

Controlling Mole Crickets on Lawns and Turf

Mole crickets have become our number one destructive insect pest on turf and lawns in Alabama. Although mole crickets infest only the southern half of the state, about \$12 million is spent in Alabama each year to control them. Hybrid bermudagrasses, common bermudagrass, bahiagrass, zoysiagrasses, and centipedegrass are most severely damaged.

Description, Life History, and Damage

Mole crickets (order Orthoptera, family Gryllidae) have grayish-brown, velvety bodies and broad, spade-like front legs adapted for digging. They have large beady eyes and are 1 to 1¼ inches long when fully grown. Adult mole crickets have wings and are attracted to lights at night. Immature mole crickets (nymphs) resemble the adults except they are smaller and lack fully developed wings.

There are two types (species) of pest mole crickets in Alabama: southern mole cricket (*Scapteriscus borellei* Rehn and Hebard) and tawny mole cricket (*Scapteriscus vicinus* Scudder). The southern mole cricket feeds on a variety of organisms in the soil and causes mainly tunneling damage. As mole crickets tunnel through the soil, they uproot grass plants, which dry out and die.



Tawny mole cricket damage to bermudagrass during late summer

Southern mole crickets are usually gray with white spots or mottling on the top of the area behind the head. Their digging claws have a U-shaped space between them (Figure 1). Southern mole crickets are predators in the soil.

Tawny mole crickets are plant feeders as well as tunnelers. Their feeding damage can result in sudden, severe turf loss during late summer and fall. Tawny mole crickets are usually tan rather than gray. There is a V-shaped space between their digging claws (Figure 1).

Mole crickets spend the winter in deep burrows in the soil. When the soil warms in the spring and night temperatures approach 60 degrees F, mole crickets move up to feed on grass. Feeding occurs primarily at night in the upper 1 inch of the soil. Mole crickets also forage on the soil surface when night temperatures are warm and the soil is moist. Activity increases in the spring, and adults fly and mate.

Female mole crickets lay eggs in chambers beneath the soil surface in spring and early summer. The eggs begin hatching during May and early June. Nymphs feed and develop during the summer. There is one generation a year, although egg laying and hatching may be spread out over several weeks.

Nymph damage to grass is usually obvious by mid- to late July. By this time, the nymphs are large enough to

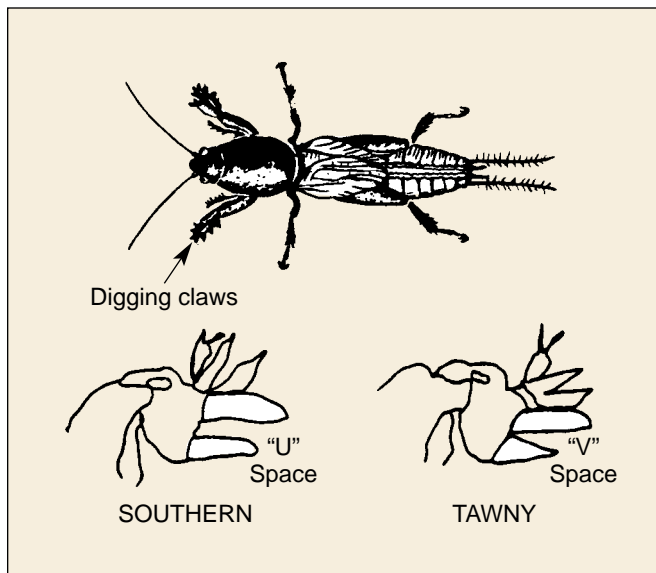


Figure 1. Characteristic digging claws of pest mole crickets

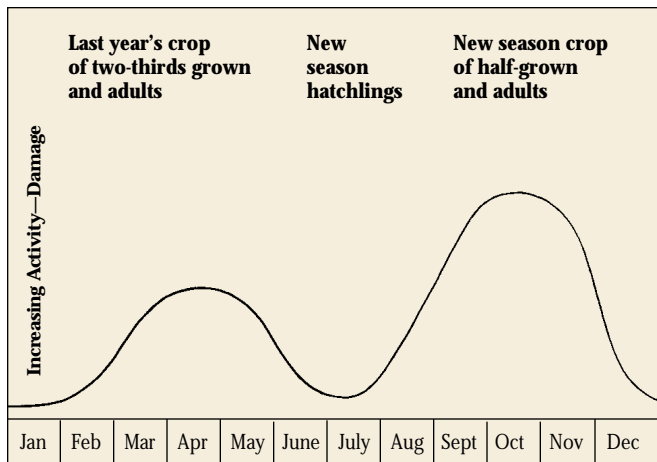


Figure 2. Mole cricket activity in central gulf coast areas

cause noticeable feeding and tunneling damage. Many mole crickets reach maturity by fall and fly again. However, mating is not known to occur during the late season (Figure 2).

Control

Mole cricket control depends on the season of the year and the life stages that the pests are in at the time. Mole cricket control is not a one-time, one-insecticide application. Control depends on an annual, well-timed plan. Timing of controls and cultural practices is as important as the choice of insecticides.

Overwintered mole crickets become active in March and April. Treatment at this time is optional except in highly maintained turf areas or sod fields. Early spring treatment reduces tunneling damage but usually does not replace treatment later in the season.

The major effort in tawny mole cricket control with insecticides should be directed toward young nymphs. Treatments in June, July, and even early August on the more vulnerable nymphs are more effective than later treatments on larger mole crickets. Parasitic nematodes that attack adult mole crickets can be applied in the spring before female mole crickets lay eggs.

Sometimes it is difficult to convince homeowners to treat in late June or July because by that time, there is little (if any) evidence of the spring's mole cricket damage. If mole crickets were active in an area during March, April, and May, there are usually treatable populations of new-generation nymphs that hatch there in June and July. By the time mole cricket damage is visible, control efforts are more difficult. Treatment time in early summer (June and July) is related to when tawny mole crickets hatch. In Alabama, hatching most years begins anywhere from mid-May to early June.

Verify the presence of young nymphs by monitoring the area with the soap flush technique. Mix 2 tablespoons of lemon-scented liquid dishwashing detergent in 1 gallon of water. Pour the soapy water onto 1 to 2 square feet of infested area. Any mole crickets present



Mole cricket developmental stages from egg to adult



Mole crickets flushed out by soapy water

will surface in a few minutes. This is best done early or late in the day. Irrigate the area after flushing to minimize sun scalding of the turf. This technique can be used at other times during spring to fall to confirm the presence of mole crickets and to monitor development. Spring weather patterns and moisture conditions contribute to developmental timing.

An assessment of spring tunneling activity on golf courses, sod farms, and other large turf areas can aid in reducing the area treated and pesticide usage when new-generation nymphs hatch later. Map larger turf areas in the spring, showing areas of overwintered mole cricket activity. Maps of fairways or fields can be made by using landscape plantings or distance markers as landmarks. Target these sites for treatment during June or July. Mole cricket mapping saves labor and usually reduces pesticide usage and costs.

The following charts include recommended insecticides for homeowner and professional use. **Be sure to follow label directions precisely and apply only to registered sites as directed.**

Insecticide Recommendations for Homeowner Use

Insecticide*	Amount To Use	Comments
SPRING (March, April, May)		
**acephate ORTHENE Turf, Tree, And Ornamental Spray or PINPOINT 15G	1 ¹ / ₃ oz. or 6 T. 0.45 to 0.75 lb./1,000 sq. ft.	Apply Orthene Turf, Tree and Ornamental Spray in 1 gallon of water per 1,000 square feet. Keep grass watered and packed down where tunneling occurs and fertilize properly. Orthene TT&O may reduce tunneling damage but does not replace summer treatment.
SUMMER (June, July, August)		
acephate ORTHENE Turf, Tree, And Ornamental Spray or PINPOINT 15G	1 ¹ / ₃ oz. or 6 T. 0.45 to 0.75 lb./1,000 sq. ft.	Apply in 1 gallon of water per 1,000 square feet from mid-July. Repeat applications are necessary.
Or, chlorpyrifos DURSBAN 0.5% Mole Cricket Bait or, isofenphos OFTANOL 1.5G	3 lb./1,000 sq. ft. 1 application/year no more than 2 years	Apply as label directs from mid-July to September. Repeat applications are necessary. Apply 3 pounds per 1,000 square feet in mid- to late June, one application a year.
FALL (September, October)		

Spot treat with Orthene or Dursban bait.

Insecticide Recommendations for Professional Use

Insecticide*	Rate	Comments
SPRING (March, April, May)		
Map areas of overwintered mole cricket activity for later treatment of new-generation nymphs during late spring or early summer. Mole-cricket-parasitic nematodes most effectively infect adults that are present in spring and fall.		
Monitor mole cricket development throughout the season!		
**acephate ORTHENE Turf, Tree and Ornamental spray (TT&O) PINPOINT 15G	4 to 5 lb./Acre 20 to 33 lb./Acre	Maintain turf as recommended for grass type. Keep tunneled areas packed down. Orthene may reduce tunneling of overwintered adults but does not replace summer treatment of nymphs.
imidacloprid MERIT .5G MERIT 75WP	60 lb./Acre 6.4 oz./Acre	Apply at or just before first hatch. (If half or more of females collected contain eggs that are hard and beadlike, first hatch can be expected in about 2 weeks or less.)
SUMMER (June, July, August)		
acephate ORTHENE TT&O	3.5 to 5 lb./Acre	Apply Orthene sprays to nymphs older than newly hatched. Most years, applications after 6 weeks from first hatch are most effective.
bendiocarb TURCAM 76W TURCAM 2.5G	2 oz./1,000 sq. ft. 3.7 lb./1,000 sq. ft.	Apply Turcam within 6 weeks of first hatch to young nymphs. Turcam is a RESTRICTED USE pesticide.
chlorpyrifos DURSBAN 50WP DURSBAN 0.5% BAIT DURSBAN 1% BAIT DURSBAN PRO or other registered formulations	5 to 6 lb./Acre 100 to 200 lb./Acre 50 to 100 lb. 4 to 6 qt./Acre	Apply within 2 to 4 weeks after first hatch to young nymphs. Apply bait from 4 weeks after first hatch through mid-September to nymphs. Surface applications of registered formulations may effectively suppress activity on new sod fields (where grass has not completely covered the soil). In Alabama, subsurface applications have been effective from June through July on nymphs.
ethoprop MOCAP 10G	100 lb./Acre	Surface applications of Mocap should be made within 6 weeks after first hatch to young nymphs. Do not apply to wet turf. Subsurface applications have been effective from late May through July in Alabama. Mocap is a RESTRICTED USE pesticide.
fipronil CHIPCO CHOICE .1G		Chipco Choice and its application are available only through company representatives.
fonofos CRUSADE 5G	80 lb./Acre	Apply Crusade within a month after first hatch to young nymphs.
**isazophos TRIUMPH 4E	1.5 fl. oz./1,000 sq. ft., or 0.5 gal./Acre/year	See site and soil texture restrictions on the label. Apply Triumph from 2 weeks after first hatch. Triumph is a RESTRICTED USE pesticide.
isofenphos OFTANOL 5G OFTANOL 2	40 lb./Acre/year 1 gal./Acre/year	Apply Oftanol shortly before or at first hatch. Make one application per year for no more than 2 years.
FALL (September, October)		

Spot treat with Orthene TT&O or Triumph 4E (Restricted rates, Restricted Use pesticide).

Mole-cricket-parasitic nematodes most effectively infect adults that are present in the fall.

*Refer to label for use and site restrictions.

**Acephate (Orthene TT&O) and isazophos (Triumph 4E) are broken down by high pH water. Test pH of spray water and buffer with a commercial buffering solution to pH 5.5 to 6.0.

Key: E or EC = emulsifiable concentrate; G = granular; W = wettable powder

What You Need to Know about Insecticides and Application for Mole Cricket Control

Orthene Turf, Tree, and Ornamental Spray (acephate) is a soluble powder (75%) recommended for mole cricket control at 3¹/₂ to 5 pounds of formulated material per acre, or 1¹/₃ ounces (about 6 tablespoons) per 1,000 square feet. It should be applied in 1 to 2 gallons of water per 1,000 square feet late in the day (or early evening) and not watered in.

Turcam 2.5 G (bendiocarb) is a restricted use pesticide, available by special permit only to professional applicators. Apply within 6 weeks after first observed hatch at a rate of 1.9 to 3.7 pounds of formulated material per 1,000 square feet (2 to 4 pounds of active ingredient per acre). Water in immediately.

Dursban 50WP or Dursban Pro (chlorpyrifos) are spray formulations that should be applied to young nymphs 2 to 4 weeks after first observed hatch. Irrigate within 24 hours prior to and following afternoon or early evening application of registered amounts.

Triumph 4E (isazophos) is a restricted use pesticide, available by special permit only to professional applicators, restricted to use on home lawns, established golf greens and tees, and sod farms on soils that are not sand or loamy sand. Apply 1¹/₂ fluid ounces per 1,000 square feet (2 pounds of active ingredient per acre) per year, as one application or two of ³/₄ fluid ounces per 1,000 square feet (1 pound of active ingredient per acre) each. Water in immediately.

Merit .5G or 75WP (imidacloprid) is the first of a new class of insecticides. It is for professional use only. Merit is a systemic insecticide and moves slowly into plants. Therefore, Merit must be applied early in order to control small nymphs as they hatch.

Mocap 10G (ethoprop) is a restricted use pesticide, available by special permit only to professional applicators, applied at 100 pounds per acre (10 pounds active ingredient per acre). Apply within 6 weeks after first observed hatch and water immediately after application. Do not apply Mocap to wet turf. Mocap 10G is NOT for use on domestic turf.

Oftanol 5G and 2 (isofenphos) are for professional use. Oftanol 1.5G is for home use. Oftanol may not be effective in areas where it has been used more than twice. Limit its use to newly established areas that have not been treated with Oftanol previously. Where it is used, application should be done at first observed hatch and watered in. Application rates are 3 pounds of the 1.5G per 1,000 square feet; 1 gallon of the 2L or 40 pounds of the 5G per acre (2 pounds of active ingredient per acre). Water in immediately. Use only once a year.

Crusade 5G (fonofos) is a granular insecticide registered for use by commercial applicators and turf managers on golf courses and sod farms. Applications of 80 pounds per acre or 1.8 pounds per 1,000 square feet (4 pounds active ingredient per acre) should be made within 6 weeks of first observed hatch. Do not pre-water, but irrigate treated area with ¹/₄- to ¹/₂-inch water after applica-

tion. Best timing for Crusade 5G application is usually within 6 weeks after first observed hatch.

Dursban 0.5% Mole Cricket Bait (chlorpyrifos) is available to homeowners and professional applicators. Baits are most effective from mid to late summer and are applied two or three (or more) times. Rates are 5 pounds of bait per 1,000 square feet; 150 pounds of bait per acre (this can be as effective if divided into two 75-pound-per-acre treatments, 3 to 4 weeks apart). Apply late in the day; do not water in.

Subsurface and Slit Placement are new, experimental technologies by which liquid or granular insecticides are placed into the turf for control of soil insects. High-pressure liquid injection places sprays into the turf from surface nozzles operating at 1,500 to 2,000 psi. So far, Dursban Turf Insecticide (for professional use) is the only insecticide registered for turf that has obtained labeling in Alabama for high-pressure injection.

Slit placement of granular formulations into the turf surface is accomplished with equipment that slices the turf, drops granules, and closes furrows. Equipment of this type was developed from modified slit seeders.

Both types of equipment are available commercially. Contract applications are available from professional applicators.

Advantages of subsurface placement are reduced surface residues, usually increased residual of insecticides, and often control with less than labeled rates. Amount of available soil moisture at time of application, excessive rainfall after application, soil texture, and soil drainage all influence the effectiveness of subsurface applications.

Chipco Choice .1G is the first of a new class of insecticides. Rates of 0.0125 to 0.025 pound of active ingredient per acre control mole crickets throughout the season. Applications and product are available only through company representatives.

Nematodes that infect mole crickets have been used commercially for several years. *Steinernema riobravus* and *S. scapterisci* are nematode species that infect and kill only adult mole crickets. These nematodes do not destroy beneficial insects, nor do they feed on grass plants. Mole cricket infection must occur or these nematodes die. Like most biological control products, mole cricket nematodes do not work like insecticides. Most often, mole crickets are suppressed rather than eliminated. This means that depending on site thresholds, fewer treatments and, thus, less insecticide may be used to control turf damage. Conditions at application are very important. Apply late in the day to warm, moist (prewatered) soil infested with adult mole crickets. Irrigate after treatment. Nematode products are exempt from registration, but the label specifies how to use the product for maximum infectivity. For further information, contact your county Extension agent.

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Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency and the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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