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Managing Fire Ants in and around Tennessee's Schools

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Fire ants are small, reddish-brown to black insects and are about 1/8 inch to 1/4 inch long. They make obvious mounds from which they can emerge quickly and aggressively when disturbed. Fire ants in and around schools can be quite upsetting to students, parents, teachers, administrators and other school personnel. Students on playgrounds or athletic fields are the most likely school occupants to encounter fire ants, but fire ants can also enter classrooms. While a typical response to a fire ant sting includes a painful, burning or itchy sensation that often results in a skin pustule, less than 1 percent of people stung can have a more severe allergic or life-threatening response, such as anaphylactic shock. Because of these hazards, fire ant management should be a top priority in and around schools.

Imported fire ants have a 2-segmented waist, sting and 10-segmented antenna with a 2-segmented club. (credit: UT E&PP Bernard)

Fire ants can impact the school environment in other ways. Fire ants foraging into the classroom can disrupt the learning environment. As temperatures drop in the autumn, fire ants will move their mounds towards heat sinks, such as sidewalks, paved areas, curbs and buildings and thus are more likely to enter buildings. Electrical equipment, such as ground-installed lighting and heat pump or air conditioning units on concrete pads, can be short circuited by foragers. Mowing grass with fire ant mounds may dull cutting blades or otherwise damage mowers. Lack of fire ant control on Tennessee school athletic fields has caused sporting events to be cancelled or moved. No school administrator wants to make the local news broadcast because of poor fire ant control on their property, yet this has happened in Tennessee.

Fire ant workers gathering along the base of a school. (credit: UT E&PP)

One of the most common pesticide misapplications in and around Tennessee schools occurs with the application of fire ant control products. Often, untrained school personnel apply pesticides without reading labels. In this case, products may be applied at incorrect rates and to sites not listed on the label, which may increase the likelihood of children coming in contact with these products. The label must be read and followed carefully. This publication will describe the proper management of fire ants in and around schools.

Management Techniques

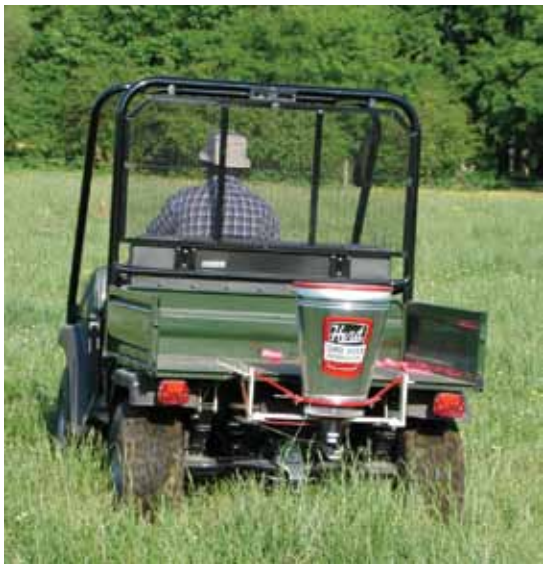
Managing fire ants in and around schools requires balancing the health risk of an ant sting with the risk of pesticide exposure. Several effective techniques are available to manage fire ants in and around schools. One of the safer methods of managing fire ants is the broadcast application of fire ant baits.

Table 1. Getting the Most from Fire Ant Baits

- Baits should be applied between 70 and 85 degrees F when maximum fire ant-foraging occurs.
- In summer, apply baits in the evening. During the cooler evening, ants will quickly discover and carry off baits. If applied during the day, in extreme heat, baits quickly lose their effectiveness. Also, ants do not forage much during the day when it is too hot (>90 degrees F)
- Use only fresh bait, preferably from an unopened container. Once opened, baits should be used as soon as possible. Unopened containers may stay fresh for up to two years.
- To see if the ants are active and if the bait is fresh, place a small amount of bait and food (hot dog or potato chip) in separate locations next to a mound. If the bait is fresh and the ants are active, ants will begin removing it within 30 minutes. This is a good time to treat. If ants do not remove the bait, but feed on the hot dog or potato chip, then the bait is spoiled. If no ant activity is seen, it is not a good time to treat.
- Apply baits when no rain or dew is expected for at least five hours. Once the baits become soggy, they are not as attractive to the ants.
- Broadcast the bait, or apply it as directed around the mound.
- Avoid disturbing the ants or the mound right before applying the bait.
- Do not contaminate baits by storing them or applying them with fertilizer, other pesticides or odorous compounds.
- Follow the directions on the label. It is against the law to apply baits in areas not listed on the label.

Broadcasting Baits

One of the most efficient ways to manage fire ants on school grounds is to broadcast a fire ant bait. Treating individual mounds can be expensive, requires more time and effort to scout for all the mounds, and often the smaller mounds are overlooked. Broadcasted baits are applied typically at 1 to 1.5 lbs pounds per acre, so a small amount goes a long way. This scattering of a small amount of bait over a large area poses minimal health and environmental risks. Ants from all mounds, regardless of mound size, will forage for the broadcasted bait as long as foraging conditions are met (See Table 1). Broadcasted baits may take longer, from three days to about 12 weeks depending on active ingredient, to control ants. Insect growth regulator (IGR) baits (fenoxycarb, pyriproxyfen and methoprene) may take from six to 12 weeks for acceptable control; whereas the faster-acting baits may take from three days to several weeks. Abamectin acts like an IGR when broadcasted. IGR baits usually take longer to achieve control, but they may reduce populations for a longer period of time. IGR baits do not affect the adult forager ants, but reduce the queen's egg production. Because workers are unaffected, they will continue to defend their territories and kill new queens that enter their territory. Thus, establishment of new mounds is reduced with IGR baits.



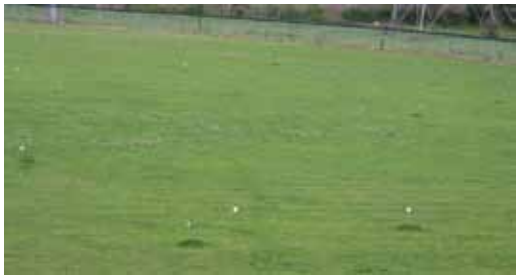
Broadcasting baits is one of the most time-efficient and cost-effective methods of managing fire ants. (credit: UT E&PP)

To obtain both rapid and long-term control, a combination of a broadcasted bait and an individual mound treatment can be used. This strategy is called the two-step method. See the list of resources for more details on the two-step method. Also, a combination of an IGR bait and a faster-acting bait can be applied as a single product (Extinguish Plus) or a hopper blend (Extinguish and AmdroPro). Planned bait applications may be applied on a Friday afternoon after school is dismissed if school is still in session, as long as preferred foraging conditions are met.

Individual Mound Treatments

When quick control is needed, an application of a pesticide to the mound may be required. Several products, such as those containing pyrethrins or a pyrethroid (bifenthrin, cyfluthrin, deltamethrin, permethrin, lambda-cyhalothrin, etc.) diluted and applied slowly in several gallons can quickly eliminate the ants in a mound. Drenches and watered-in granular applications work well when the immatures and queen are near the surface. Thus, in midsummer these applications should be applied in early morning or late evening. If a pesticidal drench, dust or granular treatment is used, be sure to restrict student access until risk of exposure is removed from the treated area. Faster-acting baits containing active ingredients such as abamectin, fipronil, hydramethylnon and spinosad can also be applied around mounds, but may take several weeks to control the ants. Indoxacarb baits may work as quickly as three days. If mounds are located under slabs, sidewalks and other heat sinks, baits are the best option as long as temperatures are between 70 and 85 degrees F. Drenches may not contact parts of the colony that are under these objects.

Watering in a granular individual mound treatment. (credit: TSU SACS Oliver)



More than 27 mounds (indicated with white flags) were found in this baseball field. This is a prime example of where a broadcast bait is needed. (credit: UT E&PP)

Broadcasting Granular Contact Products

Broadcasting granular contact products over large areas is also an option to manage fire ants, but probably should be used at a minimum in school environments because these are often more costly than bait applications, have more effects on nontarget insects, and leave a chemical residue where students can contact it. These products act by killing the foraging population and over time the colony size is dramatically reduced. Fipronil granular products may take four weeks to reduce populations by 90 percent, but may remain effective for over a year. Pyrethroids will work more quickly than fipronil, but may need to be reapplied. If soil moisture is lacking, irrigate before or after granular application as specified by the label.

Management Programs for Specific School Areas

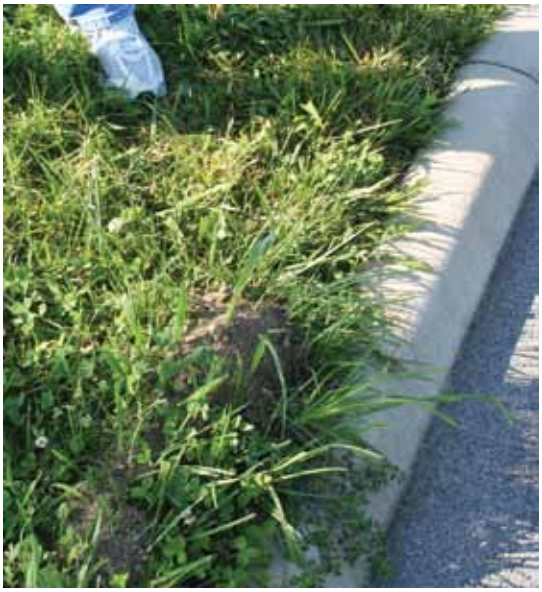
Football and other athletic fields. Broadcast an IGR or other fire ant bait two to three months before the fields will be needed. Baits should be broadcasted twice a year, preferably in the spring and fall when air temperatures are between 70 and 85 degrees F. See Table 1 for guidelines regarding fire ant bait application. In an emergency, if quick control is needed, an individual mound treatment of a liquid, granular or dust may be used. Be sure to follow label directions. If allowed by the label, treatment should be watered in and allowed to dry (~ 12 to 24 h, if appropriate) before the field is used. Pyrethrum is a quick-acting, low-residual insecticide that makes a wonderful mound treatment; however, it is difficult to

find pyrethrum/pyrethrin products registered in Tennessee for this use. We list it here in case it becomes available in the future. Pyrethroid insecticides are probably the most readily available class of insecticides for individual mound treatments in Tennessee, but will leave an insecticidal residue that could persist for months.

Broadcasting granular contact insecticides is less preferred than broadcasting bait because of health and safety concerns, but if rapid control is needed and many mounds are present, this may be more efficient than treating each individual mound. If you are broadcasting baits twice a year, it is unlikely a broadcast granular contact insecticide will be needed.

Playgrounds and other grounds. Management is similar to that of football fields. Broadcast a fire ant bait twice a year. Treat those mounds that are in high-traffic areas with an individual mound treatment such as a drench, dust or granular of a botanical (such as pyrethrum) or a pyrethroid. Make sure it is watered in, dry, and the label says it is alright for site re-entry before the kids have access. A fast-acting bait can also be used as an individual mound treatment, but will still be slower acting than the contact chemicals. Advion with indoxacarb can work as quickly as three days and fipronil, hydramethylnon and spinosad may work within a week.

Mounds near playgrounds can be difficult to manage because the colony is often located under landscape or edging materials. In this case, bait should be applied twice a year. Emergency mound treatments may be needed, but treated areas should be cordoned off until the treatment dries and the insecticide label indicates it is safe for site re-entry. (credit: UT E&PP)



Mounds next to and under curbs, sidewalks, concrete pads and other paved areas should be treated with baits because the worker ants will bring the toxicant back to the nest. A drench may miss the colony found beneath these objects. (credit: UT E&PP)

Mounds next to sidewalks, buildings, curbs, concrete pads and streets/driveways. Because parts of the fire ant nest are often under these objects, these mounds are difficult to treat. Ants will carry baits back to the nest. Thus, baits are the recommended method of control in this situation. A mound drench may miss the part of the colony under the object. When applying bait around a mound, be careful to avoid leaving piles of bait that may be attractive to children or pets.

Classroom and indoor infestations. Ants found indoors are often searching for food or moisture or trying to avoid weather extremes. Broadcast applications of fire ant baits outdoors should reduce the incidence of fire ants indoors. Fire ants that forage indoors are often from mounds that are near the building. Check the premises for ant food sources and remove them. Vacuum ants, dump the vacuum bag or contents into a locking plastic bag, and place this in a dumpster. Wipe ant trails with soapy water to remove trail pheromone, be careful to avoid being stung, and notify the pest manager. Note specifics of fire ant entrance and provide this information to the pest manager. Certain baits may be applied in stations or in cracks

and crevices and other inaccessible areas inside the building. Locate the point of ant entry on the outside of the building. Apply a residual insecticide to the outside opening. If possible, seal the opening to prevent future ant entry. Search the building's perimeter and apply a faster-acting product to nearby mounds.

Electrical equipment. It is best to work with an electrician when dealing with fire ants inside electrical equipment. Specific pyrethrum aerosol sprays may provide quick, but short-lived, knockdown of the ants in electrical equipment. For longer-term control, pyrethroid granules, such as bifenthrin, can be applied to the floor of the housing. Again, if fire ant bait had been broadcasted to the outdoor area there would be less chance of fire ants invading electrical boxes.

Tennessee Law Pertaining to Pesticide Use in Schools

According to 62-21-124 of The Tennessee Application of Pesticides Act (TAPA), pesticide application indoors in schools must be made under the supervision of a person licensed by the Tennessee Department of Agriculture (TDA) to apply pesticides, and all technicians must be certified in category 7.

Unfortunately, this law does not apply to the use of pesticides on school grounds. Thus, anyone can apply pesticides to school grounds as long as they follow label directions, are over the age of 18 and are not charging a fee. If a pest control company's services are contracted for fire ant management outdoors, the technicians can be certified in category 7, working under a GRC (General Rodent and Pest Control) licensee if the application is made close to the structure. Certification in category 3 working under an HLT (Horticulture, Lawn and Turf) licensee is required for a pest management professional to charge a fee and apply pesticides for fire ants on the playgrounds, athletic fields and other outdoor areas located away from the structure. Many of the products labeled for fire ant control around schools are produced for professional use, and many of the typical homeowner fire ant products are not labeled for use around schools, so read the label carefully to ensure you are making a legal application. Although not required by law, it is preferred that individuals applying pesticides on school grounds at least be certified by TDA.

When to Apply Each Technique

To decide on treatment options, it is important to understand the density of fire ant mounds in a location. Table 2 gives fire ant management options under various circumstances and fire ant population thresholds. Fire ants will rebuild their mounds after a rain. When assessing fire ant mound densities in an area, inspect when fire ants are most visible, i.e., the day after a rain. Mowing the lawn a day before expected rain will also make the mounds more visible. Applying individual mound treatments when the ground is very dry is not recommended, because many mounds will not be visible and will miss treatment.

The trade named of pesticides labeled for use in and/or around schools are not listed here. Instead, some pesticides registered for fire ant use around schools will be posted annually to the UT fire ant Web site at http://fireants.utk.edu/Webpages/Updates.htm. This will not be an all-inclusive list, but at least will provide some options for different sites.

This publication was modified from the following sources:

Merchant, M. 2002. Fire Ants and the Texas IPM School Program. Texas Cooperative Extension Service, Fire Ant Plan Fact Sheet #20. http://fireant.tamu.edu/materials/factsheets_pubs/pdf/FAPFS020.2002rev.pdf and Southwest Technical Resource Center, IPM in Schools, Pest Management Plans, IPM Plan Fire Ants. http://schoolipm.tamu.edu/resources/TechInfo/2009/IPM%20plan%20fire%20ants.pdf

Table 2. Location or situations, thresholds, nonchemical options, preferred chemical options and other treatment options for managing fire ants in and around schools.

Location/ Situation	Suggested Thresholds	Nonchemical Control Options	Preferred Chemical Treatment(s)	Other Chemical Treatment Options
Football/ baseball fields, other high maintenance landscapes	4-5 mounds to initiate bait application. One mound sufficient to justify mound treatment.	None very effective.	Broadcast application of IGR bait containing methoprene, pyriproxifen; or non-IGR products containing abamectin.	Other toxicant (indoxacarb, hydramethylnon or spinosad) baits. Liquid, granular, dust or aerosol insecticide treatments may be used to eliminate individual mounds. Surface-applied, slow-acting, long-residual contact insecticides such as pyrethroids or fipronil where maximum suppression is desired.
Playgrounds	One mound sufficient to justify mound treatment.	None very effective. Physical removal with a shovel.	IGR baits may be applied to turfgrass areas during spring or summer vacations. For fast control, apply non-IGR bait or contact insecticide to mounds.	Faster-acting toxicant baits such as spinosad, hydramethylnon or indoxacarb should be applied around colonies or mounds that extend under sidewalks or other pavement areas.
Low-maintenance areas	More than 40 mounds per acre or where complaints are received.	None very effective. Regular mowing to keep mounds knocked down.	Broadcast application of IGR bait containing methoprene, pyriproxifen or fenoxycarb; or use non-IGR bait with abamectin.	Faster-acting toxicant baits such as spinosad, hydramethylnon or indoxacarb. Contact insecticide mound treatments may be used to eliminate individual colonies.
Building perimeters	One mound within 10 feet of building sufficient to justify treatment. Three or more mounds per building if more than 10 feet distant.	None very effective.	Broadcast application of IGR bait containing methoprene, pyriproxifen or fenoxycarb; or use non-IGR bait with abamectin.	Faster-acting toxicant baits such as spinosad, hydramethylnon or indoxacarb. Contact insecticide mound treatments may be used to eliminate individual colonies. Barrier treatments using fipronil or other contact insecticide around perimeter walls to prevent ant foraging indoors.
Indoors	Respond to any fire ant complaints. Treat when more than one ant observed per classroom.	Check all windows and doors for tight seals. Check roof and outside areas for mounds and possible entry points. Caulk and seal all suspected entry points.	Control ants outdoors around the building (see above). Approved indoor fire ant baits applied to cracks or inaccessible voids. Follow label instructions.	Pyrethrum or similar sprays may be applied to ant entry points in emergency situations where fast control is needed and caulking or sealing is not possible.

Insect Growth Regulator (IGR):
A slow-acting disruptor of the ant's reproductive systems. IGR ant bait formulation products containing methoprene, pyriproxyfen or fenoxycarb do not kill worker ants but rather prevent the development of new worker ants for months by affecting the queen ants. Worker ants present at the time of treatment must die off naturally. For this reason, IGR baits are slow-acting, with broadcast application providing maximum effects in one to two months when applied in spring or early summer, but late summer or early fall applications having maximum effects two to six months later.

Non-IGR insecticide ingredients:
Other active ingredients are formulated in ant bait products, including spinosad, indoxacarb, hydramethylnon and abamectin. These vary in their ability to provide maximum control when broadcast-applied, with spinosad and indoxacarb being faster acting, requiring one to four weeks. Bait products containing hydramethylnon (e.g., Amdro®) provide maximum effects in three to six weeks following application and can be used safely, but may not qualify in some states as low in toxicity. Broadcast abamectin performs more like an IGR. However, both hydramethylnon and abamectin work faster when applied at a higher rate to individual ant mounds. Spinosad baits work more consistently as an individual mound treatment.

Modified from: Michael E. Merchant, Janet Hurley, Faith M. Oi and Rebecca W. Baldwin of the Southern Region l IPM Workgroup
http://schoolipm.tamu.edu/resources/TechInfo/2009/IPM%20plan%20fire%20ants.pdf

Additional references for spreaders, baits and other information on fire ant management in schools:

Managing Imported Fire Ants in Urban Areas
http://www.extension.org/pages/Managing_Imported_Fire_Ants_in_Urban_Areas_Printable_Version

The Two-Step Method for Managing Fire Ants around Homes and in Neighborhoods
http://www.utextension.utk.edu/publications/spfiles/sp419.pdf,
http://www.extension.org/pages/Fire_Ant_Control:_The_Two-Step_Method_and_Other_Approaches

New Fipronil Products Prove Popular, But Do They Fit IPM Programs?
http://schoolipm.tamu.edu/Newsletter_upload_files/Newsletter_14.pdf

Fire Ant Products Registered for Use in Tennessee's Schools
http://fireants.utk.edu/Webpages/Updates.htm

Additional references for fire ant management

extension Fire Ant Web site
http://www.extension.org/fire+ants

Imported Fire Ants in Tennessee
http://fireants.utk.edu

Fire Ant Products Registered in Tennessee
http://fireants.utk.edu/Webpages/Products.htm

Additional references for managing pests in and around schools with integrated pest management

Extension Urban IPM Web site
http://www.extension.org/urban%20integrated%20pest%20management

Tennessee Child-serving Facility IPM
http://schoolipm.utk.edu

United States Department of Agriculture

National Institute of Food and Agriculture

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.

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