IMPORTED FIRE ANTS AND THEIR MANAGEMENT

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Two imported fire ants (IFA), the red imported fire ant (RIFA), *Solenopsis invicta*, and the black imported fire ant (BIFA), *S. richteri*, were introduced into the United States in the early 1900's and currently inhabit over 320 million acres in the southern United States and Puerto Rico. Red imported fire ants have continued to spread rapidly and now have become established in California and New Mexico. They cause many problems for humans, domestic animals, and agriculture. Between 30% and 60% of the people in the infested areas are stung each year. More than 1% of those people are hypersensitive which means over 200,000 persons per year may require a physician's aid for fire ant stings. Heavy losses in agricultural products such as hay, soybeans, and cattle have been well documented reaching into hundreds of millions of dollars. In addition, IFAs destroy many ground-inhabiting animals and reduce the number of different species in many areas.

Fire ants belong to the genus *Solenopsis*. There are 4 native species in the U.S. and 2 species were accidentally introduced from South America. The native species are *Solenopsis geminata* (tropical fire ant), *Solenopsis xyloni* (southern fire ant), and two desert species, *Solenopsis aurae* and *Solenopsis amblychila*.

A current RIFA/BIFA quarantine map is maintained by the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ) and can be found on their website at http://www.aphis.usda.gov/ppq/maps/fireant.pdf. Although, fire ant distribution is limited by cold temperatures and dry conditions, if water and protected habitat is available, fire ants can potentially infest a much larger area of the United States than is presently infested (Figure 1).

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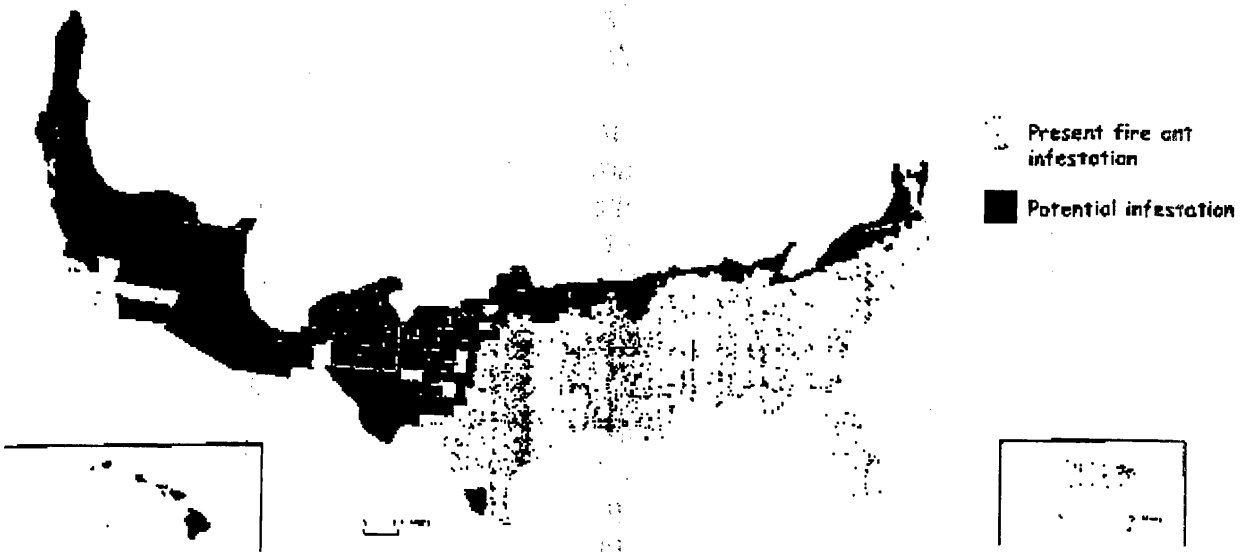

Figure 1. Present and potential imported fire ant infestation in the United States.

IFA are very aggressive, reddish brown to black ants approximately 1\8" to 1\4" long that live in large colonies. These colonies build conspicuous mounds, which can be 1 1\2 feet high and 3 feet in diameter, and contain 200,000 to 300,000 workers. They prefer sunny, open areas where the dome-shaped mounds can be easily recognized. When these mounds are disturbed, thousands of worker ants will pour out of the mound and attack any intruder. Their painful, burning sting is similar to a hot match being applied to the skin, hence the name, "fire ant".

A colony of IFA consists of a mated queen or queens, workers (different sizes), immature ants referred to as brood (eggs, larvae and pupae), and winged males and females (alates). In the spring and summer, generally following a rain, winged males and females fly from the nest and mate in flight. After mating, most of the newly mated queens will fly about 1 to 1 1\2 miles from their nest but can fly 12 miles or more if aided by the wind. Once they land, the females shed their wings, make a small burrow in the ground, seal themselves inside and begin to lay eggs. Once the first workers are produced, the queen only has the job of producing eggs. She is fed, groomed, and protected by the workers and her daily egg production increases dramatically (1000-2000 eggs/day). Workers can live 8 months or more during colder periods but generally live 2-6 months during the summer months. The queens can live 6 to 7 years.

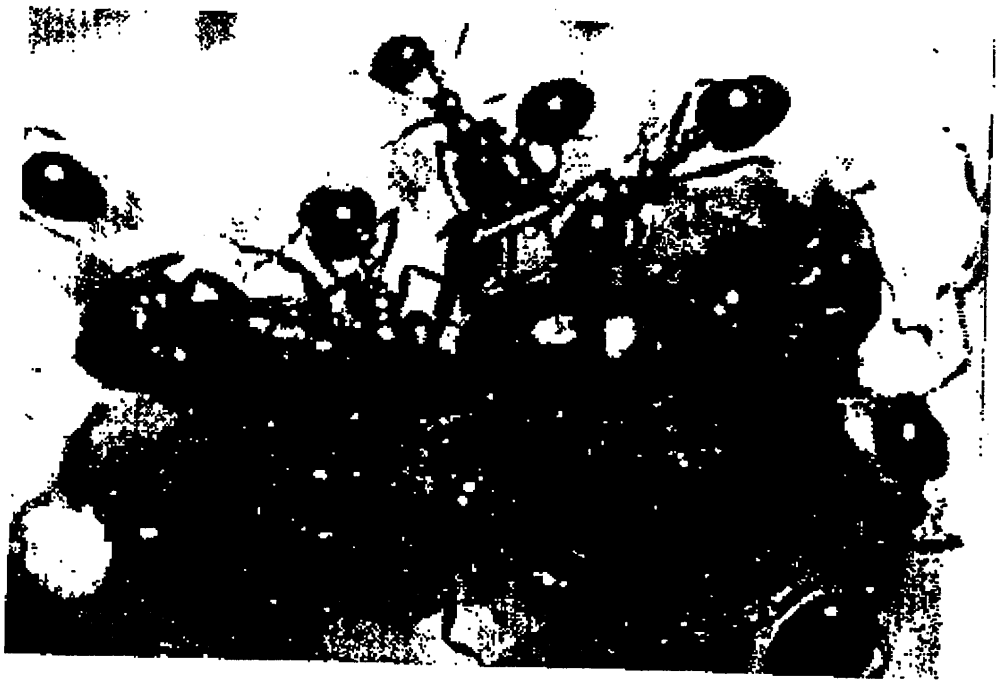

Figure 2: Imported fire ant queen surrounded by workers and immature stages (brood).

Being omnivorous, IFAs will feed on just about anything. Adult fire ants ingest only liquids, so solid foods are liquefied by feeding them to the 4th (last) larval stage in the colony. This is the only stage in the colony that can eat solid foods. Food for the colony is collected by workers foraging as far as 100 feet or more from the colony. Workers can forage both day and night and the food is taken back to the colony where it is fed to other members of the colony through a process called trophallaxis in which one ant will feed several other ants by regurgitation.

There are two types of fire ant colonies: 1) single-queen (monogyne) colonies and 2) multiple-queen (polygyne) colonies. Single-queen colonies contain only one egg-laying queen and do not tolerate another queen. These colonies are very territorial, defending the area around their colony. This allows for population levels of 40-150 mounds per acre. Multiple-queen colonies have many egg-laying queens (normally 20-60) with 100,000 to 500,000 workers, are not territorial and tolerate other colonies in close proximity so population levels of 200-800 mounds per acre are common.

Impact of Fire Ants

Imported fire ants cause many problems, but their most noticeable is on humans because of their sting. Although most encounters of humans with fire ants are not life threatening, serious injuries and even death have resulted from IFA stings in some cases. IFAs have also had a major impact on wildlife and agriculture. In areas where they occur, they are the dominant insect species because of their high reproductive capacity, aggressive foraging behavior, and lack of effective natural enemies. IFAs are also responsible for damage to such agricultural commodities as corn, citrus, soybeans, potatoes, okra, and eggplants. The economic impact of fire ants in Florida and the US is summarized in Table 1.

IFA has a great impact on other arthropods, ground nesting birds, reptiles, rodents, amphibians, and other organisms. They can be especially harmful to endangered species that are already under stress.

Table 1: Estimated annual economic impact of fire ants (millions of dollars in damages + expenditures).

Sector	Florida	USA
Agriculture	$138	$749
Other Businesses	$154	$1,375
Institutions /Governments	$29	$254
Households	$1,013	$3,375
Total	$1,334	$5,753

Impact of Fire Ants on Quail

Although in the past there has been some controversy on the effects of fire ants on quail populations, more recent information based on replicated experiments has shown that fire ants can affect quail and other bird populations in several ways. Direct effects on quail populations occur when fire ants attack and kill pipping young or other defenseless birds. Although this may be a very visible and dramatic effect on individual birds, the indirect effects may be of greater importance to quail populations. Such indirect effects of fire ants on quail populations include reduction of life span and weight gain, changes in foraging and other behaviors, reduction of available food, and changes in the community structure. All these effects may result in unfavorable conditions and a long-term decline in the quail populations. The end result will be an observed decrease in the quail population, which may not be easily associated with the presence of high fire ant populations. Some examples of research results on effects of fire ants on quail are presented in Table 2.

Table 2: Effects of fire ants and fire ant control measures on quail populations.

Factor	Effect on quail population	Reference
IFA Presence	6% mortality of pipping chicks	Johnson 1961
IFA Presence	12% mortality of pipping chicks	Dewberry 1962
IFA Infestation	57% decrease in abundance (birds/observer hour)	Allen et al. 1995
IFA attacks on chicks	56% decrease in survival rate	Giuliano et al. 1996
	19% loss in daily weight gain	
Amdro® Treatment	145% increase in quail density	Allen et al. 1995
	33% increase in whistle count	
Fire ant suppression	173 % increase in chick survival	Muller et al. 1999

Control of fire ants, especially on an areawide scale, can help improve conditions for the quail population, but in many cases may not be sufficient. That occurs when other environmental conditions besides the presence of fire ants have also been changed in a direction unfavorable to quail survival. In that case, other steps must be taken in order to restore favorable conditions for the birds. For instance, the presence of fire ants may have contributed to a decrease in the population of important diet component or nesting habitats of the quail population. The simple removal of fire ants may not be sufficient to guarantee survival of the quail population. It will also be necessary to follow that up with other measures to insure that these indirect effects of the fire ant presence are also corrected. Such measures may include several habitat restoration techniques discussed elsewhere in this publication. However, it is important to carefully consider any measures before they are implemented because recommended practices for increasing quail populations may also benefit fire ants. Thus, the beneficial effects on the quail population may be denied by a simultaneous increase in fire ant populations.

CHEMICAL CONTROL OF FIRE ANTS

Current Available Chemicals and Approximate Costs

There are many chemical products available for the control of IFAs. These can be found in hardware stores, lawn and garden centers, farmer cooperatives and chemical specialty stores. The prices vary greatly as do the results obtained by individual chemicals and methods of application (see Table 3), and depending on the location. This information, which is updated yearly, was obtained from the Alabama Cooperative Extension System and can be found on their website www.aces.edu/dept/fireants.

Types of Treatments

The two types of treatments most often used today to apply chemicals for IFA control are (1) Broadcast Applications and (2) Individual Mound Treatments.

Unlike baits, contact insecticides usually kill ants quickly. In many cases, they do not kill the queen, and the colony survives and reestablishes. However, if applied appropriately, a majority of the ants in a colony can be killed quickly by using contact insecticides. This reduces the potential danger from stings much faster than baits. To take advantage of the thoroughness of baits and the fast reductions by contact insecticides, a two-step method in which baits are applied first followed by a contact insecticide has been recommended for control of IFA in urban areas. This is because foraging workers that collect the baits need time to spread them throughout the colony before the fast kill contact insecticides are applied.

1) Broadcast Applications

Baits

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 contain slow acting toxicants dissolved in soybean oil, which is a food source for fire ants, absorbed into corn grits. The slow action of the toxicants allows the ants to feed the toxic oil to the 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 eventually dies. Broadcasting baits is one of the most effective methods of controlling fire ants, especially over large areas. It also is an efficient method of maintaining control for longer periods and is better for slowing migration of colonies into treated areas from untreated ones.

Guidelines for Effective Bait Applications:

i. **Use fresh bait.** Avoid baits that are old, left in unsealed bags, or stored at high temperatures.

ii. **Keep baits dry.** Apply baits when the grass and ground are dry or drying and rain is not expected, preferably for the next 24 hours.

iii. **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. Fire ants generally forage when the air temperature is between 70 and 90°F, day or night.

iv. **Follow the directions on the label.** It is against the law to apply baits in areas not listed on the label. Granular insecticides The chemical fipronil has recently shown excellent results in controlling IFA when applied as a granular and is now being used by this method. New chemicals being developed may also be applied by this method. Broadcasting equipment suitable for small areas (e.g. lawns and playgrounds) include hand-held seed spreaders and chest spreaders. The spreader should be set at the smallest opening, and the person should walk rapidly to apply approximately 1 ounce of bait per 2000 square feet. Electric spreaders are suitable for broadcasting baits and granules 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.

2) Individual Mound Treatments

This strategy attempts to eliminate colonies of fire ants by treating mounds individually. To eliminate a colony, the queen or queens must be killed. In the case of multiple-queen colonies, all the queens must be killed, thus, making individual mound treatments not a good choice for controlling multiple queen colonies. Also, individual mound treatments are time consuming and labor intensive because the mounds must be located and treated one at a time. An advantage of individual mound treatments is that the colonies may be eliminated faster than colonies treated with broadcast bait applications.

Methods used to treat mounds individually

Baits: Bait products used for broadcast bait applications can be also applied as individual mound treatments. Sprinkle the recommended amount of bait around the base of the mound (up to 3 feet away). Do not apply the bait on top of the mound, as the ants may not search for food there.

Drenches: Apply the drench to an undisturbed mound on cool, sunny mornings. 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.

Granules: Evenly scatter a measured amount (follow label directions) of granules over the surface and around a mound, without disturbing the mound. Gently sprinkle 1 to 2 gallons of water, with a sprinkler can, over the granules to avoid disturbing the colony and washing granules off the mound.

Dusts: Dusts are applied by evenly sprinkling a measured amount of dust (follow label directions) over the mound.

Aerosols: The insecticide should be injected as the probe is inserted into a 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.

3) Combining Broadcast Baiting and Individual Mound Treatments

This method 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. Wait 2 to 3 days after broadcasting the bait to allow fire ants to forage and distribute the bait before individually treating mounds. Treat mounds preferably with an insecticide formulated as a dust, drench, granular, aerosol, or fast-acting bait specifically labeled for fire ant control. Only treat 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, carbaryl, permethrin, deltamethrin, and others, 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.

5) Area Treatments

Recently, a granular formulation containing the active ingredient fipronil has given excellent results in field tests against fire ants. In several studies, is has been demonstrated that much larger areas of fire ants can be control for longer periods of time, more than a year, from a single application of this product. At the present time, this has not been seen with baits or other products.

6) Spot Eradication

Finally, there are some areas recently infested with fire ants that are isolated from the main infestation areas of the U.S. that could be candidates for spot eradication efforts. Fire ant suppression on large areas is currently feasible using only broadcast application of baits and/or granular insecticides. Bait and granular products applied over large areas can have detrimental effects on non-target organisms and most of these insecticide products lack registration for food crops. Therefore, selection of the area, the insecticide to be used, timing and number of applications, and the costs must be considered before attempting spot eradication. It must be emphasized that the area to be considered must be at least 5 miles from any know infestation, all lands must be treated, and multiple broadcast applications of one or more baits products for several years will be necessary in order to achieve 100 percent control. In addition, a firm commitment to monitor the treated area 2 to 4 times per year for several years before, during and after treatment will be necessary before it can be determined that the program was successful.

BIOLOGICAL CONTROL OF FIRE ANTS

IFA populations in the U.S. are more than 5 times larger than in their native South American homeland. Biological factors (predators, parasites, pathogens, competitors) are one of the major reasons for the differences in populations. So, the higher numbers of IFAs found in the United States may be a result of their escape from natural enemies in South America. Self-sustaining biological control agents could become a major factor in providing long term suppression of fire ant populations by causing direct mortality and/or becoming stress factors that reduce the dominance of fire ants. Self-sustaining biological control agents also could be useful in natural areas and other locations where pesticide usage is not tolerated. The combination of natural control agents and competition from native ants should result in a continued reduction in the overall fire ant populations. The integration of chemicals and biological control agents into an IFA control program offers a strategy in which the chemical treatments would be applied to rapidly reduce the population while the biocontrol agents would prevent, limit or slow reinfestation of IFAs into the treated area.

A number of natural control organisms have been described as having potential as biocontrol agents against IFAs; however, their effectiveness in controlling fire ant populations has not been very good. Direct applications of nematodes, mites, and fungi to fire ant mounds generally have caused colonies to move, instead of being eliminated. The potential of some parasites and pathogens are currently being studied and a few have shown excellent promise.

1) Pathogens and their Impact on Fire Ants

A) Protozoa

The microsporidium, *Thelohania solenopsae*, is a pathogen that was previously found only in South America, where it is the most common microbial enemy of native fire ants. It was discovered in the U.S. in 1996.

Studies have shown that *T. solenopsae*-infected fire ants colonies died faster than uninfected colonies. In studies in Texas, IFA nest sizes were smaller when infected with *T. solenopsae*. In Florida, reports indicated a reduction of 63% in infected IFA populations over a 2-year period. *T. solenopsae* infects all stages of fire ants and directly impacts fire ant colonies by weakening queens so they eventually do not produce new workers. *T. solenopsae* is very promising and a new tactic for the control of fire ants. This disease has the potential to: (1) be a long-term, environmentally compatible, fire ant control agent that is useful where fire ant controls are not available; (2) reduce the reliance on pesticides by slowing reinfestations; (3) protect and conserve ecosystem quality and diversity by reducing fire ant dominance and encouraging the establishment of native ants and other arthropods; (4) be utilized as a stress factor by increasing the susceptibility of IFA to other pathogens, natural enemies, and chemical pesticides; and (5) be used in an integrated pest management program where infected fire ants would be more susceptible to pesticides and, consequently, the amount of insecticide needed for control could be significantly reduced.

Vairimorpha invictae is another microsporidum that looks very promising against fire ants. In laboratory observations, fire ant colonies with infections of both *T. solenopsae* and *V. invictae* died faster than those with a single infection. Currently, *V. invictae* has only been found in South America, and it has not been released in the U.S.

A new protozoan pathogen in the genus *Mattesia* was recently discovered in Florida infecting the imported fire ant. This disease is named Yellow Head Disease (YHD) because the heads of infected ants become yellow-orange. The YHD is widely-distributed in Florida in both multiple-queen and single-queen fire ant colonies. This disease has also been discovered in ants collected in Mississippi. YHD-infected field colonies have a high death rate when moved to the laboratory. This rapid mortality of infected ants potentially indicates that this disease may have significant impact on fire ant populations, and may serve as a biological control for these pest ants.

B) Fungi

Fungi have been investigated by a number of researchers. Mortality as high as 90% was observed when IFA was exposed to the fungus *Beauveria bassiana*. Although investigations of a Brazilian strain of *B. bassiana* on fire ant colonies demonstrated that this fungus provided some control of the treated colonies, other scientists did not get acceptable levels of control with *B. bassiana* in a series of field trials and poor results were obtained in a trial conducted in Mississippi. Still, fungi offer a potential as a biopesticide for controlling IFA. Research is being conducted on 3 new fungal pathogens of fire ants that were recently discovered in Florida. The potential of these new pathogens to control fire ant populations is yet unknown.

C) Nematodes

The potential for nematodes in the genus *Steinernema* to control fire ants has been investigated by a number of researchers. Laboratory assays determined that larvae and pupae of fire ants are somewhat susceptible to *Steinernema carpocapsae* while adult workers were much less susceptible. Minimal control was achieved with this nematode in a series of field trials in Texas and Florida. In tests in Texas, a large number of fire ant colonies simply moved out of the nematode-treated mounds and this is a problem that represents a limitation in the use of nematodes for controlling IFA.

D) Bacteria

Several bacterial pathogens of other insects have been tested against imported fire ants but none gave significant control. Although bacteria have not shown much promise as biological control agents against IFA, little has been done in evaluating them against fire ants, and the few laboratory studies that were conducted involved only fire ant workers. The effects of bacterial pathogens on the immature stages of fire ants have been almost completely overlooked. Effects on immature stages may be very important because fire ant larvae lack the filtering mechanism that prevents adults from ingesting solid particles as small as bacteria. The discovery of bacterial pathogens for use against fire ants may hold considerable promise for future biological control of IFA.

E) Viruses

Information on the use of viruses as control agents against the imported fire ant and ants in general is almost nonexistent. Only recently have viruses been positively identified from fire ants by researchers from the USDA-ARS, CMAVE in Gainesville, Florida. Research in this area definitely has been neglected probably because of the

difficulty in discovering viruses for testing which is likely due to their extremely small size. Viruses may be an excellent agent for the biological control of imported fire ants, but little effort has been put forth in this area of research.

2) Parasites and their Impact on Fire Ants

A) Social Parasitic Ant

The parasitic ant *Solenopsis daguerrei* lacks workers and produces only queens and males. These parasitic queens enter fire ant colonies and attach themselves to the IFA colony queen inhibiting egg production by the fire ant queen and causing the IFA colony to collapse. The presence of *S. daguerrei* in fire ant colonies also has detrimental effects on colony growth, the number of winged males and females produced in the colony, and the number of host queens in IFA multiple-queen colonies. Recent studies have shown that this parasitic ant is extreme difficulty to rear in the laboratory and so far, it has not been successfully introduced into laboratory fire ant colonies.

B) Mites

Several mite species live on and are predaceous to plants and some animals. One of these, the straw itch mite, *Pyemotes tritici*, has been reported as a predator of imported fire ants. However, although these mites will attack IFAs, several studies have shown that this mite does not successful control IFA. Also, the straw itch mite can cause severe skin rashes (dermatitis) in humans; thus, there is a risk for individuals who handle these mites or persons exposed to the mites following applications.

C) Decapitating Flies

Flies in the genus *Pseudacteon* are one of the most promising group for biological control of fire ants because they: (1) are highly specific in their host preferences, (2) are broadly distributed across season, geography and, (3) affect fire ant behavior and probably populations. These parasitic flies attack individual workers, stop fire ant foraging, and shift the local competitive balance to native ant species. The larvae of these flies decapitate their hosts and then pupate in the ant's head capsule.

There are about 20 species of *Pseudacteon* flies found attacking fire ants in South America. So far, three of these species have been introduced in the US and their populations are spreading throughout the fire ant infested area. In South America, decapitating flies are common and active throughout most of the year, but different species are more active at different times of the day and attack different sizes of IFA workers. A single fly can stop the foraging of hundreds of workers. This reduction in foraging by fire ants should increase competition from other ants that would otherwise be excluded from food sources in fire ant territories.

The presence of decapitating flies in the field is easily determined by punching small depressions (~10 cm diameter) in fire ant mounds and inspecting them every few minutes for hovering flies. Often attacking flies can be detected several meters away because of greatly reduced ant activity.

INTEGRATED MANAGEMENT OF FIRE ANTS

Integrated Pest Management, as defined by the U.S. Code of Regulations [U.S.C.§ 136r1.], is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. For fire ant management, a sustainable approach is one in which the benefits of control exceed the costs of obtaining and maintaining a defined level of control. The level of control needed may vary depending on the hazard or risk of damage fire ants cause for a given site. Thus, the management programs within a large location may consist of different subprograms ranging from no ant management to very intensive programs depending on the needs or use pattern of the particular site. Specific control measures utilized and their effectiveness will also vary according to biological/behavioral characteristics of the pest (e.g., single or multiple-queen colonies), land use pattern (e.g., landscaping around an office building or highly used recreational field), potential for reinfestation (e.g., is the site with the control program adjacent to inaccessible property with high fire ant populations?), weather conditions (e.g., extreme drought or prolonged freezing can reduce populations), and resources available (e.g., budget, labor, time). Given these many variables, establishing and maintaining an effective control program is site specific and requires ongoing evaluation and periodic adjustments in management tactics. At this time, it is difficult to quantify in dollars the actual economic benefits of using integrated control versus insecticide treatment; however, there will be less impact on the environment because of reduced insecticide use.

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http://fireant.ifas.ufl.edu http://fireant.tamu.edu http://entweb.clemson.edu
http://www.aces.edu/dept/fireants http://www.uaex.edu http://www.lsu.edu/ants
http://www.aphis.usda.gov/ppq/maps/fireant.pdf

Table 3: List of chemicals for fire ant control and approximate cost to treat one acre from publication no. ANR-175-A, 2005 Fire Ant Control Materials for Alabama Homeowners, Alabama Cooperative Extension System, Kathy Flanders, *Extension Entomologist*, Associate Professor, Entomology and Plant Pathology, Auburn University.

Trade name (Common names are lowercased and highlighted.)	Approximate cost to treat one acre[1]	40 mounds
Baits that stop the production of new fire ants and act in 4 to 8 weeks (insect growth regulators)		
fenoxycarb		
Award Fire Ant Bait	$16	$10
(S)-methoprene		
Extinguish Professional Fire Ant Bait	$17	$22
Baits that contain a slow-acting insecticide and act in 2 to 4 weeks		
hydramethylnon		
Amdro Ant Block Home Perimeter Ant Bait	--	$36
Amdro Fire Ant Bait or Amdro Pro	$15	$18
Amdro Fire Ant Bait Yard Treatment	$123	--
spinosad		
Ferti-lome Come and Get It	$49	$21
Green Light Fire Ant Control with Conserve	$48	$19
Ortho Fire Ant Killer Bait Granules	$39	$15
Baits that contain a mixture of an insect growth regulator and a slow-acting insecticide and act in 2 to 4 weeks		
(S)-methoprene and hydramethylnon		
Extinguish Plus Fire Ant Bait	$17	$22
Baits that contain an insecticide and act within a few days		
indoxacarb		
Spectracide Fire Ant Killer plus Preventer Bait Once & Done	$87	$8
Granules that contain a slow-acting insecticide and act in 3 to 4 weeks		
fipronil		
GardenTech Over-N-Out	$181	--
Contact insecticides that act in 1 to 2 days		
Dusts (some may need to be watered in)		
acephate		

Trade name (Common names are lowercased and highlighted.)	Approximate cost to treat one acre[1]	40 mounds
Acephate 75 SP Agricultural and Fire Ant Insecticide	--	$3
Hi-Yield Acephate Systemic Turf, Tree, and Ornamental Spray	--	$5
Orthene 75% Turf Tree and Ornamental Spray	--	$5
Ortho Orthene Fire Ant Killer	--	$5
carbaryl		
Hi-Yield 10% Carbaryl Garden and Pet Dust	--	$6
cyfluthrin		
Bayer Advanced Lawn Fire Ant Killer	--	$3
deltamethrin		
Bengal UltraDust 2X Fire Ant Killer	--	$5
Bengal UltraDust Fire Ant Killer	--	$7
Eagles-7 Fire Ant Destroyer	--	$7
Eliminator Ant and Roach Killer Dust	--	$5
Eliminator Fire Ant Killer Dust	--	$15
Enforcer Fire Ant Killer	--	$10
Green Light Many Purpose Dust	--	$5
Terro Ant Dust	--	$8
Terro Fire Ant Killer	--	$9
permethrin		
Spectracide No-Odor Fire Ant Killer Ready-to-Use Dust	--	$4
pyrethrins and diatomaceous earth		
Organic One Commercial Insecticide	--	$22
Organic One Fire Ant Killer	--	$27
Liquid concentrates for use as drenches		
carbaryl		
GardenTech Sevin Bug Killer Concentrate	--	$32
cedar oil		
Natural Guard Lawn, Plant & Pet Insect Spray	--	$27
cypermethrin		
Demon WP	--	$239
Surrender Cyper WP	--	$234
d-limonene		
Citrex Fire Ant Killer	--	$150
permethrin		
ACE Soil and Turf Insect Control Concentrate	--	$121
Bonide Termite and Carpenter Ant Killer	--	$45
Do It Best Multipurpose Garden Insect Killer	--	$114
Eliminator Ant, Flea, Tick, and Mosquito Killer Concentrate	--	$68
Hi-Yield 38 Plus Turf, Tree, and Ornamental Insect	--	

Trade name (Common names are lowercased and highlighted.)	Approximate cost to treat one acre[1]	40 mounds
Control		$81
Hi-Yield Garden, Pet, and Livestock Insect Control	--	$33
Hi-Yield Indoor/Outdoor Broad Use Insecticide	--	$37
Hi-Yield Kill-A-Bug II	--	$117
K-Gro Multipurpose Garden Insect Killer Concentrate	--	$67
Martin's Vegetable Plus	--	$4
Spectracide Bug Stop Garden & Lawn Insect Control Concentrate	--	$118
Surrender Termite Killer II	--	$25
Termite Killer III	--	$94
spinosad		
Ferti-lome Borer, Bagworm, Leaf Miner, and Tent Caterpillar Spray	--	$85
Liquid concentrates for use as a hose end sprayer		
carbaryl		
GardenTech Sevin Bug Killer Ready to Spray	--	$29
Granules for mound treatment and/or broadcasting		
bifenthrin		
Ortho Fire Ant Killer Broadcast Granules	$154	$23
Orthro Max Fire Ant Killer	$160	$12
Scotts Turf Builder with Fire Ant Control	$174	--
carbaryl		
Eliminator Lawn Insect Killer Granules	--	$3
GardenTech Sevin Lawn Insect Granules	--	$3
Hi-Yield Lawn + Garden Insect Killer Granules	--	$10
Orthro BugBGon Lawn and Soil Insect Killer with Grub Control	--	$6
cyfluthrin		
Bayer Advanced Lawn PowerForce Fire Ant Killer Ready to Use Granules	--	$7
deltamethrin		
Basic Solutions by Ortho Fire Ant Killer Granules	$122	$7
Hi-Yield Imported Fire Ant Control Granules Containing Deltamethrin	--	$10
Hi-Yield Turf Ranger Insect Control Granules	--	$6
imidacloprid and beta-cyfluthrin		
Bayer Advanced Lawn Complete Insect Killer for Soil	--	$7

Trade name (Common names are lowercased and highlighted.)	Approximate cost to treat one acre[1]	40 mounds
& Turf		
lambda-cyhalothrin		
Spectracide Fire Ant Killer Granules Mound Destroyer	--	$10
Spectracide Fire Ant Killer Granules[2]	$123	$13
Spectracide Fire Ant Killer Mound and Broadcast Granules	$99	$10
Spectracide Triazicide Soil and Turf Insect Killer Granules	--	$8[2]
permethrin		
Bonide Ant Killer Granules	--	$54
Eliminator Fire Ant Killer Plus! Granules	--	$11
Enforcer Fire Ant Killer Granules II	--	$20
Grant's Ant and Spider Killer Granules	--	$60
Hi-Yield Kill-A-Bug II Lawn Granules	--	$9
K-Gro Fire Ant Killer Granules	--	$10
Real-Kill Multipurpose Lawn and Garden Insect Killer Granules	--	$6
Spectracide Bug Stop Insect Control Granules	--	$9
Terro Outdoor Ant Killer Plus Multi-Purpose Insect Control	--	$26
Vigoro G Lawn Insect Control Granules	--	$12

-- Product is not labeled to control fire ants in this way.

[1] One acre is 43,560 square feet. To determine the square footage of a yard, multiply the length in feet by the width in feet.

[2] This price applies to the 10- to 20-pound bags. If the 1-pound shaker can is use, it would cost $50 to treat 40 mounds.