



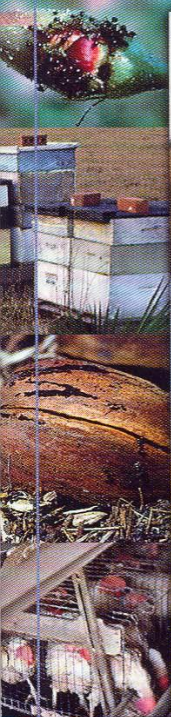
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Managing Red Imported Fire Ants in Agriculture



A Regional Publication Developed for:
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Texas Imported Fire Ant Research & Management Plan

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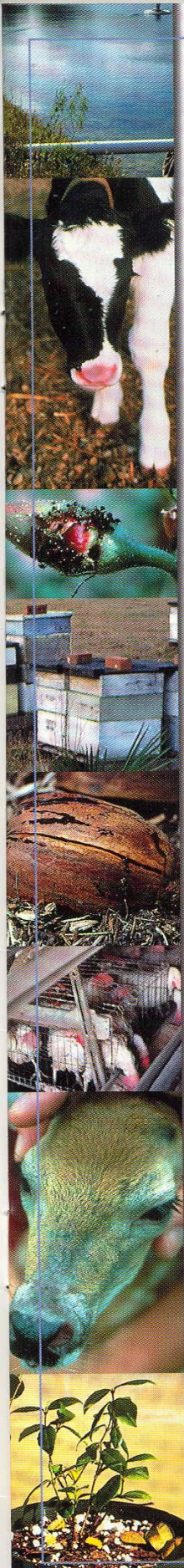


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Managing Red Imported Fire Ants in Agriculture

The red imported fire ant, *Solenopsis invicta* Buren, is an introduced species that arrived in Mobile, Alabama from South America during the 1920s. This ant species has had an enormous effect on the southeastern United States, and continues to spread into areas of North America with mild climates and adequate moisture and food. Approximately 270 million acres in the southeastern United States are currently infested. (See national map of fire ant infested and quarantined counties.) A second exotic species, the black imported fire ant, *Solenopsis richteri* Forel, and hybrids between *S. invicta* and *S. richteri* occur in northern Alabama, and portions of Georgia, Mississippi and Tennessee, but not farther west.

Fire ants cause many problems in agriculture. They form tall, hardened mounds in clay soils, which can damage equipment and slow down operations. Ant stings can cause medical problems for field workers. The ants have an affinity for electrical units and utility housings and structures, where they can cause equipment failures. Worker ants feed on some seeds and seedlings (sorghum, corn, small grains, forages, etc.) and can cause stand failure. Fire ant mounds can rapidly increase in number after agricultural lands are disturbed by mechanical operations or pesticide use.

Fire ants prey on a number of other insects and arthropods, including boll weevils, many species of caterpillars, flea larvae, ticks and chiggers, as well as beneficial insects such as green lacewing larvae. They will also "tend" some species of sucking insects (aphids, mealybugs) to obtain the sugary solution (honeydew) these insects excrete. The red imported fire ant has displaced many native ant species and reduced food used by some wildlife. Fire ants are a threat to newborn livestock and wildlife, especially animals on the ground or those nesting in low trees. Their multiple stings can cause serious injury or even death. Although the research is not conclusive, populations of some wildlife species may be dramatically reduced.

Fire Ant Biology

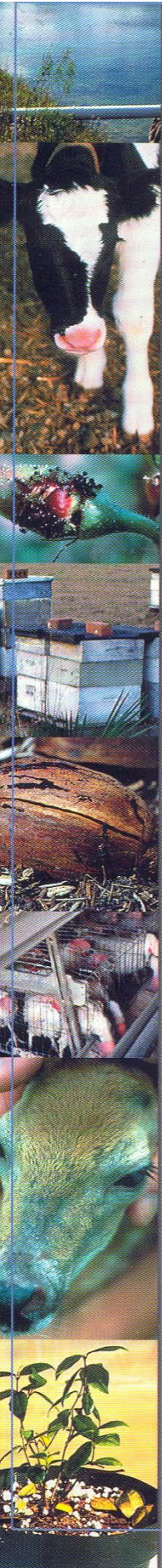
Like other ants, the fire ant is a social insect. Colonies live in mounds of dirt that may be more than 18 inches high. Mounds are often found in



open, sunny areas. Periodically, winged reproductive male and female ants leave colonies on mating flights. Mated females (queens) can fly or be carried by winds for miles. When they land they start new colonies. Ants develop from egg to adult in about 30 days, going through four larval stages and a pupal stage. There may be hundreds of thousands of worker ants (sterile female ants capable of stinging) in a mature colony.

There are both single queen (monogyne) and multiple queen (polygyne) colonies. The single queen form may build 40 to 80 colonies per acre, while the multiple queen form can build 200 to 800 or more mounds per acre. Worker ants from multiple queen colonies are not territorial and move freely from mound to mound. The opposite is true of workers from single queen colonies.

Fire ants disperse naturally through mating flights and mass movement of colonies. When land is flooded, colonies form a mass of floating bodies and float to new locations in flood water. Fire ants



can travel long distances when newly mated queens land on cars, trucks or trains. Shipments of hay, nursery stock or soil from an infested area may relocate entire colonies or nests.

USDA Quarantine Program

Because fire ants are easily transported in nursery stock and soil, the United States Department of Agriculture (USDA) developed a quarantine program in the 1950s. This quarantine is designed to slow the spread of imported fire ants by requiring proper inspection and treatment of all nursery stock, turfgrass, hay and other articles shipped out of quarantined counties. Contact your state's Department of Agriculture for specific information about complying with quarantine regulations.



Integrated Pest Management (IPM)

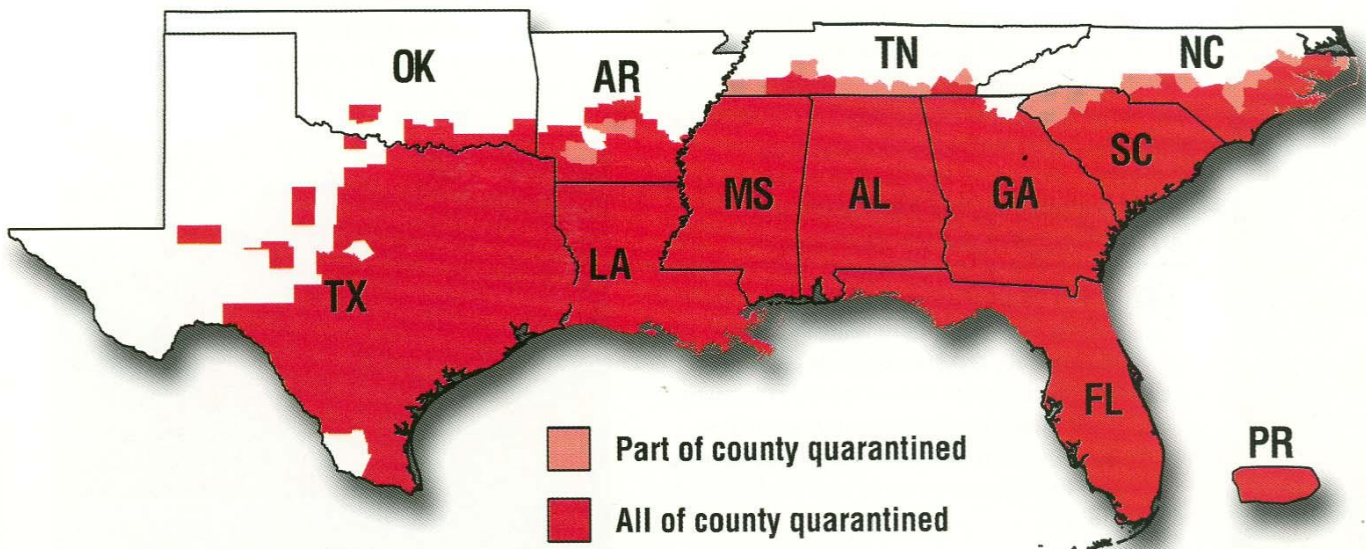
This bulletin describes site-specific, goal-oriented management programs for dealing with fire ants in agricultural areas. Where applicable, you should select programs that use a combination of non-chemical and chemical methods that are effective, economical and least harmful to the environment. The goal of fire ant management is to prevent or reduce problems caused by unacceptably high numbers of fire ants.



Every effort should be made to target control only at the red imported fire ant. Preserving and encouraging native ant species that compete with fire ants for food and resources is thought to be the best long-term solution.

Integrated Pest Management (IPM) is a concept used in many areas of agriculture to help producers determine whether the cost of pest control can be offset by production gains, before treatments are applied. The first step in any IPM program is to find out what losses are occurring and how much those losses actually cost. It is up to the individual to decide what "counts" as a fire ant-related loss and to put a value on that loss. If there is some question, it is often a good idea to make two assessments—one for definite losses and one for losses that might be attributable to fire ants. Then you have a range of costs within which treatment expenditures can be justified.

In theory, management efforts should begin only when the monetary loss caused by red imported fire ants equals or exceeds the cost of controlling them. This is the Economic Injury Level (EIL). The Economic Threshold (ET) is the level at or below the EIL at which action is justified to prevent economic losses. Losses caused by imported fire ants, however, are erratic and unpredictable, and are best estimated from experience on a given property.



Cattle Production Systems, Pastures and Rangeland

Determining Losses

In a recent survey, ranchers said that fire ant problems are widespread and costly, but vary tremendously from ranch to ranch, even within the same locality. As a result, no one management plan can be used in all situations. *Losses must be determined for each individual operation and treatment plans tailored to minimize those losses at an acceptable cost.*

Ranchers can make two common mistakes when estimating fire ant losses and deciding on treatments. First, they may not include every loss caused by fire ants that takes money out of their pockets. Dead and injured calves and infested hay bales are obvious losses. However, a shorted-out air conditioner or the cost of treating mounds around the children's swing set also should be included, even though they are not directly related to the business part of the ranch. Survey results show, in fact, that electrical damage and pesticide expenditures are the two most common types of losses.

The second mistake involves treatment options. Fire ant "eradication" is not technically or economically feasible. Still, when many ranchers think of fire ant treatments they think of treating large expanses of land to try to kill all ants. At a minimum of about \$15 per acre per year, treating large areas is not usually economical, although some methods can cut large-area treatment costs by up to half. What many ranchers fail to realize is that most fire ant problems occur on fairly small areas that can be treated rather easily and at a modest cost.

Worksheets 1 and 2 (pp. 17-18) can help you categorize and tabulate losses. The first is for cattle production, the second for hay production. Once you have an accurate estimate of losses you can choose which treatment options are best for you.

Some points to remember when estimating losses:

- 1 Be honest with yourself. Try to avoid overestimating the value of lost animals and the costs of materials, repairs, etc. Make an honest assessment at the time of a loss. For instance, if hay cutter blades wear out twice as fast because of fire ants, don't hold ants accountable for the entire cost of new blades, just half the cost.

- 2 Calculate your losses on an annual basis. Most current treatments control fire ants for a year or fraction of a year before they must be repeated. For instance, if fire ants cause a well pump to short out about every other year, include only half the cost in the analysis. If you lose an infested hay bale or two every time you cut hay, multiply the profit you would have made on those bales (remember it often varies) by the number of cuttings per year.

- 3 Don't sell yourself short. Time is a big, hidden cost of fire ants. Ranchers often spend many hours dealing with fire ant problems but value their time at \$10, \$5 or less per hour. Even if you don't actually pay yourself, that time could be spent doing something else. Put a value on it. If it takes you all morning to load up a broken shredder and haul it into town for repairs, plus another morning to retrieve it, the cost was not only what the shop charged. You, or your hired help, lost two mornings of otherwise productive work.

- 4 In analyzing cattle deaths and injuries, be sure to lay the blame correctly. A calf blinded by fire ants is fairly unmistakable, but the reason for a calf's death may not be apparent, even if the carcass is covered with ants. Ants will soon find a carcass whatever the cause of death. On the other hand, if an otherwise healthy calf was exhausted from a difficult delivery, couldn't get up for a few extra minutes, and was overwhelmed by ants, then blame the death on the ants. Only the producer can make this kind of judgment call.



- 5 Value lost/injured animals accurately. If you paid for a pregnant heifer and ants killed the calf, don't just include the added purchase price of that calf. Include what that calf would have brought at sale time, minus production expenses. Also, don't forget any re-breeding costs for the mother or any other value she may have lost or gained as a result of not having a calf around.
- 6 Be careful estimating one-time losses and expenditures. For example, a bull rendered sterile by ant stings is certainly a major loss, but it's a rare incident. As another example, many hay producers have switched from sickle-bar to disc-type cutters because of ant mounds. This is a very large expense, but it must be spread out over the life of the cutter and any other benefits or losses the cutter brings must be considered also.
- 7 Be thorough. Include any unique losses or ones on which you put a particularly high value.
- 8 This analysis is only as good as the time and information you put into it!

Management Strategies

Nonchemical: Nonchemical or cultural control methods can reduce losses while maintaining a stable ant population that will help suppress other pests (lone star ticks, filth breeding flies, etc.) and deter the multiple queen form. Nonchemical methods include:

- 1 Scheduling cow fertility programs to ensure that calving occurs during cooler weather when fire ants are less active (soil temperature below 65 degrees F).
- 2 Shallow disking of pastures and rangeland or dragging heavy objects such as railroad ties across pastures, particularly after rotating livestock. This temporarily flattens tall, hardened mounds, although it seldom eliminates fire ants. Dragging a pasture during freezing weather may reduce populations by exposing the ants. Dragging also scatters manure that harbors fly larvae upon which fire ants feed.
- 3 Using disc-type (Kountz) cutters designed to withstand the impact of fire ant mounds to reduce equipment damage.
- 4 Using mechanized balers and bale movers to reduce human contact with infested bales. Tightly-bound bales may be more difficult for fire ant colonies to infest than loose bales.
- 5 Removing hay bales from the field immediately to prevent ants from infesting them, particularly when rain is expected.



- 6 Storing bales off the ground or in an area treated for ants. (Note: The quarantine prohibits the shipment of hay from infested to uninfested counties without certificates. Call your Department of Agriculture or Plant Board to certify that hay shipments are ant-free).

Chemical: Chemical treatment can suppress fire ants in pastureland for \$10 to \$15 per acre per year. Chemical treatments do not eradicate fire ants, and the treatments need to be repeated periodically. Some bait-formulated insecticides also affect native ant species that compete with fire ants. However, in areas with 20 or more mounds per acre, using baits as part of the **Two-Step Method** method may be justified. In the Two-Step Method, a fire ant bait is broadcast once or twice a year. These treatments can kill up to 90 percent of the colonies within several weeks to several months. Hydramethylnon bait (Amdro®) takes 3 to 6 weeks and the effects last for months or until ants re-infest the treated area. Insect growth regulator baits containing fenoxycarb (Logic®, currently registered for horse pastures only; Award®, registered for turfgrass areas) or s-methoprene (Extinguish™ registered for pastures) require 2 to 6 months but suppress ants for more than a year. The second step in the Two-Step Method is to treat individual mounds that are a particular nuisance. Products containing carbaryl or Sevin® are registered as fire ant mound drenches for pastures. Once the broadcast bait treatment has taken effect few individual mounds should need to be treated. Always read and follow the instructions on the product's label.

Biological: There is great hope that in the future fire ant populations will be suppressed through the release of natural enemies from their native habitats in South America. One parasite being investigated is a phorid fly that develops inside the heads of ants. In theory, adult phorid flies looking for worker fire ant hosts suppress ant foraging and allow native ant species to compete more successfully with fire ants.

Poultry Houses, Livestock Barns and Feedlots

Imported fire ants on poultry farms can attack chickens and forage on broken eggs. Fire ant stings cause blemishes that can reduce the quality of poultry. Similar problems occur in animal feeding stations, barns and feedlots.

Treatment options:

Program 1: Poultry houses and egg farms (use a combination of the following suggestions)

- 1 Remove food sources (trash, piled feed, broken eggs and dead chickens) and potential nesting sites (pieces of lumber, old equipment and manure piles).
- 2 Mow or use herbicides to remove weeds and grass from around poultry houses.
- 3 Treat indoor surfaces with a registered product if ants are nesting inside poultry houses. Note: Although some products such as permethrin (Y-Text® GardStar®) are registered specifically for control of fire ants in poultry houses, other products such as cyfluthrin (Countdown™), dichlorvos (Vapona® Concentrate Insecticide), and lambda-cyhalothrin (Grenade™ ER Premise Insecticide) are more generally registered for “crawling pests”—including ants. Read the poultry sections of labels for precautions. Do not allow insecticides to come into contact with feed or water supplies.
- 4 If fire ants are foraging inside the poultry house from ant mounds located outdoors, spray a barrier around the outside of the building with products registered for that site (e.g., lambda-cyhalothrin).



- 5 On grounds surrounding the buildings, use the Two-Step Method (see p. 7). Conventionally formulated bait products such as abamectin (Clinch®), fenoxycarb (Logic®), hydramethylnon (Amdro®), pyriproxyfen (Distance®) or s-methoprene (Extinguish®) can be broadcast outside the poultry house, but not where chickens might come into contact with bait.

Program 2: Broiler houses and turkey operations

Program 1 for egg farms can be adapted to broiler houses and turkey operations if the products used are registered for this site, but be sure to treat only the outsides of houses so birds will not come into contact with insecticides. (see Step 5 above).

Program 3: Livestock barns and feedlots.

- 1 The programs for poultry houses can be adapted to treat fire ants in livestock barns and holding pens if the products used are labeled for treating animal premises.
- 2 Around barns and other structures, use the Two-Step Method (see p. 7) if the treated areas are inaccessible to animals. Always use registered products. Conventionally formulated baits such as abamectin (Clinch™), fenoxycarb (Logic®), hydramethylnon (Amdro®) or pyriproxyfen (Distance®) can be applied outside livestock pens according to directions. S-methoprene (Extinguish™) bait can be used in pens with no withdrawal or grazing restrictions.



Field Crops and Commercial Vegetables



Red imported fire ants are considered beneficial insects in cotton and sugarcane production, and control is not recommended. In cotton fields, fire ants are effective predators of



boll weevils. Fire ants can be sampled using the beat bucket method, whereby the terminals of cotton plants are beaten into a plastic bucket to dislodge insects. Insecticides usually are not needed for boll weevil control when an average of four or more fire ants is collected per ten terminal samples in mid- to late-season cotton. In Louisiana sugarcane fields fire ants prey on sugarcane borers, *Diatrea saccharalis* (Fabricius). There, controlling fire ants increases the damage caused by the borers and the amount of pesticide that is needed.

Fire ants occasionally feed on germinating seeds and seedlings of corn, sorghum, peanut, soybean, watermelon, cucumber, sunflower and other field or cover crops, particularly in the spring when the weather is dry. They sometimes cause stand loss. Okra growers are constantly battling fire ants



because they are attracted to the oils in the plant. Where soybeans are planted flat rather than on raised beds or rows, tall fire ant mounds along the rows interfere

with harvesting equipment. During dry periods, the fire ants sometimes chew irrigation tubing, as in vegetable crops.

Treatment options:

- 1 S-methoprene bait (Extinguish™) is now registered for treating red imported fire ants in cropland. However, the bait is slow-acting and must be broadcast several months before maximum suppression is required. The most effective timing of application(s) and the economic benefits from control are still to be determined. Use where estimated losses exceed the cost of application, and monitor closely for secondary pest outbreaks in treated fields.

- 2 To prevent damage to corn and sorghum seedlings, treat the seed with a product registered for soil insect control, or band an insecticide such as Lorsban® 15G (chlorpyrifos) over open furrows at planting where there is a history of stand loss. Gaucho® 480 Flowable (imidacloprid) is registered as a seed treatment for sorghum. Field crop seeds treated with lindane to protect against damage from other insect pests also have been somewhat protected against fire ants.



- 3 Few contact insecticides are registered specifically for fire ant control in watermelon, sunflower and other crops, although some products containing pyrethrins (Pyrenone® Crop Spray and others) are generally labeled for ant control in these sites. Insecticides registered for other pests on these crops (and known to be toxic to fire ants) are occasionally used to temporarily suppress foraging ants when damage is observed and the crop is threatened.

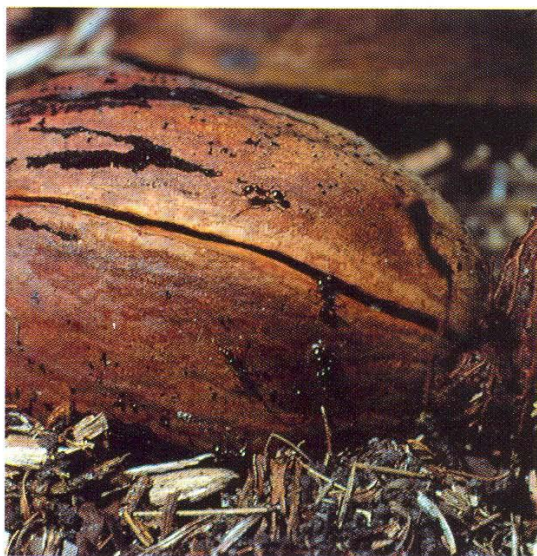


Fruit and Nut Orchards, Vineyards and Blueberry Plantings

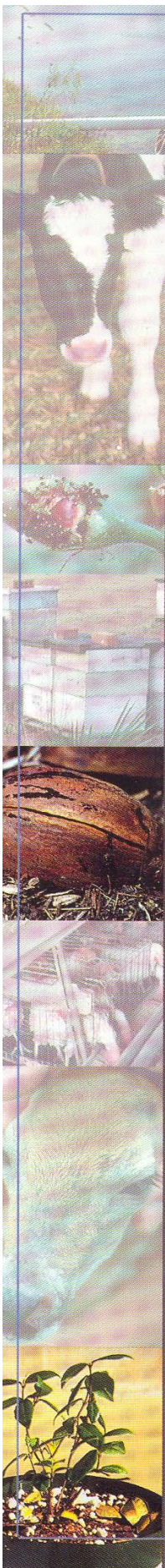
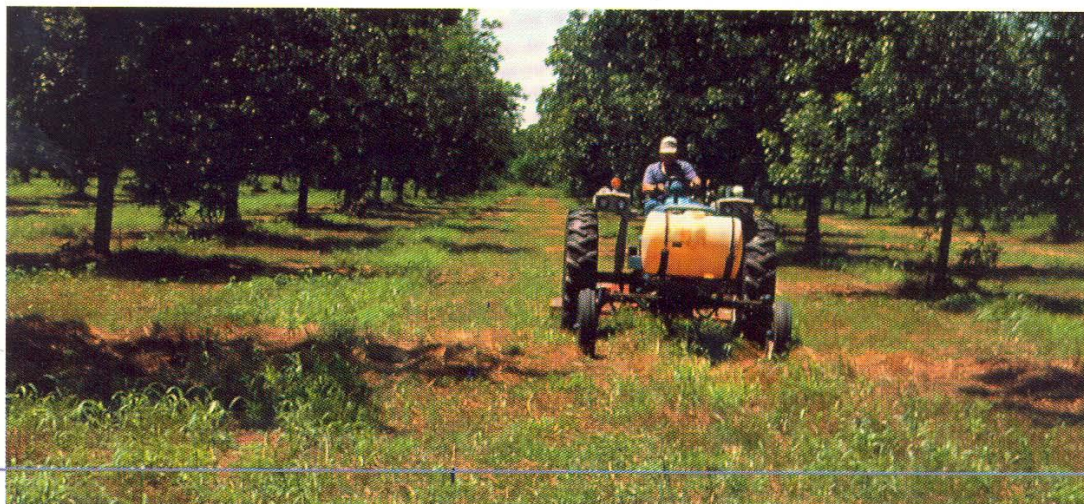
Although fire ants are mostly a nuisance to field workers in these crops, their overall economic and ecological impact is unknown. In pecan orchards, fire ants prey on pests such as pecan weevils and hickory shuckworms; however, they can encourage aphids by preying on their natural enemies. The ants' nest building aerates the soil of the orchard floor, which is beneficial, but they will feed on the meat of cracked pecans and can damage irrigation systems. Ant mounds may interfere with some types of harvesting operations. Chemical control is warranted only if the cost of control is less than the potential economic loss ants may cause. In pick-your-own operations, customer safety also should be considered.

Treatment options:

- 1** S-methoprene bait (Extinguish™) is registered for use in cropland and abamectin (Clinch®) is registered for use in bearing citrus groves. Fenoxycarb (Logic®) and pyriproxyfen (Distance®) are registered for use in young, nonbearing fruit and nut tree orchards. Optimum timing of application(s) is yet to be determined. Where used, monitor closely for secondary pest outbreaks.
- 2** In pecan and citrus orchards, chlorpyrifos products (Lorsban® 4E, 50WP and 15G) used to treat the orchard floor will temporarily suppress foraging ants. Spot applications around irrigation systems may help protect equipment from ant damage.



- 3** Few contact insecticide products are registered specifically for fire ant control in bearing peach orchards, vineyards and blueberry plantings, although some products containing pyrethrins (Fairfield American Pyrenone® Crop Spray and others) are generally labeled for ant control in these sites. Turf areas around orchards, vineyards and blueberry plantings can be treated with registered products.



Nursery Crops and Sod Farms

A copy of the entire "Imported Fire Ant Program Manual," which describes treatment programs for complying with the United States Department of Agriculture imported fire ant quarantine regulations, may be obtained from the Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Domestic and Emergency Operations (4700 River Road Unit 134, Riverdale, Maryland 20737-1236).

Federal quarantine regulations mandate specific fire ant treatment(s) for plants to be shipped to areas free of fire ants, but each infested state may have additional regulations and agencies that enforce them. In Texas and Louisiana, for instance, laws mandate that plants must be apparently pest-free but do not mandate formal treatment programs. In addition to the products mentioned below, products containing abamectin (PT® 370 Ascend™), acephate (Orthene®), carbaryl (Sevin®), diazinon, pyriproxyfen (Distance®) and s-methoprene (Extinguish™) are registered for treating fire ants in turfgrass areas, around ornamental plants or in potting media. However, these are not approved quarantine treatments at this time. The following treatment suggestions are approved for commercially produced ornamental plants to be shipped out of a quarantined area (modified from "Imported Fire Ants: A guide for Nursery Operators," Program Aid No. 1420, USDA, APHIS, December 1988). In all cases the producer must obtain a Compliance Agreement from the state regulatory agency (e.g., Texas or Louisiana Department of Agriculture, Arkansas State Plant Board, Alabama Department of Agriculture and Industries, Georgia Department of Agriculture). Greenhouse-grown plants may be exempt from quarantine treatment regulations if an inspector determines that the facility is tightly closed, but the grower still must have a Compliance Agreement.



Treatment options

(For compliance with the USDA Fire Ant Quarantine):

Program 1: Fire ant-free nursery program for containerized nursery stock.

- 1 Treat all exposed soil surfaces (including sod and mulched areas) on property where plants are grown, potted, stored, handled, loaded, unloaded or sold. Use a broadcast bait such as hydramethylnon (Amdro®) or fenoxycarb (Award®) at least once every 6 months, with the first application as early in spring as possible.
- 2 After broadcast treatments, treat individual mounds to eliminate remaining colonies.
- 3 Inspect the area for new mounds twice a month and treat any that appear.
- 4 Treat all potting media with bifenthrin (Talstar® T&O Granular Insecticide or Talstar® Flowable) or tefluthrin (Fireban® Granular Ornamental Insecticide).
- 5 Federal or state inspections of nurseries participating in this program will be conducted at least twice a year.
- 6 (Optional). Immerse stock in chlorpyrifos solution (Dursban® 4E) or apply chlorpyrifos or bifenthrin (Talstar® Flowable) to the containers to the point of saturation (one time only).

Program 2: Balled and burlapped stock.

- 1 Immerse stock in chlorpyrifos (Dursban® 4E) or drench stock twice daily for 3 consecutive days.

Program 3: Field-grown woody ornamentals, preharvest.

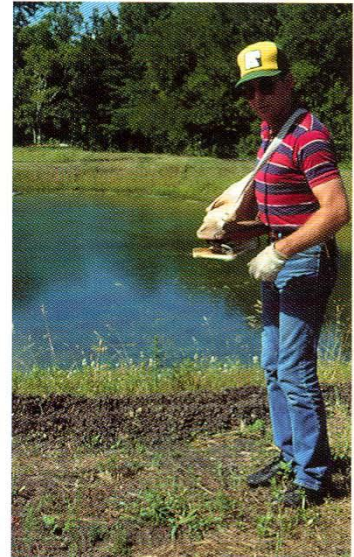
- 1 Broadcast bait (Award®, Amdro®). These treatments must be used in combination with granular chlorpyrifos (Dursban®) treatments. Consult with your local regulatory agency to see if additional treatment options apply.
- 2 See Program 2.

Note: Nursery stock or plants must be shipped within a specific period of time following treatment, depending on the treatment applied.

Fish Farms and Production Aquaculture

Bodies of water such as rivers, streams, ponds and lakes are highly attractive to fire ants. Fire ant mounds around ponds and on dams and levees of fish farms can be a nuisance and pose a threat to workers. When using insecticides in these areas, *every effort* must be made to avoid contaminating water sources. Fire ant baits contain very small amounts of active ingredients and can be applied on shorelines close to water, but not directly in the water. To minimize the risk of runoff apply baits when ants are

actively foraging so that ants collect the bait particles quickly. If individual mounds are treated use products with lower toxicity to fish, such as acephate (Orthene® TT&O). Pyrethrins and rotenone products are highly toxic to fish and should not be used. Do not apply any form of insecticide if rain is likely to occur soon after treatment. Nonchemical mound treatments with steam or very hot water may be suitable for sensitive areas.



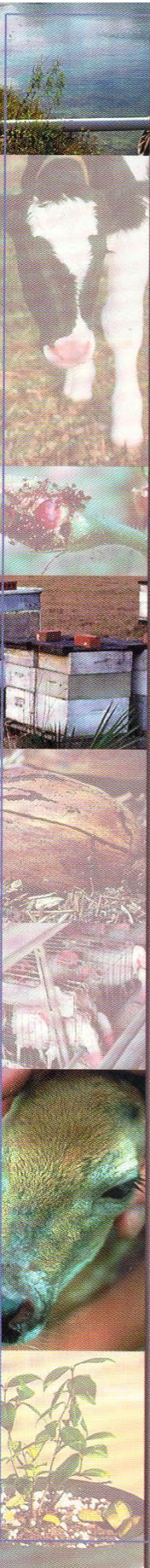
Apiaries

Fire ants invade bee hives and feed on developing bee larvae, occasionally destroying weak colonies. Use chemicals with care because the bees will be affected by insecticides.

Treatment options:

- 1** Treat areas around hives using the Two-Step Method (see p. 7). Use products registered for the site in which hives are located. Conventional bait formulations (e.g., those containing hydramethylnon, fenoxycarb, pyriproxyfen or s-methoprene) are the safest to use near bee hives; dust formulations should be avoided.
- 2** Elevate the hives several inches on bricks or stones.
- 3** (Optional). The outer surfaces of the stands that elevate hives can be carefully treated with a non-volatile, long-residual contact insecticide.

Specialty paint-on or paint additive formulations containing diazinon or chlorpyrifos (e.g., Insecta® Clear Finish, Killmaster® II) produce a chemical barrier on surfaces. A registered contact insecticide also can be applied to the ground around the hives. Apply insecticides late in the evening or early in the morning when bees are not active to prevent bees from contacting treated surfaces. Read product labels and use insecticides and formulations least toxic to bees.



Wildlife Breeding Areas

Certain forms of wildlife are especially affected by ants during and soon after birth or hatching. The risk is greatest during warm months. Fawns are vulnerable because they are born in June and because they instinctively remain motionless in their hiding places. Quail and ground-nesting waterfowl chicks are also attacked by fire ants. However, the effect of fire ants on wildlife populations over a large area has not been well documented. Fire ant control programs in wildlife areas are discouraged unless the benefits are clear and can be demonstrated. Many pesticides are toxic to wildlife (particularly to aquatic organisms) and may cause harm if not used properly.

Treatment options:

- 1 Wildlife breeding areas are considered nonagricultural lands, and thus can be treated with products registered for this kind of site using the Two-Step Method (see p. 7).



- 2 Exotic game ranches and lands considered commercial agricultural areas can be treated in the same way as livestock grazing areas or pastures (see pp. 6-7).

Maintaining Native Ant Populations

The states infested with red imported fire ants have many native ant species, including several species of fire ants. Native ants often compete for resources with the red imported fire ant, attack mated fire ant queens trying to establish new colonies, and invade weakened fire ant colonies. Preserving and encouraging native ant species is considered the best defense against imported fire ants. If an area has fewer than 20 imported fire ant mounds per acre, insecticide bait products should not be broadcast because the fire ant problem is not severe enough to justify the destruction of other ant species.

ACKNOWLEDGMENTS

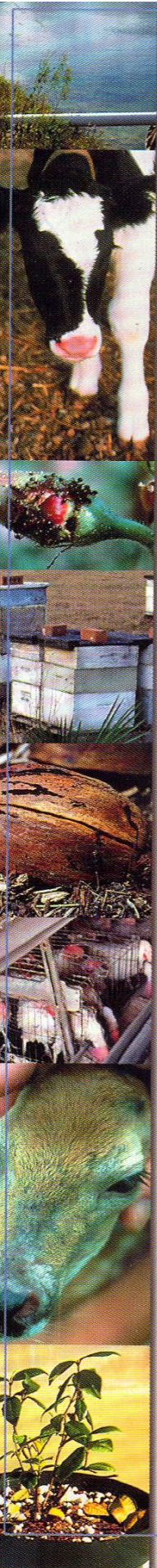
The authors are grateful to the thorough review comments from our colleagues, Dr. Jerry Cook, Dr. David H. Oi and Homer Collins.

For additional information about imported fire ant management contact your county Extension agent or visit these World Wide Web sites: www.fireant.tamu.edu
www.uaex.edu/natural/fireant/firehome.htm

The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the participating states' Cooperative Extension Services is implied.

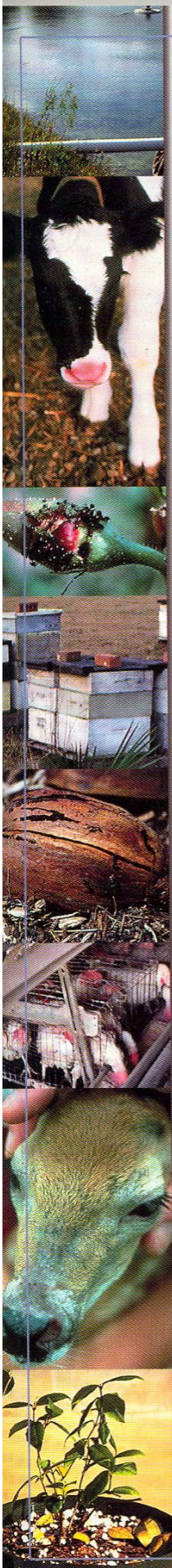
Table 1. Insecticides registered for control of red imported fire ants in agricultural lands.

Ingredient	Trade name*	Use rate	Registered site(s)
abamectin	PT370 Ascend	1 lb./acre or 5 to 7 Tbsps./mound	Turf, lawns, noncrop areas; indoor crevices or voids; utilities
	Clinch	(same as above)	Citrus groves, barns, poultry houses
acephate	Orthene Turf, Tree and Ornamental Spray (TT&O)	1 to 2 tsps./mound or 1 oz./5 gals./ 5 mounds to treat a 4-ft.-diameter circle	Noncrop areas
	Pinpoint	1 lb./100 gals. drenched into pots	Container-grown nursery stock (Note: not approved as quarantine treatment)
	Pinpoint	2 tsps./mound	Turfgrass
bifenthrin	Talstar T&O 0.2 G, Flowable	Varies with bulk density of potting media	For use in fire ant quarantine program for fire ant-free nursery program
boric acid (Note: Scientific studies have yet to demonstrate the effectiveness of these products.)	Bushwhacker Fire Ant Control	3 lbs./acre	Terrestrial food (vegetables, fruits, nuts, rangeland, pastures, forages) and nonfood (nursery, turf) crops, forestry areas, poultry farms
	SafeCide	1 to 2 lbs./100 sq. ft. or 1 to 2 cups/mound	In poultry houses
carbaryl	Sevin XLR Plus (other formulations include 4F, 50W, 80S, SL, 5% and 10% dust)	3 Tbsps./2 gals./mound	Pastures, rangeland, forested lands, wastelands, nursery stock, vegetable transplants (do not use on any food crop not listed on the label), foliage plants, bedding plants (do not use in greenhouses). Sevin 50W and 5% also registered for poultry and premises, although not specifically for control of fire ants.
chlorpyrifos	Dursban	Varies with formulation	Read and follow label directions.
	Lorsban 4E	3/4 to 1 qt./acre in 25 or more gals. water	Citrus orchard floor
	Lorsban 15G	At planting: 8 oz./ 1000 ft. of row applied as a T-band	Field corn, popcorn, sweet corn
	Lorsban 50W	2 lbs./acre	Pecan orchard floor
cyfluthrin	Countdown	16 mls. per 1000 sq. ft., may vary with type of surface	For control of crawling pests (including ants) in and around livestock premises (including poultry houses)
dichlorvos	Vapona Concentrate Insecticide	1 gal./50 to 100 gals.	Indoor livestock premises and poultry houses



Ingredient	Trade name*	Use rate	Registered site(s)
fenoxycarb	Logic	1 to 1.5 lbs./acre or 1 to 3 level tps./ mound	Horse farms and horse pastures, nonbearing crops (apples, avocados, blueberries, citrus, nectarines, peaches, pecans, plums), noncropped and nongrazed areas on the farm, turfgrass
	Award	(same as above)	Around container-grown ornamental and nonbearing nursery stock and on sod farms; turfgrass areas
hydramethylnon	Amdro Insecticide Bait	1 to 1 1/2 lbs./acre or 5 Tbsps./mound	Turf, golf courses and grounds, parks, rangeland, pasture, noncropland
	Siege Fire Ant Bait	(same as above)	
lambda- cyhalothrin	Grenade ER Premise Insecticide	0.2 to 0.4 fl. oz./gal.	In and around buildings housing livestock. For use as barrier and general surface treatment for ant control
imidacloprid	Goucho 480 Flowable	Seed treatment: 8 fl.oz./100 lbs. seed	Sorghum
permethrin	Y-TeX GardStar	9 to 11.8 mls./gal./ 750 to 1000 sq. ft. or 5 to 10 mls./gal. water/mound	In and around livestock premises, including poultry houses, to control ants
pyrethrins	Organic Solutions All Crop Commercial & Agricultural Multipurpose Insecticide	4 Tbsps./gal./mound	Grasses; animal quarters; outdoor- and indoor-grown vegetable crops; ornamentals; herbs; spices; field grain crops; fruit, nut and vine crops
	Pyrenone Crop Spray	0.05 lbs./acre	Crops (for ant control)
pyriproxyfen	Distance Fire Ant Bait	1 to 1 1/2 lbs./acre (0.35 to 0.5 oz./ 1000 sq. ft.) or 1 to 4 Tbsps./mound	Indoor and outdoor container- and field- grown ornamentals (commercial nurseries); ornamental tree farms; nonbearing nut, citrus and other tree fruits grown in nurseries; conifers; conifer nurseries; sod farms; industrial sites; uncultivated nonagricultural areas; nongrazed pastures and rangeland (Note: not approved as quarantine treatment)
rotenone	True Stop	2/3 cup/gal.; 8 to 10 fl. oz./ 4-in.-diameter mound	Vegetable and field crops, rangeland, sod farms
s-methoprene	Extinguish	1 to 1.5 lbs./acre or 3 to 5 Tbsp./ mound to a perimeter of 4 ft.	Turfgrass and landscapes, parks, zoos, golf courses, roadsides, airports, cemeteries, perimeter areas of buildings, homes, sheds, electrical and phone boxes, pump houses and other associated areas, forestry sites, commercial nurseries including field-grown and container stock, school grounds, sports fields, pastures, rangeland, citrus groves, sod farms, cropland (Note: not approved as quarantine treatment)
tefluthrin	Fireban 1.5G	Varies with bulk density of potting media	For use in fire ant quarantine program for fire ant-free nursery program
terbufos	Counter 15G	At planting: 8 oz./ 1000 ft. of row	In Texas, section 2(ee) for field corn, popcorn, sweet corn and sorghum

* All are registered® or trade marked™ product names.



Worksheet 1: Are Fire Ants Costing Your Cattle Operation Money?

How many acres are in your cattle operation? _____

1 How much do you spend in an average year to treat injured cattle?
Include medicines, bandages, vet bills and an estimated cost of your time. \$ _____

2 A. How many cattle/calves do you lose per year to ants? If fewer than one, give a fraction (e.g., 1 calf/2 years = 0.5 calf/year). Include only those directly killed by ants: _____

B. What did you pay for calf or added value of cow? \$ _____

C. How much profit if calf had been sold normally? \$ _____

Add B and C, then multiply by A to get total death losses. \$ _____

3 What are your average yearly losses from fire ants for the following:

	Cost of material	+	Labor	=	Total
			(including your own)		
Ruined feed	\$ _____	+	\$ _____	=	\$ _____
Ruined hay	\$ _____	+	\$ _____	=	\$ _____
Shredder damage	\$ _____	+	\$ _____	=	\$ _____
Electrical damage	\$ _____	+	\$ _____	=	\$ _____
Other damage/loss	\$ _____	+	\$ _____	=	\$ _____

Add the above items to get total material and equipment losses. \$ _____

4 Losses in hay production, from other form if applicable. \$ _____

5 Any medical costs for you, your family, or workers per year. \$ _____

6 Per year losses to pets, horses, food animals, exotic breeds, etc. \$ _____

7 Any other per year losses that can be blamed on fire ants. \$ _____

Grand total. Add totals for 1-7 \$ _____

Can You Afford to Treat for Fire Ants??

Grand total ÷ number of acres in your operation = \$ _____ per acre in losses.

If your Loss Per Acre is:

More than about \$15, you can probably make money by treating your entire place.

Less than about \$15, you need to pinpoint where these losses occur and only treat those areas.

Worksheet 2:

Are Fire Ants Costing Your Hay Operation Money?

On how many acres do you usually produce hay? \$ _____

How many cuttings do you usually make per year? \$ _____

What is your average profit per bale? \$ _____

How have fire ants increased your operating costs?

1 More expensive equipment: \$ _____ ÷ no. of years used \$ _____

2 Broken equipment or faster wear **per year:**
 Parts \$ _____
 Labor (include your time) \$ _____
 Add to get total breakage \$ _____

3 Stops to clean out machinery:
 Stops per cutting x cuttings per year _____
 Minutes per stop _____
 Hourly cost (labor and machine time) \$ _____

Multiply stops by minutes, divide by 60,
 then multiply by hourly cost to get lost time \$ _____

4 Do you have to raise your cutter to avoid mounds? If so,
 How much yield do you think is lost? _____ bales/acre
 Multiply by profit per bale \$ _____ loss/acre
 Multiply by number of acres to get lost yield: \$ _____

5 Other costs? Give total \$ _____

Total losses from fire ants: Add 1 - 5 totals. \$ _____

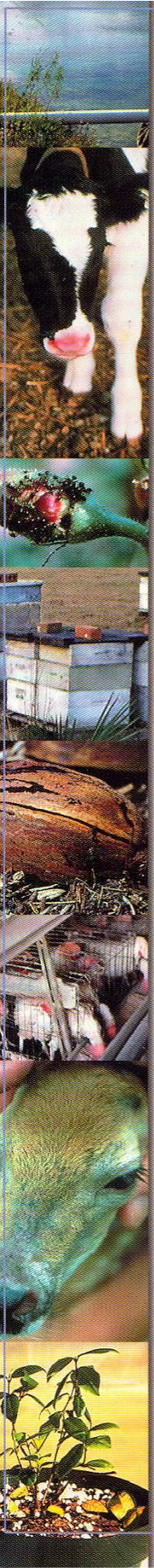
Now, divide total losses by number of acres to get loss per acre \$ _____

If your Loss Per Acre is:

More than \$15, you can probably make money by treating for fire ants.

Less than \$15 but more than \$6, you may still be able to make money using alternative/
 nonchemical methods (see page 7).

Less than \$6, fire ant treatment would not be justified.



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