

Broadcast Baits for Fire Ant Control



Texas Imported Fire Ant
Research & Management Project

Southern
IPM
Center

Broadcast Baits for Fire Ant Control



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Disclaimer

The products listed have been found to reduce the number of fire ant colonies compared to those in untreated plots in replicated scientific tests conducted by Texas Cooperative Extension and agencies in other states. Specific products are listed as a service to the reader. The lists of products here and on the companion Web site are not comprehensive. Neither Texas Cooperative Extension, the Southern Region Integrated Pest Management Center nor other cooperating organizations endorse or discourage the use of any product mentioned.

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Broadcast Baits for Fire Ant Control

When choosing a broadcast bait to control imported fire ants, consumers and professional pesticide applicators are faced with a confusing array of brand names and active ingredients with varying product performances. This guide addresses common concerns about broadcast baits to help consumers and professionals choose products that best fit their needs and situations.


Although the information presented here is as current as possible, frequent changes in technology, marketing and regulations affect the availability of and regulations for specific products. Therefore, this guide will focus on general principles of bait use, not specific products.


For specific, up-to-date information about the availability of broadcast baits, visit <http://fireant.tamu.edu/broadcastbait>.

Bait basics

A bait is an insecticide that insects sense to be food. In the case of ants, workers find the bait and carry it back to the colony, where it is fed to the larvae, workers and queens. Foraging workers may consume some of the liquid portion of the bait before returning the particle to the colony.

Most fire ant baits in current use are similar in appearance and odor and in their handling and application. These baits are small, oily, yellowish granules that smell like toasted corn. They consist of three main components:

 **Defatted corn cob granules** serve as a means of distributing the attractant and the active ingredient. Although ants carry the granules to the mound, the granules have no insecticidal properties.

 **Soybean oil** serves as both the attractant and active ingredient carrier. Preservatives and antioxidants are usually added to the oil to extend product shelf life.

 The **active ingredient** is the actual insecticide that affects the ants.

Although active ingredients have different modes of action, they all serve to break the life cycle of the colony, resulting in its death. Fast-acting baits actually kill the queen and, to varying degrees, worker ants.

Baits containing insect growth regulators (IGR) do not kill workers or queens. Instead, they disrupt






larval development so that when the adult ants die of natural causes, they are not replaced, and the colony gradually dies out. Consequently, the speed of activity of IGR baits depends on environmental conditions and may be very slow.

Broadcasting vs. individual mound treatments

The single greatest advantage of broadcast baits over individual mound treatments (IMTs) is that you do not need to find the colonies to treat them.

It takes about an hour to thoroughly examine an acre of land for fire ants and mark the colonies for treatment. With a broadcast bait, this step is unnecessary. Ants in even the smallest, most well-hidden colony will likely pick up an effective dose of broadcast bait on their own. The result is easy, thorough control over large areas.

Broadcast baits have other advantages over contact insecticides and individual mound treatments:

-  In most cases, baits are the least expensive way to control fire ants.
-  Ants are controlled in an area for a longer period than with individual mound treatments.
-  Very little labor is required for the application.
-  Baits pose very little toxic threat to people, pets and wildlife.
-  There are very few environmental hazards associated with baits.

Baits vs. granules

Many non-bait insecticides, including many that are used against fire ants, come in the form of granules. Some baits are actually labeled as “bait granules.” It is very important to know the differences between a bait and a contact insecticide granule and how to use each of them.

Appearance and odor: Baits are yellowish, oily and have a toasted corn smell. Granular contact insecticides are usually gray or brown, not oily and have either a neutral or unpleasant chemical smell.

Application rate: Most baits are applied at broadcast rates from one to, at most, about 22 pounds per acre. Granular contact insecticides are applied at rates much higher than this, often on the order of 1 to 2 pounds per thousand square feet.

Effect of moisture: Baits should *never* be watered in. Water ruins bait particles. Granular insecticides usually work faster and better when watered into the soil surface.



Granular contact insecticides and baits appear somewhat similar, but their use and how they work are very different.

What does “broadcast-applied” mean?

Insecticides may be applied either directly to a target (mounds, in the case of fire ants) or to an entire area—a procedure known as broadcasting. Although baits may be applied either way with good results, they are best suited to broadcast application because of their ability to control most of the colonies in an area, regardless of the number of colonies, without the need to locate individual mounds.

How do you use baits successfully?

Many bait products are applied at a rate of 1 to 1½ pounds per acre of land (43,560 square feet, roughly the size of a football field or a square 209 feet on a side). This is very little material and requires special application equipment. New “consumer” type baits are designed to be applied with common fertilizer spreaders and use rates of more than 10 pounds per acre.

Regardless of the exact application rate, overapplication offers little or no additional benefit in eliminating ants; it just costs more money.

Baits do require special conditions and handling for best results:

The ants must be actively foraging for bait.

Fire ants search for food (forage) at a wide range of temperatures and can be found foraging in almost any season. However, they may be searching for only certain kinds of food, which might not be the oil of a bait. The *only reliable way* to confirm whether ants are feeding on bait is to offer them a small amount and see if they pick up the particles.

Use fresh bait.

The soybean oil in baits becomes rancid over time, making it unattractive to ants. Unfortunately, bait product labels do not list a manufacture or expiration date. Rancid bait smells somewhat like latex paint, unlike the fresh, toasted corn smell of fresh bait.

Because bait can spoil sitting on store shelves, it is important to check its freshness and return it to the seller if it is rancid.

Use the bait promptly.

Most companies claim that their products have a shelf life of 2 to 3 years if the packages remain unopened. Bait left open to the air may become rancid in a few weeks. Even when resealed and stored properly in a cool, dry place, bait from an opened container should be used within a year.

Do not allow baits to come into contact with water.

Water ruins baits. In favorable conditions, most bait is picked up overnight or even within a few hours, but for best results, do not apply a bait if rain is expected within 24 hours and do not irrigate the area for at least 24 hours. Avoid application when there is a heavy dew.

Do not mix baits with other insecticides.

To avoid contaminating bait, wash the application equipment thoroughly.

What to expect from a bait treatment

Most broadcast baits work more slowly than do contact insecticides, though a few work just as fast. There is a trade-off, though: The faster a bait works, the sooner the area is open for reinvasion.

With any broadcast bait, you should expect 80 to 95 percent maximum control lasting 3 to 12 months, though the reinvasion rate depends on several factors such as weather and season. ***No product gives 100 percent control overnight or lasts forever.***

Figure 1 shows results of a fire ant test applied in Texas in October 2004. These results are typical of what should be expected from the different types of broadcast baits and other fire ant control products within the first few weeks.

Figure 2 shows data from the same test through 7 months. Note that some treatment areas are being reinvaded as others are maintaining or reaching full effectiveness.

Base your product choice on cost, the time of year that control is needed and the length of time it is needed. ***No single product is right for every situation.***

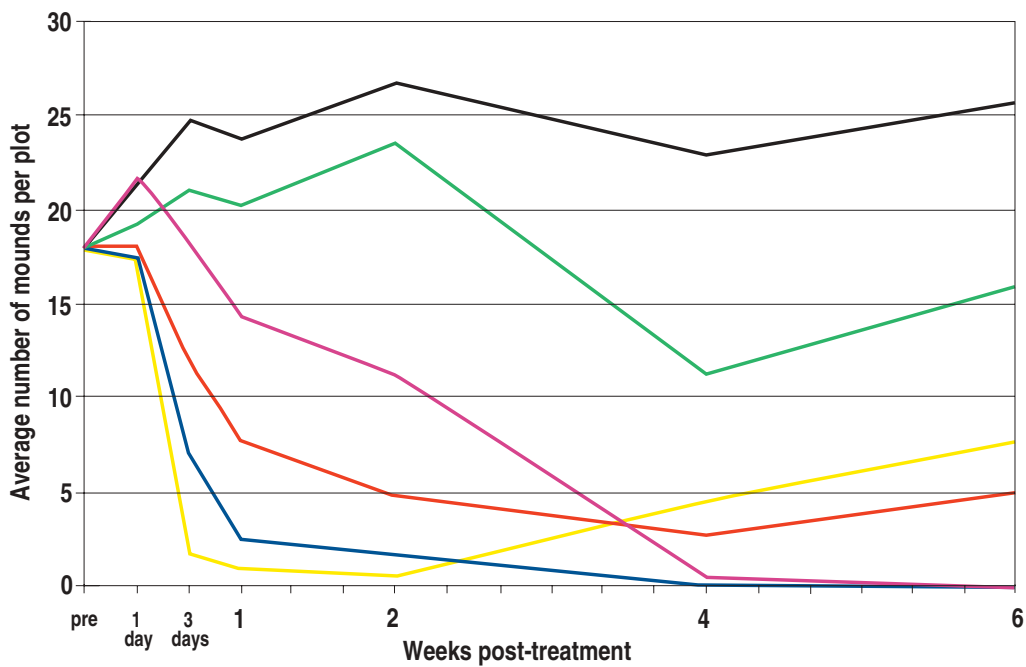


Figure 1. Fall-treatment test through 6 weeks.

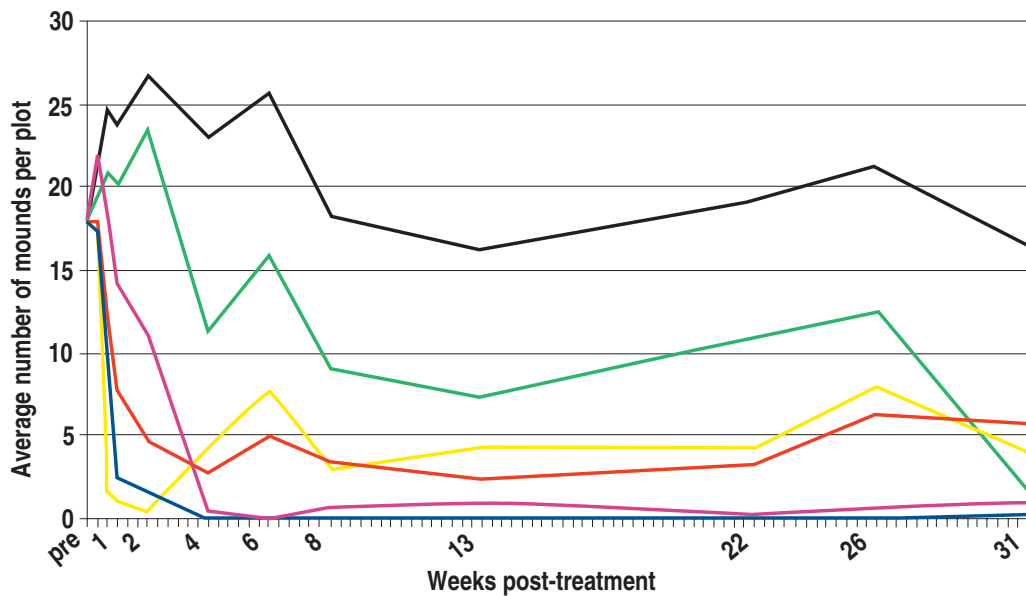


Figure 2. Fall-treatment test through 7 months.

Untreated (black): The number of mounds varies naturally by season and rainfall.

Advion (yellow): This fastest acting of baits does most of its work within a week. Thereafter, the area is open for reinvasion.

Amdro (red): This treatment represents fast-acting baits; it takes about 4 weeks to reach maximum control.

IGR (green): Most colonies do not die until warmer, drier weather the following year.

Talstar (blue): This treatment represents broadcast contact insecticides. Control is fast, and residual control can last for months.

TopChoice (purple): This is a contact insecticide that takes about a month to work fully. Residual control can be expected for a year. Reinvading colonies die in a few weeks.

Choosing a treatment method

For *most* situations, the best treatment is a bait. But despite their many good points, baits are not the best treatment for every situation.

For instance, a bait may cost \$15 per acre when broadcast. If there are 150 mounds in that acre, the per-mound cost is a mere 10 cents with little labor. But if there are only 10 mounds, the per-mound cost soars to \$1.50 per mound. At 25 cents per mound, an individual mound treatment would be a better choice.

Table 1 lists the characteristics of individual mound treatments and broadcast baits. Remember: These are generalizations; there is a range within each product category.

Applicator and Environmental Safety

When selecting and using baits, it is important to consider the safety of both the applicator and the environment. Generally, broadcast baits are safer to use and introduce less total insecticide with fewer toxic active ingredients into the environment than almost any other type of insecticide application.

The main environmental drawback of broadcast baits is that they may harm desirable ant species that pick

up the bait. However, removal of fire ants from an area may be far more beneficial to the desirable ants than any ill effects caused by a bait.

Applicator safety

Although broadcast baits by almost any standard are relatively safe and easy to apply, applicators should take a few safety precautions when applying them. Most precautions are designed to keep the granules from contacting your skin and eyes.

Pesticide handling precautions








-  Wear a long-sleeved shirt, untucked, and long pants left outside a boot.
-  Wear nonabsorbent gloves. Leather and cotton soak up oil and prolong exposure hazard.
-  Inexpensive aprons are good for keeping particles out of pockets and oil off clothes.
-  Wear boots. Bait granules accumulate easily inside shoes.
-  Wear safety glasses or goggles. Particles are easily blown by the wind and can get in your eyes.
-  If the bait contacts your skin, brush off the granules, then wash with soap and water. Remember: The active ingredient is in an oil, so soap is necessary.

Table 1. Advantages and disadvantages of individual mound treatments and broadcast baits.


Characteristic	Nonbait individual mound treatment (IMT)	Broadcast baits	Broadcast nonbait insecticide*
Speed of action	Fast (hours to a few days)	Varies (3 days to months)	Fast (hours to a few days)
Time to reinfestation	Not applicable, except where treated	3 to 12+ months	A few months; varies
Area retreatment times	Weekly to monthly	1 to 2 per year	1 to 3 per year
Need to locate mounds	Essential, takes about an hour per acre	Unnecessary	Unnecessary
Application labor	Moderate to high	Low	Low
Application equipment	Household items to professional equipment	\$10 to \$350 spreader	Fertilizer spreader (granules) Sprayer (liquid)
Cost per acre (43,560 ft ²)	Depends on how many mounds are in the area	\$10 to \$18 (1.5 lb/acre rate) \$80+ ("consumer" product rate)	\$50-\$250 per acre; varies by product and rate
Cost per mound	10 cents to more than \$1	Depends on how many mounds are in the area	Depends on how many mounds are in the area
Potential applicator toxicity	Low to high	Very low	Moderate to high
Potential environmental toxicity: leaching, runoff, etc.	Low to moderate	Very low	Moderate to high
Risk to nontarget ants	Low	Depends on the species; some other ants may benefit from fire ant removal.	High


* This section refers to contact insecticides such as pyrethroids. Products containing fipronil work in about 4 weeks but have much lower potential applicator and environmental toxicity risks as well as lower risk to nontarget ants.

 Do not wear the clothes again before washing them separately from other laundry.


 Avoid application to nontarget sites. For example, wooded and shady areas tend to harbor more desirable ants but fewer fire ants.


Application safety

 The spinning rotor of an electric spreader can seriously injure your fingers. Before you approach the rotor, be sure that the spreader is turned off or, preferably, disconnected from the battery. Even the rotor of a hand-held spreader can cause a painful bruise or cut to a finger.


 Do not apply bait to food-producing areas, such as vegetable gardens, orchards and pastures, unless the product is specifically labeled for use there.

 To prevent the particles from hitting others, do not allow anyone within 40 feet of an electric spreader.

 Avoid using baits where poultry or other animals might easily pick up the bait particles. Remove the animals until the ants have gathered the bait (overnight is usually sufficient, or as directed on the label.)

 Unlike with fertilizers or heavier granules, the wind greatly alters the distribution patterns and distances of bait, causing it to blow back onto the operator or into nontarget areas. Adjust the swath spacing and safety buffers relative to the wind as you move back and forth over an area.

 Consider using IMTs or no treatments where there are fewer than 20 colonies per acre.

 Avoid overapplication by using proper calibration methods.

 The label is the law. Always follow label directions!

One pound per acre is a light scattering, not a yellow cloud!

Environmental safety precautions

Take steps to minimize undesirable effects of broadcast baits on the environment. Although the risks are slight, the precautions are easy to follow:

 **Never** apply bait directly to water.

 Do not apply bait to hard surfaces (paving, plastic, etc.) where water runs off quickly.

Toxicity

Many people are concerned about pesticides in the environment. Table 2 outlines the characteristics of some representative baits and, for comparison, those of a few contact insecticides commonly used for individual mound treatments.

Table 2. Characteristics of commonly available fire ant baits and individual mound treatment chemicals.

Active ingredient	Brand name(s)	Concentration (as supplied)	Class or activity ¹	Active ingredient/acre	Oral/dermal LD ₅₀ (mg/kg) ²	Half-life in soil (days)
Broadcast Baits				@1.5 lb./acre		
Abamectin	Ascend, etc.	0.011%	IGR-like	0.00011 lb	300/>1,800	21
Fenoxycarb	Award	1.0%	IGR	0.01 lb	16,800/>2,000	84
Fipronil	Ceasefire	0.00015%	toxicant	0.0000022 lb	95/>2000	366
Hydramethylnon	Amdro, etc.	0.73%	toxicant	0.0073 lb	1,146/>5,000	4
Indoxacarb	Advion, etc.	0.045%	toxicant	0.00068 lb	1,730/>5,000	43
Methoprene	Extinguish	0.5%	IGR	0.005 lb	>34,600/>3,000	10
Pyriproxyfen ⁵	Distance	0.5%	IGR	0.005 lb	>5,000/>2,000	8
Spinosad	Come and Get It	0.015%	toxicant	0.00015 lb	>5,000/>5,000	14
Contact IMT				@150 mounds/ac		
Acephate	Orthene	50%	contact	1-2 lb	1,030/>10,250	3
Bifenthrin, IMT	Ortho Max, etc.	0.2%	contact	0.06 lb	55/>2,000	123
Carbaryl	Sevin	5-42%, varies	contact	about 2 lb	250/>2,000	6
Contact broadcast						
Bifenthrin, Brdcast	Talstar	0.2%	contact	2 lb (high rate)	55/>2,000	123

IMT = Individual mound treatment

¹IGR=insect growth regulator; toxicant=slow insecticidal activity; contact=contact insecticide

²LD₅₀ is the amount of technical active ingredient in mg/kg body weight that will kill 50 percent of laboratory mammals (rats or rabbits) tested when administered either orally or dermally. Higher values indicate less-toxic pesticides.

Application Equipment

Broadcast baits are easy to apply. They require no mixing, little measuring or weighing, and one rapid pass over the area to be treated. They also require some specialized, relatively inexpensive application equipment to apply such small amounts.

The main reason to use such equipment is to avoid overapplying bait. Applying too much fire ant bait has little or no effect on product effectiveness, the environment, worker safety or any other factor. It does, however, increase the cost and is illegal!

*If a little is good, a lot is not better.
It's just more expensive.*

Over a large area, you must apply baits consistently and accurately for the treatments to be effective and economical.

Large PTO-powered fertilizer spreaders are not recommended for fire ant bait.

The following are some of the more common types of effective bait application equipment. The list is not comprehensive, and the illustrations should be used only as examples. Any brand of spreader with the characteristics outlined here should broadcast bait effectively and accurately.



For small areas, not much larger than a typical yard

Type: Hand-held rotary

Cost: Less than \$10

Brand name: Numerous

Availability: Feed, hardware and garden stores

Bait distribution and rate accuracy: Fair to poor, in an 8- to 10-foot swath

Comments: These are inexpensive, rugged and good enough for around the home, but they cannot be calibrated accurately, and they usually overapply. Because the stirring agitator works poorly, the spreader must be shaken to keep the bait flowing.



For medium-sized areas (up to about 10 acres) or for high accuracy

Type: Hand-cranked rotary

Cost: \$25 to \$30

Brand name: Earth-Way, etc.

Availability: Lawn and garden centers

Bait distribution and rate accuracy: Excellent, in an 8- to 15-foot swath

Comments: Seeders can quickly pay for themselves by applying the proper amount of bait. The shaking gate agitator gives very good flow with few clogs. More area can be covered by having the applicator sit on the back of a vehicle.



For large areas (more than 10 acres) and frequent or heavy use

Type: 12V electric-powered

Cost: \$300 to \$350

Brand name: Herd, model GT-77 (various mounts available)

Availability: Farm or lawn equipment dealers, usually 2- to 3-day delivery

Bait distribution and rate accuracy: Excellent, in 20- to 30-foot swath

Comments: Can be mounted on anything with wheels and 12-volt power. The available adjustable gate is highly recommended for accurate calibration as is the blocking plate that covers two of the four gate openings.



For very large areas, rough or wooded/brushy terrain

Type: Aerial application

Cost: \$2.50 to \$4 per acre, application only

Brand name: Local certified aerial applicator

Bait distribution: Excellent and fast, but drift may be severe in crosswinds

Rate accuracy: Excellent, if calibrated and applied properly

Comments: Modifying aircraft to apply bait is simple and inexpensive. For details, see the Web site <http://fireant.tamu.edu>.

Spreader calibration

Why bother?

Baits applied at a typical rate of 1.5 pounds per acre are hard to see coming out of a spreader. Most people don't believe that such a tiny amount will do anything. Even doubling the amount is barely noticeable—until you run out of bait. Overapplication is *always* more costly than necessary. On the other hand, underapplication or poor coverage with some products can result in poor control.

Because so many factors can change, it is best to calibrate your spreader before every application. Bait flow can be altered by temperature, humidity, bait brand and lot, even ground roughness. For large treatments, you must calibrate the day of the application because of the high costs involved.

Calibration by trial and error

Trial-and-error calibration is easy for small areas and hand-held spreaders, but it is also recommended for large ground and aerial applications because it accounts for differences in bait flow caused by terrain and turbulence. You will need some type of accurate scale to calibrate. Kitchen, postal and fishing scales are inexpensive and easily available and do a good job.

Small areas and hand-held spreaders

Calculate the area to be treated, and weigh out the proper amount of bait following label directions. Set the spreader gate opening to about $\frac{3}{16}$ inch and walk at a comfortably brisk pace. Be sure to keep the swaths even with as few overlaps or gaps as possible.

If you have bait remaining when finished, apply it in swaths perpendicular to the first, and open the gate slightly wider or walk slower the next time you apply. If you run out before finishing, add more bait and complete the job with a smaller gate opening. It is helpful to make note of the gate setting and walking speed on the spreader with permanent marker to reference for your next application.

Large applications by vehicle or air

Mark a smaller area to treat for calibration (at least 1 acre for ground application). Weigh out enough bait into the hopper to cover the area plus enough to ensure that it does not “run dry” during application, and record the total amount. Set the gate opening to about $\frac{1}{8}$ inch for a Herd Seeder. An aerial applicator should have an estimate of a beginning gate setting.

Set the spreader at the height at which it will be used because this affects the swath width. Keep in mind that tall vegetation easily deflects bait particles.

Determine the swath width by spreading the bait for a few seconds and measuring the width of the pattern. It is also helpful to note how it changes or shifts to one side in the prevailing wind. You will need to compensate for this during application.

Apply the bait to the marked area at a maintainable, steady speed with even swaths. Ground infested with fire ants is often very rough, requiring slower speeds to maintain control of a vehicle.

After the application, remove all the bait from the hopper and reweigh it. Calculate the application rate based on the area you treated and the amount you used.

To increase the application rate:



Reduce the speed.



Reduce the swath width (lower the spreader)



Increase the gate opening.

To decrease the application rate:



Increase the speed.



Increase the swath width (raise the spreader).



Decrease the gate opening.

Gate adjustments are tricky. A $\frac{1}{32}$ -inch adjustment can increase or cut flow dramatically or do nothing, depending on whether or not another particle-width can pass through. For minor corrections, begin by adjusting the speed, then the swath width.



Choosing an application vehicle

Tractors: The ability to set the throttle in a tractor makes for the most accurate application. Although a 3-point-hitch mount will need to be fabricated, the spreader can be mounted high enough to clear tall vegetation with no loss of vehicle stability (easily 3 to 5 feet). Connections to shut off bait flow or an electrical connection to stop the rotor are easy to make and operate by the driver.

Pick-up trucks: Receiver mounting is fast and easy, but without mount modification, the spreader height is limited to only about 2 feet. It is also difficult to keep a consistent, slow driving speed. A mechanical shut-off is impractical for the driver to use, so an electrical switch must be installed to operate the spreader from the cab.

ATVs and utility vehicles: These work well for areas with sensitive turf, many obstructions or rough terrain, but holding a steady speed on them can be tiring. The mounting height is limited to less than 4 feet to avoid stability problems. The driver can usually operate the spreader's own mechanical shut-off or electrical switch easily and with no modification.

Fine-tuning fire ant control with broadcast baits

When applied as directed, all bait products work. But there are several ways to make them work better, faster, longer and/or at a lower cost.

Application timing

Fast-acting baits kill not only the queens, but also worker ants that consume enough bait. Before 2004, the fastest baits (hydramethylnon, spinosad) worked in 2 to 4 weeks. With the advent of baits containing indoxacarb, the time has been reduced to about 3 days.

Slow-acting baits (fenoxycarb, methoprene, pyriproxyfen, etc.) depend on natural mortality factors—particularly heat, drought and freezing cold—to kill the workers. Most slow-acting baits applied in the spring will eliminate colonies in 3 to 4 months. If applied in the fall, these same baits may not fully eliminate treated colonies until late spring the following year.

Bait combinations (hopper-blend treatments)

Research has shown that combining a fast-acting bait with a slow-acting bait as a hopper blend offers the best characteristics of both: fast action, thoroughness and forgiveness in coverage. Currently, the combination of AmdroPro® (hydramethylnon) and Extinguish™ (s-methoprene) is labeled for hopper blend application.

The real benefit of the hopper blend is that you use one-half of each product and apply the mixture at the full rate of one. Therefore, you get the benefits of both at no extra cost.

Reduced rate and alternative method applications (skip-swath treatments)

Bait applications generally cost about \$12 to \$18 per acre per application. Although quite reasonable for home yards and high-value sites such as golf courses, this cost may be prohibitive for large ranches and wildlife management areas.

To reduce costs, baits have been applied at reduced rates and/or coverages, but the results are inconsistent. Generally, fast-acting baits should be applied at full rates and complete coverage. Slow-acting baits can be applied at reduced rates and even in alternating swaths (skip swath).

Tests have shown that products containing fenoxycarb and pyriproxyfen can be applied in alternating 30-foot swaths with the spreader set to apply the normal 1½ pounds per acre. Results indicate that fire ant control is almost identical to full-rate, full-coverage application, but half the material is used.

These applications are practical only on large, open areas, but they can result in major cost savings in both products and application. For details on these tests, visit <http://fireant.tamu.edu>.

Products containing fipronil

Fipronil is one of the few active ingredients labeled for fire ant control both as a bait (Ceasefire®) and as a granular contact insecticide (TopChoice® and Over 'N Out®).

There is a common misconception, even among professionals, that TopChoice and Over 'N Out are baits. *These two products are not baits.* They are contact insecticide granules. However, their speed of control is much like a fast-acting bait—about a month.

Unlike baits, they show true residual fire ant control for a year or more in many cases. Colonies moving into a treated area will contact the toxicant and die as if they had been treated. The characteristics of the bait form of fipronil are like those of the other fast-acting baits.

High-volume baits

In recent years, several products have emerged that allow homeowners to use common, push-type fertilizer spreaders to apply fire ant bait. These products contain the same active ingredient as their parent product, but you apply much more actual bait for the same amount of active ingredient. These products may give more convenient and accurate applications for typical homeowners, but be aware that they cost considerably more than their parent products to treat the same amount of area. The effectiveness is similar.

Mixing bait with fertilizer

Buying a special spreader or mixing bait and fertilizer to save a trip across the field are **not** suggested practices. However, recent field research and grower practice have shown good results if the bait and fertilizer are mixed in the field and applied *immediately*. The longer a bait is in contact with fertilizer, the greater the chance of it not working because of salt contamination and unpalatability to the ants.

If you choose to mix bait and fertilizer, start with a small area and see if the bait works before risking the cost of a large treatment.

The latest news

Fire ant product availability and labeling commonly change several times each year. There is no practical way to keep such information current in a printed document, but there is a great need to keep it available. The most up-to-date information on fire ant bait products is available in a one-page format that can be attached to this publication at <http://fireant.tamu.edu/broadcastbait>.

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