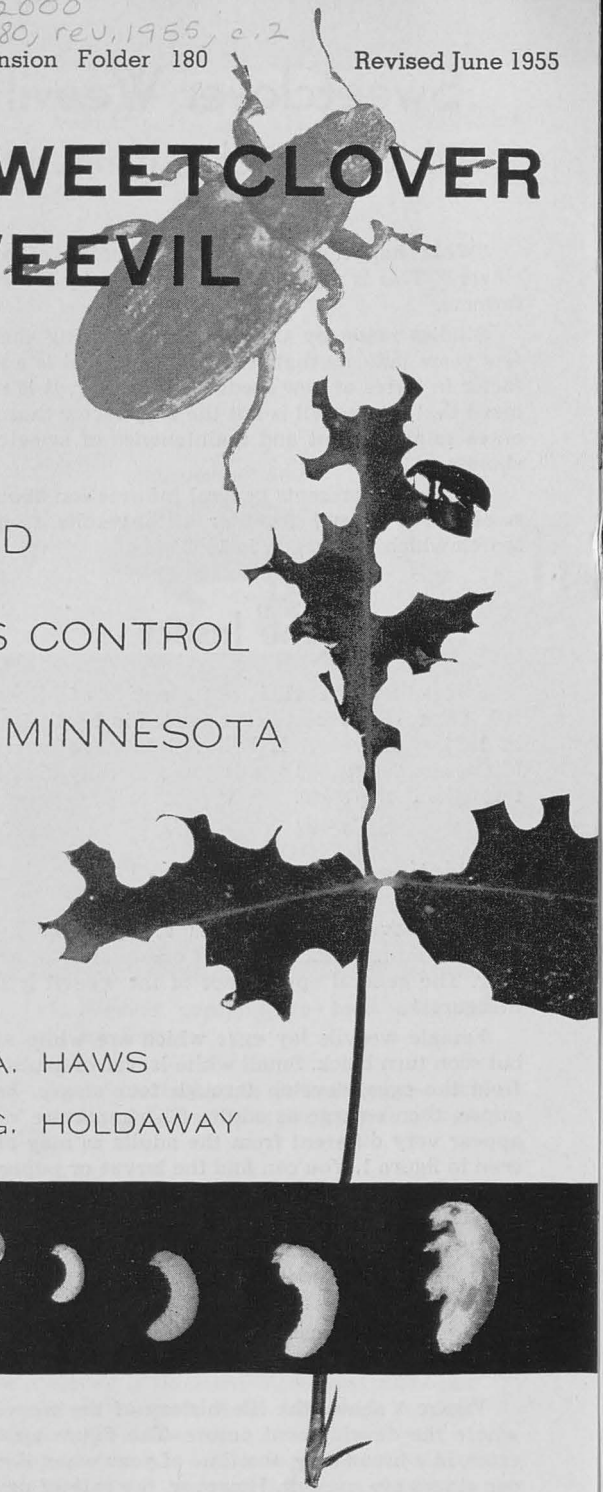
Extension Folder 180 Revised June 1955

SWEETCLOVER WEEVIL



AND ITS CONTROL IN MINNESOTA

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Sweetclover Weevil
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.

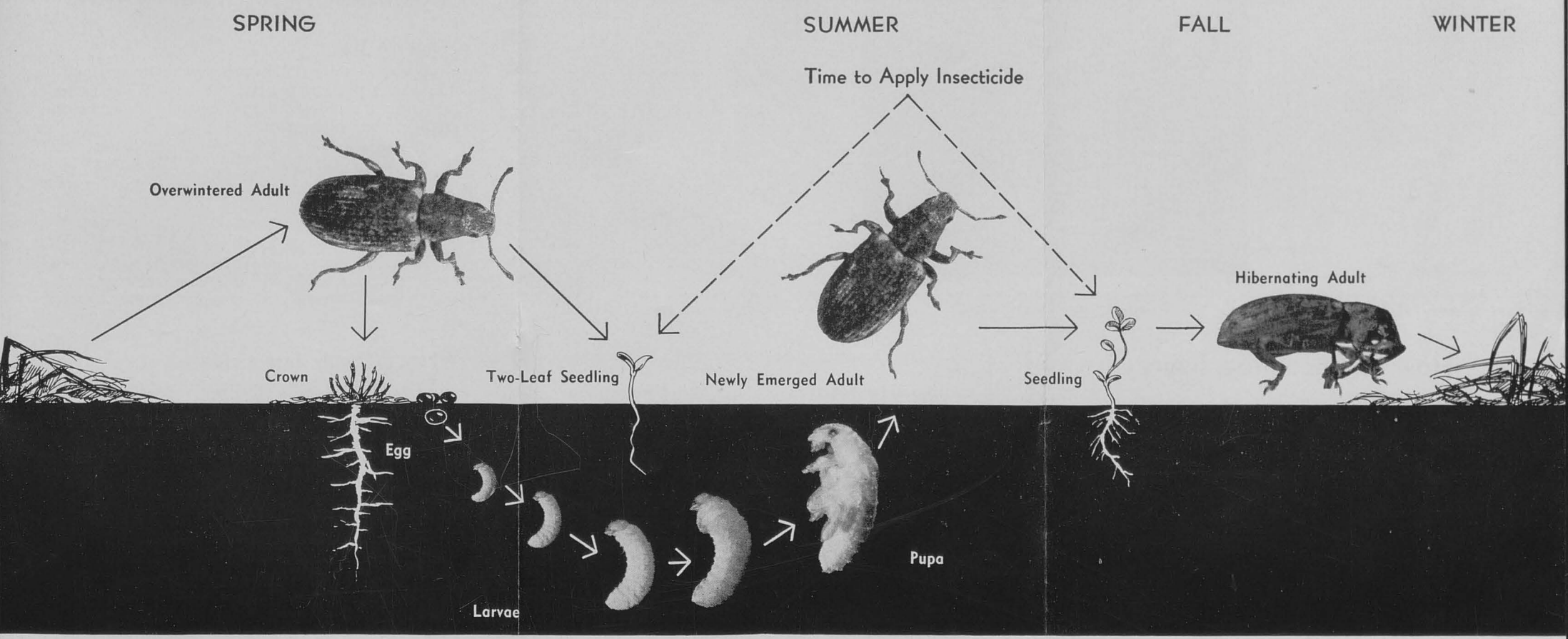
Female weevils lay eggs which are white at first but soon turn black. Small white larvae or grubs hatch from the eggs, develop through four stages, become pupae, then emerge as adults. The immature weevils appear very different from the adults as may also be seen in figure 1. You can find the larvae or 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 al-

Seasonal Cycle of Sweetclover Weevil



SPRING

Adult weevils—

1. Come out of hibernation on first warm days.
2. Feed on crowns and new leaves of old sweetclover.
3. Start laying eggs at base of plants.
4. Fly and walk to new seedings.

SUMMER

1. Larvae feed on rootlets of sweetclover.
2. Pupae don't feed.
3. New adults emerge, migrate by walking.
4. Adults feed on sweetclover seedlings.

FALL

1. Weevils continue to feed until cold weather.

WINTER

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

(Adult weevil is magnified about six times.)

Fig. 1. Development of the sweetclover weevil through the four seasons. Note the two critical times for controlling the weevil.

though the majority of the weevils develop as indicated 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 with the assistance of 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.

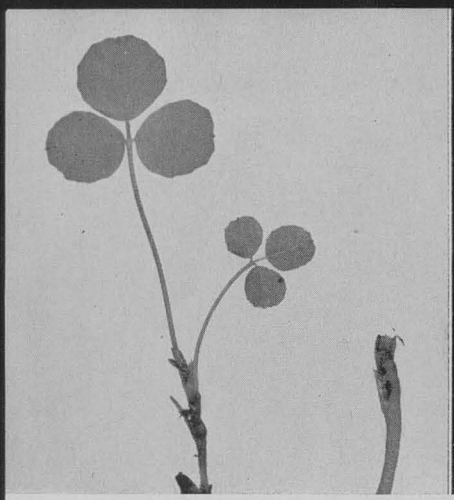


Fig. 2. Right—Crown of sweetclover plant injured by weevils. Left—Healthy plant.

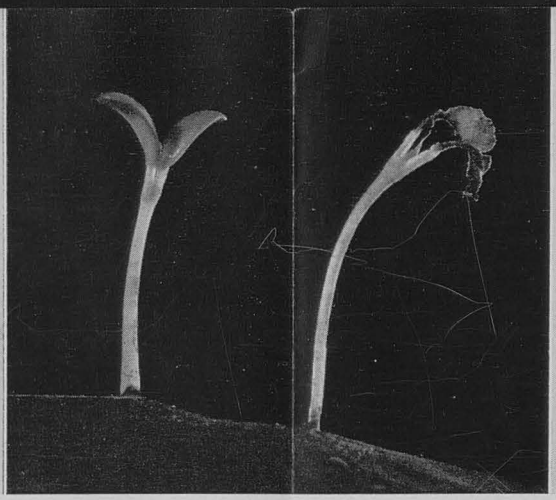


Fig. 3. Right—Two-leaf seedling injured by weevils. Left—Healthy two-leaf seedling.

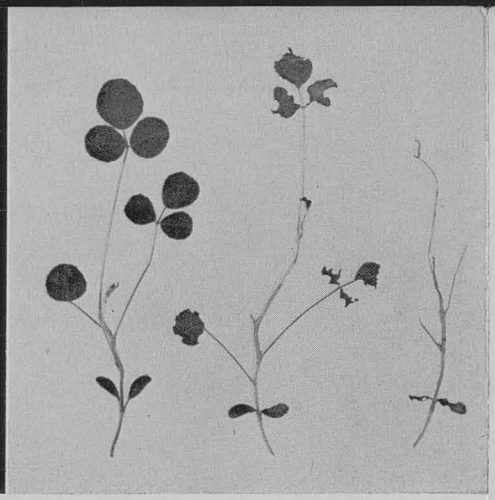


Fig. 4. Weevils also injure (center) and destroy (right) seedlings several inches tall.

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.

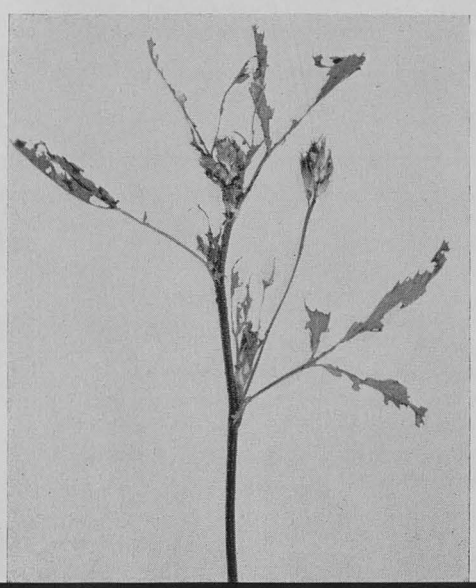
Large areas of irregular stand can often be seen along the borders of fields where weevils have destroyed young seedlings as these insects moved into a field.

Weevils Not Considered Pests of Seed

Seed production is not possible if stands are destroyed. Thus, the sweetclover weevil is important to seed production. Occasionally weevils have been seen eating immature clover seeds, but the weevil is not considered an important pest of seeds.

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 seedings of alfalfa.

Control Sweetclover Weevil

What to Use

Any one of the following insecticides applied at the rates given will control the weevil and protect the crop; the rates are the amounts of active ingredient needed per acre.

1. Heptachlor	**½ pound**
2. Dieldrin	**½ pound**
3. Aldrin	**½ to ¾ pound**
4. Toxaphene	**2 to 3 pounds**
5. Chlordane	**2 to 3 pounds**
6. DDT	**2 to 3 pounds**

Under ordinary conditions sprays are recommended. Under conditions of little or no wind, dusts can be used. Sprays can be applied by airplane or ground equipment.

When to Apply Insecticide

Data obtained have indicated that there are two critical times for protecting new seedings:

1. Early in spring when overwintered adults migrate from old stands onto new seedings, and

2. In midsummer when new weevil adults emerge from old stands.

Where to Apply Insecticide

In the spring it is advisable to apply an insecticide to entire fields of new seedings to control overwintered adults that migrate by flying and walking.

In midsummer new seedings can be protected by spraying the borders of the new fields or those of fields from which adult weevils are emerging. This control is possible because newly emerged weevils migrate by walking rather than flying.

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.

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Cooperative Extension Work in Agriculture and Home Economics, University of Minnesota, Agricultural Extension Service and United States Department of Agriculture Cooperating, Skuli Rutford, Director. Publication furtherance of Act of June 30, 1914.
5M—3-55