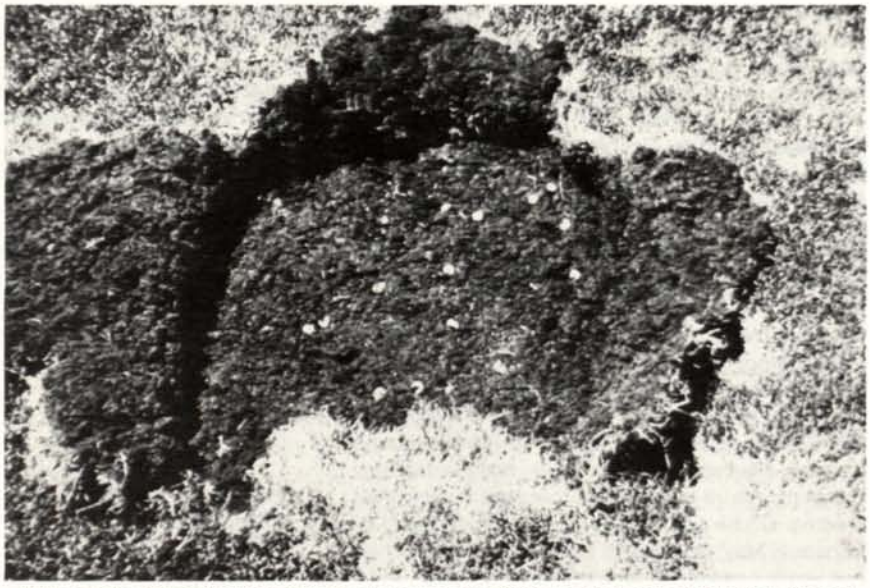
# Is Your Grass Bugged?



*When significant numbers of grubs are feeding underground by chewing of the roots of the turfgrass plant, the sod can be rolled back as shown here.*

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The average insect population per square mile is estimated to be equal to the total population of people in the world. Fortunately, less than one per cent of the nearly one million insect species are pests to plants and animals. Of the 100,000 insect species that occur in the United States, about 600 species are considered serious pests. Of these, fewer than 60 are detrimental to the growth and development of fine turfgrass.

Insects that damage turfgrass areas may be classified into various groups. The first is comprised of those insects that feed underground, such as white grubs, billbugs, wireworms, mole crickets and ground pearls. The second group are those that feed above ground, including sod webworms, armyworms, cutworms and frit flies. The above and below ground feeding insects form the two largest groups that damage turf. Other insect groups that damage turf include chinch bugs, aphids, leafhoppers and spittlebugs. They suck necessary plant juices from the leaves and stems of grasses. A final group are not plant feeders at all, but those that damage turf indirectly by building mounds, digging holes and being a nuisance to man and other animals by stinging or biting. This last group includes ants, earwigs, crickets, fleas, ticks, mosquitos, bees and wasps.

**Soil Inhabitors**

The soil-inhabiting white grubs that feed on roots of grasses are the most difficult insect pests to control. They live in soil that is usually covered with a sod layer. Their presence often goes undetected until large, brown dead areas appear. Occasionally, these areas are misdiagnosed as an inadequacy in the irrigation system or as a turfgrass disease problem. At this time the grubs are usually almost full grown and large numbers can be found in the damaged areas. If an insecticide is applied to the infested turf, the material must be washed or soaked into the root zone where the grubs are located. Sufficient water must be applied to soak the insecticide into the soil, yet not so much water that the chemical is leached from the area where it is effective.

The name 'white grub' is given to many species of insects that are similar in appearance. Species are found in all regions of the United States. They are u- or c-shaped worms found in the soil just below the surface. Typically, white grubs are cream-colored or white with a brown head, a dark area at the posterior end of the body, with three pairs of legs.

A white grub could be the immature or larval stage of one of many beetles. Examples of the adult include the Japanese beetle, European chafer, Oriental beetle and the Asiatic garden beetle. These

larvae forms can be identified by observing the rastrel pattern on the bottom side of the last body segment.

Life cycles vary with each species. For example, the Japanese beetle completes its life cycle from egg, larvae or grub and pupa or resting stage, emerging as an adult in one year. Similarly the green June beetle, European and masked chafer have one-year life cycles. On the other hand, grubs of the May beetle (*Phyllophaga sp.*) may remain in the soil for 2 or 3 years. The amount of time the larvae remain in the soil depends on the species. A white grub that has recently caused great damage to golf course turf in several Eastern and Midwestern states is the *Ataenius spretulus.* This beetle has a one-year life cycle, though the number of broods per year has not been established.

Typically, white grubs feed on grass roots during the late summer and fall. In late fall, they dig deeper into the soil, especially in regions where the ground freezes. After spending the winter deep in the soil, the grubs return to the grass root zone and resume feeding. Grubs with a one-year life cycle usually pupate in May. Grubs with a life cycle of more than two years continue to feed the following year.

**Leaf Chewers**

The second major group of insects are those that chew on the leaves and stems of the grass plant. Sod webworms or lawn moths, along with armyworms and cutworms, are usually the most damaging surface feeding insects that affect turfgrass. Lawn moths when present can be observed flying just above the turfgrass area in a zigzag pattern during the early evening hours and in the light rays of the night watering vehicle.

The female sod webworm lays the eggs while flying over the turf in the evening hours. These eggs will hatch in a week to ten days. The young webworm larvae will begin feeding on the grass, thereby causing damage to the area. Most regions of the United States have two or three generations per year. Usually, the first generation of sod webworms in early summer are not enough to cause damage. However, each succeeding generation, six to eight weeks later, can increase significantly the number of larvae. As these larvae grow larger, so does their appetite and the damage resulting to the turfgrass area.

Sod webworm feeding causes small, irregular areas of dead or dying turf. These small areas coalesce into a large damaged area within a few days. A badly damaged location has many uneven patches of dead turf with pencil-sized holes. These small holes result from birds feeding and digging the larvae from their burrows.

Armyworms are another damaging type insect larvae found on turfgrass areas. As do many insects, the armyworm commonly overwinters as a larva or pupa. Armyworms are 1 to 1½ inches long, with dark stripes down the center of the back and along each side. The remainder of the body may be varying shades of green. The armyworm feeds commonly at night, but does not hide completely during the day as does the sod webworm.

A group of insect larvae known as cutworms also damage turfgrass areas, especially putting greens after they have been cored. The vertical holes left by a coring machine (aerator) provide an ideal site for the larvae to rest during the day until they feed on the grass blades in the evening.

**Achieving Control**

To achieve adequate control of insects, it is important to know the life cycle and in what stages of development they are most susceptible to being reduced. To maintain an ecological balance in nature, it is not desirable to achieve total eradication of an organism. Insects may be controlled by either biological, chemical, physical or mechanical methods.

Examples of biological or natural controls include frogs, toads, lizards, moles and birds as well as other animals that feed mainly on insects. Some insects are predatory on other insects, such as the Tachinid fly that lays its eggs on the armyworm. As the fly larvae eat, the armyworm is soon killed. Viruses, fungi and bacterial diseases also help to hold insect populations in check. The use of bacteria, causing milky disease that kills grubs of the Japanese beetle, is another example of natural or biological control. Biological controls do not eliminate a past species completely; they only reduce the population, thereby keeping the damage minimal. However, biological controls are usually self-generating, so a control specie, once installed, continues to reproduce and remain effective.

Insecticides or chemical poisons used to destroy insect pests may be divided into two groups; stomach poisons and contact poisons. Stomach poisons are used mainly to control insects with chewing mouthparts. Contact insecticides are applied directly on the pest or are applied where the insects will pick them up. Contact poisons are especially useful in controlling insects with piercing-sucking mouthparts. If eaten, a contact insecticide acts as a stomach poison.

Physical and mechanical controls are the simplest, most obvious and at times most effective. The old-fashioned fly swatter is an example of a simple, inexpensive method of control. Unfortunately, physical and mechanical methods of insect control are limited in large turfgrass areas.

With the Environmental Protection Agency declaring the intent to cancel registrations of pesticides containing chlorinated hydrocarbons, it will become necessary now to correctly identify the damage-causing organism and treat accordingly. In the past, it was possible to treat with a broad-spectrum insecticide and achieve satisfactory control even if the damaging insect had not been properly identified.