

Red Imported Fire Ant (RIFA)

Lois Swoboda and Dini Miller*

Scientific Name

Hymenoptera: Formicidae, *Solenopsis invicta* Buren

Range

Not definitely known to be established in Virginia.

Size

2.4 –6 mm (1/8 –1/4")

Color

Shiny red head and black gaster (rear segment). Males are black.

Description

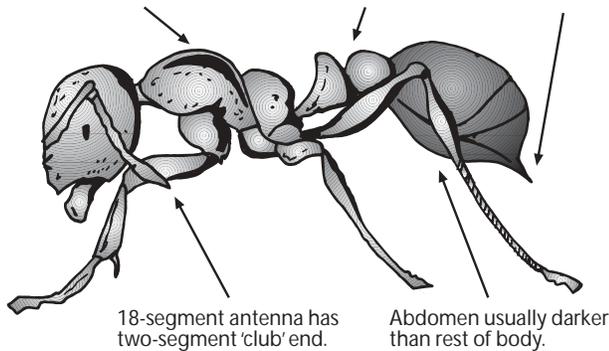
RIFAs are polymorphic, which means there are workers of several sizes within a colony. Colonies also contain eggs, larvae, and pupae, as well as one or more large, wingless, reproductive queens. Colonies may also contain winged, unmated queens and males.

Fire ants (*Solenopsis*) can be distinguished from all other North American ant species by using a microscope to verify the following characteristics. Each antenna has ten segments with a two-segmented club. The pedicel (the waist between the two segments of the body) is two-segmented. The stinger is an easily visible point at the tip of the workers' abdomens. RIFA is one species (type) of fire ant. Identification of fire ants to species is difficult and usually requires evaluating the morphology (size and shape of the body parts) of 40 to 50 worker ants. The task of identifying fire ants to species is further complicated by the fact that interbreeding between several species has occurred.

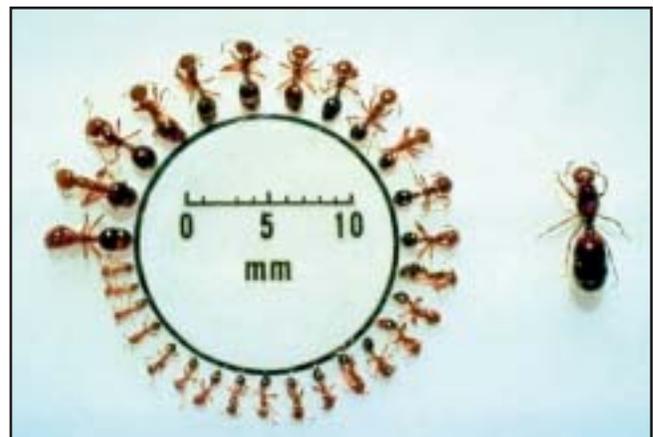
The RIFA is the most aggressive and widespread of the fire ants found in North America but at least three other species of fire ant exist. Two species, the tropical fire ant (*Solenopsis geminata* Fabricus) and the southern fire ant (*Solenopsis xyloni* McCook), are believed to be native to North America. A third species, the black imported fire ant (*Solenopsis richteri* Forel), arrived in North America around 1918. RIFA has eliminated the

Red to reddish-brown ant about 3-6 mm. or 1/8 inch long.

Thorax profile is uneven, viewed from side. Two nodes attach abdomen to thorax. Stinger is tip of abdomen.



Fire Ant Worker drawing
Modified from K-State Research & Extension, Kansas State University.



Array showing size of workers and queen.
Courtesy of Texas Imported Fire Ant Project, Texas A&M University, College Station, Texas.

*Graduate Student, Extension Entomologist, respectively; Department of Entomology, Virginia Tech

two native species from most of their range. The black imported fire ant interbred with RIFA and in some areas was displaced by RIFA. Both the black imported fire ant and RIFA pose a potential problem in Virginia. RIFAs were introduced into the United States from South America around 1930 in soil used as ballast in cargo ships. They have spread to infest most of the southern United States, including Puerto Rico and as far west as Texas and parts of California. Fire ants may disperse into new areas in various ways. They may establish new territories during the annual mating flights or by an existing colony moving into a new region in search of food or nest sites. They have also been observed rafting to new sites on various objects during periodic floods. RIFAs are most commonly transported to new territories by human beings. The most dramatic extension of RIFA's range occurred during the housing boom of the 1950s and was a direct result of sod and nursery plants being transported from production sites to areas under development for housing or commercial use. Imported plant material, mulch, and topsoil remain major sources of fire ant infestations.

The RIFA mound is often noticed before the ants themselves. The mounds are large, cone-shaped domes with hard, weather-resistant crusts. The average size for a mature mound is 10 inches to 24 inches in diameter and 6 inches to 18 inches tall. In heavy clay soil, the mounds may be much larger, sometimes reaching 3 feet in height. Such mounds may have galleries extending as far as 6 feet underground. Fire ant mounds act as staging platforms for nuptial flights and heat sinks during cold weather. They also provide an elevated refuge from flooding during periods of heavy precipitation. Mounds are characteristic of RIFA but they are not essential. RIFA may nest in a variety of settings.



RIFA Mound.

Courtesy of Texas Imported Fire Ant Project, Texas A&M University, College Station, Texas.

Habitat

Fire ants prefer land that is open and exposed to the sun. They are often found in cultivated fields or pastureland. In urban areas they will nest in cemeteries, parks, playing fields, and yards. RIFAs will also nest within the walls of structures and under sidewalks, slabs, and roadways. Colonies have been found inside cars, trucks, and recreational vehicles. RIFAs are attracted to electrical currents and will nest in and around heat pumps, junction boxes, traffic lights, and similar devices.

Quarantine! Isolated infestations of RIFA occur periodically in Virginia. It is important that all such infestations be quickly identified and eradicated. If you locate a RIFA infestation you should immediately contact the **Virginia Department of Agriculture and Consumer Services (VDACS), Office of Plant & Pest Services**. To contact the VDACS Office of Plant & Pest Services call (804) 788-3515 or (800) 552-9963 or visit the VDACS website at <http://www.vdacs.state.va.us>. VDACS will probably contact the USDA APHIS. **It is illegal to ship plant material, sod, or mulch from areas known to be infested by fire ants unless approved by the USDA. Shippers must have a cooperative agreement in place before shipment.** A current map of areas quarantined because of fire ant infestation may be viewed at <http://www.aphis.usda.gov/ppq/maps/fireant.pdf>.

Life Cycle

Like all ants, RIFA has a complex life cycle developing from eggs into white legless larvae and then pupae before emerging as adults. Development of the young takes place mostly within the nest although workers may occasionally be observed transporting young. Reproductive swarms of virgin queens and males occur during the spring or summer but can occur at any time of year when the temperature is above 72°F. Healthy nests often produce two nuptial flights a year. Normally many RIFA colonies participate in a simultaneous nuptial flight. Flights most often occur mid-morning one or two days after a rainfall. Most nests produce both male and female reproductives but swarmer in a single flight from a single nest are predominantly one sex. Males emerge first and are already airborne when the females take flight. Mating occurs in the air. After mating the males die. The newly mated queens shed their wings and construct a brood cell 25 millimeters to 50 millimeters below the soil surface. Often multiple queens will share a cell but normally only one survives to establish a colony.

The queen initially deposits 10 to 15 eggs that hatch in 7 to 10 days. The larvae are fed by the queen through trophallaxis (the mouth-to-mouth exchange of regurgitated, digested food). Queens do not forage for food. Newly mated queens subsist on stored fat and on nutrients produced as their flight muscles degenerate. The workers developed from the first brood of eggs are very small due to the limited food supply. These workers are known as minims. The minims immediately take on the tasks of foraging and nest maintenance. The queen begins to produce larger workers in addition to minims soon after the minims start to gather food to supplement her stored fat, usually within 30 days of mating. The largest workers (majors) may be 10 times the size of the minims.

The colony grows rapidly and within 6 months new workers begin to emerge daily. A healthy RIFA queen lives up to 7 years and may produce 1,600 eggs per day. A mature colony of RIFAs may contain over 250,000 ants. A large colony may also contain multiple queens. The presence of multiple queens in a single colony or family is unusual among ants. It is found only rarely among populations of RIFA in their native range (Central and parts of South America), but is fairly common in North America. Experts believe this behavior may have developed among RIFA imported to North America as a reaction to environmental differences. In addition, sparse competition from native ants allows the nests to develop to an unusually large size, which may in turn allow each nest to support more queens.



Fire ant queen shown with workers and brood.
Courtesy of Sanford D. Porter, USDA, Gainesville, Florida.

Type of Damage

The RIFA has been called the “ant from hell.” These ants are omnivorous, feeding on almost any plant or animal material, alive or dead.

Environmental

RIFAs attack and destroy the seeds, fruit, shoots, and seedlings of numerous native plant species. Their presence on plants may interfere with the activity of natural pollinators and beneficial predatory insects. Fire ants “tend” pests such as scale insects, mealy bugs, and aphids (ant cows). These insects feed by sucking plant juices and then produce a sweet excretion (waste product) called honeydew that the RIFA uses for food. RIFAs may also feed on their ant cows if the population of sucking insects is large. RIFAs actively transport sucking insects to new feeding sites and protect them from predators. Such sucking insects may spread disease organisms and weaken the plants on which they feed.

Fire ants have a major impact on the ground-nesting animals in any ecosystem. While their preferred food seems to be insects and spiders, studies have demonstrated at least a two-fold reduction in ground-nesting vertebrates (e.g. snakes, turtles, birds, etc.) where RIFAs are present. Fire ants will attack reptile or bird eggs, nestling birds, beehives, the nests of other social insects, and even adult reptiles, rodents, birds, and amphibians. Depredation by RIFAs may lead to the local elimination of an entire species. Even fish kills have occurred as a result of the consumption of large numbers of fire ant workers by fish after heavy rainfall. In coastal areas, RIFAs will even venture onto the floodplain between tides to feed on exposed plants and animals.

Agricultural

RIFAs are known to damage more than 50 cultivated plants by feeding on germinating seeds (e.g. corn, sorghum, soybeans) and damaging developing fruit and flower buds (e.g. citrus, tomatoes). RIFAs have also been observed causing significant damage to potato tubers and the subterranean pods of peanuts. Young trees may be girdled and destroyed. Fire ants are a particular problem during periods of drought since they will attack food crops seeking water. The presence of RIFAs in a field can hamper hand-harvesting of fruits and vegetables.

Fire ants pose a threat to young or debilitated livestock that may not be able to escape attacks by ant workers. Fire ant mounds in a field may interfere with foraging livestock and the voids that form beneath abandoned mounds may collapse beneath the weight of an animal leading to injury.

RIFAs are also known to interfere with or destroy drip irrigation systems by building mounds over the emitters.

Tractors and other field equipment may be hampered or even damaged by the hard outer coating of RIFA mounds.

Urban

As in rural settings, RIFAs can cause significant damage to landscape plants and significantly reduce the number of wild birds and mammals in the urban environment. RIFAs can discourage outdoor activities in parks, yards, and school grounds. They frequently become a nuisance around dumpsters, trashcans, kitchen gardens, and areas where pets are fed and watered. Fire ants may be a threat to young animals or small, confined pets.

RIFAs rarely nest indoors, but may establish nests under sidewalks, roadways, and structures of all kinds. If a nest site is later abandoned, the soil may shift, causing cracks or, occasionally, the actual collapse of part of a structure.

Fire ant stings

Fire ants have a painful bite but they are most notorious for their sting. These ants are extremely aggressive and respond rapidly to any disturbance of the nest or a food resource. A single ant can sting repeatedly. On encountering an enemy, a RIFA reacts by grasping it with barbed mandibles and stinging repeatedly while pivoting the abdomen in a tiny circle. The result is a small, acutely painful wound that develops into a pustule (small, firm blister-like sore) in 24 to 48 hours. Pustules can become sites of secondary infection or cause permanent scarring. A few individuals are acutely sensitive to fire ant venom and may exhibit intense reactions to stings including nausea, shock, chest pains, and, in rare cases, coma.

Structural invasions by this ant, which are especially common during periods of heavy precipitation, can endanger children and the elderly. A number of deaths have resulted from



Pustules resulting from fire ant stings. Courtesy of Sanford D. Porter, USDA, Gainesville, Florida.

fire ant attacks. Fire ant stings have also caused traffic accidents, and unconscious or injured accident victims have been attacked by fire ants after being thrown from vehicles.

Control

If you believe you have discovered a RIFA nest, contact VDACS immediately. Individuals and commercial pest control operators should not attempt to treat fire ant infestations. Failure to eradicate an entire nest will result in the local establishment and spread of RIFA in a very short period of time.

At this time, there is no effective treatment for large areas infested with RIFA, **persons acting on behalf of VDACS** may make use of several strategies to eradicate small infestations. Individual mound treatments and baiting can both be successfully employed to mitigate infestations in small areas (e.g. the area surrounding a single building or an urban playground). In other states where established RIFA infestations exist, neighborhood groups have successfully collaborated to create ant free zones by coordinating the ant treatments of individual land parcels over a multi-block area.

The following section dealing with RIFA control strategies is meant only to describe techniques that may be used by people acting on behalf of VDACS. Private citizens and commercial pest control operators not acting on behalf of VDACS should not attempt to employ these techniques. If you believe you have discovered a RIFA nest contact VDACS immediately.

Individual mound treatments

When treating individual fire ant mounds, it is extremely important that the mound remain undisturbed prior to treatment. Drenches and dusts or granules must come in direct contact with the ants to be effective. Disturbing the mound may cause the workers to move the queen or even the entire colony to a safer location.

Individual mound treatments may take the form of a drench where the mound is flooded with a large volume of liquid containing an insecticide labeled for this purpose. This is the quickest form of fire ant management. Unfortunately, the queen may be located too deep in the soil to be destroyed by the insecticide; in which case, control will be temporary. Injection devices to aid in the deep penetration of liquid insecticide are available but these are relatively expensive. In addition, formulations of insecticide labeled for use as

“injectants” are expensive and can be dangerous if improperly handled. Individual mounds may also be treated by a surface application of a dry or granular pesticide. Such dry treatments are more effective when they are “watered in.” This form of treatment is slower and less effective than drenching.

Gasoline and similar combustible materials are not labeled for fire ant control. Attempting to drench RIFA mounds with such materials or to incinerate nests using such materials is illegal, dangerous, and harmful to the environment. In addition, such “treatments” are rarely effective since the queen is generally located too deep in the nest to be destroyed by simple drenching or burning. Only temporary control will be achieved.

Baits

A number of fire ant baits are commercially available both to pest management professionals and homeowners. **At this time, the application of such baits in an attempt to control RIFA infestations in Virginia, by pest management professionals or private individuals, not acting on behalf of VDACS, is prohibited. Individuals and commercial pest control operators should not attempt to treat fire ant infestations. If you believe you have discovered a RIFA nest contact VDACS immediately.**

While baits are generally much slower than direct mound treatments, they are safer and may be very effective if properly applied. **Fire ants are only able to consume liquid food.** (The application of dry grits to fire ant mounds as a control measure is an urban legend with no basis in fact.) Fire ant baits generally take the form of an insecticide suspended in oil and impregnated in an inert carrier such as a corncob. Foraging worker ants find the bait, ingest the insecticide and carry it back to the nest where it is distributed throughout the colony. Baits may be broadcast in the general area of an infestation or concentrated in an area where ants are known to feed (e.g. around trash cans or vegetable gardens). In some cases it is possible to prebait an area with birdseed and broadcast ant bait granules once the ants are feeding there on a regular basis. The use of baits is the least expensive and least labor-intensive method to control RIFAs.

When broadcasting fire ant bait, it is important to remember that the product should be applied very sparingly. A high concentration of bait granules is often repellant to foraging ants. **Baits should never be**

applied directly to a fire ant nest. The workers will treat the bait as refuse rather than food and may move the nest entrance in response.

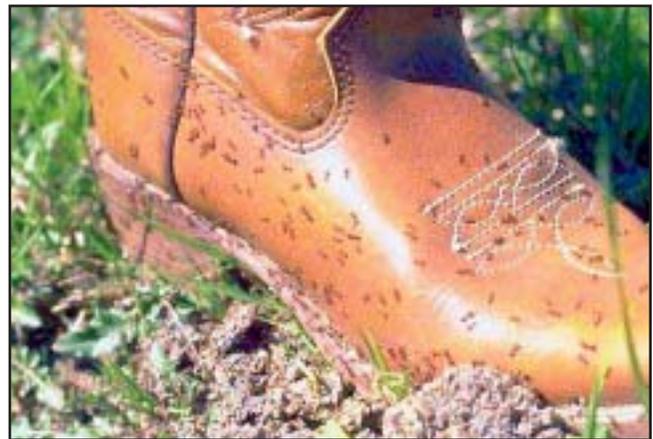
There are a few disadvantages to baiting RIFA. As has been mentioned, baiting is relatively slow and ant bait retrieval is temperature dependent. (Fire ants do not forage when the temperature is below about 65° F.) Because baits are water soluble, they must be renewed after significant rainfall. Baits are nonspecific to fire ants so some care must be taken in placing them to avoid affecting non-target organisms.

Biological control

Several approaches to biological control of RIFA (e.g. endoparasites, ectoparasites, predators, and disease pathogens) are under investigation but none of them has proven to be practical in the field.

Remember

Individuals and commercial pest control operators should not attempt to treat fire ant infestations. Failure to eradicate an entire nest will result in the local establishment and spread of RIFA in a very short period of time. If you believe you have discovered a RIFA nest contact VDACS immediately.



Fire ants are extremely aggressive when disturbed.
Courtesy of Texas Imported Fire Ant Project, Texas A&M University, College Station, Texas.

Interesting facts

Dr. Ted M. Freeman of the Wilford Hall Medical Center in San Antonio, Texas, has developed a whole-body extract of RIFA that has been successfully used to desensitize patients known to be allergic to RIFA venom. Unfortunately, the vaccine is not commercially available.