

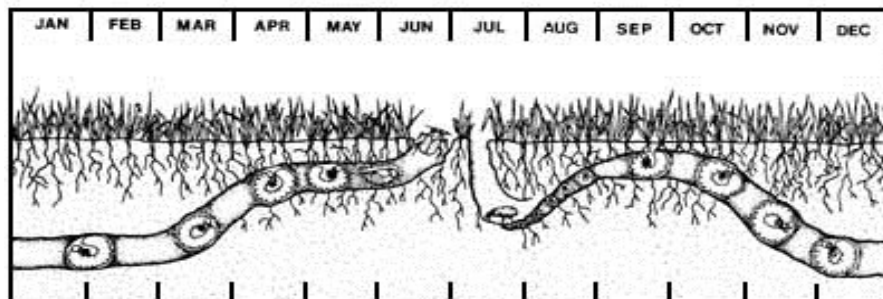
EUROPEAN CHAFERS, JAPANESE BEETLES AND THEIR DAMAGE TO LAWNS

Many insects attack our lawn grasses. Most of them are minor pests and their damage is usually overlooked. A few, however, can cause extensive serious damage, sometimes killing large areas of grass. The two insects which cause the most extensive and widespread damage to lawns and other turfgrass areas in the Capital District are the Japanese beetle and the European chafer. The white grub (larval) stage of these insects feed on the roots of grasses. Well managed lawns are able to withstand more insects without showing damage than lawns which are stressed. Providing adequate soil moisture and reducing soil compaction, along with proper fertilization and soil pH, can do much to combat these pests.

General Lifecycle: Both the European chafer and the Japanese beetle have a similar lifecycle. The adult beetles of both species lay eggs during July and August. The eggs hatch in about twelve days into small, grayish-white grubs which begin feeding immediately on the grass roots. The white grubs grow quickly and molt three times, each time becoming larger. In the Capital District, late August, September, October and into November are good times to check lawns for these new white grubs. It is also possible to check for white grubs in April and May, too. The only way to tell if a white grub is a European chafer or a Japanese beetle is to examine the raster pattern of spines near the anus.

As soil temperatures cool in the autumn, the white grubs go deep into the soil to spend the winter. As the soil warms in the spring, they rise again to feed on turfgrass roots. In an average year, white grubs may be found feeding near the soil surface in mid-April. In the later spring, the white grubs will pupate and then emerge from the ground as adult beetles.

White grub specifics - White grubs are found below ground among the roots of turfgrasses. The white grubs are C-shaped, off-white in color with a brownish head. Their size varies from 1/4 inch to 3/4 inch in length depending on the species and time of year. One year is required by most individuals to complete their development, but some occasionally take longer. Damage occurs primarily in the spring and fall. White grubs chew off the roots of the grass plants, and the lawn turns brown and dies. The insects are in the beetle stage during the summer and do not damage lawns in mid-summer. Many lawns in the Capital District have both European chafers and Japanese beetles present. Other similar species, including Oriental beetles and Asiatic garden beetles, are also found here.

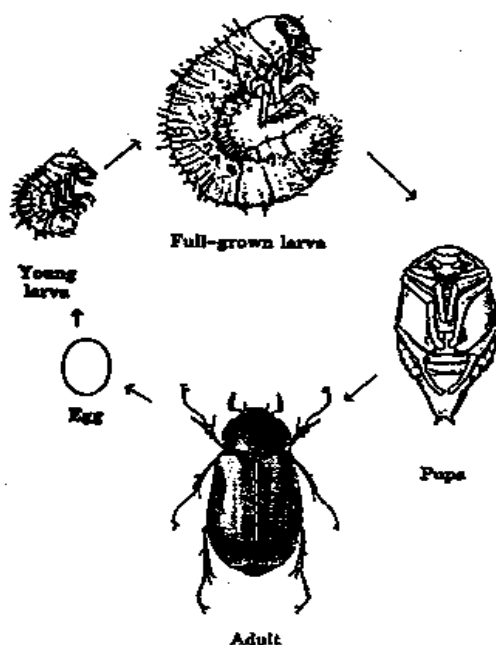


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Japanese Beetle - The white grubs of the Japanese beetle feed on turfgrass roots, while the adult beetles feed on leaves, flowers or fruit of many kinds of plants including many ornamentals. They eat the tissue between the veins of the leaves leaving only a skeleton of the leaf. The beetles are somewhat social and prefer to feed in groups. The adult beetle has a shiny, metallic brown and green colored body. Japanese beetles can be found in many areas in June, July and into August.

European Chafer - The European chafer is a golden tan to light brown beetle. It is oval in shape, and about ½ inch long. During the months of June and July, adult beetles emerge from the ground at about 8:30-8:45 p.m. E.D.T. and take off in mating flights. The mating flights consist of many individuals and have been described

"to sound and look like a swarm of bees." The flights occur at sunset when enormous numbers of beetles swarm about a tree or tall shrub, or even sometimes a chimney, for about 30 minutes, and then settle down on the foliage where mating occurs. The adult beetles do not feed and they do not bite or sting. They may, however, tear plant foliage as they attempt to hold on with their spiny legs. The following day females will burrow into the soil a few inches and deposit eggs in earthen cells. Generally they lay 20-30 eggs, depositing them singly in cells. In two to three weeks, the eggs hatch and the tiny white grubs begin feeding. Most European chafers have a 1 year life cycle, but some may take 2 years to complete development. The European chafer is illustrated here.



Are White grubs Really In My Lawn? The best method for checking for white grubs involves digging a square foot of turf four inches deep. Gradually pull apart the turf over a piece of cardboard and look at the soil. On high value lawns, lawns that receive a good deal of attention, or lawns in a weak condition, if there are more than 5 to 10 white grubs per square foot, treatment may be justified. Check the lawn for white grubs in the spring before using a preventive product, or anytime when using a curative product. Many insecticide applications are made each year in the Capital District when white grubs are not present, resulting in a great waste of time, money, and insecticide. If you have treated for several years and you do not see evidence of white grubs in your lawn or your neighbor's lawn, it may be time to stop treating. It isn't always necessary to treat for white grubs every year.

No one can tell if a lawn has a white grub infestation just by looking at the ground. Skunk, mole and bird damage to lawns may indicate a white grub problem, but since these animals have a varied diet, this is not a foolproof method. A lawn at one home may have a severe white grub problem while the house next door has a lawn with no white grubs. White grubs will generally be found in lawns in full sun, in lawns that contain a good percentage of Kentucky bluegrass, and in lawns less than 20 years old. Even poor lawns full of crabgrass and other weeds can have large white grub populations, however.

Management: Attempts at controlling both the Japanese beetle and the European chafer during the adult beetle stage are generally not effective, so with the exception of traps, most control measures are aimed at the white grub stage.

Beetle traps use a chemical sex attractant (pheromone) to attract adult male beetles. The traps commonly sold will only attract Japanese beetles, and not European chafers. It is generally thought that while the traps can catch a significant number of beetles, many more are attracted to the general area but do not end up in the trap. The trap may therefore increase the number of beetles in a given area. Traps may be more effective if placed several yards away from the area containing the plants which need to be protected. It is unclear if trapping adults will reduce the white grub population the following autumn. Researchers are working on more efficient traps which will collect a higher percentage of the beetles in the area.

Beneficial nematodes have been shown to be very effective in some trials, but poor results often occur as well. Since they are living organisms, many pitfalls can occur in when purchasing and applying nematodes. One of the most effective nematodes goes by the scientific name *Heterorhabditis bacteriophora*. Nematodes need to be applied in large number to moist soil, and lawns must be watered after application. Applications in the evening are usually more successful than during the day, since nematodes are light-sensitive. Nematodes usually have to be purchased from mail-order companies and must shipped quickly and applied when in a healthy state. It is important to use very clean sprayers or other application equipment. Contact Cornell Cooperative Extension for specific information regarding beneficial nematodes.

Milky spore: Milky spore disease, a bacteria that infects Japanese beetle white grubs, has been applied extensively on turfgrass in the northeast for many years. Milky spore disease is of questionable value in upstate New York for several reasons. The bacteria is most infective to Japanese beetle white grubs and is of limited value against other common white grub species, including European chafers. Soil temperatures in upstate New York are often too cool for rapid disease build-up, so it often takes several years (minimum) for disease populations to rise to sufficient levels to make an impact on white grub populations. Milky disease bacteria can only multiply within the living bodies of white grubs and for this reason, one must be willing to tolerate a period of relatively high white grub populations to obtain disease levels sufficient to control white grubs. Milky spore may be most useful on large, marginal, or low-value lawn areas.

Insecticides are the most common way white grubs are managed. There are ten active ingredients and over 500 products legally available in New York State to manage white grubs, so only the active ingredients and not the product names are listed here. The nine active ingredients include: carbaryl, imidacloprid, azadirachtin, acephate, chlorpyrifos, trichlorfon, bifenthrin, cyfluthrin, and chlorantraniliprole. Not all of these products are often sold to home gardeners, however. All imidacloprid-containing products for commercial use are “restricted-use” statewide, meaning that they may only be sold and used by a New York State Department of Environmental Conservation certified pesticide applicator. Additionally, the sale, use, and distribution of consumer products containing imidacloprid are not allowed in Nassau, Suffolk, Kings, or Queens Counties. The critical issue with any white grub control product is the active ingredient, so check the label carefully (especially the fine print) to see the active ingredient contained in the product.

Preventive products: Products containing imidacloprid and chlorantraniliprole will not control white grubs if applied in the spring, since they move very slowly through the soil to where the white grubs live. They are preventive products that work well on newly hatched white grubs present in July or August, but are less effective if applied later in the fall. Imidacloprid is best applied in June or July, which will allow time for the product to move into the soil. Chlorantraniliprole, which moves very slowly into the soil, is best applied in April or early May, after which it will control the white grubs that hatch in July and August. Most insecticides should be applied to moist soil and need to be watered in after application (read the label carefully).

Curative products: Carbaryl and trichlorfon are considered curative treatments, since they are short-lived compounds that kill active white grubs. While not as effective as the preventive products, they can be used if high numbers of white grubs are found in the fall or spring. In spring, treatments are often not needed, since the white grubs have already done most of their feeding damage and will not grow much larger. However, if a large white grub infestation is discovered in spring and a treatment is deemed necessary, trichlorfon is generally regarded as the most effective. Treatments should be made by mid-May at the latest. Bifenthrin and cyfluthrin bind to organic matter in the soil and will not move down to where the white grubs are feeding, making them the least effective for white grub control, although they are effective for surface-feeding insects, such as the chinch bug.

Core cultivation? Recent research has shown that core cultivation (also known as core aerifying or spiking) can destroy up to 81% of the white grubs present in a lawn. Information on timing, number of cultivations necessary, and other critical issues has not yet been resolved, so we do not have a recommendation at this time.

Written by David Chinery, Cornell Cooperative Extension of Rensselaer County, from information adapted from various Extension sources, including Michigan State University Turfgrass Science “Home Lawn White grub Control Products 2012” and “2015-2016 Cornell Pest Management Guidelines for Commercial Turfgrass.”

Diagram on page 1 from <http://www.ext.colostate.edu/pubs/insect/insimg/jh008cos.jpg>

Diagram on page 2 from http://www.pir.sa.gov.au/__data/assets/image/0004/8167/Image48.gif

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READ THE LABEL BEFORE APPLYING ANY PESTICIDE.

This publication contains pesticide recommendations. Changes in pesticide regulations occur constantly and human errors are still possible. Some materials mentioned may no longer be legal. All pesticides distributed, sold or applied in New York State must be registered with the New York State Department of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide use in New York State should be directed to the appropriate Cornell Cooperative Extension specialist or your regional DEC office.