



Cornell University



Cornell University  
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Department of  
Environmental  
Conservation

# IMIDACLOPRID: Reducing Risks to Groundwater from Commercial Turf Uses

## Practical Approaches for Users

**Introduction.** The pesticide imidacloprid (found in Merit, Criterion, Bandit, Mallet, Zenith, Xytect, etc.) is showing up in Long Island's groundwater. Imidacloprid insecticide is commonly used in commercial turfgrass maintenance and occasionally in sod production. This fact sheet was prepared to help turfgrass managers and sod producers use imidacloprid more conservatively while continuing to effectively manage pests and protect Long Island's groundwater.

This and other factsheets have been developed as part of The Long Island Pesticide Pollution Prevention Strategy, which became effective July 2014. The strategy was developed by the NYS Department of Environmental Conservation (DEC) in collaboration with numerous stakeholders. The goal of the strategy is to protect groundwater and surface water from pesticide related contamination while continuing to meet the region's pest management needs.

### Protect Our Drinking Water

The Long Island aquifer is used by nearly three million people as a source of high-quality potable water. The aquifer is an underground water source that yields over 300 million gallons of water every day. The characteristics that allow the aquifer to reliably supply this much water also make it vulnerable to contamination from above ground. This is especially important for materials like imidacloprid that have widespread use and can move easily through soil to the underlying groundwater. For these reasons, commercial turfgrass managers need to exercise careful environmental stewardship when using imidacloprid.



A profile of a Long Island's sandy/gravelly subsoil.

### Modify Practices (Best Management Practices)

To reduce or eliminate the risk of imidacloprid movement to Long Island's groundwater, turfgrass managers should modify day-to-day practices especially where soil applications are used:

**Application Rates** – When applying imidacloprid to turf use the lowest label rate. Labels allow for a range of rates when making most ground applications. Although residual activity may be reduced, lower rates can still provide acceptable control especially when timed for smaller grub stages. Always stay below the maximum allowable rate of 0.4 pounds of active ingredient/acre/year (e.g. 0.4 lb active ingredient/acre = 8.6 oz Merit 75WP/acre = 4 level teaspoons Merit 75WP/1000 ft<sup>2</sup> = 1.8 lb Merit 0.5G/1000 ft<sup>2</sup>). If high rates are used early for billbugs or black turfgrass ateniensis do not make a second application later for grubs.



**Application Timing** – Imidacloprid turf treatment on Long Island usually targets white grubs and likely to be most effective applied at or just prior to egg hatch, which can occur over a long period, starting early June and continuing to early August. Annual application is not needed in most cases. Avoid making applications when heavy rain is predicted within 24 hours, where soil is frozen, waterlogged, or saturated, or in areas with shallow water tables.

**Application Method** – Never apply as a soil injection on Long Island. Broadcast granular and spray applications should never be made on hardscapes, roads, or where material can drift, blow, or move off target or into storm drains and waterways. Use drop spreaders or broadcast spreaders with deflectors along these sites or avoid use entirely. Sweep or blow granules from impervious surfaces back onto grassy areas. Distribute evenly and do not apply in concentrated bands. Calibrate application equipment before treatment. Load hoppers or tanks away from storm drains, sumps and other routes to groundwater. Lightly irrigate (0.25" water) about 24 - 36 hours before and after application (0.25" = 155 gallons per 1,000 sq. ft.). If conditions are expected to be dry before and during treatment or it is not possible to irrigate after, granular applications may be more stable. Excessive thatch can interfere with performance. Control thatch through topdressing, core aeration, and vertical mowing.

#### KEY POINTS

- Three key practice modifications can reduce risk of imidacloprid movement to groundwater:
- Use lowest label rates
  - Use or alternate with other effective insecticides or practices
  - Avoid spills, drift, or runoff to storm drains

## Some Alternative Insecticides

Other insecticides approved for use on Long Island control many of the same pests. Some alternatives are summarized below for a few target species including organic (\*), biopesticide (^), and conventional options. Note that imidacloprid is not effective against mites and most caterpillars – use other products or methods if needed for these pests. Use insecticides selectively and as a last resort to help maintain biological controls.

Pest	Insecticide	Active Ingredient	Notes
<b>White grubs (Japanese beetle, oriental beetle, European chafer, Asiatic garden beetle, northern masked chafer, May and June beetles)</b>	Dylox	trichlorfon	Best used around mid-August when egg hatch complete, short-residual
	^BotaniGard ES or WP	<i>Beauveria bassiana</i> GHA	Target youngest grub stages (before early August) and maintain moisture to promote grub infections
	^grubGONE! G	<i>Bacillus thuringiensis</i> subsp. <i>galleriae</i>	Follow application by light irrigation (0.5") or apply just prior to rain to carry material into root zone
	*^Molt-X, Ornazin, AzaGuard, Azatin O, Neemix	azadirachtin	Make application 1 – 3 weeks after adult stage first (early to mid-June) appears. Mow/irrigation before application with only light watering (3 -5 min.) after application

## Integrated Pest Management Practices

The following are non-pesticide practices that can be utilized as part of an IPM program to manage white grubs targeted by imidacloprid. If not sure of the pest or cause of a plant problem submit samples to a diagnostic laboratory for identification.

- Identify the problem correctly. Turf thinning and bare patches can be caused by Pythium, Rhizoctonia or other pests.
- Turf that is well-maintained with a healthy root system will tolerate higher grub populations. Use a soil test to determine lime and fertilizer amendments and adjust irrigation to apply as needed according to environmental conditions.
- High-cut turf (3") and some grasses such as endophyte-containing tall fescue or perennial rye are more tolerant of drought stress and may withstand greater levels of grub damage. Mowing should remove no more than 1/3 of the grass height each time.
- Reducing water and fertilization in summer may help discourage infestation, but maintaining proper irrigation and fertilization helps damaged grass survive attack and recover more quickly.
- Sample for grubs around early to mid-August to determine the need for treatment. The *Cornell Pest Management Guidelines for Commercial Turfgrass* includes sampling directions and thresholds for different grub species. Preventive treatment is not needed in most years.
- For turf damaged by grubs an early autumn fertilization can speed recovery but avoid application of high-N fertilizer in spring, which encourages shoot at the expense of root growth. Tall fescues may withstand grub damage better and recover more quickly in warmer conditions than other cool-season grasses.
- Entomopathogenic nematodes can be used for biological control and may perform even better in combination with imidacloprid. For best results apply during the evening or on an overcast, cool day and just after rain or irrigation (0.5") when grubs are present (early to mid-August) and when soil temperatures are at least 65°F (check guidelines for each species). Verify nematodes are alive (move when viewed under magnification) prior to use and again in a sample collected from the nozzle during application, remove nozzle screens, and apply with pressure below 300psi. Use a minimum of 1 billion/acre. A light irrigation following application (1/4") is suggested to move nematodes off grass and thatch into the soil. *Heterorhabditis bacteriophora* or *Steinernema glaseri* are recommended species to use.
- Consider alternatives to turf such as mulched plant beds, permanent groundcovers, or gravel especially around hardscape areas where turf is hard to maintain or where off-site movement of pesticides could pose a problem.

*Trade names used in this publication are for convenience only. No endorsement of products is intended, nor is criticism of unnamed products implied.*

## CONTACT INFORMATION

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For more information or electronic copies of this factsheet go to <http://ccesuffolk.org>  
 Cornell Cooperative Extension of Suffolk County Diagnostic Lab: <http://ccesuffolk.org/agriculture/horticulture-diagnostic-labs>  
 For more information on the Long Island Pesticide Pollution Prevention Strategy: <http://www.dec.ny.gov/chemical/87125.html>