



Residential, Structural and Community Pests

Department of Entomology
North Carolina Cooperative Extension



CONTROL OF THE RED IMPORTED FIRE ANT

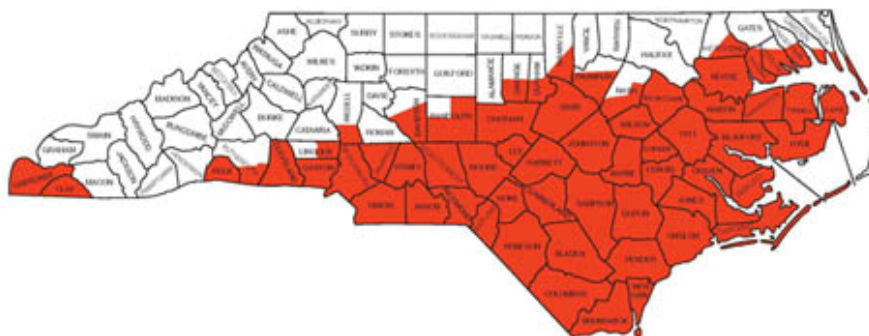
North Carolina's red imported fire ant infestation continues to expand, partially as a result of recent mild winters but more recently due to increased residential and industrial development and subsequent introductions of fire ants in infested sod and nursery stock. Although fire ant stings are not fatal for most people, they are painful. The mounds that the ants build can interfere with the operation of machinery in agricultural fields. It is not practical to eradicate these ants, but their populations can be controlled, and the chance of contact with people can be minimized. This publication discusses the red imported fire ant and suggests suitable control methods.



Area of Infestation

The red imported fire ant, *Solenopsis invicta*, a native of southern Brazil, currently inhabits eleven southern states, as well as isolated areas in New Mexico and California. In North Carolina, imported fire ant is found throughout much of the eastern half of the state, along with isolated areas in western NC. These areas (shown in red on this map) are currently under quarantine by the U.S. Department of Agriculture (USDA) and the North Carolina Department of Agriculture & Consumer Services (NCDA&CS), regulating the export of certain items that might carry ant infestations to other parts of the country.

Imported Fire Ant Quarantine Area North Carolina - 2008

www.ncagr.com/plantind/plant/entomol/ifamap.htm



 Regulated Area - Movement of regulated articles from this area into or through white area requires inspection.
 Non Regulated Area - Movement of articles from or through these areas does not require inspection.

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Map source: NC Department of Agricultural and Consumer Services

Infestation Expansion.

Even if you are not currently in a quarantined area, you should be aware of how fire ants will affect you and how you can control them because North Carolina's fire ant infestation is expanding into counties adjacent to the quarantine zone. The ants expand naturally and steadily into new territory because of their high reproductive rate; mild winter weather has accelerated their movement. Current technology and control efforts are not expected to reverse this growth trend in the foreseeable future. In addition, long-distance movement often occurs because of human activities, primarily through the transport of fire-ant-infested nursery plants and sod into areas outside of the federal and state quarantine zone. The NCDA conducts yearly surveys to detect the spread of fire ants and adjusts the established quarantine zone accordingly.

Fire Ant Biology and Behavior

Adult red imported fire ants are reddish to dark brown and occur in several forms: (1) minor workers (~ 1/8 inch); (2) major workers (~ 1/4 inch) (3) winged males and (4) females, each about 1/3 inch long; and (5) queens also about 1/3 inch long.



(Image courtesy of Texas A&M Univ.)

Fire ant mounds vary in size, usually in direct proportion to the size of the colony. For example, a mound that is 2 feet in diameter and 18 inches high may contain about 100,000 workers, several hundred winged adults, and one queen. In addition, when the mound of an active fire ant colony is broken open, whitish rice grain-like larvae and pupae usually can be found. These immature ants will eventually develop into workers or winged adults. Mounds constructed in clay soils are usually symmetrical and dome-shaped; mounds built in sandy soils tend to be irregularly shaped. It is often difficult to distinguish the red imported fire ant from the tropical fire ant and the southern fire ant, which are also found in North Carolina. For positive identification, take a specimen to your county Cooperative Extension Center.

During the spring and summer, winged males and females leave the mound and mate in the air. After mating, females become queens and may fly as far as 10 miles from the parent colony. However, most queens descend to the ground within much shorter distances. Only a very small percentage of queens survive after landing. Most queens are killed by foraging ants, especially other fire ants. If a queen survives, she sheds her wings, burrows into the ground, and lays eggs to begin a new colony. In the late fall, many small colonies of fire ants will appear. Many of the colonies will not survive the winter unless the weather is mild.

Fire ants prefer oily and greasy foods. They also feed on many other insects and, from that standpoint, could be considered beneficial. To find food, workers forage around their mound often in underground tunnels that radiate from the mound. If the mound is disturbed, ants swarm out and sting the intruder.

Commercial and Public Impact

From an agricultural perspective, red imported fire ants are nuisances primarily because they annoy field workers and because their mounds may damage harvesting equipment. Livestock injury and crop damage are usually minor. Fire ants have a much greater impact on the ornamental plant, sod, and landscaping industries because of problems associated with shipping infested plant material into uninfested areas of the country (see the section entitled "Quarantine Assistance"). Mounds discovered in previously uninfested areas of North Carolina frequently can be traced to landscaping performed at commercial and industrial developments. For the general public, two aspects of red imported fire ant infestations are particularly annoying: the unsightly mounds formed in lawns and yards and the painful stings received when mounds are disturbed. Within 24 hours after a person is stung, a pustule-like sore forms at each sting site (as shown here), which usually itches intensively. Scratching the pustule may rupture the skin, leading to secondary infection and scarring. A small proportion of people stung is highly allergic to fire ant stings and require immediate medical attention. As red imported fire ants spread into more populated areas of the state, more people are likely to be stung. Encounters with fire ants can be expected not only outdoors but indoors as well. In other southern states foraging ants have invaded private residences and buildings such as offices, hospitals, and nursing homes. In these situations, fire ant control is more critical and potentially more difficult because of concerns related to both the ants and the indoor use of chemical insecticides.



Photograph by Daniel Wojcik., USDA-ARS

Managing Imported Fire Ants

Because fire ants cannot be eradicated over wide areas, the goal should be to manage the ants with a combination of chemical and non-chemical control tactics in order to eliminate fire ants in areas where they pose the most immediate hazard to people, pets and livestock, and to reduce infestations to "acceptable" levels.

Sanitation

As with any other insect pest, fire ants spend a great deal of time searching for food. That foraging activity can bring them inside buildings. You can reduce ant foraging around buildings by eliminating available food sources in these areas.

- Outdoor trash cans around schools, parks, and other buildings (right) should be emptied frequently during the day. Avoid leaving trash in them overnight. Keep the area around trash cans clean.
- Dumpsters and grease bins (at food service facilities) should be emptied routinely and the areas around them kept as clean as possible.
- Keep shrubs pruned away from the building so that ants can't use them as a "bridge" to avoid treated areas.



Inspection and Observation

Because fire ants can be spread in new landscape material such as shrubs, sod, wheat and pine straw, check these items carefully before you purchase them or have them installed. If you are doing your own landscaping there is a chance you could get stung while handling fire ant infested items. If you find fire ants in plants, sod, pine straw or wheat straw, contact the supplier immediately.

Chemical Control

There are two basic approaches to chemical control of fire ants. An insecticide can be applied to individual mounds or it may be broadcast over a wide area infested with fire ant colonies. Individual mound treatments are usually more environmentally and ecologically acceptable because they use less insecticide and limit areas treated as compared to broadcast treatments, and they are likely to have less impact on non-target insects. Regardless of the method used, the objective is to kill not only the workers but also the queen, because she is the only ant in the colony that is capable of laying eggs. **Always follow the label directions should when applying any fire ant insecticide.**

Mound Treatments

Individual mounds may be treated with a liquid or dust insecticide formulation or with an insecticidal bait.

Liquid treatments may be done by rodding the chemical deep into the mound (as seen in the image to the right) or by drenching the mound. To be effective, the drench must trickle down through the mound and contact most of the fire ants in the colony. Ants contacted by the drench die in less than 24 hours. Drenches are the preferred treatment when the risk of human contact with fire ants is high and the fire ant infestation must be eliminated immediately because of the health risks of someone getting stung. High-risk areas include home lawns, school grounds, parks, and other areas frequently used by the public. Best control results are usually obtained in spring and fall when temperatures are between 70°F and 85°F. Control with drench treatments is more difficult to achieve during very hot summer months because the ants remain deep within their mounds and are hard to reach with liquid insecticides. The following procedure is recommended for drenching mounds. Contact your county Cooperative Extension Center or consult the *NC Agricultural Chemicals Manual* for information on fire ant insecticides appropriate for use by the general public and by public health and pest management professionals. Following label directions, pour the correct amount of water into a bucket or sprinkler can. Add the prescribed amount of insecticide, mix well (avoid splashing the chemical), then gently pour the diluted insecticide over the surface of the mound. Apply the drench at a rate of approximately **1 gallon per 6 inches of mound diameter**. At this rate, for example, a mound measuring 12 inches across would receive 2 gallons of insecticide drench. The amount of drench applied is more important than the concentration of insecticide in the drench. Thoroughly wet the ground to a distance of about 2 feet around the mound. Sometimes the drench does not kill all fire ants in a treated colony. The surviving ants will construct small mounds within 10 to 15 feet of the parent colony. Several days after the application, search the area around the treated colony for new mounds and treat them with the insecticide drench. **Keep children and pets away from the treated area until it is dry (or as designated on the pesticide label).**



Ant baits can also be used to treat individual mounds. These baits are essentially a mixture of an insecticide and a food that is attractive to fire ants. Worker ants carry particles of the bait back to the mound and feed them to the "brood" (larvae or immature ants) and the queen. Even when the insecticide kills the queen, workers may be active inside the mound for several weeks before the colony finally disappears. Baits are somewhat slow acting but easier to apply than mound drenches. Therefore, they are best used in situations where many mounds must be treated, or when water for mixing mound drenches is difficult to obtain, or when the risk of human or non-target animal contact is low and there is no urgent need to eliminate the infestation. The active ingredients in ant baits are rapidly degraded by high temperature, high humidity, and intense sunlight. The baits can be rendered ineffective in a few hours by these conditions. Follow this procedure when using baits.



Follow this procedure when using baits:

- Contact your county Cooperative Extension Center or consult the NC Agricultural Chemicals Manual for information on fire ant baits appropriate for use by the general public and by public health and pest management professionals.
- In the spring when ant foraging first starts to increase, you can gauge ant activity by placing potato chips in areas of known or suspected ant mounds. Watch for ants to start feeding on the chips. At that point, baiting is likely to be more successful.
- Apply the bait according to label directions. Sprinkle the recommended amount around each mound (not on top of the mound itself). It is best to apply the bait in the early evening.
- Many bait labels recommend that the material should not be applied within 6 hours after precipitation occurs (either rainfall or heavy dew). Moisture can lead to the bait's attractant oils becoming rancid and less attractive to foraging ants or may cause the bait granules to lodge in the grass foliage and so the ants do not readily find them.

"Two-Step Method" - You can also apply a mound drench 5-7 days after baiting to kill of remaining workers more quickly.

Broadcast Applications

Broadcast treatments can be used to apply insecticides (liquids, baits, or granular insecticides) over a large infested area containing many fire ant colonies. One disadvantage of broadcast treatments is that they can also disrupt ant communities. Although most people think of ants strictly as being pests, they are also a very important parts of our ecosystem. Broadcast treatments can result in an ant community changing from one that is dominated by native ants to one dominated by imported fire ants. On the other hand, in areas with very high mound densities, broadcast applications allow large areas to be treated quickly. Areas of high public use may be protected by spring and fall broadcast applications of ant bait or a well-timed granular insecticide. One limitation on the use of granular insecticides (not granular baits) is that most of them require water (either from rain or by irrigation) to be applied shortly after the application. When rain is not expected for several days or in areas where watering may be restricted or not feasible, a granular insecticide may not be the best choice. If the area becomes reinfested with fire ants during the summer months, individual mounds can be treated with an insecticide drench or ant bait, although as noted previously control is more difficult when



temperatures are high. Consult the *NC Agricultural Chemicals Manual* for a list of granular insecticides (and baits) that can be used against fire ants.

Indoors

The key to reducing the threat of fire ant infestations indoors is prevention, which means removing exposed food sources that may attract these insects. In some cases, fire ants may nest indoors, e.g., inside walls or partially under concrete slab floors. In those instances you will likely see soil and other debris pushed out around expansion joints near the edge of carpeting (image at right) or around water or other utility pipes. In most situations, fire ants are simply entering the building from an outdoor nest. In those situations, the treatment objective must be to reduce the potential for accidental stings as quickly as possible. Insecticides labeled for indoor use can be found in the *NC Agricultural Chemicals Manual*.



Particularly the pyrethroid insecticides (products containing chemicals such as permethrin, cyfluthrin, bifenthrin, etc.), can be used in homes and public buildings to drive foraging ants outside or away from high-use or critical areas, such as kitchens, recreation rooms, patient rooms, operating rooms, or intensive care units. **Select products that are specifically labeled for use indoors.** Although baits work well for many ant species that invade buildings, they are not the best choice for controlling fire ants indoors because they are more likely to draw more ants inside and potentially increasing the chance that someone will be stung. For this reason, it is important to positively identify the ants that are invading your home before applying any control measures. Information about other ant species can be found in *A Guide to House-Invading Ants and Their Control*. Contact your county Cooperative Extension Center or consult the *NC Agricultural Chemicals Manual* for advice on baits, dusts and liquids to use to control fire ants both indoors and outside.

Options for control are more restricted for areas such as pastures that may be used for grazing horses or livestock. Consult the following publications for advice in dealing with these situations:

- *2005 Fire Ant Control Materials for Alabama Homeowners*
(www.ces.ncsu.edu/depts/ent/notes/Urban/fireantproductlist.pdf)
- *Fire Ant Management in Pastures*
(www.ces.ncsu.edu/depts/ent/notes/forage/rifanote04/rifanote04.htm)
- *Fire Ant Management in Horse Operations*
(www.ces.ncsu.edu/depts/ent/notes/forage/rifahorsenote05/rifahorsenote05.htm)
- *North Carolina Agricultural Chemicals Manual*
(<http://ipm.ncsu.edu/agchem/5-23.pdf>)

Non-Chemical Control of Fire Ants

There are some non-chemical methods that have been used against fire ants but with limited or no success.

Hot Water and Mechanical Disruption

Hot water (i.e., >90° F) and mechanical disruption have been used in many instances. Results of some preliminary evaluations at Texas A&M University have shown that these treatments will kill large numbers of ants; however, satellite mounds formed by surviving ants subsequently appear. Thus, these methods can have a useful, but temporary impact on fire ant colonies in areas situations where pesticides of any type are considered unacceptable. Other non-chemical mechanical devices that disrupt colonies do not have scientifically-based test data to support their effectiveness. One potential downside to using hot water is that

it can damage/kill vegetation in the general vicinity.

Grits

A long-standing folklore method of controlling fire ants (and other ants) has been to pour grits over the mound. The assumption in some cases has been that the ingested grit particles absorb water and cause the ants to "explode". However, fire ants (and ants in general) feed primarily on liquefied foods and their digestive tracts filter out these solid particles. Results of laboratory studies at Texas A&M University have shown that foraging fire ants collect the grits, but there is no reduction in the number of ants in the colony.

Biological Control

Research is underway to look at the use of biological control agents to control imported fire ants. These agents include parasitic flies and other ants, fungi and other microorganisms. These methods are not yet proven to be extremely effective by themselves but can help reduce fire ant populations as part of an IPM program. For more information about biological control of fire ants, visit this USDA-ARS website. <http://www.ars.usda.gov/Research/docs.htm?docid=8943>.

Quarantine Assistance

Although eradication of firmly established fire ants from an infested area is usually not feasible using available control agents, efforts to prevent or delay long-range spread have been successful. The North Carolina Department of Agriculture & Consumer Services provides technical advice for problems within and outside the regulated (quarantined) area. Through nursery inspections, compliance agreements, and certification, the NCDA&CS and the USDA-Animal and Plant Health Inspection Service (USDA-APHIS) cooperatively regulate shipments of nursery and sod farm items, such as balled nursery stock and turf, to areas outside of the quarantine zone. Under the terms of the compliance agreement, nursery operators have several ways to obtain certification and to ship nursery stock out of the quarantine zone. For information and assistance, contact the NCDA&CS.

Information and control recommendations were developed for North Carolina and may not be appropriate for other states. Any recommendations for the use of chemicals are included as a convenience to the reader and do not imply that insecticides are necessarily the sole or most appropriate method of control. Any mention of brand names or listing of commercial products or services in the publication does not imply endorsements by the North Carolina Cooperative Extension nor discrimination against similar products or services. All recommendations for pesticide use were legal at the time of publication, but the status of registrations and use patterns are subject to change by actions of state and federal regulatory agencies. Individuals who use chemicals are responsible for using these products according to the regulations in their state and to the guidelines on the product label. Before applying any chemical, always obtain current information about its use and read the product label carefully. For assistance, contact the Cooperative Extension Center in your county.

This document was modified from AG-486, "Control of the Red Imported Fire Ant", by C. Apperson (NCSU), L. Garcia (USDA-APHIS) and M. Waldvogel (NCSU) available on the web at <http://insects.ncsu.edu/Urban/ifa.htm>