

## Black Cutworms in Golf Course Turf

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The black cutworm, *Agrotis ipsilon* (Hufnagel) occurs throughout most of North America and worldwide. Black cutworm (BCW) is the most destructive of all cutworm species that attack turfgrasses. It is considered a major pest on golf course putting greens and tees. Damage to turf is caused by feeding of the larval or caterpillar ("worm") stage whereby it clips-off grass blades and shoots with chewing mouthparts. Black cutworm caterpillars are particularly destructive to creeping bentgrass putting greens where feeding results in sunken pock-marks or suppressions that reduce uniformity and smoothness, and may disrupt ball roll. As they feed, BCW larvae create burrows in the thatch and soil. And, when available they exploit and occupy aeration holes or other cavities.



**BCW Adult**



**BCW Larva and Feeding Damage**

**Plants Attacked and Damage** Black cutworm caterpillars attack and feed on most of the common cool-season turfgrass species including annual bluegrass, creeping bentgrass, fine-leaf and tall fescues, and perennial ryegrass, as well as numerous weed species. BCW does exceptionally well on creeping bentgrass and non endophyte-enhanced perennial ryegrass. Although BCW will feed on Kentucky bluegrass, its ability to develop and survive on this grass species is poor.

**Life Cycle** In Wisconsin, there are typically three annual BCW generations. Because the BCW has difficulty surviving at subfreezing temperatures, it is unable to overwinter in Wisconsin. Spring infestations begin with the arrival of migratory adults that make their way from southern states via the jet stream. Adults commonly start arriving in late April to early May, and subsequent first generation caterpillar damage appears late May to early June. Damage from the second generation shows up on putting greens from early-late July, and damage from the third generation BCW appears in late summer (August - September). A range of larval sizes may be present at one time since adult emergence and subsequent egg-laying tends to be spread out as the growing season progresses. Adult BCW moths are active from dusk into the night, and they do not cause damage to the turf. Mating occurs immediately after adult emergence; thereafter females lay as many as 1200-1600 eggs over 5-10 days. BCW eggs are attached to the tips of grass blades. Eggs usually hatch in 3-6 days, depending on temperature, and subsequent young larvae commence feeding on leaf blades. As caterpillars grow and mature, older larvae develop a subterranean habit of forming burrows in the thatch and soil. Because BCW caterpillars are nocturnal, they hide in burrows during daylight, and they venture forth at night to feed. Caterpillars go through six molts (life stages), maturing in 20-40 days. Young larvae do not cause meaningful damage, but larger ones are highly destructive. Pupation or transformation into the adult occurs within the soil profile, and the adult moth typically emerges two weeks later.

**Monitoring and Sampling** BCW moths can be monitored with commercial pheromone traps containing a synthetic female sex attractant. However, trap catches are not necessarily a good predictor of infestation levels on golf courses. Traps can be used as an informational tool to plan for sampling of BCW larvae. The most effective method for sampling BCW larvae on putting greens and tees is to use a soap disclosing solution to determine populations. BCW larvae can be effectively sampled using one ounce or two tablespoons of lemon-scented liquid dishwashing detergent in two gallons of water. Next, pour or apply it with a sprinkling can over a 1 yard<sup>2</sup> area of turf and allow to soak into the thatch and soil. If present, medium to large-sized BCW caterpillars will surface within 3-5 minutes. This sampling method is also effective for armyworms, billbug adults, black turfgrass ataenius (BTA) adults, earthworms, and sod webworms. Other types of liquid detergents may be effective, but test them to determine that they will not burn the turf. Soap flushing is an useful method to confirm the presence of BCW and to determine the size range of larvae as well as determining the effectiveness of an control application.

**Control** Research suggests that daily mowing and clipping collection removes most BCW eggs from creeping bentgrass putting greens, and subsequent eggs in clipping collections can survive the mechanical mowing process. Additionally, BCW caterpillars are capable of crawling as far as 60 feet or more in a single night, thus clippings collected from putting greens should be discarded a considerable distance away from putting greens and tees to reduce re-infestations. Moreover, BCW are incapable of surviving on Kentucky bluegrass, therefore it may be advantageous to establish mono-stands of Kentucky bluegrass in the peripheral area surrounding putting greens and tees. If surrounding areas around greens and tees consist of perennial ryegrass or tall fescue, it may be beneficial to treat a 20-30 foot buffer zone with a conventional insecticide to prevent BCW larvae from crawling onto, and infesting, putting greens and tees.

Once BCW larval populations reach an unacceptable level or threshold, turfgrass managers can choose among many products for their control. Traditionally, conventional insecticides such as carbamates, organophosphates, and synthetic pyrethroids are used. However, two relatively new types of insecticides, halofenozide (MACH 2<sup>®</sup>), an insect growth regulator (IGR) and spinosad (Conserve SC<sup>®</sup>), a bacterial-based insecticide, are available. All of these products provide effective control when applied at the right time and according to certain guidelines. Liquid formulations generally perform better than granules. Since BCW larvae are foliage feeders, it is critical not to water the material in, and to withhold irrigation for a minimum of 24 hours after application to keep residues on the foliage. Additionally, it is best to apply treatments as late in the day or early evening to ensure that the night feeding caterpillars will make contact with viable residues and to reduce potential exposure control products to golfers until they have dried. Morning and early afternoon applications may be less effective because most insecticide lose activity due to photodegradation and volatization.

Biological insecticides may also provide effective control of BCW. Entomopathogenic (insect parasitic) nematodes are fairly effective, however several specific conditions must be met before suitable control can be achieved. Microbial insecticides containing *Bacillus thuringiensis* (Bt) are also labeled for BCW control. These products provide control of small or young (1<sup>st</sup> and 2<sup>nd</sup> instar) caterpillars, and they are considerably less effective against older or larger larvae. Azadirachtin, a natural botanical insecticide, acts as an insect growth regulator that disrupts an insects normal molting (growth) process. This product provides some control when applied to small larvae, but perform poorly against larger larvae.

**For pesticide recommendations:** See UW-Extension Bulletin A3714 or contact your County Extension Agent.

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