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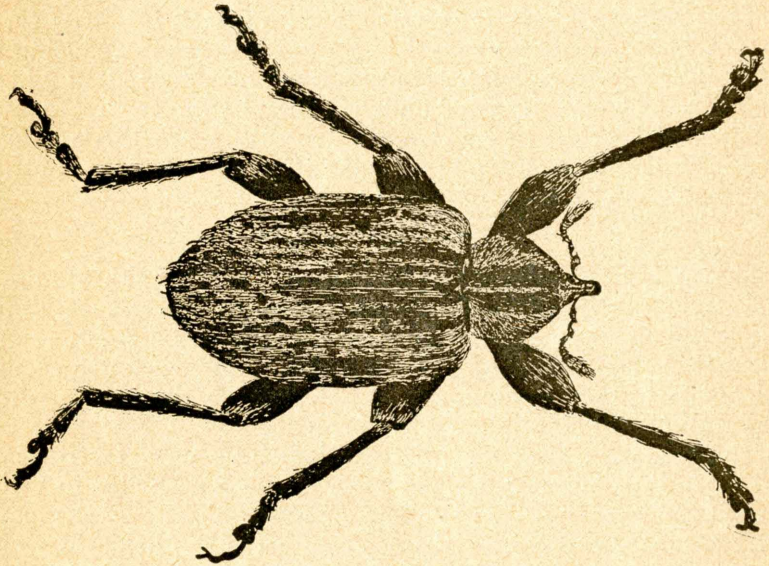
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THE ALFALFA WEEVIL

(*Phytonomus posticus* Fab.)

By HAROLD R. HAGAN



CIRCULAR NO. 31

Utah Agricultural College
EXPERIMENT STATION

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THE ALFALFA WEEVIL

(*Phytonomus posticus* Fab.)

By HAROLD R. HAGAN

The alfalfa weevil is rapidly spreading over the entire alfalfa-growing areas of the western states. Its injury to the alfalfa crop still aggregates an enormous sum annually. This is due to the fact that each year it is extending its attack into new territory. Control measures adopted by the farmers are reducing its injury in the treated fields. Many farmers are now cutting more alfalfa in the weevil-infested districts than before the appearance of this pest because of adopting better cultural methods as outlined in Bulletin No. 110 and Circular 10 of this station. Both of these publications are now out of print.

DISTRIBUTION

Since the first evidence of this insect in Salt Lake county in 1904 it has continued its steady advancement into new territory. At present it is recorded from Rexburg, Idaho, on the north, to well within the borders of Arizona and New Mexico on the south, and from western Wyoming and Colorado on the east to practically all the alfalfa in eastern Nevada.

The principal means of distribution into new territory is flight. In late summer the adult weevils seek a shelter in which to pass the winter. This is their summer flight. A comparatively large percentage of them never leave the fields in which they have been feeding. Those which do leave may travel several miles before hibernating. In the spring the over-wintering adults appear and take their spring flight in search of food. It is supposed that these two migrations cause the weevil to spread at the average rate of twenty miles a year. Careful study of weevil migration during the past few years has shown that dispersal along favored routes is much more rapid than at the above rate. Such an advantage as volunteer alfalfa along roadways, ditch banks, and railroad tracks enable weevils to spread perhaps fifty or sixty miles in a season.

LIFE HISTORY

The over-wintering adult weevil appears in the alfalfa field in early spring as soon as the crop has commenced growth. After feeding a few days the female weevil starts laying her eggs in the alfalfa stems. After first puncturing the stem with her long beak, she inserts her ovipositor into the wound and deposits an

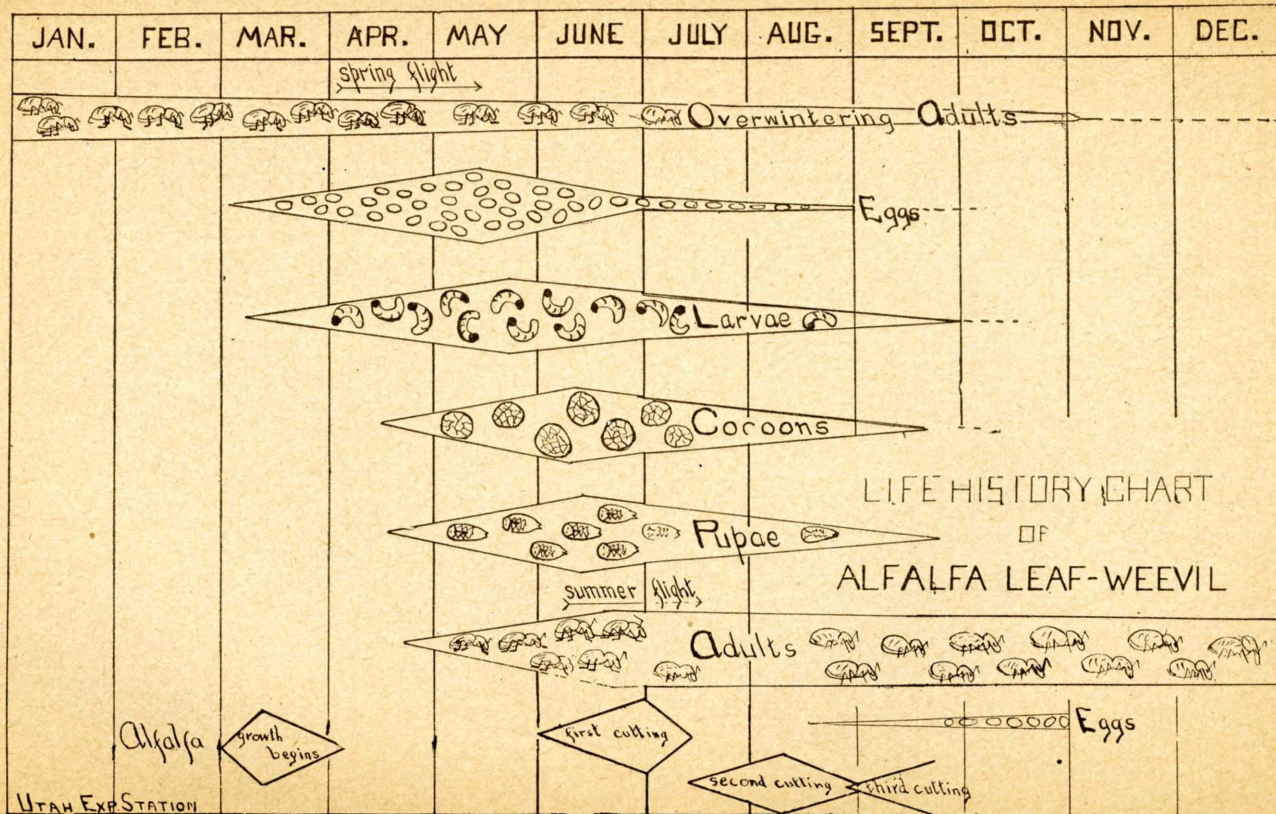


Chart showing the life history of the Alfalfa Weevil.

egg. As many as forty eggs may be laid in each egg puncture of the insect. The female lays from six hundred to eight hundred eggs during the spring. If the weather is warm and dry, egg-laying is completed within a few days; if it is a cold, wet season, the egg-laying period extends over several weeks.

The larva upon hatching from the egg works its way up to the tender, developing leaf buds. Here it lies, feeding upon the tenderest part of the plant, the growing tip. Its attack stops the further growth of the leaf buds at this point and the plant starts new growth immediately below the injured part. The new growth is in turn attacked and the plant makes no headway. As the larva becomes larger, it no longer feeds in the leaf bud. It can be found eating the larger leaves, and as it becomes necessary it crawls from place to place on the plant in search of fresh food. What has been described applies not only to one plant but to every plant in the infested field with the result that a light first crop is obtained. The first crop cannot mature until the larva has become full grown and dropped to the ground. Old fields yield very poorly; new fields suffer less and respond more readily to cultural methods.

After the weevil larva is fully grown it seeks a shelter in which to spin its cocoon. This shelter is usually a dry, curled alfalfa leaf or simply the loose, dead vegetation which accumulates at the alfalfa crown. The larva does not burrow into the soil for shelter. Each one spins a net-like, globular cocoon within which it changes to the resting, pupal stage.

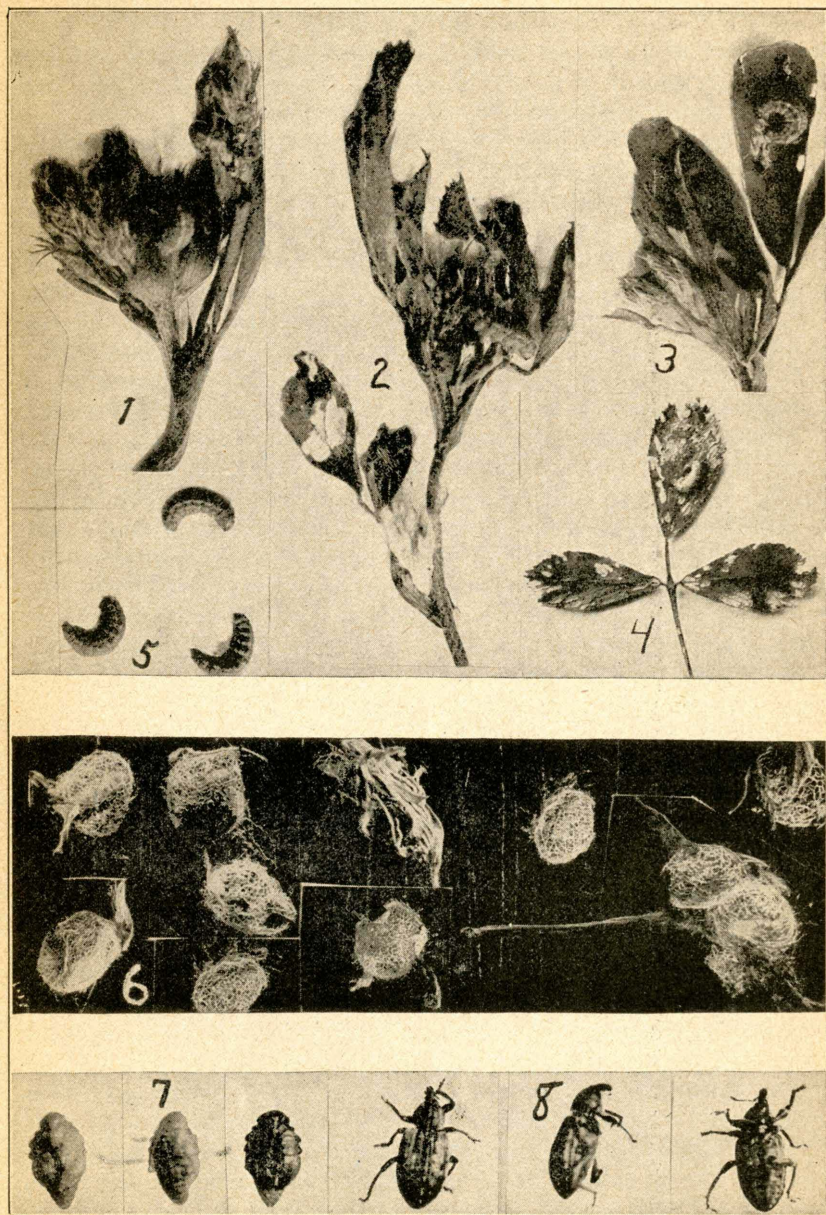
The pupa requires about ten days to become an adult insect. At the expiration of that time the fully formed weevil appears.

The adult weevil is an oval beetle about three-sixteenths of an inch in length. The head bears a long blunt snout on which are placed the antennae, or feelers. Its color is brown or grayish brown, with a dark line running along the middle of the back. Later in the summer, at least by the following spring, most of the brownish color is rubbed off leaving the insect much darker.

In late summer or early fall the weevil ceases attacking the alfalfa and seeks shelter for the coming winter.

CONTROL MEASURES

As the most serious damage to the crop is the feeding of the larval insects before the first cutting, control methods should be adopted to reduce this loss. The second crop is delayed by the weevils' attack on the first crop. The farmer should use every available means to bring the first crop to an early maturity.



1-4, Larvae feeding in alfalfa crowns; 5, Larvae in characteristic positions; 6, cocoons; 7, pupae; 8, adults.

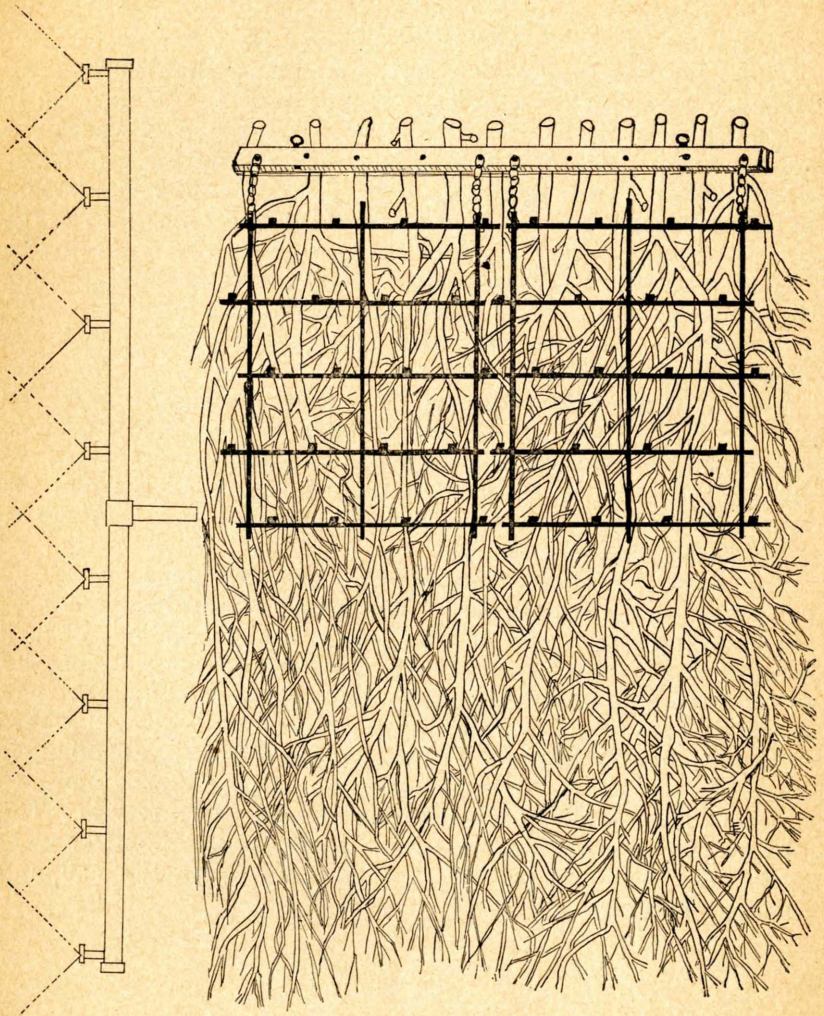
The field should be disked early in the spring in order to open the soil and so to obtain early and rapid growth of the alfalfa. The best irrigation practice should be employed to secure the maximum growth and to keep the plant vigorous.

In cases of severe infestation, the crop will be so greatly retarded that it will not bloom by the time the first cutting is normally due. Sometimes the plants are unable to make any further growth, being completely checked at an immature stage. When this occurs, it is advisable to allow the crop to stand long enough to be sure that practically all the eggs have been laid (about the middle of June), then to cut the field and to remove the hay as quickly as possible. The field should be gone over carefully with the spring-tooth harrow and this followed by a thorough treatment with the brush or wire drag. The objects of the cultural methods are: to break up the surface of the soil, to stimulate early growth of the second crop, to tear all green tissue from the alfalfa crowns and stems in order that the weevil larvae will starve, to make a fine dust mulch which heats under a hot sun and which burns and suffocates the larvae, and to crush or drag out into the mulch all the larvae hiding in the alfalfa crowns. For success with the dust mulch method the field must be dry or no fine, powdery dust can be secured. After allowing the field to lay bare two or three days, turn in the irrigation stream. A thrifty, rapid growth of alfalfa should result.

Following the best agronomic practice, alfalfa fields should be plowed up at the end of about the fifth year in order that the land may be used for the production of other crops. It has been observed that old alfalfa fields are unable to resist weevil attack as well as young fields; neither can they produce as heavily in a weevil-infested district. For these reasons, crop rotation with four or five years of alfalfa are strongly advised.

THE BRUSH DRAG

The ordinary brush drag consists of a two-inch by six-inch board about fourteen feet long. On top of it the butts of several straight limbs are securely fastened. These limbs are eight or ten feet long and are chosen because of their toughness and springiness. They should have a great number of short, stiff twigs on every branch. Hawberry is an example of good material for the brush. The brush should be almost as broad as long. In using the drag farmers find that it is best to weight it evenly by throwing a spike-tooth harrow on it and then riding on the harrow. Additional weighting may be secured by putting



Brush drag, properly constructed (on right). Eight nozzles on spray pipe as used for covering the young alfalfa with a fine mist spray (on left).

on sacks partly filled with rocks. A brush drag made of dead or brittle limbs rapidly becomes useless.

THE WIRE DRAG

This drag has gradually come to supplant the brush drag because it is so quickly and easily made; its life is longer and it is claimed by many to be more effective. The end of a piece of hog fence about twelve feet long is securely fastened to a log or heavy plank. It is weighted by putting a spike-tooth harrow on the front end of the wire. The teeth of the harrow should be set back. The rear part of the wire can be weighted by fastening to it a few short pieces of heavy wood, short pieces of railroad rails, fish plates, or sacks partly filled with coarse gravel.

Sometimes the brush and wire drags are profitably combined by placing the brush on top of the wire.

Pasturing the field with sheep has proved beneficial in weevil control. The animals should not be kept on more than three or four days or longer than is necessary to rapidly eat the field clean. Care must be taken that they do not pack the soil too much. Pasturing is practiced in early spring. It is advised to use sheep for this purpose.

Poisoning has been resorted to on gravelly lands where the dust mulch is an impossibility. The young alfalfa has been covered by a fine mist spray of lead arsenate. Five pounds of lead arsenate paste is used to one hundred gallons of water. To spray the crop when it is almost ready for cutting renders the hay unsafe for use. Spray can be applied to the early growth where it will undoubtedly kill many of the larvae. The possible danger of poisoning stock, the cost, and the lack of any cultural value to the crop prevents the recommending of spraying methods. The cultural method advocated above contrasts favorably with spraying for it costs less, controls the weevil, loosens the soil, and increases the yield.