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SWEETCLOVER WEEVIL



AND

ITS CONTROL

IN MINNESOTA

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Sweetclover Weevil¹

and Its Control in Minnesota

“What happened to my new seeding of sweetclover?” This is a question often asked by Minnesota farmers.

Studies made by the University during the past few years indicate that sweetclover weevil is a major factor in losses of new seedings. However, it is recognized that the weevil is not the only factor that influences establishment and maintenance of sweetclover stands.

This folder presents general information about the sweetclover weevil together with results from research which was begun in 1952.

The Insect

Sweetclover weevil is not a native of Minnesota. It is a European insect first reported in North America in 1924. The weevil is believed to have arrived in Minnesota about 1933 and is now generally distributed throughout the state.

Description

Sweetclover weevil adults are gray or brownish-gray insects that are about one-quarter of an inch long. The general appearance of the weevil is shown in figure 1.

Female weevils lay eggs which are white at first but soon turn black. Small white larvae or grubs hatch from the eggs and burrow into the soil. They feed on the roots of sweetclover plants, develop through four stages, become pupae, then emerge as adults. The immature weevils appear very different from the adults as may also be seen in figure 1. You can find the larvae and pupae easily by examining the soil where established stands of sweetclover are being plowed down.

Newly emerged adults are light tan or brown, and their bodies are much softer than those of older adults.

Life History

Figure 1 shows the life history of the weevil and where the development occurs. The figure also indicates, in a broad way, the time of year when the various stages are present. However, the rate of development varies with conditions such as moisture and temperature. Preliminary studies have shown that although the majority of the weevils develop as indi-

¹ *Sitona cylindricollis* Fahr.

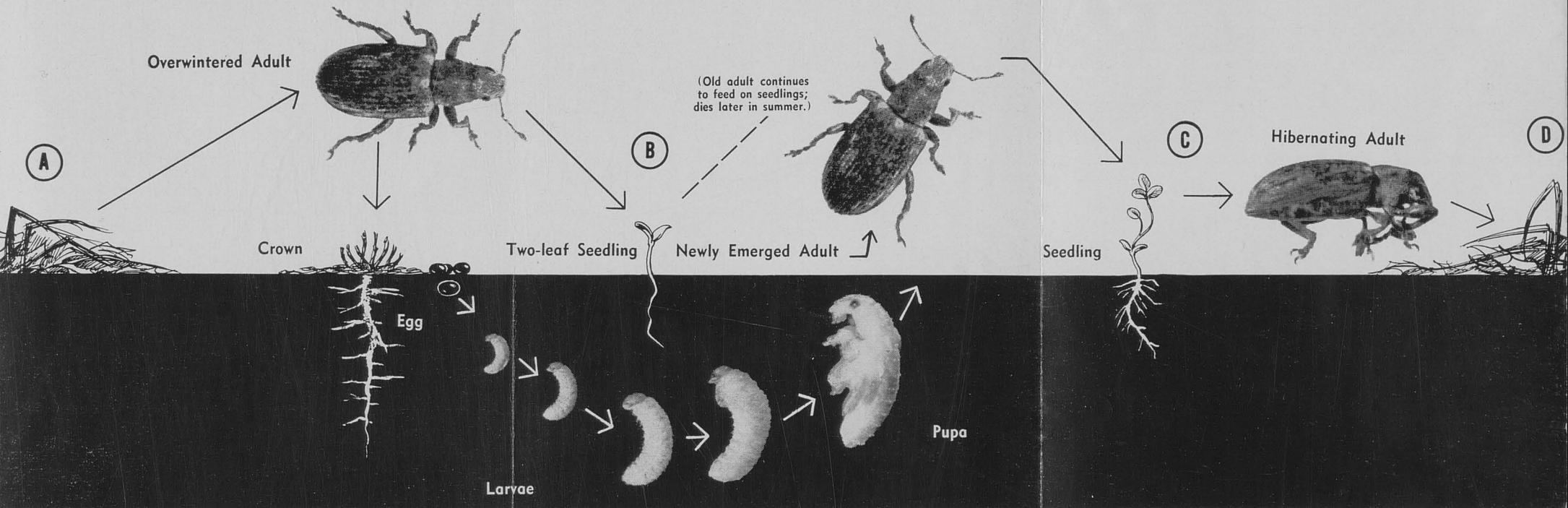
Seasonal Cycle of Sweetclover Weevil

SPRING

SUMMER

FALL

WINTER



Adult weevils—

1. Come out of hibernation at base of sweetclover plants on first warm days.

2. Feed on crowns and new leaves of old sweetclover in grain stubble.

3. Start laying eggs at base of plants.

4. Fly and walk to new seedlings.

1. Larvae feed on rootlets of sweetclover.

2. Pupae don't feed.

3. New adults emerge, migrate by walking, and feed on sweetclover seedlings.

4. Most of the old adults die by late summer; newly emerged adults live on.

1. Weevils continue to feed until cold weather.

1. Adults hibernate in sweetclover fields, in trash, and in the upper layers of the soil.

Fig. 1. Development of the sweetclover weevil through the four seasons. Note critical times for controlling the weevil. A, B, C, D represent four times when the weevil might be controlled by the application of insecticides.

cated in the figure, certain stages of immature weevils have been found at nearly all times of the year.

Seasonal History

The seasonal activities of the weevils are also indicated in figure 1. Weevil adults overwinter in trash and surface soil of sweetclover fields. The overwintered adults become active the first warm days of spring. They feed, mate, and lay eggs.

Apparently most or all of these weevils die later in the summer. The new adults that emerge in midsummer or a little later feed on sweetclover (and sometimes on alfalfa) until winter. If there are alternate periods of cold and warm weather in the fall, the adults continue to appear and feed during warm days. With the onset of colder weather they hibernate and remain inactive until spring.

This publication has resulted from a research program on seed production of forage legumes being conducted by the University of Minnesota Agricultural Experiment Station. In the early years of the program assistance was provided by the Iron Range Resources and Rehabilitation Commission. Facilities for the field work on sweetclover weevil have been provided by the Northwest School and Experiment Station and farmers at Crookston.

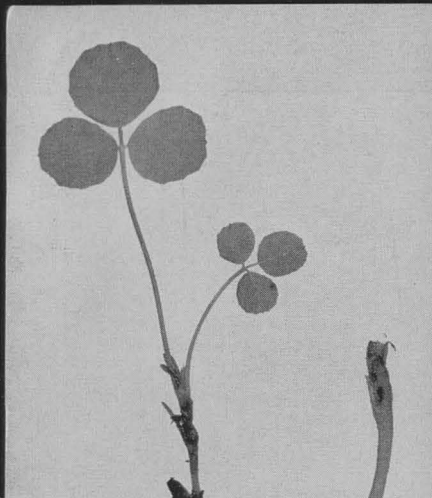


Fig. 2. Right—Crown of sweetclover plant injured by weevils. Left—Healthy plant.

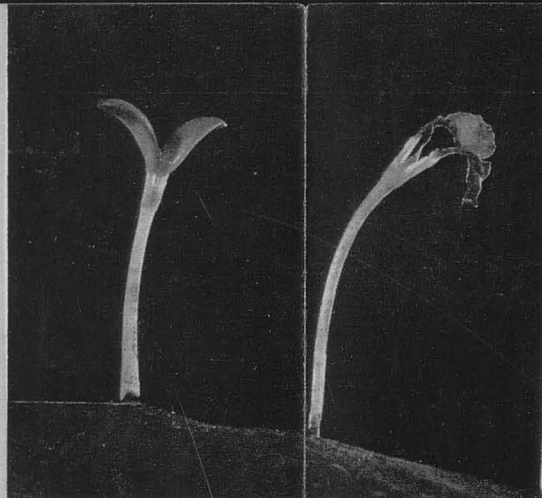


Fig. 3. Right—Two-leaf seedling injured by weevils. Left—Healthy two-leaf seedling.

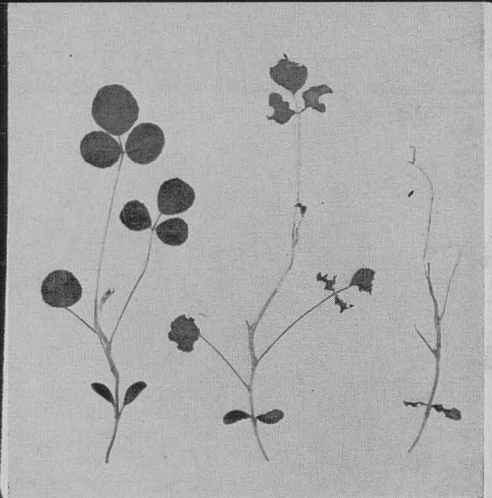


Fig. 4. Weevils also injure (center) and destroy (right) seedlings several inches tall.

How to Recognize Injury

The picture on the cover shows the typical notches made by the adult weevil. Recognition of weevil injury is important since it is easier to find the injury than the weevils. Injury is useful in determining if weevils are present, and whether or not an insecticide should be applied.

—To Crowns

"My last year's seeding of sweetclover seems to be standing still this spring," say many Minnesota farmers, and they're right.

Overwintered adults eat the tips of new shoots as soon as plant development begins in the spring (figure 2). The sides of tender stems below the soil surface may also be injured.

—To New Seedlings

A few notches in the leaves of a new seedling such as that seen in figure 3 may kill the plant.

Weevils migrate from stands where they have hibernated and may be present to attack these new seedlings as soon as the plants emerge. Many losses of stand thought to be due to poor germination were probably caused by weevil.

Learn to recognize the two-leaf seedling and the weevil injury to it (figure 3). If you find injury, use an insecticide to protect the seedlings.

—To Seedlings Several Inches Tall

Seedlings that escape destruction by weevils in early spring may be attacked later in midsummer.

While larger seedlings can sustain considerable injury and survive, plants that are injured as severely as the one shown on the right in figure 4 often die. Seedlings must be protected at this stage of development if large numbers of newly emerged adult weevils are present.

Large areas of irregular stand can often be seen along the borders of fields where weevils have destroyed young seedlings as these insects moved into a field.

Weevils and Sweetclover Seed

Weevils have not generally been considered pests of seed, but they have been observed eating new buds, flowers, and green seeds and chewing off racemes. Adult weevils are often brought into combines with the seed during harvest, but we have not seen them eating mature seed.

Sweetclover Weevils Sometimes Injure Alfalfa

The sweetclover weevil, as the name implies, is usually associated with injury to sweetclover, but the weevil also injures alfalfa (figure 5).

Watch for weevil injury to alfalfa seedlings and apply the same chemical controls recommended for sweetclover.

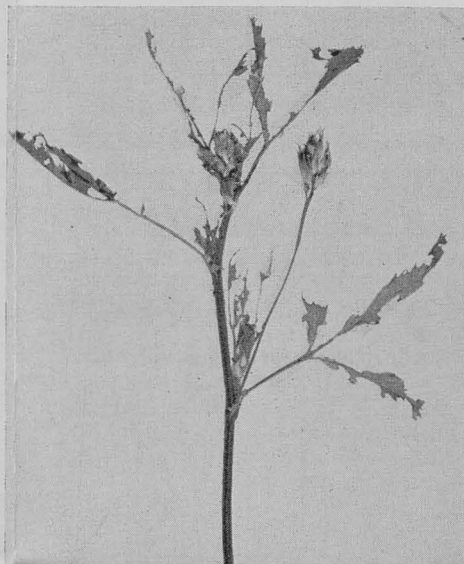


Fig. 5. Alfalfa plant from a field severely injured by sweetclover weevil. This field was near sweetclover which had been plowed down for green manure. Weevils can completely destroy new seedlings of alfalfa.

Control Sweetclover Weevil

What to Use

In our tests any one of the following insecticides applied at the rates indicated has destroyed a high percentage of the weevils present at a given time, but none has completely protected new seedlings throughout a season in all circumstances.

- | | |
|---------------------|------------------|
| 1. Heptachlor | 1/2 pound |
| 2. Dieldrin | 1/2 pound |
| 3. Aldrin | 1/2 to 3/4 pound |
| 4. Toxaphene | 2 to 3 pounds |
| 5. Chlordane | 2 to 3 pounds |
| 6. DDT | 2 to 3 pounds |

Sprays applied by airplane or ground equipment have been most satisfactory. Dusts can be used if wind is slight or absent. Granular formulations applied with seed have shown promise if weevil infestations are light. They can also be used on old stands in the fall or spring to control overwintering adults.

Application of Insecticides

The time and place for applying insecticides may vary with degree of weevil infestation and location of fields. Present evidence suggests that injury to new seedlings might be eliminated if weevils are destroyed in old stands during the fall or very early spring on one's own and surrounding farms. If overwintered adults are not destroyed in old stands, new seedlings near the old stands will need to be protected as soon as the seedlings come up. Also the borders of new stands may need to be sprayed to destroy new weevils that usually emerge from soil of old stands sometime during July or August.

Seed crops should be protected by an application of dieldrin just prior to flowering.

If insect control becomes necessary during blossom time on seed fields, use toxaphene and apply it late evening or early morning when bees are not present.

Avoid Planting Next to Established Stand

It's a good idea not to plant a new seeding of sweetclover close to an old stand if you can avoid it. Both overwintered and newly emerged adult weevils migrate from old stands to new seedings.

Other Possibilities for Controlling Weevils

Chemical control of the weevil has been emphasized here, but biological control, cultural control, and resistance of sweetclover varieties to weevil injury are being investigated with promising results.

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