

# Red Imported Fire Ant<sup>1</sup> in New Mexico: Treatment Methods

Cooperative Extension Service  
College of Agriculture and  
Home Economics



## Guide G-320

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### INTEGRATED PEST MANAGEMENT IN FIRE ANT CONTROL

Several publications in this series cover situations where control of red imported fire ant (RIFA) may be desirable or even essential.<sup>3</sup> When possible, select programs that use a combination of both non-chemical and chemical methods that provide effective, economical control of the pest with the least harm to the environment. The goal of such an “integrated pest management” (IPM) strategy is to prevent or reduce problems caused by unacceptably high numbers of fire ants, rather than to eliminate all ants. Many of our native New Mexican ants can be effective predators or competitors against a variety of other pests, including newly mated fire ant queens. A program based only on one insecticide can be quite costly and can end up eliminating or harming many non-target species. This can only benefit RIFAs, which will quickly fill the available living spaces.

Treatment methods and products mentioned below vary greatly in effectiveness, speed of activity, practicality, and toxicity to both user and the environment. Study the available treatment methods and their proper use so you can select the best combination for a particular situation. Many methods and products have been evaluated by research and Extension faculty in other parts of the southern U.S. Costs for various control methods vary considerably. Per mound treatment costs range from about 15 cents to more than \$1; bait treatments can cost \$8 or more per acre.

### NATURAL AND BIOLOGICAL CONTROLS

A number of organisms kill newly mated fire ant queens, including other ants, dragonflies, several bird species, spiders, lizards, and toads. Their effectiveness at mound control undoubtedly varies in different areas and depends on many factors, not all of which have been identified or studied.

A variety of parasites and pathogens are known to attack fire ants and several have been marketed for control of RIFA:

- The predatory straw-itch mite, *Pyemotes tritici* (Lagreze-Fossat and Montane), feeds on and paralyzes developing RIFA. It's not effective when applied as directed and, as the common name implies, can be potentially harmful to the user.
- Parasitic nematodes (*Steinernema* spp.) are minute roundworms that seek out and penetrate the bodies of various insects, paralyzing them. The nematodes develop inside the host, eventually causing the insect's death. Species and strains vary in their effectiveness. Tested strains caused ants in treated mounds to temporarily move away from the treated mound, but few colonies were eliminated.
- *Thelohania solenopsae* is a microsporidian (protozoan) pathogen of fire ants discovered in 1973 in Brazil, the homeland of the red imported fire ant. It has since been found in red

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<sup>3</sup>For more publications on red imported fire ant, contact your county Extension office. You can also visit the college's World Wide Web site at [www.cahe.nmsu.edu/pubs/](http://www.cahe.nmsu.edu/pubs/), then scroll down to “How-to Publications,” OR contact the Bulletin Office at (505) 646-2701, or [bulletin@nmsu.edu](mailto:bulletin@nmsu.edu).

imported fire ant colonies in Florida, Mississippi, and Texas. This microscopic pathogen infects ant colonies and chronically weakens them. Workers transmit the pathogen to the queen through food exchange. The disease slowly reduces her weight. She lays fewer and fewer eggs, all infected with the pathogen, further weakening the colony. Colony death can require from 9 to 18 months after initial infection. The microorganism appears specific to both red imported and black imported fire ants and does not infect either plants or native ant species. Studies are underway to determine feasible methods for mass-producing the pathogen. It has been released in limited field tests in Florida, Arkansas, and Oklahoma.

- Parasitic fungi (e.g. *Beauveria bassiana*) also are being evaluated in parts of the southern U.S. as individual mound treatments. Several strains have been identified and are being evaluated for efficacy under field conditions in the southeastern U.S.
- Decapitating phorid flies are minute flies that attack fire ants, depositing single eggs into individual ants. The fly larva develops in the ant head capsule, decapitating the ant at maturity. Preliminary field tests with this species in Florida during the summer of 1997 suggest that the flies may be establishing themselves.
- A parasitic ant species is known to attach to fire ant queens. As it lays its eggs, it re-directs the fire ant workers to care for the young parasitic ants at the expense of the fire ant colony. This biocontrol agent is still under investigation in quarantine facilities in Gainesville, Florida.
- Some minute parasitic wasps and at least one species of Strepsiptera (a unique order of endoparasitic insects with varying degrees of host specificity) are being evaluated in lab and field trials, particularly in Florida. To date, none of these potential biocontrols have shown the promise of other agents described above.

The most effective biological control organisms for large-scale programs ultimately may be those that spread from mound to mound independently.

Introduction of natural enemies of RIFA into the U.S. may someday help reduce the numbers of fire ants in some habitats. Eradication of any pest merely by manipulating its natural enemies has never been accomplished. In South America, where a variety of native fire ant species have many natural enemies, the ants are still present and thriving.

Currently, the best biological control method for fire ants is conservation of native ant species that compete with them. One key way to do this is the judicious use of insecticides.

## PHYSICAL AND MECHANICAL METHODS

Probably the simplest method of fire ant control is to pour boiling or scalding water directly on target colonies. For best results, the ants should be close to the mound surface, such as on a cool, sunny morning. Approximately 3 gallons of hot water poured on each mound will kill about 60 percent of the mounds, according to at least one study. However, there are a number of problems with this technique: hot water must be kept off desirable plants and their roots; handling large volumes of boiling water can result in serious burns; and the technique requires a fair amount of energy and personal effort. It can be repeated as frequently as needed, however.

If moving problem colonies away from sensitive areas would suffice, consider disturbing or knocking down mounds frequently. Ants under stress like this will move. It's a myth that shoveling one ant nest on top of another will cause the ants to fight to the death; unfortunately, this is not true.

Barriers can effectively keep RIFAs out of sensitive areas if a person has the time, persistence, and money to tend them. Talcum powder and Teflon-like tape or sprays can be used on vertical surfaces; however, they lose their effectiveness in the warmth and humidity of greenhouses. Tanglefoot®, a petroleum-based, sticky substance is available as an aerosol or gel; it is temporarily effective until it becomes coated with dust or other debris. Wires or plates heated to about 140°F can form a hot barrier that ants will not cross.

## CONTROL DEVICES

Catalogs, brochures, and other media often feature various mechanical and electrical devices that have been marketed for RIFA control. One device is reported to electrocute fire ant workers as they climb onto an electric grid inserted into the mound. It will kill numerous workers, but the queens and brood are unaffected and losses are often replaced within a day or two. There also are sound-producing and vibrating machines that claim to “repel” colonies, and other units that supposedly heat mounds or explode them. That such “control” devices are on the market does not indicate they are effective or even legally recognized by the New Mexico Department of Agriculture; they are neither. Deceptive or fraudulent claims concerning fire ant and other pest control devices should be reported to the New Mexico Department of Agriculture, the state Attorney General’s Office, or the Federal Trade Commission.

## HOME REMEDIES

In addition to drenching with boiling water, a variety of other home remedies have been tried on fire ants. Many of these can be called “revenge treatments” that do more to make the applicator feel better than to kill ants. While there is no lack of enthusiastic supporters for various positions or techniques, scientific trials with these preparations indicate they either don’t work at all or the colony moves a few feet to a new location. Sometimes, the queen and a few workers will temporarily remain hidden underground, particularly when above-ground conditions are especially harsh.

Gasoline and a variety of petroleum products will kill fire ant colonies but the risk of using these compounds may not be immediately recognized. All petroleum products are dangerously flammable, even explosive. They can kill desirable plants around treated mounds and can seriously pollute the soil, air, and ground water. Soap solutions, cleaning products, or wood ashes soaked into the mound are believed to remove the protective natural coverings on RIFA bodies. However, these treatments would be incredibly

hard to manipulate and monitor for effectiveness and the ants most likely would outrun these drenches. Use of battery acids, bleaches, or ammonia products can be dangerous and is strongly discouraged, except when they are ingredients in a registered pesticide product accompanied by appropriate use directions.

Another favorite treatment in the southern U.S. is sprinkling instant grits onto fire ant mounds. According to proponents, the ants eat the grits, which absorb body moisture quickly, swell, and rupture the ants’ bodies. Unfortunately, adult RIFAs simply cannot ingest solid food. They have elaborate screening mechanisms in the head and mouth parts that essentially remove solids, leaving only fluids for consumption. Only the last stage larval fire ant is able to ingest solids. Some natural substances found in crushed or grated citrus peels are reportedly toxic to fire ants. However, proper formulations and application techniques for these naturally occurring chemicals have not been developed, so these products also are unlikely to be effective.

## “ORGANIC” INSECTICIDES

Several products said to be “organic” (of natural origin) are currently marketed for fire ant control, such as the botanicals. All of these products are registered by the Environmental Protection Agency as pesticides and some are quite effective. They are not necessarily safer than other insecticides, however. All pesticides should be used with care.

## CHEMICAL CONTROL

Chemical insecticides (both organic and synthetic) continue to be the main methods of battling fire ants. Insecticides registered by the Environmental Protection Agency pose minimal risk when used as directed. Insecticide applications can be aimed at the foraging ants and/or the entire colony, depending on circumstances. Table 1 lists fire ant insecticides by generic names of ingredients. Carefully follow directions on the product label for the use of protective clothing, re-entry intervals, and watering practices before and after treatment.

Keep in mind that colonies with young queens and drones or multiple queens and drones may be stimulated to release these if the colony is disrupted, thus producing more colonies. Thus, insecticide treatment occasionally can be counter-productive.

## Baits

Conventional bait formulations combine specific pesticide ingredients with processed corn grits coated with soybean oil. Soybean oil is a feeding stimulant important to acceptance by foraging RIFAs. Baits can be applied as spot treatments to individual mounds or broadcast over larger areas. To achieve satisfactory results:

- Use fresh bait, preferably from an unopened container or one that has been tightly resealed and stored for no more than 2 years. Purchase only enough bait to make one treatment and do not store large quantities once the containers have been opened. Bait is only collected by foraging workers when it is fresh. It is then carried back to the colony and shared with other members of the colony. Rancid or stale bait smells bad and is ignored by foraging ants.
- Apply when worker ants are actively foraging. This can be determined by leaving a small pile of bait in the area to be treated. When ants are seen actively removing the bait 10-30 minutes later, you will know both that the bait is attractive and that ants are foraging. Tuna fish, pet food, or potato chips (all contain oils) also are attractive to foraging ants. Foraging activity slows when soil temperature is lower than 70°F or higher than 95°F. In mid-summer, apply bait in late afternoon or early evening because foraging ants are less active during the heat of the day.
- Apply when the ground and grass are dry and no rain is expected.
- Do not mix bait with other materials such as fertilizer or seed.

Use appropriate application equipment and calibrate it properly. Differences in the oiliness of

bait brands and production batches can cause variations in applicator output. Temperature and humidity also affect the rate at which bait flows through the applicator openings. The speed at which the applicator is moving is an important factor, particularly with factory-calibrated settings.

Hand-operated spreaders such as the Cyclone® Seed Sower, Ortho® Whirlybird, and Republic or Scott's hand-held spreader are the least expensive applicators. They are adequate for treating small areas. The operator can walk or ride on the back of a vehicle. Some push-type applicators, such as Spyker® Models 24 and 44 also may be suitable, but some modification (attach the "fire ant plate") is required to keep from applying too much material. Most rotary and drop-type fertilizer spreaders will not apply fire ant baits at the recommended rate.

Electric spreaders such as the Herd® Model GT-77A, Cyclone® Spreader Model M-3, or similar applicators are best for treating large areas. These spreaders have vibrating opening plates that prevent clogging. Swath width is either pre-set or adjustable with a rheostat. Applicators can be mounted on any vehicle that will maintain a low speed. Do not use ground-driven or power take-off-driven equipment, because it can rarely be set to apply such a low rate. Aerial application requires modifications of the aircraft and application equipment. A description of these relatively simple modifications and calibration methods can be obtained from bait product manufacturers.

In addition to their use as a broadcast treatment, baits can be used for individual mound treatment or spot treatment. Compared to other mound treatment products, baits cause less hazard to the environment and less mound relocation. Several bait products (hydramethylnon, sulfonamide) are available in stations to place where ants are foraging (indoors or outdoors).

## Individual Mound Treatments

In addition to baits, mound treatment insecticides are formulated as dusts, liquids, granules, and aerosols. Their effectiveness depends on proper application. Contact insecticides must contact ants to work and should be applied during times of the year when ants are close to the

mound surface. It also is important not to disturb the mound during treatment.

### **Mound Drenches**

Although a few are ready-to-use, most fire ant mound drenches are formulated as liquid concentrates that must be diluted in the amount of water specified on the label. Avoid skin contact with the concentrate. Mix the proper amount in a gallon container, such as a sprinkling can plainly marked "POISON." Do not use the container for any other purpose. Properly store or discard containers after use. Pour the solution on top of and around the undisturbed mound. Most mound drenches require several days to eliminate the colony, although those containing pyrethrins are effective almost immediately.

### **Granular Products**

To treat a single mound with a granular product, measure the recommended amount in a measuring cup and sprinkle it on top of and around the mound. Do not disturb the mound. If the label specifies to water in the insecticide, use a sprinkling can and water the mound gently to avoid disturbing the colony. Several days may pass before the entire colony is eliminated.

### **Dusts**

Some products, such as those containing acephate (Orthene®), are specially labeled for dusting individual fire ant mounds. Distribute the recommended amount of the powder evenly over the mound. Treated colonies are usually eliminated in several days.

### **Injectable Products**

Products containing pyrethrins, resmethrin, tetramethrin, or chlorpyrifos are manufactured in special aerosol containers to which an injection rod is attached. The rod is inserted into the

mound in a number of places, according to instructions on the product label, and the pesticide is injected for a specified time into each mound. Special equipment is required to apply PT® 270 Dursban® (chlorpyrifos) and Earthfire® (resmethrin).

### **Surface Applications and Barriers In and Around Structures**

Products used to treat ant trails and colonies located in wall voids are usually dusts or sprays, although some are insecticide-latex paint mixtures. Unless the colony itself is treated, these products only reduce the number of foraging worker ants. Surface treatments also are used to create barriers to protect items or areas from foraging worker ants.

### **Surface Applications Outdoors**

Granular insecticides are applied with fertilizer spreaders. These materials must be thoroughly watered into the soil after application. Liquid formulations are applied with a high-volume, hydraulic hose-end or boom sprayer. Contact insecticides are usually long-acting (2-3 months), suppress foraging ants quickly, and prevent small mounds from becoming established. Through repeated use, these treatments can eliminate colonies.

The user is always responsible for the effects of pesticide residues, as well as for problems that could arise from drift or movement of the pesticide to neighboring areas. **ALWAYS READ AND FOLLOW CAREFULLY THE INSTRUCTIONS ON THE PESTICIDE CONTAINER AND ANY OTHER INSTRUCTION MATERIALS THAT COME WITH THE PRODUCT.** Pesticides must be registered and labeled for use by the U.S. Environmental Protection Agency and the New Mexico Department of Agriculture. The status of pesticide labels and registrations is subject to change and may have changed since this publication was printed.

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**Table 1. Fire ant insecticides, modes of action, and formulations, with generic names of active ingredients and some examples of product names.**

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**Insect Growth Regulator** (fenoxycarb). This material imitates the effects of the ant's own hormones, reducing the production of viable eggs by the queens and preventing the development of worker ants for up to a year after application. Hormones of ants and other insects are in no way chemically similar to human hormones. Insect growth regulators do not kill adult ants. Treated ant colonies persist for at least several weeks after treatment, until worker ants present at the time of treatment die of old age. Fenoxycarb is formulated as a bait to be applied to individual mounds or broadcast. Examples: Award™, Logic®.

**Botanicals** (pyrethrins, rotenone, pine oil, turpentine). These plant-derived products are contact insecticides and have various modes of action. Pyrethrins, which act on the nerve cell, kill ants quickly (within minutes to hours) and can be used as mound treatments or surface sprays. Rotenone acts on the respiratory tissues, including nerves and muscles. Pyrethrins and rotenone products break down rapidly in the environment. Rotenone and pine oil (turpentine) products are relatively slow-acting (days to weeks) and are applied as mound drenches. Examples: Insecto® Formula 7, Organic Plus® Fire Ant Killer, and others.

**Derivatives of Pyrethrins** (allethrin, resmethrin, sumithrin, tetramethrin). Like pyrethrins, these products alter nerve cell membranes and kill ants quickly, but they are quickly deactivated and have little residual activity. They are contact insecticides applied as aerosol injections, mound drenches, or surface sprays. Examples: Enforcer® Fire Ant Killer.

**Pyrethroids** (bifenthrin, cyfluthrin, cypermethrin, fenvalerate, fluvalinate, lambda-cyhalothrin, permethrin, s-bioallethrin, s-fenvalerate, tefluthrin, tralomethrin). These products also alter nerve cell membranes. They can persist in the environment longer than pyrethrins and their derivatives. They are relatively quick-killing contact insecticides applied as mound drenches, dusts, or surface sprays and granules.

**Avermectins** (abamectin). This bait product is derived from a soil fungus and inhibits nerve transmission. As a mound treatment it kills worker ants and colonies quickly, but as a broadcast treatment it acts more like an insect growth regulator, preventing the production of viable eggs. Example: Ascend®.

**Carbamates** (bendiocarb, carbaryl). These materials disrupt nerve transmission. They are relatively quick-killing contact insecticides used as mound drenches and surface sprays. Examples: Sevin®, Turcam®.

**Organophosphates** (acephate, chlorpyrifos, diazinon, dichlorvos, fenthion, isofenphos, malathion, propetamphos, propoxur, trichlorfon). These products also interfere with nerve cell transmission. They are relatively quick-killing contact insecticides formulated as aerosols, liquids, dusts or granules and applied as mound treatments or surface applications. Examples: Dursban®, Oftanol®, Orthene®, and others.

**Miscellaneous Compounds.** Hydramethylnon (amidinohydrazone) and sulfonamide kill ants by preventing them from converting food into energy. These baits eliminate fire ant colonies within a week when applied to individual mounds, but take several weeks when broadcast. They also are formulated in bait stations. Examples: Amdro®, Combat®, MaxForce®, Raid® Max.

**Inorganic Compounds.** Boric acid is a slow-acting stomach poison. It is commonly formulated as a dust or liquid bait for control of ants. Diatomaceous earth (D.E.), and silicone dioxide products are usually applied as contact insecticides to ant trails indoors. D.E. abrades the waxy layer from the insect exoskeleton, causing the insect to dry out. However, D.E. does not eliminate colonies within treated mounds. When D.E. is used as a carrier in formulations of pyrethrins, it may enhance penetration of this botanical insecticide into insect bodies.



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