

# Lawn Care

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## CONTROL OF GRUBS

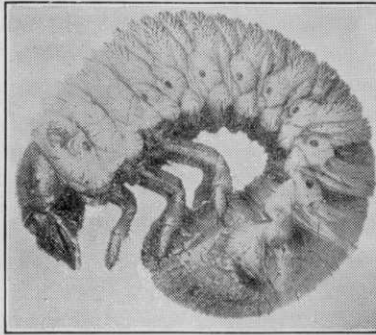
**D**URING the past several years many lawns, putting greens and other turfed areas in the northeastern portion of the United States have been ruined by the grubs of various beetles. The greatest damage comes from the grubs of those beetles having a one year life cycle, namely, the Japanese, Oriental, and Asiatic Garden species. The grubs of May beetles are also troublesome but they have a three year life cycle.

Turf damaged by grubs appears to be suffering from lack of water. The grass turns brown and dies in irregularly shaped circular patches as shown on page 6. The grass is severed at the roots so that it can be literally rolled up like a carpet. Severely injured turf often has a springy feel similar to that after the frost has gone out in the spring. If the sod is removed at the right time a colony of the feeding grubs will be found. The presence of grubs is often disclosed by flocks of birds such as grackles and starlings. They drill holes in the ground about the size of a lead pencil to feed on the grubs. Skunks are also fond of grubs

so where they are damaging lawns the way to get rid of them is to destroy the grubs.

### Grubs of Japanese and Asiatic Beetles

The four phases (egg, grub, pupa, beetle) in the life of Japanese and similar beetles are completed in one year in the latitude of Pennsylvania and New Jersey. Farther north where the warmer seasons are shorter this may take two years. To the south there may be more than one cycle each year.



Grub of Japanese Beetle, enlarged 3 times.  
Courtesy U. S. D. A., Bureau of Entomology.

The milky-white eggs of these beetles are usually deposited during June or July in unshaded grass land to a depth of two or three inches. Since damp soil rich in humus is preferred, lawns and putting greens are especially favored. In a week or ten days the eggs hatch into grubs about the size of the head of a pin. They develop rapidly and are about one-third grown in two to four weeks. Their food is decaying organic matter and living grass roots. At first they consume so little that the damage to turf is negligible.

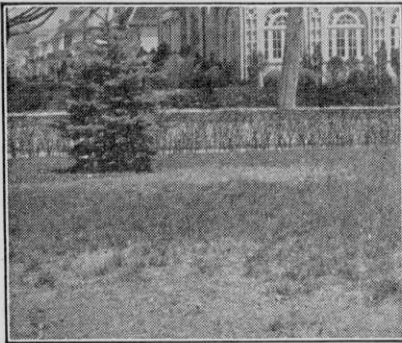
When the grub is one-third grown it casts away its first skin and gets a new and larger one along with a bigger appetite. Grubs begin to eat ravenously near the end of August when they are approaching maturity. They do their greatest damage to turf then as they lay away enough food to last them until spring. As the ground freezes they burrow deeper into the soil to protect themselves from sudden changes in temperature produced by alternate freezing and thawing.

In the following March or April as the soil warms the grubs crawl back near the surface to feed. Again they eat heartily to regain the weight lost during the winter. At this time they may damage turf seriously but the effects do not appear until the warm days of May or June. By then it will be found that many grass roots have been cut off just below the surface.

### Appearance of Adult Beetles

During May and June grubs go into the resting or pupa stage and are gradually transformed into beetles. This transition may take several weeks depending upon the soil temperature.

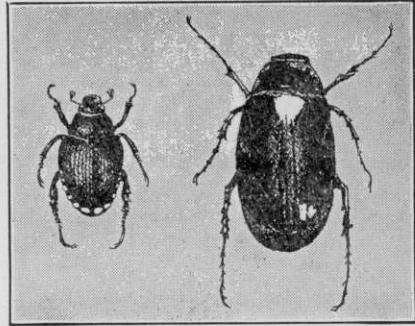
The adult beetles leave the ground to feed on the foliage of trees, shrubs and other plants. Sometimes they defoliate



Typical destruction by grubs. This is a good setting for an invasion of weeds, especially crabgrass. They are often blamed as the cause of poor turf when actually they are the result.

Photo courtesy Conn. Agr. Exp. Station.

the attacked plants leaving only the stems or branches and the skeleton of the leaf structure.



Left: JAPANESE BEETLE. Actual size. An attractive creature of bright metallic green tinged with bronze. It has two distinguishing white spots at the tip of the abdomen and five others on each side. The Oriental and Asiatic Garden beetles are slightly smaller, straw to brown colored with black markings.

Right: MAY BEETLE, also known as the "June Bug." Larger than the Japanese; dark brown color.

After a few days of feeding the beetles mate and the female begins to lay eggs to start the cycle all over. Her front feet are enlarged like those of the common mole so she can dig into the ground to deposit eggs. The depth of deposition depends on the soil moisture since eggs are placed so they will be surrounded by moist soil.

The female usually lays ten or more eggs before she returns to the surface to mate again and deposit another clutch of eggs. This routine is continued until she has laid about sixty eggs. Cold weather may halt this since it kills all adult beetles of the one year species.

### Infested Localities

The Japanese beetle was first discovered near Riverton, N. J. It is thought to have been introduced from its native home in Japan in the soil about the roots of some iris plants. Since its discovery in 1916 it has spread slowly, advancing only 5 to 10 miles a year, to include northern Delaware

and most of New Jersey, southern New York, and eastern Pennsylvania. Aside from the slow natural spread, beetles have been introduced in sections to the west and south. They have been transported on automobiles and trains and some have possibly been carried on plants that were slipped through the quarantine barrier. Japanese beetles are now pretty well distributed through Ohio notably at Cleveland, Canton and Cincinnati. Other isolated infestations are reported at Indianapolis, St. Louis, Erie and in scattered Southern cities.

Oriental and Asiatic Garden beetles are found in Connecticut and in scattered spots along the Atlantic seaboard.

### May Beetles

In contrast to the Japanese beetle the life cycle of the May beetle is of three years' duration.

From April to June of the first year May beetles are found feeding on their favorite food such as oak leaves. They mate at night, the female returning to the soil to lay eggs which hatch in three to four weeks. The resulting

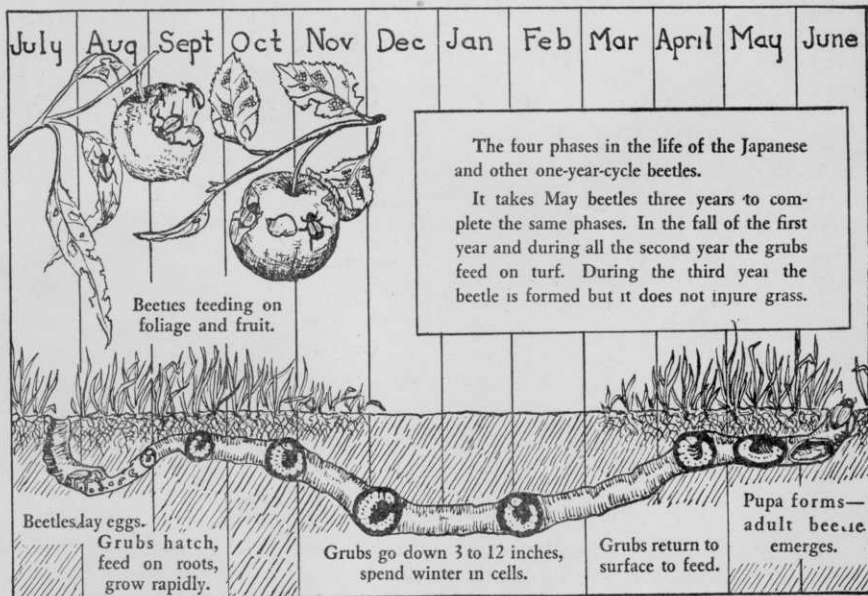
grubs live on organic matter and roots until cold weather when they hibernate for the winter. They remain in the ground all through the next year to emerge as adult beetles the third year.

The May beetle is found in almost any state north of the Ohio River and westward to South Dakota. May beetles appear every summer because different broods mature in different years.

### Control of Grubs

Fortunately the control of all these grubs is easily accomplished by poisoning the soil with Lead Arsenate. The grubs get a small amount of this poisoned soil while eating at the grass roots. It usually sickens them so they soon cease feeding and within three weeks they die.

The minimum application for light infestations is 5 to 10 pounds of Lead Arsenate per 1000 square feet. Even greater amounts may be needed on clay soils especially if quick results are wanted. In such cases the rate should be doubled. A light sandy soil may respond quickly to the 5 to 10 pound



rate but the poison will not remain effective as long as in clay soil. Under average conditions the heavier treatments grub-proof soils for three years.

Lead Arsenate should be applied as soon as a grub infestation is discovered even if it is mid-summer. Winter or early spring is a good time for the application since this gives the chemical a chance to work into the ground during the first warm days. Grubs begin feeding during the latter part of April so it is well to apply the Lead Arsenate by April first.

In sections where grubs are apt to cause damage it is well to anticipate them and poison the soil in advance with a heavy application of Lead Arsenate. As much as 40 pounds to the 1000 square feet can be worked into the upper two or three inches of soil a few days before seeding. This may delay seed germination for a few days and the grass may be darker green at first but these effects are only temporary and are soon gone. Grubs will be kept out for a long time.

Another value of Lead Arsenate is that it keeps earthworms and other pests in check. Its use may mean the difference between a good lawn and a total failure.

#### **Methods of Application**

It is difficult to apply dry Lead Arsenate evenly since it is such a fluffy powder and the quantity used is so small. It can be put on in liquid form by using a sprinkling can or sprayer but neither method is very satisfactory. It settles to the bottom of the container when sprinkled and is blown by the wind when sprayed. Furthermore the Lead Arsenate in suspension may burn the tender grass blades and cause a temporary check in growth.

A good method of application is to mix the powder with soil, sand or compost and broadcast it by hand or with a spreader. About a bushel of carrier is needed for each 1000 square feet. It

Lead Arsenate to turf have not resulted the grass blades to prevent burning and to insure quicker penetration.

So far as is known applications of lead arsenate to turf have not resulted in injury to birds, animals or persons. Even so, care is advised in the use of Lead Arsenate as it is extremely poisonous. It may be mixed with the bare hands but it is better to wear gloves. It is well to make sure that no lumps of material are left in the grass where they may be eaten by dogs, cats or poultry, and that any excess material is stored away from children and animals.

Lead Arsenate should be used sparingly in flower or vegetable gardens. Some perennials will not grow in the presence of the arsenic found in the chemical and some vegetables take up the poison into their tissues.

The grubs of Oriental as well as Asiatic Garden beetles are also controlled with Lead Arsenate.

#### **Natural Control of Grubs**

The most effective natural enemies of beetles and grubs are not common in this country. Some are gradually becoming established through the efforts of the U. S. Department of Agriculture. The major ones are parasitical wasps. The female wasp digs into the soil and upon contact with a grub attacks and stings it causing a temporary paralysis. While the grub is inactive an egg is firmly deposited on its under surface. This hatches into a larva which feeds by sucking the body fluids of the host grub. In fifteen to twenty days it consumes the entire grub.

#### **Poisoning Is More Effective**

While natural enemies may be somewhat effective in controlling harmful beetles they will hardly approach the efficiency of a well timed application of Lead Arsenate. These treatments serve a two-fold purpose in that they destroy the grub which is an enemy of grass and a potential beetle which is an enemy of other vegetation.