



# Best Management Practices for New York State Golf Courses

## Use of Softer and Alternative Pesticides

IPM encourages the use of pesticides as a “last resort” when other methods of pest control prove to be inadequate. However, when pesticides are deemed necessary, an effective product least likely to harm human health or the environment should be selected. Other management options include using an alternative product, such as biological controls or reduced risk pesticides.

## Biological Controls

Biological control uses other living organisms to suppress or eliminate pests. Several organisms are known to have some efficacy against turfgrass pests and have been marketed as pest control products. These biological controls may act to suppress pest populations alone or work synergistically with other natural, cultural, physical, or chemical management methods. Examples of biological controls that are commercially available in New York State are provided in the table below.

### Biological Controls

Beneficial Bacteria	Action
<i>Bacillus licheniformis</i>	Labeled for dollar spot management
<i>Bacillus subtilis</i>	Labeled for management of brown patch, dollar spot, powdery mildew, rust and anthracnose
<i>Pseudomonas aureofaciens</i> (strain TX-1)	Labeled for management of anthracnose, dollar spot, pink snow mold and pythium
<i>Bacillus thuringiensis</i>	Labeled for management of caterpillars in turf. A strain that affects white grubs is known, but not currently commercially available.
<i>Paenibacillus popilliae</i> and <i>Paenibacillus lentimorbus</i>	Cause “milky spore disease” and are labeled for management of Japanese beetle grubs in turf. Other strains cause milky spores in other species of grubs, but are not commercially available.
Entomopathogenic Nematodes	Action
<i>Heterorhabditis bacteriophora</i> and <i>Steinernema glaseri</i>	Effective against white grubs
<i>Steinernema carpocapsae</i>	Effective against cutworms and possibly annual bluegrass weevils

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## Reduced Risk Pesticides

The EPA defines conventional “Reduced Risk” pesticides as having one or more of the following advantages over existing products:

- low impact on human health
- low toxicity to non-target organisms (birds, fish, and plants)
- low potential for groundwater contamination
- lower use rates
- compatibility with IPM

A number of reduced risk pesticides can be used on turfgrass in NYS. Biological pesticides, which also have many of these desirable characteristics, are classified separately by the EPA.

### Reduced Risk Pesticides

Category	Reduced Risk Pesticide
Fungicides	Azoxystrobin
	Boscalid
	Fludioxonil
	Trifloxystrobin
Herbicides	Bispyribac-sodium
	Carfentrazone-ethyl
	Mesotrione
	Penoxsulam
Insecticides	Chlorantraniliprole
	Spinosad