Biology and Control Of a Species of Hyperodes

by **R. SCOTT CAMERON,** Cornell University, Ithaca, New York

In recent years a species of *Hyperodes* has damaged turfgrass, particularly *Poa annua* L., on golf courses in the Long Island and Westchester County areas of New York State. Large patches of *Poa annua* are killed on greens, tees, and fairways (Fig. 1). Unlike grass damaged by fungi or wilt, many of the grass plants attacked by *Hyperodes* are severed at the base of the stems and lie flat soon after being damaged. This type of stem feeding is different from that of other common turf insects, such as chinch bugs which suck plant juices, and Japanese beetle grubs which chew on the roots of grasses. *Hyperodes* damage occurs in May and early June. Larvae, pupae, and young adults can be found beneath the damaged turfgrass in mid-June.

Biological and control studies of the insect reported here were initiated late in the summer of 1967.

CLASSIFICATION—The species of *Hyperodes* involved has not been determined. It has been identified as both *H. anthracinus* (Dietz) and *H. maculicollis* (Kirby), but counts of punctures and hairs on specimens of Long Island *Hyperodes* indicate that they are significantly different from either species. Dr. Rose Ella Warner recently classified several *Hyperodes* collected on Long Island golf courses as *Hyperodes* sp. nr. *anthracinus* (Dietz). The common name of "turfgrass weevil" has been given to the species of *Hyperodes* causing damage to golf course turf on Long Island.

DESCRIPTIONS—The turfgrass weevil larva is crescent shaped, legless, creamy-white, and has a dark brown head capsule. A larva will vary in length from 1 mm (1/25 inch) when it first hatches to about 4.5 mm (1/6 inch) when fully grown. The pupa is about 4.5 mm (1/6 inch) long, creamy-white and exhibits many of the adult characteristics. The adult is oblong and about 3.5 mm (1/7 inch) long (Fig. 2). The front of the head is elongated to form a beak with elbowed antennae attached near the tip. Young adults are soft and orange-brown, but they gradually darken and harden. The mature adults are generally black and are clothed with fine hairs and yellow-brown to grayish-white

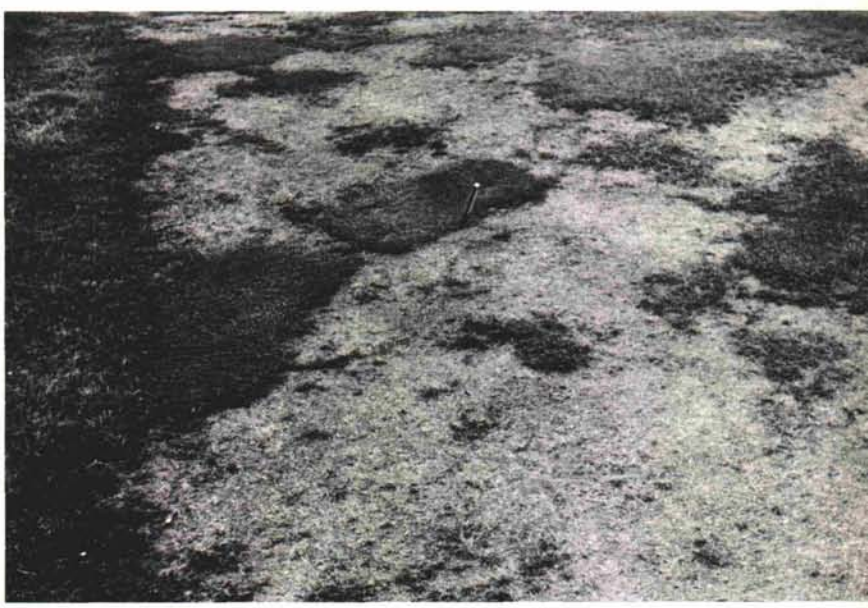


Fig. 1. Hyperodes damage on a fairway showing larval preference for annual bluegrass over bentgrass. The dark rectangular areas are patches of bentgrass which were sodded in the area 2 years before. The larvae killed the surrounding Poa annua *leaving the bentgrass unharmed.*

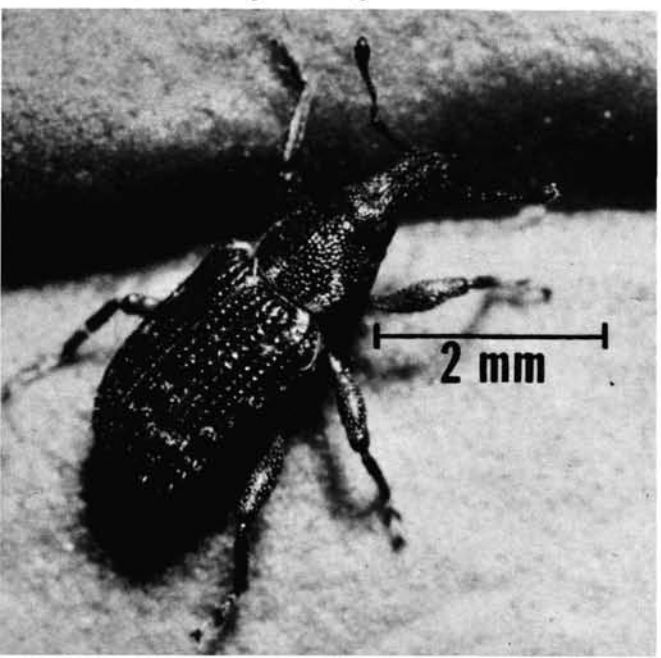
scales. As the adults grow older, many of the hairs and scales are worn off, leaving a shining black body.

BIOLOGY—Turfgrass weevil eggs are deposited between leaf sheaths in *Poa annua* stems, where the larvae hatch after about five days and begin feeding (Fig. 3). The small larvae emerge from the original stem and move about above the soil in the thatch and often tunnel in several other stems. The large larvae appear to be more sedentary. They feed externally on grass stems from a small burrow formed in the thatch and upper soil. Larvae prefer *Poa annua* to other grasses, particularly bentgrass and Kentucky bluegrass (Fig. 1). Larval feeding causes most of the damage to turf. Adult feeding is usually restricted to leaves and upper stems of grass plants and appears to cause little damage.

A turfgrass weevil larva passes through five instars in about 30 days before becoming fully developed. It then burrows about 1/4 inch deep in the soil where it transforms into a non-feeding pupa. The pupal cuticle is shed after five days, and the young adult remains in the pupal cell for several days before emerging to begin active feeding. In laboratory feeding trials, adults generally preferred *Poa annua* to other grasses. Except when they first emerge from the soil, adults are generally hard to find during the day. They hide in the thatch among the grass stems during the day and become active at dusk as they crawl to the tips of leaves to feed. No important natural enemies of the turfgrass weevil have been found.

Turfgrass weevils overwinter as adults in protected areas on or near golf courses. Many adults have been found in tufts of fescue and among leaves and debris under bushes and trees during the winter. Overwintering adults become active soon after thawing temperatures predominate in the spring. Some adults fly from the overwintering sites to more favorable breeding sites while others probably migrate on the ground.

Fig. 2. Turfgrass weevil adult.



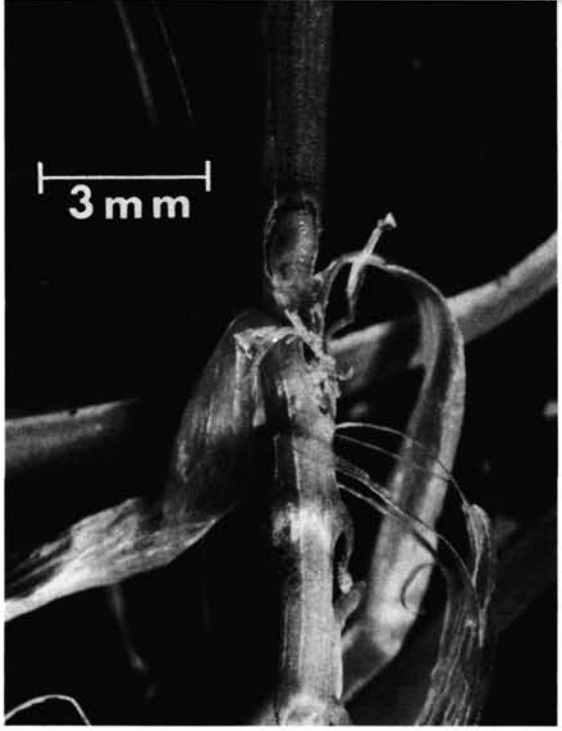


Fig. 3. Medium-sized turfgrass weevil larva feeding inside a Poa annua stem.

On Long Island there is one complete spring generation and what appears to be a partial late summer generation. Eggs of the first generation are laid throughout April and May. Larvae are numerous from mid-May through early June and become relatively scarce in late June. Pupae and young adults are most numerous throughout June, with a peak in mid-June. The bulk of the spring generation develops from eggs to adults in about two months, from late April to late June.

Eggs of the second generation are laid during July and August. Larvae are found during August and early September. Pupae and young adults are found throughout September.

It appears that the spring generation may occur anywhere on golf courses, while the second generation has only been observed on greens and tennis courts which receive intensive care throughout the summer.

Some adults probably migrate to their overwintering sites as early as the beginning of September, while others do not leave the greens and tennis courts until October.

CONTROL—Twenty-five insecticides were tested on turfgrass weevil adults in laboratory experiments. Several organophosphate insecticides, including Guthion®, Supracide®, Baytex®, and Dursban®, were most effective, while sev-

eral chlorinated hydrocarbon insecticides, including heptachlor and chlordane, were least effective.

The materials which were most promising in the laboratory bioassay experiments were selected for field testing in 1969, along with Di-Syston®, which looked promising in 1968 field tests, and diazinon, an insecticide commonly used against soil dwelling insects. Diazinon was given more emphasis than the other materials because it had been used with apparent success on an operational scale by several golf course superintendents.

Nearly all the 1969 plots treated in both April and again in May were conspicuously healthier than their surrounding control plots. Dursban® applied at a rate of 2½ pounds active ingredient per acre in April and again in May gave the best control. Diazinon applied at a rate of five pounds active ingredient per acre in April and again in May consistantly gave good control, while diazinon applied at a rate of two pounds active ingredient per acre in April and May gave only fair control. The diazinon plots treated only once in mid-April showed considerable weevil damage.

Applications were made with the intention of controlling the adults before they laid their eggs, but it now appears that the small larvae can be controlled before they cause appreciable damage.

Results of the field plot tests and the operational field trials lead to the conclusion that the turfgrass weevil can be controlled by insecticides applied at the proper times. To control the turfgrass weevil, granular diazinon at a rate of from three to four pounds active ingredient per acre, or Dursban® emulsifiable concentrate at a rate of 1½ to two pounds active ingredient per acre, should be applied on suspected problem areas in mid-April and again in mid-May. Neither diazinon nor Dursban® are registered for use against the turfgrass weevil, but both are registered for use against other turf insects. More extensive field tests could prove that lower rates of application and one treatment per year would adequately control the turfgrass weevil.

In January, 1968, the New York State College of Agriculture at Cornell University received a grant from the Long Island-Metropolitan Golf Course Superintendents Research Foundation. The USGA Green Section was a major contributor. These funds have supported the research for the past two years.

How to Grow Grass Without Pain

by **FRANKLIN B. JARMON**, Superintendent, Facilities, The Du Pont Country Club, Wilmington, Delaware

Superintendents who have spent sleepless nights worrying about disease, drought, and labor until their ulcers erupted or their heads seemed to split—will not find the answer to their problems here.

Let's face it, there is no panacea for growing grass. As always, nature will continue to challenge every successful superintendent to expect the unexpected. Just as soon as one adversity is overcome, another in the form of a more vigorous insect or a more virulent fungus is sure to appear. Certainly superintendents don't have to be convinced that growing grass can be quite a pain. This, however is the kind of pain that we all have to learn to accept and expect.

There is another and much more devastating kind of pain. It is the pain caused by accidents. Physical pain is all too often the result of some careless and/or unsafe act which exacts an intolerable toll of both physical and mental suffering. Fortunately, we can generally do something about it.

Of course, we don't run golfers down with a tractor, nor do we intentionally walk in front of their drives. These hazards to our safety are all too obvious. But what of the unnumbered subtle hazards we, our men and our members encounter on the golf course each day? Although safety is everyone's business, the fact remains we too are responsible for those using our facilities. In one way or another, whatever happens to an employee or a member also happens to us.

Accidents resulting from overlooked or inadequate safety practices are inexcusable, and pain cannot be removed by sharing it. The only thing we can and absolutely must do is to prevent accidents from happening in the first place. Those areas most vulnerable are the eyes, fingers, arms, feet and legs.