PURDUE UNIVERSITY

PURDUE EXTENSION

E-259-W

LANDSCAPE & ORNAMENTALS

Department of Entomology

NEW WHITE GRUB PESTS OF INDIANA

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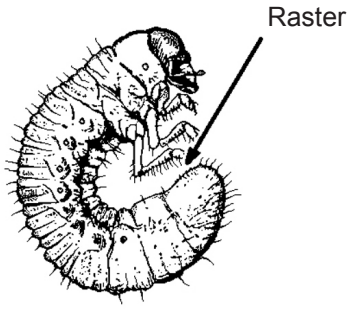
Although Indiana turfgrass managers have grown accustomed to managing Japanese beetle and masked chafer grubs, three new species of white grubs seem poised to cause additional management concerns across the state. Recent statewide survey efforts have detected adults of the European chafer, Asiatic garden beetle, and Oriental beetle in one or more Indiana counties, and damaging grub populations of at least one species have been confirmed. Although these invasive white grubs are biologically similar to other annual white grub species, differences in their seasonal ecology, habitat, and host-plant preference may pose new challenges for turfgrass managers. This fact sheet provides information on the known distribution, biology, identification, and management of these new white grub species.

THREE NEW WHITE GRUB SPECIES

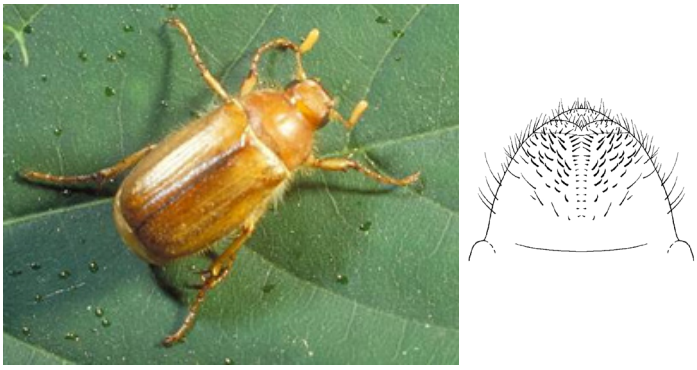
Identification

Adult beetles can be relatively easily recognized (photos below) but grubs are more difficult to identify. White grub species can be identified by the pattern of short hairs and spines located on the underside of the tip of the abdomen (raster). A 10X hand lens is useful when examining the “raster pattern" (see line drawings below).



European Chafer *Amphimallon majalis* (Razoumowsky)

Host Plants: European chafer adults are not known to feed, but the immature stage (grubs) will attack the roots of turfgrass, clover, alfalfa, small grains, soybean, and a variety of nursery stock, including containerized plants.



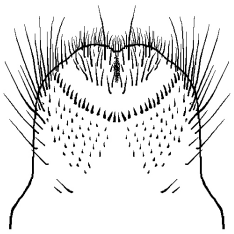
European chafer and raster pattern (*Photo and drawing credit: Dr. David J. Shetlar, The Ohio State University)*

Threat: European chafer grubs damage plants by feeding on roots. Grubs typically feed from July through October and may remain high in the soil profile into winter. If conditions are favorable, European chafer grubs are able to feed under the cover of snow and are the first grubs to resume feeding in the spring (as early as March). Dead and dying spots in lawns where adult chafer flights have been observed the previous June should be suspect, and this type of injury is usually visible by late summer. European chafers are capable of infesting areas that other white grub species do not, especially drier, less intensively managed areas. Relatively light grub infestations can cause extensive root loss in containerized nursery stock.

Distribution: The European chafer was likely introduced to North America from Europe during the first half of the 20th century and was first detected in Newark, New York in 1940. Since then, it has spread westward into lower Ontario, Michigan, and Ohio and southward into Maryland and West Virginia. Now, for the first time, European chafer has been collected from traps in Porter, Allen, Kosciusko, and Knox counties in Indiana.

Asiatic Garden Beetle *Maladera castanea* (Arrow)

Host Plants: Grubs of the Asiatic garden beetle occasionally attack and damage turfgrass, but they seem to prefer the roots of a variety of perennial plants, flowers, vegetables, and

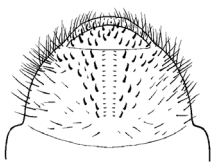


Asiatic garden beetle and raster pattern (*Photo and drawing credit: Dr. David J. Shetlar, The Ohio State University)*

field crops, and they have caused serious problems in newly planted field corn in northern Indiana. Grubs are sometimes found clustered in areas where orange hawkweed grows and around flower beds containing adult food plants. The adults feed on more than 100 species of plants, but they have an apparent preference for certain flowers, including aster, dahlia, chrysanthemum, and rose. Adults will also feed on the leaves of a variety of trees, shrubs, and vegetable crops.

Threat: Adult beetles emerge from the soil mainly from mid-July to mid-August, but may be found anytime from late June through October. Adults can be a serious pest of vegetables and ornamentals, feeding on foliage at night and returning to the soil during the day. Unlike Japanese beetles, Asiatic garden beetles do not skeletonize leaves, but rather strip or notch the foliage. Grubs become active in late July and feed on organic matter and the roots of a variety of different grasses, vegetables, and herbaceous plants. Extensive damage to seedling corn has been documented during the spring of 2007 and 2008 in northern Indiana.

Distribution: The Asiatic garden beetle was introduced to North America from Japan during the 1920's. Since then, it has expanded its range westward from New England along the great lakes corridor to Ohio and south along the eastern seaboard into South Carolina. In 2006, Asiatic garden beetle was collected from traps in Allen, Porter, St. Joseph, Elkhart, Kosciusko, Marshall, Starke, Jasper, Newton, Allen, and Knox counties in Indiana.



Oriental beetle (*Photo credit: Doug Richmond*) and raster pattern (Drawing credit: Dr. David J. Shetlar, The Ohio State University)

Oriental Beetle *Exomala orientalis* (Waterhouse)

Host Plants: Although adult beetles apparently do little feeding, they have occasionally been found feeding on the petals of daisies and other flowers, including rose, phlox, and petunia. Grubs feed on the roots of turfgrasses, perennial plants, weeds, nursery stock, and potted or containerized plants.

Threat: Adults emergence typically begins in mid-June and may continue into September, with the bulk of adult emergence taking place in late June and July. Adults are capable of causing minor damage to an assortment of flowering plants, but are particularly attracted to daisies. By mid-July, grubs actively feed on soil organic matter and plant roots. Grubs can cause serious damage to turfgrass and ornamental plants and have been known to damage nursery stock and containerized plants. *Distribution*: The oriental beetle was introduced into North America from Japan during the early 20th century and was first detected in Connecticut in 1920. Since then, it's range has expanded mainly by being transported in the soil of nursery stock. Oriental beetle is now present in most of New England and has moved westward to Ohio and as far south as South Carolina. The Oriental beetle has been found only in Tippecanoe County, Indiana, but official surveys initiated this spring will determine its presence in other parts of the state.

MANAGING INVASIVE WHITE GRUBS

For the most part, management options for these three white grub species are the same as for Japanese beetle and masked chafer. However, reducing irrigation during the sensitive egg stage, which can seriously lower the survival of other white grubs, may not affect European chafer. Cultural practices that promote turfgrass root development (deep, infrequent irrigation, core aerification, and fall fertilization) and reduce plant stress can enhance the ability of turfgrass to tolerate white grub feeding and improve recovery should damage occur. Judicious insecticide use can help conserve important natural enemies of white grubs, including ants and parasitic wasps. The insect parasitic nematode *Heterorhabditis bacteriophora* is an effective biological management alternative, and commercial suppliers can be found on the internet. However, use of nematodes requires some degree of diligence and strict adherence to labeled instructions.

There are four basic chemical management options for white grubs. Choosing the appropriate insecticide and application timing will usually depend on specific requirements for the site. Regardless of the approach, it is important to remember that white grubs are soil-inhabiting insects and that no insecticide will be effective unless it reaches the target zone where the grubs are feeding. Therefore, post-application irrigation (or rainfall) of at least ¼ inch is recommended, and close adherence to labeled instructions is always important.

Preventive Control *(June/July)*

Preventive control consists of the prophylactic application of insecticides to prevent damaging populations from occurring. This approach is most often used in areas with a history

of repeated grub damage or where the risk of grub damage is high. This strategy may also be employed as part of a multiple targeting effort aimed at controlling multiple pest species with a single insecticide application. Suitable pesticides have extended residual activity in the soil or plant roots and may include any of the following compounds:

- chlorantraniliprole (Acelepryn)
- clothianidin (Arena)
- clothianidin + bifenthrin (Aloft)
- halofenozide (Mach II)
- imidacloprid (Merit)
- imidacloprid + bifenthrin (Allectus)
- thiamethoxam (Meridian)

Early Season Reactive Control *(July/August)*

Insecticides can be applied early in the season in response to high populations of first and early second instar grubs before damage is visible. Scouting for white grub populations in the soil can aid in decision making at this time. Treatment thresholds ranging from 5-15 grubs/ft^2 are typical benchmarks for insecticide treatment. While treatment thresholds vary depending on the situation, thresholds for European chafer tend to be lower than those for the Asiatic garden beetle or Oriental beetle. Suitable pesticides for early season reactive control include almost any registered soil insecticide. In addition to the preventive insecticides above, the following chemistries are also effective during this time frame:

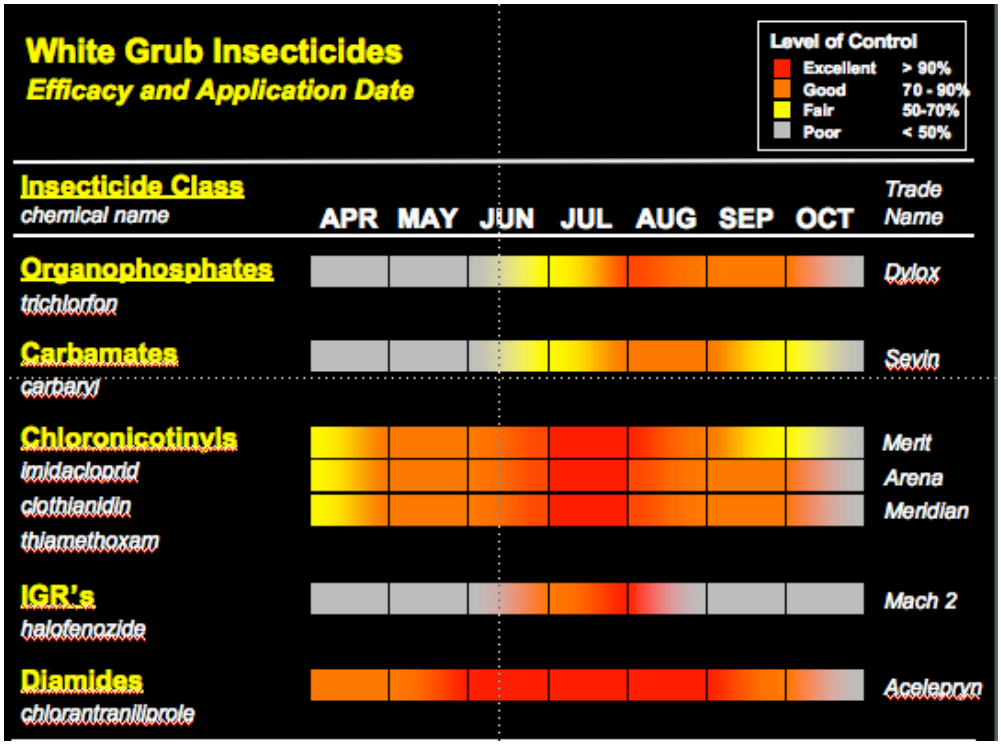
- carbaryl (Sevin)
- trichlorfon (Dylox)

Late Season Reactive Control *(September and later)*

Late season reactive applications, or rescue treatments, are generally made in response to visible grub damage or damage caused by skunks and raccoons foraging for white grubs. These are usually attempts to rescue the turf from more serious damage. Suitable pesticides will have high knockdown capacity, which usually requires ingestion of the insecticide. Therefore, grubs must still be actively feeding for insecticides to be most effective. Any of the previously mentioned insecticides can be effective when used in this way, but their activity may be reduced considerably. Although chlorantraniliprole (Acelepryn) does not kill large grubs quickly, it does reduce white grub feeding. Trichlorfon (Dylox) and carbaryl (Sevin) may require two applications made at 10-14 day intervals, and thorough post-application irrigation is extremely important.

Spring Control *(April)*

Spring applications may be warranted in some situations, especially if severe secondary damage occurs as a result of skunk or raccoon activity, or if spring renovation activities are being undertaken to repair grub damage from the previous fall. Otherwise, this approach is not suggested because the amount of turfgrass damage is often minimal and the grubs are difficult to control at this time. Suitable pesticides will only include compounds with good contact/oral activity such as trichlorfon (Dylox) and carbaryl (Sevin), and grubs must be actively feeding in order for the insecticides to be even marginally effective. The efficacy of most soil insecticides has not been thoroughly examined for use in this capacity.



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.

Revised 9/2008