additional tricks, like spot-treating mounds that survive the bait treatments.

Baits—The key to success with baits is applying them as broadcast treatments instead of treating only individual mounds. You will never win the battle against fire ants by only treating individual mounds. In addition to the big mounds you can easily see—or trip over—there are a lot of little colonies that are just getting started. If you eliminate only the big mounds, the small colonies will thrive because they have less competition, and they will quickly grow into large mounds. Don't confuse granular contact insecticides with granular baits. Baits are impregnated with oil or some other food substance and a small amount of slow-acting insecticide. The worker ants actively collect the bait granules and carry them back to the colony. Granular insecticides are simply granules that are impregnated with insecticide. They are not attractive to ants. Broadcast bait treatments target all colonies in the yard, regardless of size. Early spring is one of the best times to apply fire ant baits because fire ants are actively foraging for food at this time. If you are going to treat only one time per year, do it in the spring. But you can improve control by treating again in midsummer and a third time in the fall, especially if you live where fire ants are abundant. With lower infestations, you may only need to treat once or

twice per year. Be proactive! Don't wait until you see more big mounds to make the next bait treatment. If you don't like to have big fire ant mounds in your yard, you have to treat **before** you have big fire ant mounds in your yard. Use the holidays — Easter, Independence Day, and Labor Day—to remind you when it is time to put out fire ant bait. Try to pick a time when it is not likely to rain for a couple of days. This gives the ants time to collect the bait and carry it back to the mound before it is washed away. You also need to avoid watering for a couple of days after applying bait. For small areas like home lawns, most broadcast fire ant baits are easily applied using a small, hand-powered spreader. Don't try to use your fertilizer spreader— it will put out way too much! Read and follow the label directions. Baits are a cheap way to control fire ants if you use the proper rate, but they can be very expensive if over-applied. A few baits are formulated for application at higher rates so they can be applied with a lawn fertilizer spreader. These products usually give suggested spreader settings on their labels and are applied at rates of around 20 pounds per acre. Maintaining uniform coverage is less important when applying fire ant baits than when applying fertilizers, herbicides, or other lawn insecticides. The foraging fire ant workers will compensate for any narrow untreated areas that may occur between swaths of bait. It is not necessary to apply fire ant baits in a crisscross pattern, as is normally done with seed, fertilizers, herbicides, or granular insecticides. Apply baits when the ground is dry and when ground temperatures are between 70 and 90° F with no forecast of rain. Remember that fire ant baits are supposed to be slow-acting. The worker fire ants pick up the bait granules and carry them back to the colony. The insecticides used in fire ant baits have to be slow-acting to allow time for the insecticide to be spread throughout the colony. Depending on which bait you use, it can take 2 to 6 weeks to obtain maximum control. Baits work great, but you have to be patient! Where they are properly applied two to three times per year, baits will give 80 to 90 percent control.

Mound Treatments—Can't wait 4 weeks for a bait treatment to control that big mound by the edge of the patio? Individual mound treatments containing contact insecticides provide much quicker control than bait treatments, and they are the best way to quickly eliminate mounds that are especially troublesome. There are two basic methods of treating individual fire ant mounds: liquid drenches and dry mound treatments. The liquid drenches provide the quickest control, but they are time-consuming to mix and apply. The dry mound treatments are easy and convenient to use, but these are less effective and usually take a few days to work. Regardless of which method you use, **don't disturb mounds before treating**. If you do, the workers may take the queen or queens to safety, by moving them either deep into the mound or out one of those underground tunnels to establish satellite mounds. Use a watering can to mix and apply liquid drenches. Just mix the specified amount of insecticide in water and pour over the mound. The key to success with liquid drenches is to use enough liquid to thoroughly soak the mound. Depending on the size of the mound, this ranges from 1 to 2 gallons of mixed drench. Begin by applying about one-fourth of the total volume to a 10- to 12-inch band around the outside of the mound. This prevents the queen from escaping through those underground foraging tunnels and improves control of workers. Then apply the rest of the drench directly to the mound. Failure to use enough drench to thoroughly soak the mound is the main reason for unsuccessful mound drenching efforts. Dry mound treatments may not work as fast as drenches, but they sure are convenient, and they provide a quick, easy way to treat that mound you spotted while mowing the lawn. Sprinkle the specified amount of powder over and around the mound, and be patient. It can take a few days for a dry mound treatment to work.

The University of Tennessee Agricultural Extension Service has educational materials available to consumers to assist them in identifying fire ants and minimizing their impact. They also have recommendations for insecticides that are approved and effective. Contact the county extension office.

This fact sheet was assembled using material from the Tennessee Department of Agriculture and Mississippi State University. The TN Dept of Ag website address was given above, the Mississippi website is <http://msucares.com/insects/fireants/>. This fact sheet was assembled by Dennis Gregg, the Executive Director of the Obed Watershed Community Association as a service to our members and the community in promoting an appreciation for the natural and cultural heritage of the Obed River watershed. Those wanted to join this membership organization or more information may call 484-9033 or write OWCA at 185 Hood Dr., Crossville, TN 38555.