

An Integrated Approach to Insect Management in Turfgrass: Sod Webworms

Fact Sheet FS1007

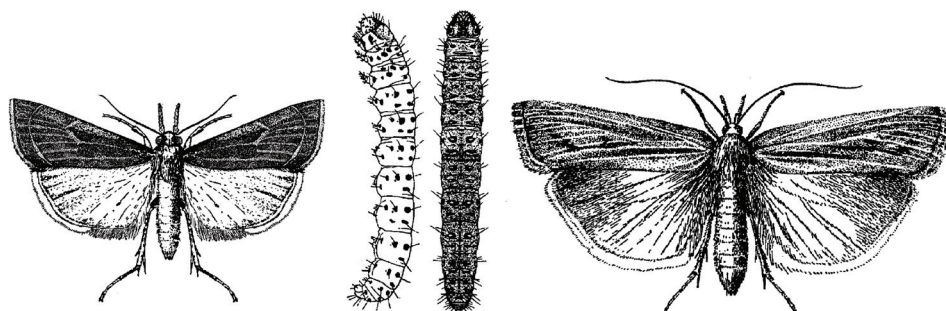


Figure 1

Cooperative Extension

Albrecht M. Koppenhöfer, Extension Specialist, Turfgrass Entomology
Richard J. Buckley, Director, Plant Diagnostic Laboratory

Introduction

Sod webworms (SWW) are small caterpillars that live in silk-lined tunnels in the thatch and soil below turfgrass. Adult SWW moths, also called 'lawn moths' or 'snout moths', are small, buff-colored moths that hover over turfgrass at dusk. More than 20 SWW species attack turfgrasses across North America, but usually only two to three species are pests in a given area.

Common species in New Jersey include the bluegrass webworm [*Parapediasia teterrella* (Zincken)] and the larger sod webworm [*Pediasia trisepta* (Walker)]. SWW can damage all cool-season grasses including Kentucky bluegrass, most fescues, perennial ryegrass, and bentgrass.

Symptoms of Infestation

SWW chew off leaves and stems just above the grass crown. Healthy well-maintained turf will often tolerate and recover from this scalping. However, weak or drought-stressed grass may be killed by sun-exposure of the crowns. Damage begins as general thinning, followed by small patches of brown, closely-cropped grass. A close look will reveal the typical silk-lined SWW tunnels, often with clumps of pinhead-sized, green fecal pellets around the mouth of the burrows. In severe infestations, the scattered patches may coalesce into large irregular areas. Because most SWW species don't feed on grass roots, the damaged grass remains firmly anchored.

Damage is most common in sunny sites during hot, dry periods. Early symptoms of damage may be masked by dormancy in drought-stressed grass, but this grass will not recover after rains. Flocks of birds probing in the grass may indicate SWW infestation but the birds may also be feeding on other insects.

Insect Description

SWW eggs are tiny (size of dot on this "i") and oval-shaped or barrel-shaped, with longitudinal ribbing on the surface.

SWW larvae are beige, gray, brown or greenish (depending upon species) with a brownish head. Most species have characteristic dark, circular spots and coarse hair scattered over their body. Fully-grown larvae range from 5/8" to 1" (16 to 25 mm) in length.

SWW pupae are torpedo-shaped, tan to dark brown, and 3/8" to 1/2" (10 to 13 mm) in length. Pupae of most species are enclosed in silken cocoons in the soil. The cocoons are covered with bits of fecal matter, soil, and plant debris.

Adult SWW are small dull-colored moths (wingspans 3/4" to 1"). The front wings are mostly whitish, dull gray or tan, with longitudinal stripes or other faint markings in silver, gold, yellow, brown and/or black depending on species. The hindwings are usually lighter with delicate fringes on the outer margins. Because the wings are typically rolled around the body, resting adults resemble slivers of wood or grass stems. A snout-like projection formed by the mouthparts extends forward from the front of the head (→ 'snout moths').

Seasonal History and Habits

SWW overwinter as partially grown larvae in silk-lined chambers in the thatch or soil. They resume feeding in spring, grow rapidly, and pupate. The moths emerge after 10 to 20 days, mate, and the females start laying eggs. Eggs are dropped individually during flight and settle in the upper thatch. A total of 30 to 500 eggs (depending on species) are laid during

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New Jersey Agricultural
Experiment Station

Rutgers, The State University of New Jersey
88 Lipman Drive, New Brunswick, NJ 08901-8525
Phone: 732.932.5000

a life span of usually < 14 days. Depending on temperatures, eggs hatch in 4 to 20 days and the larvae develop through usually 6 to 8 larval stages in 4 to 7 weeks.

Young larvae feed by scraping surface tissue off the leaves, but soon drop to the ground and start feeding from their typical tube-like silk-lined tunnels made in the thatch or surface soil. The older larvae chew down foliage around their burrows mainly at night. Most SWW have two (e.g., bluegrass webworm) or two to three (e.g., larger SWW) generations per year.

Monitoring

The best way to confirm a SWW infestation is to get on your hands and knees for a close examination of the turf, part the grass and look for chewed blades, small green fecal pellets, silk-lined burrows, or the larvae themselves. Check the interface between damaged and healthy grass.

If SWW are suspected but cannot be found, use an irritant solution to flush up the larvae. Mix one ounce of liquid, preferably lemon-scented dishwashing soap (e.g. Joy®) in two gallons of water and apply over 1 square yard of turf. Most SWW, other caterpillar pests, chinch bugs, and billbug adults will come to the surface within 5 to 10 minutes (small SWW might take up to 20 minutes). The insect will be more visible in shorter mown turf but the caterpillars will tend to climb up the grass leaves. The method works better in moist soil and in the morning when the larvae are close to the surface. Irrigate the sampled area afterward to reduce any chances of sun scalding.

Damage thresholds vary considerably for different situations. On short-cut bentgrass on golf courses, fewer than 10 larvae per one square yard may warrant control; on medium to low maintenance lawns with sufficient irrigation or rainfall, as many 200 larvae per one square yard may not cause damage.

The best time to check for larval populations can be determined by monitoring the adult populations. For some species, commercial sex attractant lures are available (e.g., bluegrass webworm). The simplest monitoring method is to regularly walk the turf at sunset after daytime temperatures warm to 80°F (26°C) and night temperatures are above 55°F (13°C). Adult moths will skitter in low zig-zagging flight over the grass. Note the peak adult flight activity; 10 to 14 days later most of the larvae will have hatched.

Management

A healthy, vigorous turf and balanced fertility and irrigation during dry periods will enhance the turf's tolerance to SWW feeding. Endophyte-enhanced (infected with *Neotyphodium/Epichloë* endophytes) perennial ryegrasses and fescues are relatively resistant to SWW.

Natural Enemies

Various species of parasitic wasps and flies and predatory insects such as ground beetles, rove beetles, and ants, and many bird species prey on SWW eggs, larvae, pupae, and adults. Predators and parasites often keep SWW populations at tolerable levels.

Treating lawns preventively will 'control' the parasitic and predatory insects and may encourage SWW outbreaks later in the year.

Chemical Control

SWW are fairly easy to control on a curative, as-needed basis. Always confirm potentially damaging SWW infestations through sampling or inspection before considering control measures. Controls have to be directed against the feeding larvae, not the moths.

To aid in locating control products, active ingredients listed below are followed by the trade names in parentheses. Consumer product names are not listed because active ingredients tend to change too often. When purchasing control products, always check the label for the active ingredient. Always read instructions on insecticide labels very carefully

Effective insecticides for SWW control include the neonicotinoid clothianidin (Arena®); the oxadiazine indoxacarb (Provaunt®); the anthranilic diamide chlorantraniliprole (Acelepryn®); the pyrethroids bifenthrin (Talstar®, Ortho®Lawn Insect Killer Granules), cyfluthrin (Tempo®), deltamethrin (Deltagard®), lambda-cyhalothrin (Battle®, Scimitar®), and permethrin (Astro®); the carbamate carbaryl (Sevin®); the organophosphates acephate (Orthene®, Address®), chlorpyrifos (Dursban®; not for residential turf or where children may be exposed), and trichlorfon (Dylox®). Chlorpyrifos, deltamethrin, and lambda-cyhalothrin are presently only available for commercial use.

Biorational insecticides include those that are less toxic and more environmentally benign. They are safer to use and, unlike most traditional insecticides, they have only minimal direct effects on beneficial insects including the predators and parasites of SWW and other turfgrass insect pests.

Biorational insecticides include the naturalyte spinosad (Conserve®, Bull's Eye™), the insect growth regulator (molt accelerator) halofenozide (MACH 2®), and the botanical azadirachtin (an extract from seeds of the neem tree) (e.g., Bioneem®, Azatrol®).

The traditional insecticides chlorantraniliprole, indoxacarb, and clothianidin also have excellent risk profiles and can be considered least toxic and safer on beneficial insects.

Chlorantraniliprole, indoxacarb, spinosad, and halofenozide are just as effective as the other insecticides

Be aware that products containing azadirachtin are effective only if applied against young larvae. A considerable quantity of azadirachtin must be eaten by larvae in the 1st to 3rd instars to get the best control. Application when SWW damage shows up is often too late. A vigorous monitoring program, however, will help to properly time the treatments and maximize control. Remember that as generations overlap later in the year, larval populations will be less uniform and control will be less effective because only the smaller larvae will be controlled at that time.

Optimizing Chemical Control

Try to apply late in the afternoon or evening because the larvae feed at night and control materials may be broken down especially during hot and windy days. Liquid sprays often work better than granules for SWW control. Apply in about 2 gal/1,000 ft² (8 L/100 m²).

It is paramount not to water treatments in, and withhold deep irrigation and mowing for 1–2 days to leave the residues on the grass. Therefore, do not tank mix the treatments with other pesticides. Granular formulations must be activated with a light post-treatment irrigation (1/8"=3 mm).

Rotate materials of different chemical classes to reduce the chance for resistance problems or enhanced microbial degradation. Always read instructions on insecticide labels very carefully.

Biological Control

Products that contain the insect-parasitic nematode *Steinernema carpocapsae* (e.g., Ecomask™, Millenium®, Carpsanem) give good SWW control. Nematodes need moist soil for optimal performance. Apply with sufficient water (2-5 gal/1,000 ft²–8–10 L/100 m²) and then water in immediately (at least 1/10"–2.5 mm). To avoid heat and direct sunlight exposure of the nematodes apply in early morning

or late in the day. Because these nematode products contain living organisms, they have to be handled and stored with more care than chemical insecticides. They have the advantage of no reentry interval due to their non-toxicity to humans.

Products containing the insect-pathogenic bacterium *Bacillus thuringiensis* (Bt) subspecies *kurstaki* (DiPel®, Javelin®) or Bt subspecies *aizawai* (XenTari®) are effective only if applied against young larvae so vigorous monitoring and precise application timing are essential. They have the advantage of no reentry interval due to their non-toxicity to humans.

Figure Captions

Page 1 (l-r): Adult bluegrass webworm, sod webworm larva (side/top view), and adult larger sod webworm.

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Revised March 2010

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