



BAYER SOLUTIONS

Update

White Grubs in Turf

Paul Giordano, Green Solutions Specialist

The larvae of several beetle species, commonly known as white grubs, are major pests of turfgrass throughout most of Canada. Integrated management programs that include the strategic use of insecticides should be utilized to control these damaging root feeders. Merit® is a broad-spectrum insecticide that is effective against problematic white grubs such as the Black Turfgrass Ataenius, European chafer, and Japanese beetle. Insecticide performance can be affected by a number of factors including application timing and accuracy, amount of thatch, rainfall and/or irrigation following treatment, insect species, insect infestation level, and dosage. All of these factors must be considered when treating with Merit® insecticide to ensure optimal insect control is achieved.



(L) Stressed turf as a result of white grub activity. (R) Due to lack of root system, turf easily peels back to reveal white grubs. Photos by Dr. Rob Golembiewski and Dr. Derek Settle - Bayer CropScience

The Problem

White grub species include northern and southern masked chafers (*Cyclocephala borealis*, *C. immaculata*, and/or *C. lurida*), Asiatic garden beetle (*Maladera castanea*), European chafer (*Rhizotrogus majalis*), May or June beetle (*Phyllophaga spp.*), Japanese beetle (*Popillia japonica*), Green June beetle (*Cotinis nitida*) and Oriental beetle (*Anomala orientalis*). Injury to turfgrass occurs from larval feeding on the roots, resulting in infested areas first turning yellow, then brown, and finally dying. When grub populations are heavy, areas of turf can be easily lifted from the soil. In addition, moles, raccoons, skunks, birds and other vertebrate animals that feed on white grubs, can cause severe damage as they forage for the insects in infested turf.

What to Look for:

Beetle adults differ in size, colour markings and life cycle, but their larval stages are often very similar in appearance. To identify grub larvae, use a 10X or 20X hand lens and examine the spines on the underside of the abdomen



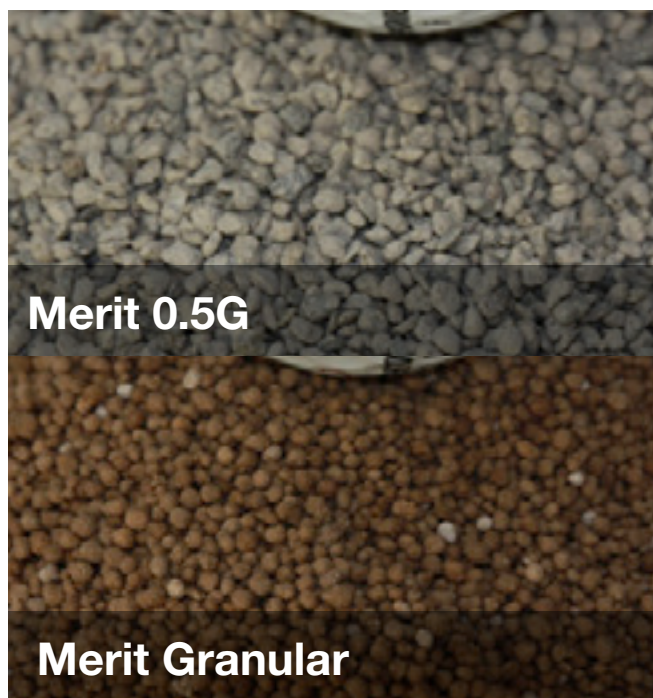
(T) Close-up of white grubs actively feeding in the upper root zone of a turf stand. (B) Damage associated with grub infestations due to skunk and raccoon foraging. Photos by Dr. Rob Golembiewski and Dr. Derek Settle - Bayer CropScience

tip, called the raster. The raster pattern is different for each grub species and is the most common method of identification. In most cases, adult emergence occurs in mid-summer often after significant rainfall or irrigation, followed by mating and egg laying. The eggs hatch and the small larvae begin feeding on roots with molting from first to second instar occurring in a few weeks. Most of the visible feeding damage is caused by the large third instar larvae. Overwintering occurs in this third instar stage with larvae moving downward during late October or November into the soil profile for protection from cold weather. The following spring, these larvae will move up to the soil-thatch interface to feed and replenish food reserves lost during the winter months before moving back down and transforming into the pupal stage. A one-year cycle will be completed with beetles emerging from this pupal stage a short time later. Monitor beetle activity by establishing black light or pheromone traps in areas that historically have had grub infestations. Japanese beetles may be monitored during the daylight hours using pheromone traps, while chafers and other species require black light monitoring at night. Check these traps at 2- or 3-day intervals, and record and graph collection numbers. Continue trapping until counts start to decline. Larval activity can be expected to occur four to six weeks after peak adult counts.

Bayer Solutions

There are a number of management strategies that must be integrated into a successful grub control program including:

- If renovating or establishing a new turf area, select turf species and varieties more tolerant of grubs.
- Grow healthy turf – implement proper cultural practices including mowing, fertilization, irrigation and aeration.
- Manage the thatch layer ensuring that there is no more than 1.27 – 1.9 cm (0.5-0.75 inch) of thatch present.
- Properly identify the insect pest and understand its life cycle.
- Select and implement appropriate control strategies.
- If applying an insecticide, make sure to:
 - Calibrate application equipment prior to application.
 - Under dry conditions where thatch is present, irrigate the area to be treated prior to application. Wetting the thatch/soil interface encourages the larvae to move closer to the surface.



(T) Old MERIT 0.5G formulation (B) New MERIT Granular formulation. Note the more evenly sized prills and uniform round shape with no fine particles

- Where possible, irrigate immediately after application. If a complete irrigation cycle is not possible, then syringe immediately and complete irrigation later in the day. No additional irrigation is required if sufficient rainfall to thoroughly wet the thatch and move the product into the soil occurs after application.
- Do not apply to turfgrass soils that are waterlogged or saturated and will not accept irrigation. Adequate distribution of the active ingredient cannot be achieved under these conditions. The treated turf must be in such a condition that the irrigation or rainfall will penetrate vertically into the soil profile.
- Avoid mowing turf until rainfall or irrigation has occurred so that uniformity of application will not be affected.
- Understand that as grub larvae mature from first instar to third instar, they become more difficult to control due to their body size and weight. Therefore, it is crucial to make sure applications are timed properly to optimize insecticide control.
- If the area to be treated experienced high grub populations the previous year and/or was exposed to a mild winter resulting in limited “environmental regulation” of the population, apply the highest label rate of the insecticide.

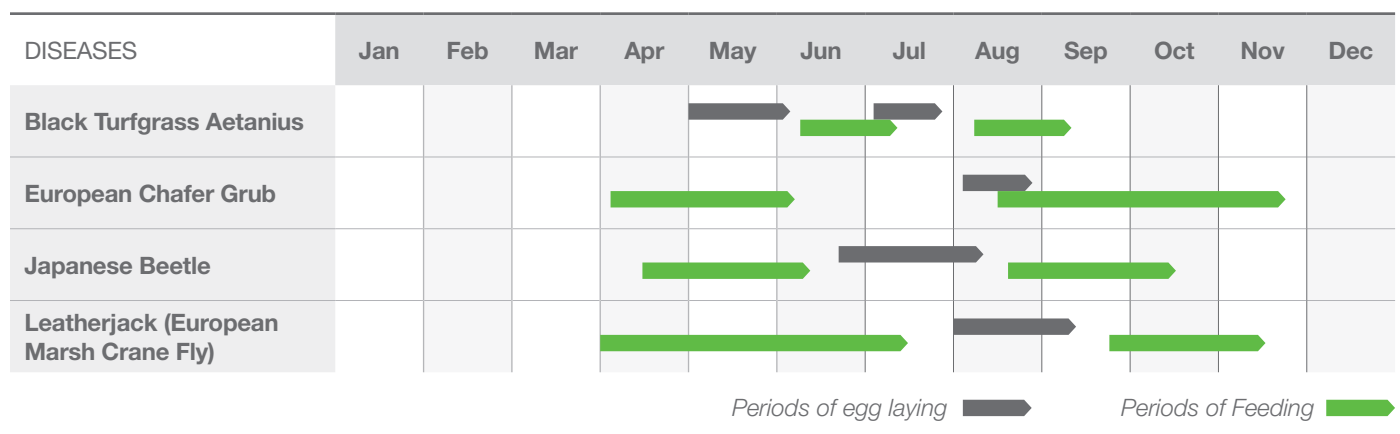
Preventive Grub Control with Merit® Granular and Merit® Solupak

Merit® insecticide is a broad-spectrum, systemic insecticide that is effective at low use rates. Imidacloprid, the active ingredient in Merit®, interferes with nerve impulses and disrupts insect behavior resulting in insects not feeding, not reproducing, and eventually dying. The newly formulated Merit® Granular has an innovative gypsum carrier with no fine particles. This rounded, more uniformly sized prill produces less dust and optimally penetrates into the turf canopy. Merit® Granular insecticide has sufficient residual activity so that application can be made preceding the egg laying activity of the adult stage. Merit® Solupak can be conveniently applied through a sprayer followed by an irrigation cycle. Merit® insecticide should be applied prior to the onset of the third larval stage of white grubs, which in most areas will occur around mid-August. Optimum control is achieved when applications are made prior to egg hatch of the target pests and when irrigation or rainfall (≥ 1.5 cm) occurs within 24 hours after application to move the active ingredient through the thatch into the soil profile.

Application Timing for MERIT Granular

- **May through June:** *Black Turfgrass Aetanius*
- **Mid-June through mid-August:** *European Chafer and Japanese Beetle*
- **August to mid-September:** *Letherjacket suppression*

Turfgrass Insect Time Profile



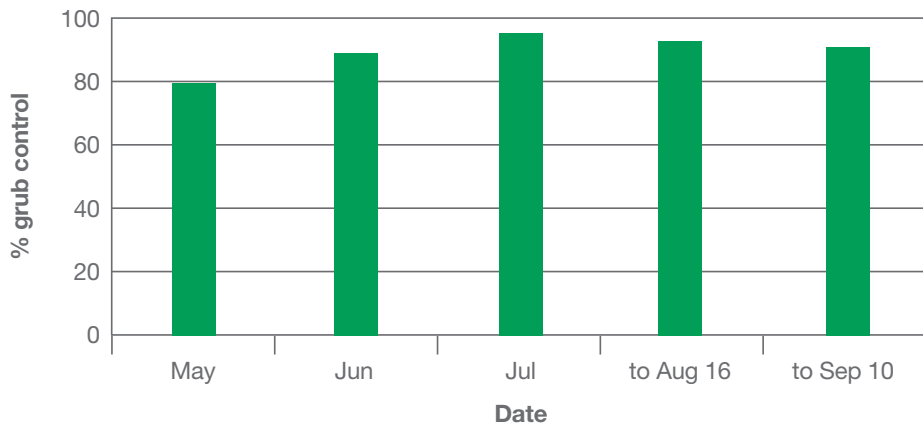
Rates and Timing

PRODUCT	Application Rate	Water Volume	Post Irrigation Amount	Post Irrigation Timing
Merit Granular	0.56 kg /100 m ²		5-10 ml	1-2 weeks of treatment
Merit Solupak	1 packet / 1200m ²	8 L 100 m ²	5-10 ml	As soon as possible within 12 hours

Research Data

Merit® insecticide has been tested extensively by university researchers throughout Canada and the United States for the past 20 years. These trials have shown Merit® to consistently deliver outstanding grub control under a wide range of application timings, soil types, and environmental conditions.

Grub Control with Merit by Time of Application



■ Merit 0.33 kg a.i. /ha

From studies published in Arthropod Management Tests (1976-2011) using Japanese Beetle and Masked Chafer efficacy data where checks had 4+ grubs per square foot and significant results.