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Turf Tips

For the Homeowner

European Chafer

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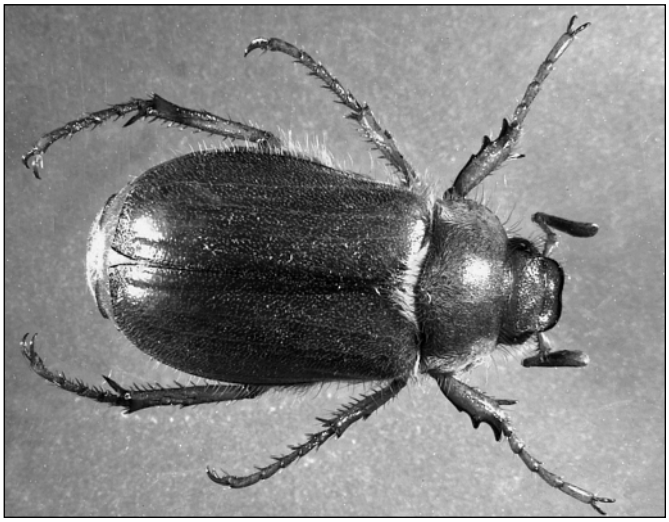
Origin and distribution: The European chafer, *Rhizotrogus majalis*, is native to western and central Europe. It was discovered in the United States in 1940, when a grub was found in a nursery-growing area near Rochester, N.Y. Today, it has been reported from New York, New Jersey, Connecticut, Pennsylvania, Massachusetts, Rhode Island, Ohio, Michigan, Delaware and southern Ontario. In Michigan, the European chafer is most abundant in the southern half of the Lower Peninsula.

Pest status: The European chafer may be the most serious grub pest of home lawns and low-maintenance turf. Although not as widespread as Japanese beetle, the European chafer grub is more damaging to home lawns in areas where both are found. Unlike Japanese beetle, European chafer is not a problem in daily irrigated turf. The European chafer grub is slightly larger than the Japanese beetle grub. It feeds later into the fall and starts feeding again earlier in the spring.

Figure 1: European chafer (*Rhizotrogus majalis*) larva and adult.



Injury: European chafer grubs feed most heavily on grass roots from August to November and from March to early May. Even during the winter months, grubs may resume feeding during warm spells. Turf damage caused by grub feeding injury to roots is most severe under drought conditions, when water-stressed grass plants cannot grow new roots to replace injured ones. In heavily infested areas, entire lawns may turn brown and die during prolonged periods of dry weather in the fall or spring.

Life history: European chafer adults are 1/2 inch long. Males and females are a uniform tan or light brown color. Larvae are typical C-shaped white grubs, reaching a maximum size of 1/4 inch wide and 1 inch long.

Most European chafer grubs complete development in one year, but a small proportion of the population may require two years to complete development. Adult

beetles emerge from the soil between the middle of June and early July in Michigan and New York. Emergence may be two to three weeks earlier in southern Ohio, Pennsylvania and New Jersey. They fly on warm evenings (above 65 degrees F) for several hours just before and after sunset. Adult activity peaks within two to three weeks of first emergence. Eggs are deposited 2 to 4 inches below the soil surface. First instar (or larval stage) grubs emerge from eggs in early August and molt to second larval stage instars by the middle of August. By September 1, nearly all grubs are second instars (1/2 inch long), and by October 1, most grubs are third instars (3/4 to 1 inch long). They continue feeding on turf roots until the soil surface freezes (usually sometime in November).

Overwintering grubs remain just below frozen soil. On average, 24 percent of the grubs do not survive the winter. Surviving grubs return to the surface as soon as the ground thaws, feeding on grass roots again in late winter and spring. By late May, almost all of the grubs move down to a depth of 2 to 10 inches to pupate. They remain as pupae for about two weeks before emerging as adults. Wet soil during pupation may cause high mortality.

Natural control of European chafer by predators, parasites and pathogens is excellent in Europe but poor in the United States. Several parasites, including four species of flies and two wasp species, have been released with little success. Natural enemies reported in the United States include two species of ground beetles that feed on grubs and eggs, a protozoan pathogen and a rickettsia pathogen.

Management: Damage thresholds have been estimated at five to 10 grubs per square foot for low-maintenance turf and 15 to 20 per square foot for daily irrigated turf. Frequent irrigation helps turf survive root pruning by grubs. The neonicotinoid insecticides imidacloprid, thiamethoxam and clothianidin are very effective against grubs when applied in June or July. These preventive treatments kill young grubs as they hatch but do not work as well against larger, established grubs. Carbaryl or trichlorfon can be used as curative treatment in late August, September, October, March or April. Liquid insecticide sprays should be followed immediately with 1/2 inch of irrigation to move the insecticide into the thatch and root zone. Granular formulations are more practical for low-maintenance turf because they remain stable until rain falls. European chafer grubs may not be as susceptible to some insecticides as Japanese beetle grubs.

EC Grub image by: R. Calhoun, MSU Extension

EC Adult image by: M. Reding and B. Anderson, USDA ARS, Bugwood.org

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