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Managing White Grubs in Home Lawns



White grubs are the most destructive of all pests of home lawns in Connecticut. These root-feeding pests are larvae of scarab beetles that were introduced into the United States in the early to mid-1900s. For many years the Japanese beetle, *Popillia japonica*, was the most common, but the oriental beetle, *Exomala orientalis*, Asiatic garden beetle, *Maladera castanea*, and European chafer, *Rhizotrogus majalis*, have become more numerous in the last decade.

Additional indirect damage to lawns results from vertebrate pests, such as skunks and raccoons, digging up large areas of turf to feed on the grubs. Moles also feed on grubs and kill turf by leaving roots exposed to air in their tunnels. Successful, environmentally safe, management of white

grubs in home lawns can be accomplished with accurate identification of grub species, correct selection and proper timing of management strategies.

DAMAGE

Damage done by white grubs is aptly described as ‘the lawn rolls up like a carpet’. Grubs eat roots near the soil line causing large dead patches in late summer and fall. Without the water and nutrients supplied by their roots, the grass declines and may die. Damage is more pronounced and widespread if conditions are hot and dry. While they are a major problem in turf, white grubs also feed on herbaceous and woody ornamental plant roots. Oriental beetles seem to be the most common species found in landscape beds. Planting small, bare-root plants into grub-infested soil can result in plant losses.

Adult beetles feed on the leaves and flowers of many herbaceous and woody plants, giving them a ragged appearance. Japanese beetle adults feed during the heat of the day, skeletonizing the leaves of many plants. Their favorites are roses, grapes and linden trees. Asiatic garden beetle adults feed at night from the leaf margin inward on many herbaceous perennial plants, favoring daisies and their relatives. Oriental beetle

adults feed on the flowers of rose, squash, dahlia and daylily and often congregate in swimming pools where they can be so numerous that they clog filters. European chafer adults do little feeding but can become a nuisance, often collecting in chimneys during their mating flights.

DESCRIPTION

All white grubs are cream colored with dark patches because of the soil they ingest. Three pairs of jointed legs are found just behind the reddish-brown head capsule. Grubs can reach up to one inch (25mm) in length at maturity and are usually found curled up in C-shapes, especially when disturbed. European chafers are the largest and Asiatic garden beetles are the smallest.

Adult scarabs are also different from each other. The European chafer is tan to brown, 5/8" long with a heavy body. Japanese beetles are metallic with copper-colored wings, a green head and patches of white hair along each side of the 1/2" long body. The Oriental beetle is 1/2" long and straw-colored with irregular black patches which can cover the entire beetle. Asiatic garden beetles are 3/8" long, heavy bodied and reddish-brown with a faint iridescence. See the images at the end of this fact sheet.

LIFE CYCLE

These beetles have a one-year life cycle in Connecticut. Winter is passed as partially grown grubs in the soil below the frost line. As the soil warms in spring, grubs move back up into the root zone to resume feeding. Pupation occurs in May and adult beetles emerge in June or July depending on the species. European chafers conduct mating flights at dusk near trees or chimneys. Japanese beetles can be seen mating at their feeding sites during the day. Asiatic garden beetles are nocturnal and, along with oriental beetles, will come to

lights at night. After mating, females lay eggs in moist soil in turf or nearby landscape beds. Adults live from six weeks up to four months.

Eggs absorb moisture during development and hatch in one to two weeks, depending on soil temperature. Small grubs begin feeding on roots. As their mouthparts get larger, they are able to completely sever roots.

MANAGEMENT

Integrated pest management (IPM) uses a variety of methods to effectively monitor for and then manage diseases, insects and weed problems while protecting applicators, other people and the environment. Cultural, mechanical and biological means should be tried, where feasible, before resorting to chemicals or in conjunction with chemicals for management of white grubs.

Cultural

Vigorous turf can usually tolerate some grubs. Maintain good vigor with annual fertilization and periodic liming based on soil test results. Mow on a regular basis, but cut off no more than a 1/3 of the grass blade height each time to avoid turf stress. If the lawn is used as a play area or walkway, aerate it with a core aerator as needed to reduce compaction and allow for good root growth. High maintenance lawns that receive multiple fertilizations and frequent irrigation during the summer months may develop a thick thatch layer, found between grass blades and the soil line, which can limit percolation of water and fertilizers as well as movement of any needed insecticides. Dethatch with a mechanical rake to keep thatch 1/4 to 1/2". Frequent irrigation during the scarab beetle egg laying period in July and August may actually increase white grub populations.

Mechanical

Managing white grubs mechanically is usually unproductive. Lawn aerating spiked sandals puncture grubs as you mow your lawn. The best time to try this is in late spring when the grubs are large and near the surface. Literally, this is a hit or miss situation and at best minimally successful.

Mechanical management of adult beetles can be helpful. Handpicking clumps of Japanese beetle adults into cups of soapy water may help reduce the population. The same can be done to Asiatic garden beetles and oriental beetles at night when they come to lighted windows and can be flicked off screens. Using a butterfly net to catch European chafers during their mating flights can result in large captures of beetles which can then be drowned in soapy water.

Floral and sex pheromone bag traps for Japanese beetles, that attract both males and females, should be placed away from favored food plants, such as roses. Catches may help reduce beetle numbers and therefore grub numbers.

Biological

Biological control of white grubs using bacteria can be effective. Milky disease, caused by native bacteria, can infect European chafer, Japanese, and oriental beetle grubs. Annual untreated grub populations are needed however, to keep the disease going. This disease has not been effective in controlling white grubs in home lawns in Connecticut. A more recent discovery is *Bacillus thuringiensis galleriae* (Btg, sold as GrubGONE!) Btg can be effective against early, mid- and last-instar grubs, as long as the product is applied while grubs are still actively feeding, as they must ingest the bacteria to be affected. Btg will attack the Asiatic garden beetle grubs which milky disease does not.

Beneficial nematodes, microscopic roundworms, can be watered in to the soil where they enter white grubs. Once inside the grub, the nematodes release a bacterium that actually kills the grub. Because they are living organisms that dry out quickly and die if exposed to sunlight, they need to be applied on cloudy, calm days; or in the early morning; or evening; or in the rain. Nematodes need to be applied by mid- to late-August to protect turf. Nematodes, require one-half inch or more of rain or irrigation to incorporate them so they will be present at a depth where they will interact with newly hatched grubs.

Chemical

IPM typically involves applying chemicals only after early detection of a damaging pest population. White grub larval development, however, limits the success of this practice. The most effective chemicals work only on newly hatched larvae, which are barely visible to the naked eye. Therefore, waiting to apply insecticides until mature grubs are detected in late summer or early fall prevents adequate control. Monitoring the location of adult activity is not always predictive of where grub populations will be as adults are capable of flight. If monitoring detects a damaging population of white grubs that is causing dead patches in the lawn, application of a preventative insecticide to the next generation the next year may be the most effective way to manage white grubs.

Since the early 1990s, neonicotinoid insecticides, such as imidacloprid, have been the mainstay for preventive control of white grubs. However, concern about the risk of adverse effects to pollinators feeding on flowering plants growing in lawns, led to these products becoming restricted use pesticides in Connecticut, when the legislature passed the pollinator protection

act in 2016. The most commonly used alternative contains chlorantraniliprole (Grubex), which is virtually non-toxic to bees and vertebrates and is available to homeowners. For both the neonicotinoids and chlorantraniliprole products, the correct timing of application is immediately prior to significant rainfall between May and the last week of July. If needed, irrigating the lawn with ½” of water can take the place of rainfall. The insecticide will stay active in the soil and kill the next generation of grubs when they hatch in August.

Killing adult beetles before they can lay eggs is another chemical control option. Many insecticides are labeled for control of beetle adults in landscapes. Japanese beetles and Asiatic garden beetles are the only species that congregate on plants in large numbers where sprays might provide effective control. Older insecticides, such as Sevin, which is very toxic to bees, and malathion have good activity against adult beetles. All are somewhat toxic to the applicator and environment. Pyrethrins, such as bifenthrin and cyfluthrin, which are derived from plants, are less toxic to mammals but are effective against insects in general.

With all applications, be sure to read and understand the entire label and follow all directions. The label is the LAW! Regulations and insecticides change frequently so be sure to use a product that is appropriate for the safe management of your correctly identified pest.

Reference

Turfgrass Insects of the United States and Canada, 2nd Edition. Vittum, Villani and Tashiro.

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Asiatic Garden Beetle



Japanese Beetle



Oriental Beetle



European Chafer