UCONN
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Biological Pest Control Products Available for Connecticut School Grounds

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INSECT PATHOGENIC NEMATODES	Turf	Landscape
Heterorhabditis species (including *H. bacteriophora* (e.g., Nemasys) and *H. megidis*) or *Steinernema glaseri* (e.g., Nemagard): for control of **white grubs**. Nematodes move through moist soil, enter into the insect body cavity, and release mutualistic bacteria. The bacteria multiply, producing antibiotics that prevent other organisms from colonizing the dead insect. Moderate soil temperatures are required for bacterial growth (60° – 90°F).	X	
Steinernema carpocapsae (e.g., NemAttack): for control of billbugs, cutworm, armyworm, sod webworm. Parasitic to insect pests that typically have a developing (larval or pupal) stage of life in the soil. May also parasitize above ground stages of adults, nymphs and larvae.	X	
BACTERIAL BIOINSECTICIDES		
Bacillus thuringiensis (Bt): a naturally occurring soil bacterium that is fatal to the larva stage of certain insects.		
• *Bt galleriae (*e.g., grubGONE; beetleGONE): useful against **beetle larvae (white grubs** in turf), and certain adult beetles (Japanese beetles and emerald ash borers). Controls Japanese, Oriental, June and Asiatic beetles; chafers, weevils & borers.	X	X
• *Bt israelensis* (e.g., Aquabac): kills larvae of mosquitoes.		X
• *Bt kurstaki* (e.g., Safer Brand Caterpillar Killer, DiPel DF): effective against young, external-feeding lepidopteran **caterpillars** (e.g., winter moth, gypsy moth, bagworms, leaf rollers, bagworms, tent caterpillar, fall webworm).		X
Chromobacterium subtsugae (e.g., Grandevo PTO): a naturally occurring bacterium used in a fermentation process that produces a product with insecticidal properties. A broad-spectrum bio-insecticide/miticide that reportedly **controls or suppresses insect and mite pests on ornamentals and turf.**	X	X
BIOFUNGICIDES		
Bacillus licheniformis (Roots EcoGuard) is registered for use on turf (dollar spot and anthracnose) and ornamentals to manage **fungal diseases**.	X	X
Bacillus subtilis (e.g., Rhapsody, Companion) is labeled for control of several turfgrass **fungal diseases** (brown patch, dollar spot, gray leaf spot, powdery mildew, red thread, rust).	X	X
Pseudomonas chlororaphis (Zio) is a new option for **fungal disease** control in turf (brown patch, Pythium blight, dollar spot, anthracnose) and ornamentals.	X	X
Trichoderma asperellum and *T. gamsii* (Obtego) a mixture of two fungal species with activity against several **soil-borne pathogens** (*Rhizoctonia, Pythium, Sclerotium, Armillaria*).	X	X
FUNGAL BIOINSECTICIDES		
Metarhizium anisopliae (e.g., Met52) - found naturally in soils; infects and kills insects. Targets **ticks, thrips, weevils, mites and whiteflies**.		X
Beauveria bassiana strain GHA (e.g., BotaniGard ES, Mycotrol WPO) – for ornamentals and turf; targets **chinch bugs, billbugs, whiteflies, aphids, thrips, psyllids, weevils and mealybugs**. **Toxic to bees**; should not be used where pollinators are present.	X	X

INSECT PREDATORS AND PARASITOIDS		
Three species of parasitoid wasps* (*Tetrastichus setifer, Diaparsis jucunda* and *Lemophagus errabundus*) help control **lily leaf beetles** (*Lilioceris lilii*).		**X**
Lacewing *(Chrysoperla rufilabris)* larvae are active predators of soft-bodied insect pests: **aphids, spider mites (especially red mites), thrips, whitefly, leafhoppers, eggs of pest moths, small caterpillars, soft scales, mealybugs, and some beetle larvae.** Lacewing are available for purchase; however, they are naturally occurring and feed on nectar, pollen, and honeydew. They will independently populate landscapes that include yarrow, coreopsis, goldenrod, cosmos, sunflower, dill, and other native plants.		**X**
Hoverflies* (*Allograpta oblique*) look like small bees or wasps. Hoverfly larvae prey on **aphids, thrips, scale insects, and caterpillars**; adult hoverflies are also important pollinators. They are attracted to many ornamental plants and will independently populate landscapes, including sweet alyssum, cosmos, marigold, sunflower, dill, fennel, cilantro, and yarrow.		**X**
INSECTS FOR INVASIVE PLANT CONTROL*		
Beetles and weevils are used to control **purple loosestrife** *(Lythrum salicaria)* • *Galerucella pusilla* and *G. calmariensis*: leaf-eating beetles • *Hylobius transversovittatus*: root-boring weevil • *Nanophyes marmoratus*: flower-feeding weevil		**X**
Rhinoncomimus latipes (weevils) are host-specific to **mile-a-minute vine** (*Persicaria perfoliata*).		**X**
**Not available for purchase in the trade, but are either naturally occurring (hoverflies), or are being released by universities' grant projects with the goal of increasing the natural distribution and spread of parasitoid populations.*		

BIOLOGICAL PEST CONTROL PRODUCT VENDORS:

COMPANY	PHONE/EMAIL	WEBSITE
ARBICO Organics	(800) 827-2847	www.arbico-organics.com
Atlantic Golf & Turf	(413) 863-4444	www.atlanticgolfandturf.com
BASF Corporation	(800) 526-1072	www.basf.com
Beneficial Insectary	(800) 477-3715	www.insectary.com
Biobee		www.biobee.com/global-activities/biobee-us/
Biobest	info@biobestgroup.com	www.biobestgroup.com
Bioline AgroSciences	(805) 986-8265	www.biolineagrosciences.com
Bioworks	(800) 877-9443	www.bioworksinc.com
Green Earth Ag & Turf	(866) 374-5101	www.greenearthagandturf.com
C. Hart Seed Company	(860) 529-2537	www.hartseed.com
IPM Labs	(315) 497-2063	www.ipmlabs.com
Koppert Biological USA	(810) 632-8750	www.koppertus.com
SiteOne Landscape Supply	(800) SITE-ONE	www.siteone.com
Tom Irwin, Inc.	(800) 582-5959	www.tomirwin.com

Mention of trade names are not intended to constitute an endorsement of a trade product.

Products must be registered with the state of CT to be used on school grounds.

Always read and follow label instructions. *The information in this document is for educational purposes only. The recommendations contained are based on the best available knowledge at the time of publication. The Cooperative Extension System does not guarantee or warrant the standard of any product referenced or imply approval of the product to the exclusion of others which also may be available.*

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