

Turfgrass Insects

Department of Entomology

MANAGING BLACK CUTWORMS IN TURFGRASS

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HOW TO USE THIS PUBLICATION

This publication provides turfgrass management professionals and golf course superintendents in Indiana and throughout the Midwest with information to 1) properly identify the black cutworm, 2) understand black cutworm biology, 3) recognize black cutworm damage, and 4) formulate safe and effective black cutworm management strategies. For information on turfgrass identification, weed, disease, and fertility management, visit the Purdue Turfgrass Science Website (<https://turf.purdue.edu>) or call Purdue Extension (888-EXT-INFO).

DISTRIBUTION

The range of black cutworm *Agrotis ipsilon* encompasses the entire continental United States but varies seasonally, as it does not tolerate colder temperatures. It has four to five generations in the southern-most states, three to four in the transition zone, and 2 to 3 generations in the most northern parts of its range including Indiana.

Larvae are the damaging stage; adults feed only on nectar. It is a well-known pest of corn, cutting the stalks at the base without consuming the rest of the plant. The larvae also feed on turfgrasses, causing notable damage on closely mowed turf. This feeding makes it a common pest of golf course putting greens and tees. It is not known to cause significant damage in higher cut turf.

IDENTIFICATION AND SEASONAL BIOLOGY

Adult

The black cutworm moth is mottled brown/black in color and bears dagger-shaped marking on the forewings (Figure 1). The marking can also be described as a dart below a kidney-shaped spot. The wingspan of the forewing can range between 1.25 - 2 inches (32-51mm).

Egg

The egg is a creamy yellow color and the shell is smooth, bearing no visible markings. Adult females attach single eggs to the tip of a blade of grass (Figure 2).



Figure 1. Black cutworm adults have distinctive dagger-shaped markings on each wing.



Figure 2. Black cutworm eggs are usually laid singly and toward the tips of grass blades making them easy to remove by mowing.

Larva

The black cutworm caterpillar's body appears green-gray to almost black, with a lighter gray underside and a broad stripe of lighter gray or brown down the middle of the back (Figure 3). The body is hairless, excluding a few bristles. The head capsule is darker than the body and when fully grown, the larva is about 2 inches (50 mm) in length.



Figure 3. Black cutworm larvae are green-gray to almost black, with a lighter gray underside and a broad stripe of lighter gray or brown down the middle of the back.

Seasonal Biology

Black cutworms overwinter in the southern-most states as pupae and adults. Adult moths travel northward from southern states on weather fronts from April through May. The adults mate upon arrival in and begin laying eggs. Eggs are laid singly on the tips of grass blades, but one female can lay as many as 1600 eggs. The eggs hatch into caterpillars a few days later and the caterpillars burrow into the thatch and soil, emerging to feed at night. As the larvae get larger, they may crawl considerable distances overnight making them capable of infesting shorter-cut turfgrass areas from surrounding higher-cut areas. Larvae generally pupate in late May and emerge as adults by early June. A second generation of larvae appears throughout July and a third generation of larvae is often present through September. Cold temperatures during October usually kill remaining individuals. Because it is an important pest of several crops, pheromone traps are used by Purdue Extension Entomologists to monitor adult black cutworm activity Statewide in Indiana.

DAMAGE AND DIAGNOSIS

Initially, black cutworm damage can be misdiagnosed as ball marks or other depressions in highly manicured turf. These pockmarks become more irregular as the caterpillar continues to feed. This kind of damage may interfere with play on golf courses and can be unsightly when large numbers of caterpillars are present (Figure 4).

Detection and Monitoring

Black cutworms only come out to feed during the night and generally hide during the day. This feeding behavior



Figure 4. Over time, pockmarks caused by black cutworm larval feeding become more irregular in shape.

means extra effort is needed to find evidence of the caterpillar's presence before damage occurs. The presence of birds, especially the European starling, foraging on turf can indicate the presence of black cutworms or other caterpillars such as sod webworms. Birds will leave probe marks when searching for cutworm pupae or larvae in the grass (Figure 5). Tufts of loose grass around probe markings can indicate where birds have pulled up larvae or pupa from the thatch or soil.

A more direct approach to monitoring for black cutworms is to apply a soapy water flushing solution. Adding two tablespoons of liquid detergent to two gallons of water will create a solution that can be applied to one square yard of turf using a watering can. The best detergent for soap flushing is lemon-scented Joy, but Ultra Dawn and Ivory Clear also do not damage turf when used. Avoid using Palmolive. A few minutes after application, larvae become irritated by the soap flush and rise to the surface, largest to smallest. Watch video below on soapy water flushing for black cutworms in turfgrass. Larvae can then be collected for identification. Flushes should occur in the morning when the larvae are still close to the surface. Turf should be well-irrigated for best results. Soap flushing can also be performed after insecticide applications to assess efficacy.



VIDEO: Soapy water flushing for black cutworms in turfgrass.

BLACK CUTWORM MANAGEMENT

Black cutworm management relies on a combination of cultural, biological, and chemical tools aimed at keeping populations below damaging levels. Although observation of the migrating adults may forecast a potential future problem, only management of the larvae will reduce damage.



Figure 5. Birds foraging for black cutworms often leave probe marks in the turf.

Cultural Tools

The primary challenge for turfgrass managers is striking a balance between the functional and aesthetic requirements of the turf and maintaining an environment that is suitable for beneficial organisms and the services they provide. Sound cultural practices include 1) selection of turfgrass species and cultivars that are well adapted for a specific site or use and 2) proper mowing, fertilization, irrigation, thatch management and cultivation to promote healthy vigorous turf. Such turf is capable of tolerating or quickly recovering from insect feeding and serves as the foundation of “integrated pest management” (IPM).

Proper mowing is essential for controlling black cutworms on high maintenance turfgrass. Mowing tees and putting greens every morning removes the majority of the eggs laid the previous night. The clippings should be collected and disposed of a fair distance away from susceptible playing surfaces to avoid re-infestation by wandering larvae that may still hatch from eggs collected with the clippings. Cutworm larvae readily inhabit aeration holes (Figure 6), so filling these openings with sand or other top-dressing material soon after aeration may reduce their attractiveness.



Figure 6. Black cutworm larvae will readily inhabit aeration holes left unfilled with topdressing material.

Resistant Turfgrasses

Selection of appropriate turfgrass varieties can play an important role in black cutworm management because they are less likely to suffer damage and recover quickly if damage should occur. Although the turfgrass areas most vulnerable to black cutworm damage (golf course greens and tees) are closely mowed and generally planted to creeping bentgrass, the collars, aprons and approaches surrounding these areas are often planted to different turfgrass species and maintained at a higher cut. Black cutworm damage is rarely visible in higher cut areas, but these areas may serve as a reservoir for larvae that are capable of migrating onto

more closely mowed areas. When complemented by proper mowing, irrigation, and fertilization, planting resistant turfgrass varieties in these potential reservoir areas can help reduce the need for chemical insecticides.

Resistant Kentucky Bluegrasses

Kentucky bluegrass is generally resistant to black cutworm larvae. When planted in *Collars*, *Aprons*, and *Approaches*, Kentucky bluegrass may deter black cutworms from moving through these areas to reach more sensitive areas such as putting greens when they become larger and more mobile.

Endophyte-Enhanced varieties

Endophyte-enhanced (E+) cultivars of perennial ryegrass, tall fescue, and creeping red fescue provide some resistance to black cutworms. E+ turfgrasses harbor microscopic fungi (*Neotyphodium spp.*) that deter above-ground insects (Fig. 1). E+ turfgrasses also benefit from improved tolerance to environmental stresses such as heat and drought and they can greatly reduce reliance on insecticides. However, the effects of E+ turfgrasses on black cutworm larvae are generally sub-lethal and have not been shown to completely stop black cutworm feeding and development.

Biological Controls

Although a host of pathogens, predators, and parasites will attack and kill black cutworm larvae, commercially-available biological controls are limited primarily to the insect-parasitic nematode *Steinernema carpocapsae*. When used properly, it can provide good control and is generally safer than chemical insecticides. However, special considerations must be made when using them. Nematode products should be refrigerated upon arrival and stored as briefly as possible. Nematode viability should be checked prior to application. After mixing, nematodes should be applied immediately. Applications should be made in the evening and irrigation should immediately follow. Screens should be removed from spray nozzles and spray equipment should be pressurized to a maximum of 50 psi. CO₂ should not be used to pressurize spray equipment as nematodes may be asphyxiated. *Steinernema carpocapsae* is available under the trade names Millennium® (BASF), NemAttack™ (Arbico Organics) and others.

The black cutworm has several natural enemies and while they are not commercially available, they can assist in management. Ants will attack any caterpillars they come

across, but are killed by many insecticides used in turfgrass. Tachinid flies will lay their eggs on caterpillars, where their larvae will hatch and then excavate the host's body. As mentioned previously, birds eat black cutworm caterpillars, but cause minor damage by pulling up turf in the process. The baculovirus virus (*AgipMNPV*) infects and kills black cutworms without any danger to humans or wildlife. The virus can be spread through ingestion, mating, and egg-laying. However, outbreaks usually only occur in high population densities which is contradictory to IPM. Finally, two species of entomophagous fungi, *Beauveria bassiana* and *Metarhizium anisopliae* can also infect larvae, but they may not perform well on turf receiving regular fungicide applications.

Chemical Insecticides

A curative strategy using chemical insecticides is the most efficient strategy for achieving control of black cutworms. This strategy relies on careful monitoring to identify black cutworm larval activity, followed by timely application of an effective insecticide. Black cutworm larvae can be managed with a wide assortment of insecticides and Table 1 provides a list of insecticides recommended for black cutworm management. Black cutworm larvae are typically exposed to the insecticides through both physical contact and ingestion of treated plant material. Applications should ideally be made in the late afternoon or evening, due to the black cutworm's nocturnal feeding behavior. When liquid materials are used, post-application irrigation should be avoided for 24 hours in order to ensure that the insecticide residue remains in the target zone of the turf canopy and thatch as long as possible. Granular materials should always be lightly irrigated after application to release the active ingredient from the carrier granule.

Some insecticide products may provide protection against infestations for an extended period after application. When used at appropriate rates, products containing the active ingredients clothianidin, chlorantraniliprole, cyantraniliprole or thiamethoxam prevent black cutworm infestations for several weeks after application. Regardless of the material used, insecticide applications targeting black cutworms on golf course greens and tees should include potential reservoir areas lying 10-15 feet beyond the margins of the close mowed area being treated.

Table 1. Active Ingredients of insecticide products recommended for black cutworm control using curative and/or preventive strategies.

Insecticide* (Trade Names)	Insecticide Class	Curative Strategy	Preventive Strategy
SYNTHETIC INSECTICIDES			
Beta-cyfluthrin (Tempo)	Pyrethroid	x	
Bifenthrin (Talstar)	Pyrethroid	x	
Carbaryl (Sevin)	Carbamate	x	
Chlorantraniliprole (Acelepryn; others)	Diamide	x	x
Chlorpyrifos^a (Dursban)	Organophosphate	x	
Clothianidin (Arena; others)	Neonicotinoid	x	x
Cyantraniliprole (Ference)	Diamide	x	x
Deltamethrin (DeltaGard)	Pyrethroid	x	
Dinotefuran (Zylam)	Neonicotinoid	x	
Imidacloprid^b (Merit; others)	Neonicotinoid	x	
Indoxacarb (Provaunt)	Oxadiazine	x	
Lambda-cyhalothrin (Scimitar; others)	Pyrethroid	x	
Permethrin (Astro; others)	Pyrethroid	x	
Thiamethoxam (Meridian)	Neonicotinoid	x	x
Trichlorfon (Dylox)	Organophosphate	x	
Zeta-cypermethrin (Talstar Xtra)	Pyrethroid	x	
BIOLOGICAL/BIORATIONAL INSECTICIDES			
Spinosad (Conserve)	Spinosyn	x	
<i>Steinernema carpocapsae</i> (Millenium, others)	Parasitic nematode	x	

* Always consult label directions for specific timing and application recommendations.

^a Labeled only for use on turfgrass grown for sod or seed.

^b Labeled for suppression only.

READ AND FOLLOW ALL LABEL INSTRUCTIONS. THIS INCLUDES DIRECTIONS FOR USE, PRECAUTIONARY STATEMENTS (HAZARDS TO HUMANS, DOMESTIC ANIMALS, AND ENDANGERED SPECIES), ENVIRONMENTAL HAZARDS, RATES OF APPLICATION, NUMBER OF APPLICATIONS, REENTRY INTERVALS, HARVEST RESTRICTIONS, STORAGE AND DISPOSAL, AND ANY SPECIFIC WARNINGS AND/OR PRECAUTIONS FOR SAFE HANDLING OF THE PESTICIDE.

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