

WARM-SEASON INSECT CONTROL

Strategy through streamlining is keeping turf managers ahead of the pests in southern climates.

by Patricia P. Cobb, Ph.D., Auburn University

The key element to keep in mind when preparing to control insects in Southern turf has been and will continue to be "strategy."

Strategy implies the use of knowledge, planning and skillful management in getting the better of one's adversaries. That's exactly what's taking place among Southern turf managers who are streamlining insect control efforts and treatment costs.

An increased demand for quality turf, coupled with the wide variety of Southern turf insect pests, has created the potential for outrageously expensive control efforts. These increased costs, coupled with today's heightened awareness of environmental protection, have meant developing and adopting new approaches to both old and new insect problems.

An affordable, effective control strategy will use available pesticide information to select and benefit from today's biological, cultural and chemical tools.

Problem insects

Although mole crickets and fire ants remain the most expensive turf insects to control, grub problems continue to become more widespread throughout the Southeast. Spittlebugs, once a coastal problem, now damage turf in most areas of the Gulf States and Georgia.

In 1989, tropical sod webworms, usually found only in central and south Florida, were reported by lawn care professionals in areas along the Gulf Coast.

Annual pests in Florida, southern Georgia and the southern half of the mid-Gulf states, mole crickets have made their way into the Carolinas and

INSECT CONTROL CALENDAR

| Warm-Season* | Late Winter (Mar) | Spring (Apr-May) | Summer (June-Aug) | Fall (Sept-Oct) |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Southern) Chinch Bugs | Replace susceptible turf with resistant or non-host varieties. If overwintered adults become active treat in March with diazinon ¹ (4 lb AI/Acre), Dursban [®] (1 lb AI/Acre), Triumph ² (1 lb AI/Acre), or Oftanol [®] (2 lb AI/Acre). | Control thatch as recommended. Mid-April to May treatments prevent population buildup. Treatments include those listed for late winter. | Damage limited to sunny rather than shady areas spot or area treat damaged grass. Treatment for existing population include those listed for late winter. | Late summer applications usually make fall treatments unnecessary. |
| Billbugs | Treatment can be done now if adults are active. Diazinon ¹ (4 lb AI/Acre) Dursban [®] (1 lb AI/Acre), Oftanol [®] (2 lb AI/Acre), or Triumph ¹ (1 lb AI/Acre), may be used. | Treat adults when they become active as recommended for late winter. | Treat billbug grubs with grub rates of Turcam [®] , Mocap [®] 5G, Triumph ² (if not used earlier), or diazinon ¹ . | Billbug grub infestations discovered now may be more difficult to control. |
| Grubs | Control with insecticides usually does not extend to new generation in late July and August. | Late March-early April treatments are only effective before pupation occurs. Treatment may include Turcam (2-4 lb AI/Acre), diazinon ¹ (4 lb AI/Acre), Triumph ² (2 lb AI/Acre), or Mocap [®] (5 lb AI/Acre). Late summer treatments may still be required if reinfestation occurs. | New generation grubs present by late July-mid August can be controlled with Turcam [®] (2 lb AI/Acre), diazinon ¹ (4 lb AI/Acre), Triumph ² (2 lb AI/Acre), or Mocap [®] (5 lb AI/Acre). For green June beetle grubs: use Sevin [®] (2 lb AI/Acre) Irrigate before treatment in hot, dry conditions. | Treatments are effective most years through Sept. Proxol [®] (8 lb AI/Acre) or Triumph ² (2 lb AI/Acre) are effective for late-season control. |
| Sod Webworm | Treatment is not appropriate at this time. | Warm season grasses out-grow moderate damage. Diazinon ¹ (4 lb AI/Acre), Dursban [®] (1 lb AI/Acre), Proxol [®] (6 lb AI/Acre), Orthene [®] (1/3 lb AI/Acre), or Dipel [®] may be used when larvae are present. | Treat when larvae are present or two weeks after peak moth flight. Treatments include those listed for spring. | Treatment in early Sept. may reduce overwintering population. |
| Cutworms | Treatment is not appropriate at this time. | Apply insecticide late afternoon and do not irrigate immediately unless specified on label. Treatments include Dursban (1 lb AI/Acre), Proxol [®] (6-8 lb AI/Acre), or Sevin [®] (2-4 lb AI/Acre). | In the South cutworms are usually a spring problem. If summer infestations occur treat as directed for spring. | Treatment usually not necessary at this time. |

eastern Texas. Control costs have increased as the tawny mole cricket, one of the pest species, moved north and west.

The cost of controlling mole crickets in Florida usually exceeds \$40 million annually. Florida turf managers, in cooperation with University of Florida scientists, have accelerated biological control efforts in a big way.

Nematodes to the rescue

Parasitic nematodes specific to mole crickets have been released at sites selected throughout the state. Evidence of mole cricket population suppression by these parasites has kindled hope for an effective biological tool for long range control of the Southeast's most damaging turf pests.

A two-year project just concluded in Alabama verified the importance of "knowing the pest" in development of control strategies for mole crickets.

Our project involved monitoring pest populations by soap flushing, mapping areas of overwintered mole cricket activity in early April, and treating only mapped areas later for the newly-hatching generation. Mapping in April accounted both years for 90 percent or more of the total area damaged by mole crickets through the whole season.

Timed applications

Tying treatment dates to first observable hatch—before damage became visible—resulted in effective control with lower than label rates of some insecticides. Thus, the combination of mapping and monitoring seed labor and insecticide costs resulted in more effective control.

Dr. Leon Stacey, turf consultant in Georgia, has also reported success with mole cricket mapping.

Heavy spring rains in 1989 brought an end to the drought in many areas, but provided a perfect environment for two-lined spittlebug development. Once a coastal problem, spittlebugs are now a major lawn problem in cities such as Atlanta and Birmingham—particularly in "wet" seasons.

Management practices, especially dethatching, play a major role in effective control of this pest, yet insecticides are still the backbone of our control efforts.

Newer and safer

New and safer formulations of existing products can be expected. Dustless granular insecticides, such as a new granular Mocap from Rhone-Poulenc, will be the result of new formulation technology.

| Warm-Season* | Late Winter (Mar) | Spring (Apr-May) | Summer (June-Aug) | Fall (Sept-Oct) |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fall Armyworms | Treatment is not appropriate at this time. | Populations usually develop later during summer and fall. | Treatments are most effective in early morning or late afternoon. Use Dursban (1 lb AI/Acre), diazinon ¹ (4 lb AI/Acre) or Proxol ² (6-8 lb AI/Acre). | Apply as directed for summer. Fall armyworms are usually a greater problem in Sept. - Oct. than earlier. |
| Fire Ants | Treatments are less effective at this time. | One of the following baits: Amdro (1.5 lb bait/Acre), ProDrone (.88 lb bait/Acre), Affirm (1 lb bait/Acre), Logic ² (1-1.5 lb bait/Acre), or Oftanol ² (.05 lb AI 1000 sq ft.) may be used for area treatment. Wait a week after bait application and treat existing mounds with a registered contact insecticide such as diazinon, Dursban or Orthene. | Treat mounds as reinfestation occurs with registered formulations of diazinon ¹ or Dursban ² or Orthene ² 75S dust (2 tsp/ mound) | Area treatments as described for spring may be done in heavily-infested areas. Apply controls for area or mound treatments early in the morning or late in the day. Irrigate before treatment if drought conditions exist. |
| Mole Crickets | Treatment of overwintered populations is optional in most areas, and does not substitute for summer treatment of nymphs. Tunneling at this time can be reduced somewhat with Orthene sprays (3.5 lb AI/Acre). Rolling, fertilizing and irrigating warm-season grasses speeds recovery. Map areas of overwintered mole cricket activity for summer treatment of nymphs. | Monitor areas mapped in March or April weekly with soap flushes to determine when hatching. If hatching occurs in your area before June treat as recommended for summer. | Apply one of the following within six weeks after first observed hatch: Mocap ² (7.5 - 10 lb AI/Acre) Oftanol ² in areas where used less than two years (2 lb AI/Acre), Triumph ² (2 lb AI/Acre), Turcam ² (2 lb AI/Acre), or Sevimol ² (6-8 lb AI/Acre). High pressure injection (1500-2000 psi) specialized equipment of Dursban ² (2 lb AI/Acre) can be done in states where labeling permits. Spot or area treat later in summer with Orthene ² (2.6-3.5 lb AI/Acre) or Dursban ² bait (75-150 lb bait/Acre). | Spot treat with Orthene (2.6-3.5 lb AI/Acre) or Dursban bait (75-150 lb bait/acre) Triumph ² (2 lb AI/Acre) is effective late season. |
| Two-Lined Spittlebug | Treatment is not appropriate at this time. | Treatment usually not necessary at this time. Dethatch turf when appropriate. | Mow, irrigate several hours or the day before treatment. Spray with diazinon ¹ (4 lb AI/Acre) or in less thatchy turf with Dursban ² (1 lb AI/Acre). | Treat infested areas as described for summer. |

* Review accompanying text for details. Follow label directions for specific application instructions.

¹ Diazinon may not be used on golf courses or sod farms.

² Triumph is registered federally for commercial lawn applicator use. Triumph is also registered in some states (24c-Special Local Needs Labeling) for use on golf course tees, greens and aprons and sod farms meeting soil type requirements. Two pounds active ingredient may be applied annually, either as one application or two at 1 lb AI/Acre each.

Source: Dr. Cobb

New formulations of Triumph from Ciba-Geigy and fonofos from ICI are expected this year. Registration of new pyrethroids for turf insect control is also expected.

High pressure liquid injection of insecticides (1500 to 2000 psi) continues to be of interest to turf managers and researchers. This system, developed by Cross Equipment Co. of Albany, Georgia, injects material without slicing as nozzles move over the turf surface.

Advantages of this system include effective control of mole crickets and grubs with lower-than-label rates of certain insecticides and reduced surface residues. (In some states special labeling is required for insecticide application by high pressure injection equipment).

Southern turf in many areas now includes a variety of traditionally

cool-season fescues and ryegrasses. Those varieties that are endophyte-containing (plant within a plant) have long been known to be less damaged by surface-feeding insects.

Dr. Dan Potter of the University of Kentucky, reports results of tests in which certain endophyte-bearing grasses were less damaged by grubs.

During the past decade, southern turf insect problems have become more severe. To what extent the loss of organochlorine insecticides, increased turf quality, expanded pest ranges or the probable combination of factors is responsible, we can not say with certainty. What we can say for sure is that turf professionals have responded positively.

Continued restrictions

Restrictions on pesticides and pesticide use, and increased product

costs have resulted in our examining our options more closely. Basic pest information has taken on new meaning as we learn more about how to manipulate cultural practices to disrupt pest life cycles.

New technology in product formulations, production of biological control agents, and application methods promises greater applicator and

environmental safety.

In summary, Southern turf managers have and are meeting the challenge of cost-effective insect pest control by increasing their knowledge and expertise, supporting research and extension efforts, and through skillful planning.

In other words, it's the same important basic message: (1) Know all you

can about the pest; (2) Know your control options; (3) Develop your strategy and time efforts effectively, considering long range as well as immediate effects.

The general information offered here is intended to assist the Southern turf manager with developing control strategies for common insect pests.

SPRING (April-May)



Early April treatments of chinch bug and billbug adults may eliminate egg layers and reduce damage later in the season. Chinch bug treatments in May reduce the first nymphal (immature) population that is responsible for June damage.

Turf areas that don't "green up" need to be checked for grubs. If grubs are not in the pupa stage, treatment can be done, but may have to be repeated later in the summer if re-infestation occurs.

Mole cricket hatching begins in May in most areas. Infested turf should be monitored weekly with soap flushes (2 tbs. liquid dishwashing soap in 1 gal. water) in order to determine when first hatch occurs. Be sure to monitor late or early in the day, then flush area with plain water to avoid excessive turf "scalding" by the detergent.

Treatments to reduce spring tunneling are considered optional in most areas.

Sod webworm caterpillars that overwintered in turf

usually pupate and moths emerge in April. Larvae usually hatch about two weeks after moth flights peak. Treatments to infested turf two to three weeks after moth flights peak can eliminate damage.

Cutworm moths often lay their eggs in aeration holes on golf greens in the spring. Larvae hatch and feed at night. Apply insecticides late in the day, and irrigate after treatment only if specified by the label.

Fire ants establish new colonies after rain on warm spring days. During this time fire ants are active on and near the soil surface. New mounds may not be visible above the turf for several days. Infested turf of an acre or more can be broadcast-treated with a fire ant bait.

Allow a week for foraging workers to pick up bait particles, then treat all visible mounds with a contact insecticide to eliminate workers. Treat mounds as re-infestation occurs.

This plan is usually less labor-intensive than simply mound-treating all season, and often results in less pesticide usage.

Ground pearl nymphs hatch during the spring, although treatment has not been shown to be effective. Healthy turf, including disease and nematode control, are important in preventing further damage.



Spittlebugs, once only a coastal problem, now damage turf in most areas of the Gulf states and Georgia. Nymph damage will first appear in June or July, according to Auburn's Dr. Pat Cobb.

SUMMER

(June-August)



Chinch bug damage usually first appears in dry periods of June. During wet seasons, chinch bug damage is less severe. Billbug grubs are in the soil, and can be treated in June. Check turf areas where adult billbugs were active in the spring.

Adults of most grub species peak in June and "new generation" grubs are usually present by mid-August. During the drought years beetle emergence was delayed, and grub survival less.

August grub treatments may need to be preceded by irrigation if drought conditions exist. The moisture moves the grubs closer to the surface and contact with the insecticide. This does not replace irrigation after treatment.

Green June beetles emerge over a long period during summer and the grubs may have to be treated in some areas more than once. Remember, lower rates are usually very effective in controlling green June beetle grubs. However, the fact that the grubs surface to die is a nuisance in itself.

Mole crickets can be effectively controlled in most areas during June and July. Later treatments become less effective. Residual treatments are most effective if timed within six weeks after first observed hatch.

Sevinol sprays are effective on newly-hatched nymphs. Baits are most effective in most areas from July through August. Orthene sprays are usually most effective

after six to eight weeks from first observed hatch.

Pre-treatment irrigation is a "must" because it encourages mole cricket activity nearer the soil surface.

Sod webworms may damage warm season grasses severely during late June through August. Infested turf should be treated two weeks after peak moth flights in order to control hatching larvae.

Tropical sod webworms can be controlled best with registered formulations of B T. (Dipel).

Area treatments for fire ant control can still be effective in June unless drought conditions exist. Mound treatments are most effective if timed early or late in the day. Spittlebug damage from nymphs feeding deep in the turf is usually first noticeable in June and July.

The progression of symptoms resembles chinch bug damage-yellow spots that brown and die. Unlike chinch bug damage, yellow spots from spittlebug feeding usually first appear in shady areas. Within these areas masses of "spittle" containing cream-colored nymphs can be found deep in the turf.

Adult spittlebugs are especially attracted to Japanese hollies, and may move from these shrubs to the turf. All common warm-season turfgrasses are susceptible to damage, and damage was also reported on lawn fescue in 1989.

Fall armyworms are reported along coastal areas by late June or July most years. Bermudagrasses are preferred, although damage is usually not permanent.

Grasses infested with ground pearls should not be allowed to suffer from drought stress. These scale insects contribute to the decline of turf that is further stressed by such factors. Ground pearl treatments have not been effective.

FALL

(Sept.-Oct.)



Control in the fall is often complicated by such factors as hot, dry, conditions; slowed turf recovery; and larger, more difficult-to-control insect pests.

Sob webworms and fall armyworms are best controlled earlier in the fall. Overwintering sob webworm larvae are extremely difficult to control in late September and October.

Treatment of overlapping generations of thatch-dwellers such as chinch bugs and spittlebugs may result in less effective control of existing populations.

Soil insects such as grubs, mole crickets and fire ants are less active near or on the soil surface during dry fall weather. Irrigating turf before and after treatment can be essential for effective control.

Mole cricket dispersal flights take place in the fall. This complicates fall treatment, and spot treatment with Orthene or Triumph (where label permits) may be necessary.

Once rains begin, use baits, followed by mound treatments, in areas heavily infested with fire ants.



Areas that are heavily infested with fire ants require broadcast treatment, the author says.

LATE WINTER

(Nov.-Dec.)



Billbug and chinch bug adults may become active in March some years. Chinch bugs prefer varieties of St. Augustinegrass (except Floratam in most extreme southern areas). Billbugs prefer zoysias and bermudagrasses.

Treat infested turf during mid-day when chinch bug and billbug adults are most active. Treatment at this time can prevent population build-up and turf damage in June and July.

Late season reinfestation may occur from unmanaged areas. Evidence of "varmint" digging—armadillos, skunks, raccoons—may indicate grub or mole cricket activity. Generally, treatment at this time is "second best" for these pests.

Grubs often reinfest the same areas, and can be effectively controlled in the smaller, more susceptible stage in middle to late summer. Mole cricket nymphs are easier to control in June than the overwintered nymphs and adults are at this time.

New technology promises greater applicator and environmental safety.

Areas of grub or mole cricket activity can be "mapped" now and targeted for monitoring and treatment later. Warm season grasses usually recover from spring damages. Grub-infested cool season grasses may have to be treated before grubs pupate in order to reduce further damage before the turf enters summer dormancy.

Usually, Mole cricket mating flights begin in March.

LM



More than \$40 million is spent annually on mole cricket control in Florida. Still, late-season damage remains a common site on southern landscapes.

Cultural practices are important weapons when battling insects

The following is a brief look at several cultural practices you can employ to reduce pest populations in turf areas.

Dethatching: Follow extension recommendations for specific turfgrasses. Thatch control increases movement of insecticides through turf and decreases moisture, which is essential for spittlebug development.

High pressure liquid injection: HPLI (1500-2000 psi) is a new technique whereby lower rates of certain insecticides are being used to control mole crickets and grubs with reduced surface residues.

Mapping: Initially done for grub treatments in northern Alabama, this procedure has also proven successful in reducing area treated and pesticide usage in mole cricket control. Areas of overwintered populations are located and marked on a map of the turf site (such as golf course fairway maps, lined football fields and home plant profile map). These areas are then treated when the more susceptible "new generation" insects are present, before visible turf damage appears.

Monitoring: This procedure is designed to verify the presence of certain pests or pest stages. Examples include soap flushes, which can be used to detect the presence of

cutworms, fall armyworms, sod webworms, mole crickets and green June beetle grubs. Flushes are best done in late May. Irrigate the area afterward to prevent scalding.

Another method is to cut a square foot of sod on three sides, fold back, shake turf and count the grubs present.

A third practice is to cover a plug of turf with water and count the chinch bugs that float to the surface.

Plant selection: Choose plant varieties that are less-susceptible to insects present in your area. For example, chinch bug-resistant varieties of St. Augustinegrass, endophyte-infected fescues and ryegrasses resistant to surface feeders. Japanese hollies planted near centipede grass lawns make an ideal setup for spittlebugs. Choose a "less-deadly" combination.

Pretreatment irrigation: Soil insect pests including grubs, mole crickets and fire ants are more active in moist soil. Watering before treatment of mole crickets is essential. Watering before grub or fire ant treatments during drought can improve control. These pests move closer to the surface in response to moisture and therefore make contact with the insecticide.

—Dr. Cobb □