



Ornamentals & Turf

Department of Entomology

TURFGRASS INSECT MANAGEMENT

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Turfgrass insects are managed most effectively by combining sound cultural practices with responsible use of pesticides. This system, called “integrated pest management” (IPM), attempts to keep pest populations below an economically or visually offensive level. Used properly, IPM may not eliminate the use of pesticides, but it can significantly reduce the amount of pesticides used.

The foundation of IPM is sound management practices that keep the turfgrass healthy and vigorous. Healthy turf is capable of tolerating low to moderate numbers of lawn pests because of its increased capacity for producing new roots and shoots. Selection of turfgrass species and cultivars that are well adapted to a specific site will help prevent turf pest damage. Proper mowing, irrigation, fertilization, thatch management, and compaction alleviation also will help ensure a healthy turf. Turfgrass management information bulletins (available through local county offices of Purdue Extension or by calling 1-888-EXT-INFO) will help with turfgrass management practices.

INSPECTION

Routine inspection and proper identification of the pest are the first steps in successfully controlling turf problems. Systematic inspections at several locations throughout the turfgrass should help detect early insect infestations. Look at the general appearance of the grass from a distance as well as inspect individual plants close-up. Examine above-ground plant parts, such as leaves and stems, for feeding scars and discoloration. Inspect the crown areas for damage by pulling several handfuls of grass. If plants dislodge easily, the problem may be in the crown or root. To inspect plant parts below ground, cut three sides of a 1-foot square by 4-inch thick section of sod. Roll the sod back to expose the root zone and, possibly, root-feeding insects. Finding the insects respon-

sible for the feeding damage is the best way to diagnose the problem. Remember that some insects are active during the day time while others only come out at night.

DAMAGE SYMPTOMS AND IDENTIFICATION

Fertilizer burn, diseases, improper mowing, vandalism, unsuitable grass variety, urine spots from pets, and improper use of insecticides, fungicides, or herbicides all cause symptoms that resemble insect feeding. For this reason, make a thorough search to determine whether insect pests are truly the cause of the problem. While many insect species are found in the lawn, fortunately, only a few cause damage. Most insects are either beneficial or are of no serious consequence. Some insects may be nuisance pests only on rare occasions when they become very abundant. Descriptions of the most common lawn-invading insect pests in Indiana, their biology, damage symptoms, and control recommendations are provided in this publication.

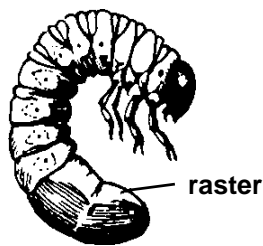
Lawn and turf insect pests can be grouped into one of three broad categories by where they are found: below-ground (root-feeders), thatch-dwellers (crown- and stem-feeders), and above-ground (blade- or leaf-feeders).

Below-Ground Pests

The most common insect problem on Indiana lawns is caused by grubs that feed on the root systems of the grass plants. Grubs are the immature stages of several species of beetles, including Japanese beetles, June or May beetles, masked chafers, and turfgrass atenioid beetles. Correct treatment of grub infestations depends upon proper identification of the species involved and understanding its particular life history.

White grubs are fat, white, C-shaped larvae with many wrinkles or folds along the body behind the head. The rear end is slightly larger in diameter and may appear bluish or black in color. White grubs have brown heads and six legs. Depending on species and age, they may range from 1/4 to 1-1/2 inches in length.

White grubs begin feeding on roots immediately after hatching. Larvae burrow below the freeze line to overwinter and return to the root zone to resume feeding each spring. Depending on the species involved, grubs may feed for a single year or several years. To determine which white grub species is present turfgrass managers must examine the pattern of hairs on the tip or raster of the abdomen.



White grub

Symptoms of white grub damage begin with a wilting of the grass plants and end with dead or brown patches of turf. Damage is primarily noticed in the fall, but may also be seen in the spring. Other symptoms include sod that pulls up easily (like a carpet), revealing the white grubs underneath. Sometimes raccoons, skunks, or flocks of birds foraging in the lawn may indicate severe grub infestations.

Feeding damage is often magnified after the grass enters a period of drought stress because of the plant's decreased ability to take up water. Minor grub damage can be minimized by increased irrigation and a pesticide application. Once damage is obvious with only casual observation, it is often too late to treat with a pesticide.

The **Japanese beetle** is now a very familiar insect in Indiana. Full grown larvae are approximately 1/2 inch in length and have a characteristic "V-shaped" rastral pat-

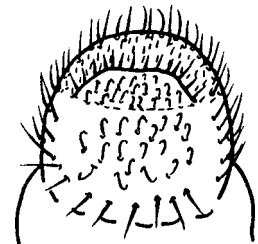


Larval raster

Japanese beetle

tern. Adults are approximately 1/2 inch in length and have a shiny metallic-green head and body with coppery-brown colored wing covers. The Japanese beetle has a 1-year life cycle. Eggs are laid during mid-July and hatch during the first few weeks of August. Chemical controls in place by early August are most effective against newly emerged (more susceptible) larvae.

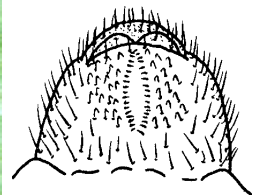
Masked chafer grubs are slightly larger than those of the Japanese beetle, but lack any distinct rastral pattern. Adults are approximately 1/2 inch in length and have a darkened (or masked) area across the face. Unlike Japanese beetles, masked chafer adult beetles are short-lived and do not feed. They are strongly attracted to lights, where they mate during late July and early August. Like the Japanese beetle, masked chafers complete their life cycle in a single year. Apply control chemicals by early August for best results.



Larval raster

Masked chafer

The larger **May or June beetle** grubs may grow to 2 inches in length. They require from 1 to 4 years for complete larval development. Because they must feed several years in succession, seasonal timing of insecticide application is not as critical as for other white grub species. Controls can be applied anytime throughout the growing season, but chemicals applied while the ground is warm are more effective. Adults are similar to the chafers in overall appearance, but can be much larger and often much darker. May and June beetles feed on leaves of deciduous trees, but are seldom noticed except when they appear at lights in the evening. One species, the



Larval raster

June beetle

green June beetle, stands out as a metallic green beetle, approximately 1 inch in length. This beetle feeds on ripening fruits, but the grubs may damage turfgrass by their constant tunneling, while looking for decaying organic matter upon which they feed.

Thatch-Dwelling Pests

Thatch-dwelling and above-ground pests may best be detected by using a disclosing solution, such as a weak concentration of dish soap, applied in selected spots to the turf. This solution "irritates" hiding insects, causing them to move to the surface, where they are visible.

Armyworms and cutworms are the caterpillar stage of several species of night-flying moths. The dull-colored caterpillars may grow to 2 inches in length and feed on the above ground parts of plants. They are usually considered pests of crops, but may infest lawns and turf,

Billbug larvae appear somewhat similar to white grub larvae, except that they are smaller (1/4 to 3/8 inch) and are legless. Billbug larvae feed on roots and stems. Damaged grass stems turn brown and may be pulled out easily, often exposing brown saw-dust like frass. Billbug adults are small, black or brown weevils ("snout" beetles) that often may be found sunning themselves in early spring



Billbug larvae



Black cutworm larva and adult



Armyworm larva



Billbug adult



Armyworm adult

especially in those areas that border crops or large, unattended fields. Armyworms may migrate in large numbers from one area to another to feed. Usually, the caterpillars hide by day and feed by night, thus often go unnoticed. They feed on grass blades and may actually cut off the plants at crown level. Turf may show brown patches and have an overall "ragged" appearance.

on sidewalks and driveways. Adults may also damage lawns by eating small holes in the blades and stems. Areas around the holes may turn yellow, and the grass may take on a "speckled" appearance.

Sod webworm larvae are the caterpillar stage of several species of small "lawn moths." Mature caterpillars are about 1 inch long, slender, grayish-black, and are covered with distinct, black spots. Adults are whitish or buff-colored moths with long snouts and a 1 inch wing span. They roll their wings close to the body when at rest and appear very slender. Adults hide during the day and may be noticed flitting just above the grass in very short and erratic flight patterns at dusk. Adults do not feed, but only mate, and drop eggs on the grass blade. This pest seems to prefer new lawns and several generations may occur each season. Larvae overwinter in silken tunnels and emerge in the spring to feed on grass blades, growing tips, and greener portions of the crown. Damaged

areas appear as scattered, irregular, brown patches during the summer, and grass may take on an overall “ragged” appearance. Damage usually occurs in sunny rather than shaded areas of the lawn. Presence of larvae together with visible damage symptoms justifies chemical controls for sod webworm.



Sod webworm eggs



Sod webworm larva



Sod webworm adult

Above-Ground Pests

Chinch bug adults are small (1/5 inch), white and black insects that fold their wings flat over their bodies. Immatures (nymphs) are similar in shape to the adults, but are usually bright red in color, often possess a white band behind the neck, and lack wings. Both nymphs and adults damage lawns by sucking sap from grass blades. Grass may turn yellow and then brown as feeding continues. Damage is more severe in hot dry weather, especially droughty years. Chinch bugs themselves are often found on the margin between the damaged and healthy grass. They may occur in large numbers, but, because of their relatively small size, often remain unnoticed for some time.

Two generations of chinch bugs occur in Indiana each year. Adults become active in the spring and move to rapidly growing grasses, where they mate and lay their eggs. A female may lay up to 200 eggs, that hatch within two weeks. When bugs mature, they mate and produce a second generation. Second generation adults overwinter in grass clumps and leaf litter.



Chinch bug adults and nymphs

Leafhoppers are small (1/8 to 1/4 inch) generally pale yellow, white, or green colored insects that jump or fly short distances when disturbed. Both adults and

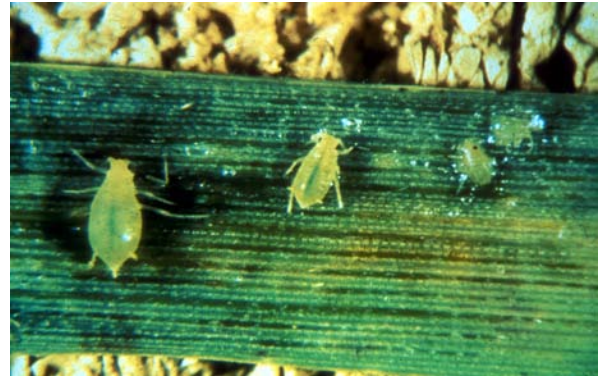


Leafhopper adult and nymphs

nymphs damage plants by sucking plant juices from leaves and stems. They may become very abundant and feed on nearly all species of plants. There can be two or more generations per year, depending on the species and the weather. Leafhopper feeding causes grasses to become yellow-spotted and to appear “bleached.” Severe infestations may cause the entire lawn to appear wilted, as if from drought.

Greenbugs are a species of aphids that is slightly less than 1/8 inch in length is either green or black and may or may not have wings. Greenbugs are quite common in Indiana and arrive from southern states each spring. They may reproduce rapidly under favorable conditions. Because they suck plant juices, damage may appear similar to leafhopper feeding, or they may impart a yellow to burnt-orange coloration to the turf. They are common in agronomic crops, but also can cause consid-

erable damage in turf. This insect can produce many generations each season under ideal conditions and prefers healthy green lawns.



Greenbug adult and nymphs

TREATMENT

If destructive insects are found in sufficient numbers to cause damage, cultural as well as chemical controls should be considered. Increased irrigation, fertilization and possibly higher mowing may help reduce the severity of insect damage. Table 1 contains a list of insecticides recommended for control of the most common turf pests in Indiana. More than one chemical and formulation is usually available. Always read and follow label directions.

CONTROL EVALUATION

Remember that insecticides are designed to kill insects not bring dead grass back to life. Do not expect immediate improvement in the appearance of your turf after insecticide application. Killing the turf pests only prevents further damage. Even under optimum conditions, lawns may require several weeks to recover.

After insecticide application, always evaluate the performance of the treatment applied. Insecticides may require 2 to 3 days to kill above ground insects and 2 to 3 weeks for those below ground. Some biological controls may require 1 month or more. If you suspect that a treatment has failed, try to determine the cause. Most insecticide failures can be attributed to one of the following.

- *Enhanced biodegradation.* Continued use of the same chemicals on an area of turfgrass year after year can select for a population of soil-inhabiting microbes that feed on the insecticides applied. If such microbial populations are allowed to build up, insecticides may be rendered ineffective very quickly. Periodically switching from one chemical to another will prevent this buildup from occurring.

- *Tank hydrolysis.* If chemicals are mixed with water that has either a high or a low pH value, insecticides will begin to break down inside the sprayer. The longer they are held in the tank, the more breakdown will occur. Mix only what is required for the job, and do not “save” spray mixture.
- *Improper calibration or poorly maintained equipment.* Equipment should be recalibrated each season. Each product behaves differently in a sprayer or granular applicator, thus each product must be calibrated for individually. Applications of improper rates can be very expensive and may cause undue problems.
- *Improper irrigation.* Label directions for most white grub insecticides recommend watering with at least 1/2 inch of water immediately after application. This procedure not only helps wash the chemical off the grass blades, but also causes the grubs to rise nearer the soil surface where the chemical is located. Purdue entomologists recommend watering 24 to 48 hours before and immediately following chemical application whenever possible.
- *Improper timing.* Insecticides applied too late or too early in the season are often ineffective. Be sure insects are present before applying chemicals. In the case of white grubs, time chemical applications to coincide with activity of young grubs near the soil surface.
- *True insecticide failure.* If the above causes have been ruled out and product did not perform as advertised, contact the manufacturer.

Table 1. Recommended Turfgrass Insecticides

Chemical Insecticides	Armyworms & Cutworms	Billbugs	Chinch bugs	Fall armyworms	Greenbugs (aphid)	Leafhoppers	Sod webworms	White grubs
acephate (Orthene)	X			X	X	X	X	
bendiocarb (Turcam, Ficam)		X	X			X	X	X
carbaryl (Sevin)	X	X	X			X	X	X
halofenozide (Mach II)								X
imidacloprid (Merit)								X
thiamethoxam (Meridian)								X
cyfluthrin (Tempo)	X	X	X				X	
cyhalothrin (Scimitar/Warrior T)	X	X	X	X			X	
ethoprop (Mocap)		X	X				X	X
fonofos (Mainstay, Crusade)	X	X	X	X			X	X
fluvalinate (Mavrik)	X		X			X	X	
trichlorfon (Dylox, Proxol)	X			X			X	X
Alternative Controls								
<i>Beauveria bassiana</i> (Naturalis/BotaniGuard)								
conserve (Spinosad)	X			X			X	
<i>Bacillus popilliae</i> (Doom, Milkyspore) (Effective only on Japanese beetle grubs. May require several years to provide control. Cannot be used in combination with other grub control products.)								X
<i>Bacillus thuringiensis</i> (Bt)	X	X		X			X	
parasitic nematodes (Biosafe, Exhibit)	X	X		X			X	X

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READ AND FOLLOW ALL LABEL INSTRUCTIONS. THIS INCLUDES DIRECTIONS FOR USE, PRECAUTIONARY STATEMENTS (HAZARDS TO HUMANS, DOMESTIC ANIMALS, AND ENDANGERED SPECIES), ENVIRONMENTAL HAZARDS, RATES OF APPLICATION, NUMBER OF APPLICATIONS, REENTRY INTERVALS, HARVEST RESTRICTIONS, STORAGE AND DISPOSAL, AND ANY SPECIFIC WARNINGS AND/OR PRECAUTIONS FOR SAFE HANDLING OF THE PESTICIDE.

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