

Millenium®

Advanced Biocontrol for Cutworms, Armyworms and Sod Webworms

Millenium® is a proprietary formulation of the naturally occurring insect-parasitic nematode *Steinernema carpocapsae* that searches out and enters insect pests. Once inside, nematodes release symbiotic bacteria that quickly kill targeted insect pests. Reproduction inside the insect releases a new generation of infective nematodes that disperse in search of further prey.

Millenium is active against many common turfgrass pests, including billbugs, cutworms, armyworms, sod webworms, and chinch bugs. With no restricted entry interval (REI = 0) and no adverse effects on beneficial insects and soil microorganisms, Millenium is ideally suited for use in integrated pest management programs as an important tool for resistance management, worker safety, and environmental responsibility.

Armyworms, Cutworms, and Sod Webworms in Turfgrass

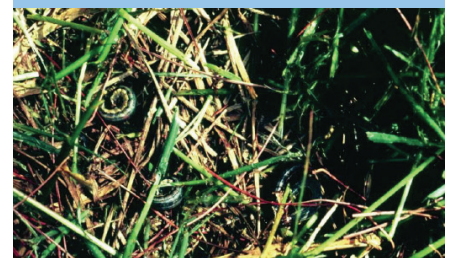
Several species of nocturnal moths including cutworms, armyworms, and sod webworms lay eggs in lawns and golf courses. Hatched larvae of these insects damage turfgrass by chewing off leaves and stems just above the soil surface. Most feeding occurs at night, with larvae seeking protection in the thatch layer or in a burrow in the soil during the day. Damage mimics drought stress, with infested areas appearing thin with reduced leaf density that, if left untreated, eventually coalesce into irregular brown patches as larvae continue to grow and feed.

Damage often is most evident during periods of hot, dry weather, but this varies based on geographical location. In many regions of North America, peak damage occurs in July and August, whereas areas with mild winters may experience damage in spring, summer, and fall. Consult your local extension agent for appropriate times to monitor for pest infestations, although scouting for presence of larvae is recommended if nocturnal moths are observed flying over turfgrass.

(Continued)



Fall armyworm, *Spodoptera frugiperda* ¹
Larvae feed on leaf tissue just above the soil surface.



Discloing solutions are effective means to determine pest population densities. ²

An effective monitoring tool for larvae of armyworm, cutworm, and sod webworm is a disclosing solution made from liquid dishwasher soap and water (2 tablespoons liquid detergent in 7.56 Litres of tap water applied to 0.37 square meter of turf). The soapy solution is an irritant to larvae and forces them to the surface of the turfgrass stand where they can easily be counted. Action thresholds will vary by region and grass species, but presence of 4-6 larvae per .09 square meter of turfgrass generally warrants treatment.

Application Details

Apply Millenium at a rate of 7.35 billion nematodes per hectare when larvae are small or when damage is first detected. Millenium should be applied in a minimum spray volume of 1852 L per hectare. Remove all sprayer filters and maintain pump pressure below 300 psi to avoid damaging nematodes.

Optimum results are achieved when nematodes are applied to moist soil in early morning or evening to avoid heat and direct sunlight. Irrigation with 6.25 - 12.5 mm inch of water 24 to 48 hours prior to application will bring larvae closer to the soil surface to maximize contact with Millenium. If soil temperature is higher than 32°C, irrigate with at least 2.5 mm of water to reduce temperature prior to applying Millenium.

Treated areas should be irrigated following application of Millenium to move nematodes into the turf canopy and out of direct sunlight. Irrigation with 2.5 mm of water should occur within 30 minutes unless applications were made in dark or overcast conditions during cool, wet weather. Under these conditions, irrigation can be delayed for up to 2 hours. Applications of Millenium should be repeated at 14-21 day intervals as needed.



Bronzed cutworm, *Nephelodes minians*³
Treatments should be made when larvae are small or first detected.

¹ Clemson University, USDA Cooperative Extension Slide Series, www.insectimages.org

² North Carolina Forest Service, www.insectimages.org

³ Whitney Cranshaw, Colorado State University, www.insectimages.org

Always read and follow label directions.

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Millenium[®]
Beneficial Nematodes