

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, or larvae, 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.

WHITE GRUB



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 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 grubs. The only way to tell if a grub is a European chafer or a Japanese beetle is to examine the raster pattern of spines near the anus.

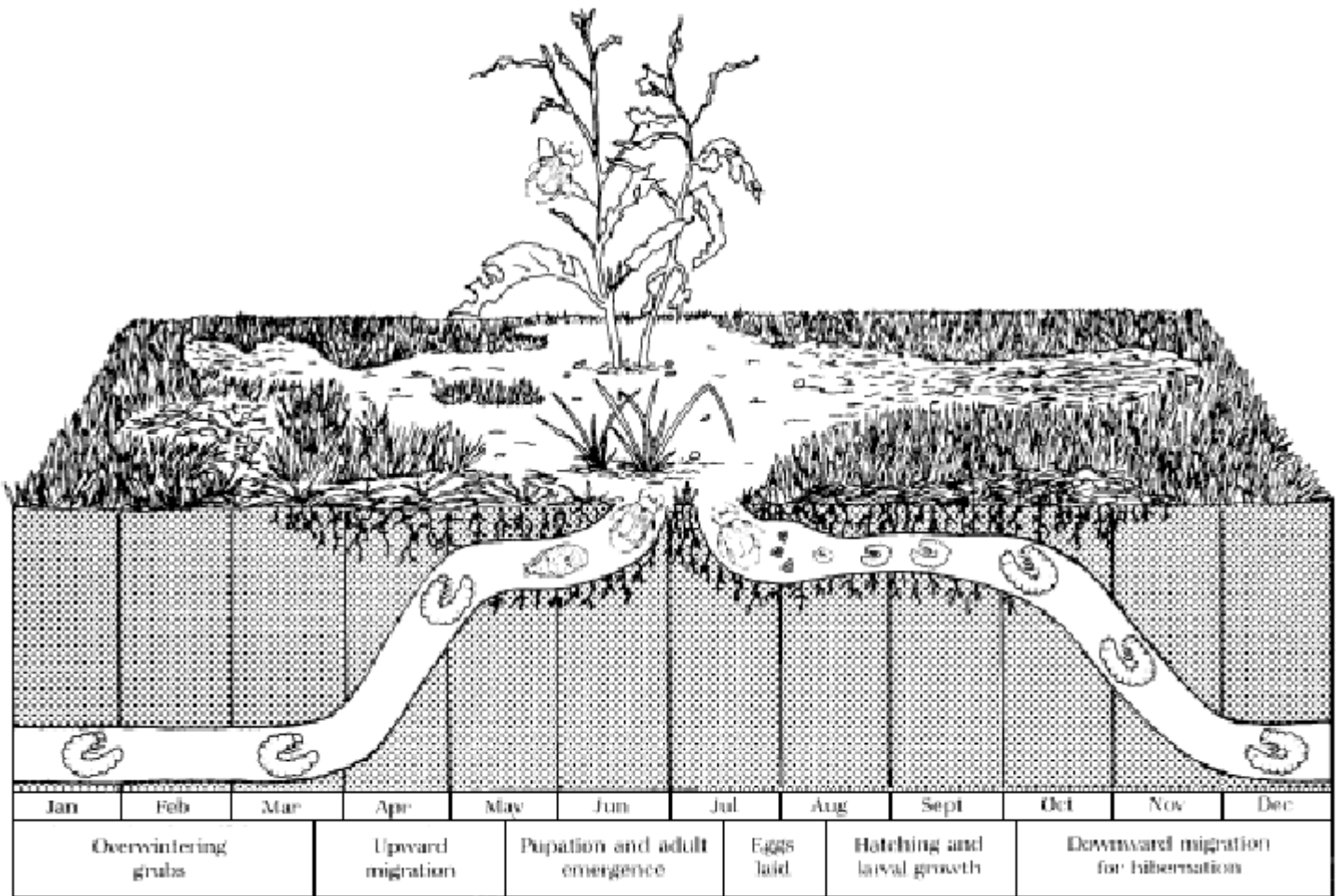
As soil temperatures cool, the grubs go deep into the soil to spend the winter. As the soil warms in the spring, they rise again to feed on turfgrass roots. In an average year, grubs may be found feeding near the soil surface in mid-April. In the later spring, the grubs will pupate and then emerge from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

Depiction of the life cycle of the Japanese beetle. Life stages of the Japanese beetle. A) eggs; B) larva or grub; C) dorsal and ventral views of the pupa; D) adult.



White Grubs - White grubs are found below ground among the roots of turfgrasses. The 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. 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. Infested lawns turn brown and die because the grubs have chewed off the grass roots. Many lawns in the Capital District have both European chafers and Japanese beetles present. See the diagram below for lifecycle information.

No one can tell if a lawn has a grub infestation just by looking at the ground. Skunk, mole and bird damage to lawns may indicate a 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 grub problem while the house next door has a lawn with no grubs. Grubs will generally be found on lawns in full sun, in lawns that contain a good percentage of Kentucky bluegrass, and lawns less than 20 years old. Even poor lawns full of crabgrass and other weeds can have large grub populations, however.



Are Grubs Really In My Lawn? The best method for checking for grubs involves digging a square foot of turf three 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 grubs per square foot, treatment may be justified. Do not treat lawns without checking for grubs. Many insecticide applications are made each year in the Capital District when grubs are not present, resulting in a great waste of time, money, and insecticide.

Japanese Beetle - The 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 grubs begin feeding. Most European chafers have a 1 year life cycle, but some may take 2 years to complete development.

Management: Attempts at controlling both the Japanese beetle and the European chafer during the adult beetle stage are generally not effective, so all control measures are aimed at the grub stage.

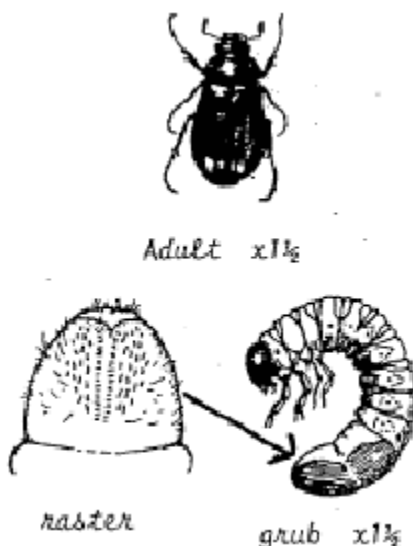
Beetle traps use a chemical sex attractant (pheromone) to attract adult male beetles. The traps commonly sold will only attract Japanese beetles, and not European chafer. It is generally thought that while the traps can catch a significant number of beetles, many more are attracted to the general area 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 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.

Insecticides are the most common way grubs are managed. The insecticides Carbaryl (Sevin), *Trichlorfon (Dylox or Proxol), imidacloprid (Merit or Bayer Advanced Season Long Grub Control), *†Halofenozide (Grub-Ex) or Permethrin may be used.

For late summer/fall insecticide treatments: All of the insecticides listed above can be used in the late summer or early fall with the exception of imidacloprid (Merit or Grub-Ex). Most insecticides should be applied to moist soil and need to be watered in after application. Fall treatment is more effective than spring treatment. Trichlorfon penetrates thatch better than the other insecticides.

For spring insecticide treatments: Most insecticides do not work well in the spring. Spring treatments are generally not needed, since the grubs have already done most of their feeding damage, and will not grow much larger.



If a large grub infestation is discovered in spring and a treatment is deemed necessary, trichlorfon (Dylox or Proxol) is generally regarded as the most effective. Treatments should be made by mid-April.

Special information about imidacloprid and halofenozide: Imidacloprid (Merit or Bayer Advanced Season Long Grub Control) and halofenozide (Grub-Ex)* are used differently than the other insecticides. Imidacloprid is applied preventatively between June 1 and August 15, before the beetles present lay their eggs. It will not work as effectively if applied in the fall or early spring. Halofenozide should be applied in late July or early August, at or before egg-laying. It is an insect growth regulator and will not work well at other times of the year. Halofenozide is not advisable for use against European chafer.

Milky spore: Milky spore disease, a bacteria that infects Japanese beetle 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 grubs and is of limited value against other common 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 grub populations. Milky disease bacteria can only multiply within the living bodies of grubs and for this reason, one must be willing to tolerate a period of relatively high grub populations to obtain disease levels sufficient to control grubs. Milky spore may be most useful on large, marginal, or low-value lawn areas.

*restricted use pesticide; may be purchased and used only by certified applicators or used by someone under the direct supervision of a certified applicator.

†not for use in Nassau and Suffolk Counties

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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.

READ THE LABEL BEFORE APPLYING ANY PESTICIDE.