Products containing imidacloprid for Professional Turf Uses have been classified "Restricted Use" in New York State

Imidacloprid: Best Management Practices for Long Island, New York

Professional Turf Uses

CORNELL Cooperative Extension of SUFFOLK COUNTY

New York State Department of Environmental Conservation

BAYER

Bayer CropScience

Best Management Practices
for Professional Turf Uses of Merit® on Long Island

Introduction

Merit® insecticides have been registered in New York State since 1995 and are now widely used to control certain turfgrass pests, especially white grubs. Merit® has largely replaced several other insecticides which were less effective, had higher mammalian toxicity[1] or are no longer registered. It is typically applied at much lower rates than other soil insecticides (0.3-0.4 lbs vs 2-8 lbs active ingredient per acre). There are very few equally effective alternatives to Merit® and some of these are not available for use on Long Island. Merit® is available in several formulations, including soluble powder (Merit® 75WP, Merit® 75WSP), liquid (Merit® 2) or granular (Merit® 0.5G) including various fertilizer combinations. Labeled use sites for turfgrass include home lawns, business and office complexes, shopping and multifamily residential complexes, golf courses, airports, cemeteries, parks, playgrounds, athletic fields and sod farms (see labels for specific sites permitted for each product). The active ingredient, imidacloprid, is highly systemic when taken up by plant roots and can target internally feeding species such as billbugs or annual bluegrass weevil. It controls insects both by contact and through ingestion. Imidacloprid is in the chloronicotinyl class of insecticides and acts on nerve receptors common to some insects, but has relatively low mammalian acute toxicity.

According to the Extension Toxicology Network Pesticide Information Profile for imidacloprid[2], "there is generally not a high risk of groundwater contamination with imidacloprid if used as directed. The chemical is moderately soluble, and has moderate binding affinity to organic materials in soils. However, there is a potential for the compound to move through sensitive soil types including porous, gravelly, or cobbly soils, depending on irrigation practices." Soils or sub-soils around much of Long Island are generally well-drained, sandy or sandy loams and leaching models run by the New York State Department of Environmental Conservation (NYSDEC) at maximum use rates indicate the potential for movement to subsurface water. Material inadvertently applied to hardscape areas (sidewalks, pavement, etc.) and washed into storm drains, sewers or recharge basins poses another route for groundwater contamination.

Since groundwater monitoring began on Long Island in 1997 as a condition of New York State registration, imidacloprid has been detected in several shallow wells in Suffolk County, NY. Detections of imidacloprid remain far below established levels for health concerns according to the US Environmental Protection Agency and NYSDEC and below an action level agreed upon by NYSDEC and Bayer. However, in order to maintain continued registration and uses of these valuable products to the professional landscape community on Long Island and to minimize the risk of imidacloprid movement to Long Island's sole-source aquifer, the following Best Management Practices for Professional Use of Merit® in Turfgrass are offered to guide responsible management of the product. Guidelines for other uses of imidacloprid in agricultural crops and arboriculture (landscape trees and shrubs) are addressed

in other Best Management Practices available from dealers, Bayer or Cornell Cooperative Extension.

Where is Merit® used in turfgrass? Merit® is primarily used to control the white grubs (larvae of scarab beetles), such as Japanese, oriental, Asiatic garden, European chafer, June and green June beetles and masked chafers. Merit® can also be used to control the immature stages of black turfgrass ataenius, which is primarily a pest in golf course turf, as well as billbugs. Merit® is labeled for control of annual bluegrass weevil, although results have been inconsistent, and suppression of cutworm caterpillars and chinch bugs. Alternative materials are available and tend to be more effective for these pests. Particularly for white grubs, Merit® is best applied around the time of egg hatch before infestations are easily detectable. Older grubs (third instar stage) are much less susceptible to imidacloprid (see **Apply at the correct time** below). Some Merit® products are also labeled for use on landscape plants such as trees and shrubs. Those uses are addressed in a separate document, Best Management Practices for Arboricultural Use of Merit®.

Maintain good application and pest records including product applied, application rates, target pest(s) and weather conditions at application and for the next 48 hours. A history of infestation can help determine where controls are likely to be needed and timing for best results.

Correctly identify problem before treating. Many diseases and cultural problems mimic insect damage. For example, Pythium root rot causes thinning turf that may initially appear similar to grub infestation, but is not controlled with Merit® applications. Brown patches of dead turf may be due to Rhizoctonia (brown patch disease), black turfgrass ataenius, white grubs or other causes. Cooperative Extension offices can help assess turf problems and provide management recommendations.

Identify the grub species present. If white grubs tend to be a problem in the area, determining the dominant species present can indicate proper timing and suggest whether alternative controls might be effective. For example, applicators often assume Japanese beetle is the main species of concern in lawns, but oriental beetle tends to be more common on Long Island and is much less susceptible to the bacteria causing milky disease. To help distinguish among grub species, consult Turfgrass Problems: Picture Clues and Management Options[4] for helpful keys or contact Cornell Cooperative Extension for assistance (in Nassau, 516/228-0426; in Suffolk 631/727-4126 or 581-4223).

Consider alternatives to lawn areas such as perennial beds, flowering shrubs or converting to a naturalized setting, particularly around or near areas such as storm drains where runoff is difficult to control. Hardscaping (e.g. gravel), permanent groundcovers or pathways might be options for some areas where turf is hard to maintain or where off-site movement of pesticides could pose a problem.

Use other alternatives such as cultural and non-chemical controls. High cut turf and some grasses such as tall fescue can withstand greater levels of grub damage. 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. Endophyte-containing cultivars of tall fescue, fine fescue and perennial ryegrass are available with resistance to certain turf pests, such as hairy chinch bug and bluegrass billbug. Beneficial insect-killing (entomopathogenic) nematodes can also be used, but currently available species are not very effective in the field without highly favorable conditions. Combining nematodes drenches with Merit® sprays have shown results better than nematodes alone. Japanese beetle, in particular, is susceptible to milky disease, but commercial products are not highly effective.

Clean up spills promptly and dispose of properly. Do not apply to highly compacted areas where product will run off rather than being absorbed into the soil and avoid contaminating ground and surface water when washing equipment. Every applicator should carry a spill cleanup kit with personal protective equipment and cleanup materials, including: gloves, coveralls, boots, goggles, a shovel, broom, dustpan, and heavy-duty storage bags. In the event of a liquid spill, promptly spread an absorbent material such as sawdust or cat litter. When there is a high likelihood of surface or groundwater contamination, dam around the spill. Do not allow the material to wash into drains, recharge basins, or similar areas where there is a high risk of leaching or runoff. Sweep or shovel the absorbent material into a heavy-duty plastic bag. Repeat this procedure a number of times to ensure thorough decontamination. Sweep up granules or dry product. For areas where soil needs to be removed, immediately shovel the top 2-3 inches of soil into a heavy-duty bag and cover area with fresh topsoil. Imidacloprid-contaminated soil and absorbent material in quantities under 500 lbs can be disposed of through the normal waste stream. For larger spills and for more information regarding disposal and spill guidelines, contact Bayer CropScience at 1-800-334-7577, Chemtrec at 1-800-424-9300, or the State Department of Environmental Conservation at either 1-800-457-7362 (to report spills) or 631-444-0320 (for questions regarding spill clean-up).

Is there a history of infestation or damage? For control of grubs, Merit® is typically used before damage is apparent. Knowing the history of infestation in an area can help in deciding whether control is likely to be needed. Monitoring is also helpful for accurately timing treatments when needed. Monitoring methods are outlined in Cornell's Pest Management Guidelines for Commercial Turfgrass[3]. Some applicators find it helpful to draw simple maps as a record showing where infestations tend to occur.

Does the infestation require treatment? Turf can tolerate some infestation and damage. Suggested action thresholds exist for several pest species listed in Table 1. These might need to be adjusted according to local conditions and tolerance, but provide a guideline for estimation. Assessing spring populations may not accurately predict summer and fall infestations, but can be useful to determine which species tend to be most common. Summer scouting (late July to early August) can be used to make decisions where applicators are able to delay treatment to the latest window for Merit® application.

Spot treatments may be sufficient for isolated infestations or for areas where aesthetic quality must be high. Backyard areas and golf course roughs may be among lower priority areas where applications are not necessary.

Do not apply when turfgrass areas are frozen, waterlogged or saturated. For areas with in-ground sprinkler systems, check to make sure the system is operating correctly. Some digging may be required to detect saturated conditions. Nassau or Suffolk County Soil Surveys are available from county Soil and Water Conservation Service offices.

Do not apply directly to water or intertidal areas where the application will be below the average high water mark or contaminate such areas when you are washing out your application equipment. Do not allow runoff to flow into storm drains that lead to bays, estuaries, streams or other bodies of water.

Shallow groundwater areas. In areas where the water table is shallow or where a high risk of leaching is expected, use other strategies for insect control.

Store and handle concentrated material carefully. Place packages and containers in storage inside secondary containment such as plastic bins to reduce chances of spillage. Mix and load over a properly designed and maintained containment pad if available or place spreaders over a tarp when loading granular material. If there is no containment pad, maintain a minimum distance of at least 25 feet (of which at least 15 feet must be heavily vegetated) between the mixing/loading area and potential surface-to-groundwater conduits such as storm drains, field sumps, uncased wellheads, sinkholes, floor drains or recharge basins.

Make sure equipment is properly calibrated and in good working order prior to application to avoid spotty control or excess deposition. Do not apply Merit® through irrigation systems.

Use deflectors on granular applicators or drop spreaders, if available, to keep granules off driveways, streets and other non-target areas. If rotary-type spreaders are used, sweep or blow granules from hard surfaces back onto the treated area to minimize surface runoff into storm drains and drywells that may be conduits to groundwater.

Assess turfgrass conditions prior to treatment. Merit® applications are likely to be most effective applied after mowing or between mowings and when thatch levels are low.
Grubs may move deeper when soil dries out. Under such conditions and if treatment is delayed after the optimal timing, results may be improved if turf is lightly irrigated (0.25" water) about 24 - 36 hours before application (0.25" = 155 gallons per 1,000 sq. ft.). If conditions are expected to be dry before and during the treatment period or it is not possible to irrigate after treatment, granular applications may be more stable. Excessive thatch can interfere with performance of insect control materials. Control thatch through topdressing, core aeration and vertical mowing.

Apply at the correct time. Merit® remains active in the plant or soil for several months but does not work quickly even on small grubs. It may be two weeks or more after treatment for the insecticide to be taken up in grass and grubs are killed. Applications are most effective timed around or shortly before egg hatch, but Merit® will still control small grubs (first and second instar stages). Treatments are likely to be unsatisfactory if delayed until grubs are large (third instar) and damage is apparent, i. e. in mid-spring for overwintering grubs or from late August through fall. In such cases use other materials. Following is a list of suggested timings and thresholds for use of Merit® to control various grub species. Under droughty conditions where turfgrass is stressed, the lower thresholds usually apply. Application timings may need to be delayed if insect development is adversely affected under such conditions.

Table 1. Suggest application timings and action thresholds for selected turfgrass pests

Pest	Application timing	Suggested action threshold
White grubs:		
Oriental beetle	Last week of June to early August	7 - 10 grubs/sq. ft.
European chafer	Last week of June	5 - 7 grubs/sq. ft.
Northern masked chafer	First week of July to early August	6 - 14/sq. ft.
Japanese beetles	First week of July to early August	8 - 10 grubs/sq ft.
Blugrass billbug	Late May to early June	1 bilbug/minute on pavement
Black turfgrass ataenius	Early to mid-May	30 - 50 grubs/sq. ft.

Care after treatment. Following application, light irrigation (0.25") or rainfall is needed to move the material through the thatch and to minimize degradation from exposure to sunlight. This may also reduce risk of exposure to susceptible non-target organisms such as bees. Do not mow or remove clippings for several days after treatment to avoid affecting uniformity of treatment.

Limit application rates. For Merit® 75WP and 75WSP, do NOT apply more than 8.6 oz per acre (four level teaspoons/1000 sq. ft.) per year. For Merit® 2, do not apply more than 1.6 pt per acre (0.6 fl oz or 17 ml per 1000 sq. ft.) per year. For Merit® 0.5G, do not apply more than 80 lb per acre (1.8 lb per 1000 sq. ft.) per year.

Limit application frequency. Make only one application per season. If Merit® is used from early to mid-spring for black turfgrass ataenius or billbugs, a later application for grub control is generally not needed although higher application rates at the spring timing may be needed to provide sufficient residual control for summer grub infestations.

Best Management Practices Training Sessions: All users of Merit are encouraged to attend training sessions and/or educational programs. Contact Cornell Cooperative Extension or a local distributor for dates and locations.

1) Imidacloprid acute toxicity: rat oral LD50 = 450, dermal LD50 >5000 mg/kg. End-use products: rat oral LD50 = 3000 - 5000 mg/kg.
2) Internet accessed 5/15/03 at http://ace.ace.orst.edu/cgi-webglimpse/mfs/services/data/info/extoxnet?link=http://ace.orst.edu/info/extoxnet/pips/imidaclo.htm&file=/services/data/info/extoxnet/pips/imidaclo.htm&line=114#mfs
3) Pest Management Guidelines for Commercial Turfgrass, Cornell Cooperative Extension, Ithaca, NY updated annually.
4) Gussack, E. & F. S. Rossi. 2001. Turfgrass Problems: Picture Clues and Management Options. Natural Resource, Agriculture, and Engineering Service (NRAES), Cornell Cooperative Extension, Ithaca.

IMPORTANT!

This bulletin is not intended to provide all the information necessary for the use of this product. Before using the product, read and carefully observe the precautionary statements, directions for use, restrictions, storage and disposal statements and other pertinent information on the label. For additional product information, call toll-free 1-866-99BAYER (1-866-992-2937) or visit our Web site at BayerCropScienceUS.com, or contact Cornell Cooperative Extension of Nassau or Suffolk County.

ALWAYS READ AND FOLLOW LABEL DIRECTIONS. These guidelines are not a substitute for pesticide labeling. Applicators should be sure to verify current NY pesticide labels and registration status at http://pmep.cce.cornell.edu/pims/current/.

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