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Two Ways to Fight Alfalfa Weevils

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Alfalfa weevil (**Hypera postica** Gyllenhal) is the major pest attacking alfalfa (**Medicago sativa** L.) in Kansas now. Although introduced into the United States near Salt Lake City, Utah, before 1904, it was 1960 before the weevils were first discovered in Cheyenne and Hamilton counties, Kansas. They had spread to 40 western Kansas counties by 1969, and an eastern strain, discovered in Maryland in 1951, infested alfalfa fields in Cherokee County, southeastern Kansas, in 1967.

The eastern strain spread west and north and caused serious damage to some Kansas fields by 1972. The eastern strain and possibly hybrids of the eastern and western strains spread to all of Kansas in 1974, when at least 95 percent of the acreage was infested. More than 824,000 acres were treated with insecticides in 1974, 220,000 in 1973, and 49,200 in 1972.

A pest of the first cutting, the weevil may also damage the second cutting by eating new growth in its early stages. Larval stages of the weevil do most of the damage.

The weevil passes through egg, larval, pupal, and adult stages. It produces one generation

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during the growing season and a partial second generation when falls remain warm.

We conducted trials at the South-Central Kansas Experiment Field near Hutchinson, Kansas to determine the effects of insecticides and alfalfa management on the alfalfa weevil.

Materials and Methods

Insecticides

We tested eight insecticides on Buffalo alfalfa in a randomized complete block design with three replications. Plots were 5 ft. x 30 ft. Insecticides were applied April 17, 1974. Weevil larvae were sampled four times with a 15-inch sweep net (April 17 and 24 and May 15 and 29).

Plots were harvested and yields calculated in tons per acre dry weight and percent of control.

Alfalfa Management

To test alfalfa management without insecticides, we established eight plots (12 ft. x 100 ft.) in Buffalo alfalfa in February 1974. The fall growth was removed from four plots, and left standing in the other four.

Weevil larvae were sampled five times (April 17 and 24, May 15 and 29, and July 3).

Results and Discussion

Insecticides

Before we applied insecticides, weevil larvae were uniformly distributed over the test plots (Table 1, April 17 sampling date).

All insecticides at indicated rates (Table 1) significantly reduced larvae within 1 week (April 24). No larvae were found in plots treated with either 0.25 or 0.50 lb ai/A of Furadan. Two weeks later, larvae still averaged less than 0.5 larvae per sweep on the Furadan-treated plots, compared with 12.4 on the control (untreated) plots. Where Furadan was applied at 0.5 lb ai/A, larvae averaged less than one per sweep at harvest 5 weeks after treatment. Vydate, Imidan, Alfa-Cide, and Supracide also controlled well over 5 weeks (Table 1). First-cut forage yields were directly related to numbers of larvae, varying from 1.23 tons/acre from the control plot to 1.63 for the Furadan plots (Table 1).

We observed no phytotoxicity from any insecticide tested.

Table 1. Effects of insecticides on alfalfa weevils and forage yields.

Treatment	lb ai/A	Larvae/sweep April 17	Larvae/sweep April 24	Larvae/sweep May 15	Larvae/sweep May 29	Forage yield T/A	Forage yield As % of control
Alfa-Cide	3.00	2.[illegible]	0.2	0.9	2.2	1.61	131
Alfa-tox	2.25	2.1	0.4	1.9	4.6	1.50	122
Furadan 4F	0.25	2.4	0.0	0.4	1.8	1.60	130
Furadan 4F	0.50	2.3	0.0	0.4	0.9	1.63	132
Imidan 50W	1.00	2.3	0.4	0.9	3.1	1.48	120
Lannate 90W	0.25	2.1	0.7	2.3	5.6	1.43	116
Lannate 90W	0.50	1.9	0.4	2.1	5.8	1.46	119
Lannate 90W	1.00	2.2	0.2	1.8	4.7	1.48	120
Lannate L 1.8	0.25	2.6	0.4	2.3	6.7	1.38	112
Lannate L 1.8	0.50	2.2	0.2	2.1	6.0	1.44	117
Nudrin 1.8	0.22	2.3	0.9	1.9	7.1	1.29	105
Nudrin 1.8	0.45	2.0	0.6	1.7	6.4	1.32	107
Nudrin 1.8	0.90	2.4	0.3	1.3	4.4	1.35	110
Nudrin 2.4	0.22	1.8	0.9	2.2	4.4	1.49	121
Nudrin 2.4	0.45	2.1	0.6	1.9	4.4	1.46	119
Nudrin 2.4	0.90	2.4	0.4	1.7	3.6	1.50	122
Supracide 2E	0.50	2.3	0.2	0.9	2.0	1.46	119
Vydate L	0.25	2.1	0.7	1.3	3.1	1.45	118
Vydate L	0.50	2.1	0.6	0.8	3.9	1.59	129
Control (untreated)		2.0	3.9	12.4	20.2	1.23	100
LSD .05[1]		NS[2]	0.9	1.1	2.9	0.23	

1. Unless the difference between two entries is equa[illegible] or great[illegible]an the LSD value, little confidence can be placed in the superiority of one treatment over another.
2. Differences between treatments not statistically different.

Table 2. Alfalfa management to control alfalfa weevil, south-central Kansas experiment field, Hutchinson, Kansas, 1974.

Treatment	Larvae/sweep April 17	Larvae/sweep April 24	Larvae/sweep May 15	Larvae/sweep May 29	Larvae/sweep July 3	Plant height (inches) May 6	Plant height (inches) June 7	Forage yield, Tons/A dry wt. May 29
Uncut[1]	7.1	13.8	36.2	19.1	2.8	13.7	9.2	0.99
	*[3]	*	*	*		*	*	*
Cut[2]	1.3	4.3	20.0	11.9	2.9	17.8	11.1	1.49

1. Fall growth not removed.
2. Fall growth cut and forage removed, Feb. 12, 1974.
3. Figures separated by asterisks differ statistically (.05).

Alfalfa Management

Larvae were reduced 82% by April 17 by removal of fall growth in February. April 17 larvae hatched from eggs laid the previous fall. One week (April 24) and 4 weeks (May 15) late larvae were reduced 69 and 45 percent, respectively. The May 15 data mainly reflect larvae hatched from eggs laid in the spring. At harvest time (May 29), only 38 percent fewer larvae were found on plots with fall growth removed than on plots with fall growth undisturbed.

Apparently, removing fall growth removed most of the weevil eggs laid the previous fall. That process might reduce insecticide applications from two to one. During some years, an insecticide might not be needed until after the first harvest. Also (although no data were obtained), removing fall growth may expose adult weevils to winter temperature, other climatic factors, and predators, or the weevils may leave the field to seek shelter. We plan additional studies to determine effects on adult weevils of removing fall alfalfa growth. We know that removing the fall growth reduces other insect pests such as pea aphids.

At harvest time, average height of alfalfa on the plots where fall growth had been removed was 17.8, compared to 13.7 inches on the uncut plots. Corresponding heights for recovery after June 14 cutting were 11.1 and 9.2 inches (Table 2).

First-cut forage yields for the cut and uncut treatments were 1.50 and 0.99 tons per acre dry weight—or ½ ton for removal of fall growth. The fall growth of alfalfa after the last cutting should not be removed until after the first frost, and then only when temperatures are expected to remain low so the weevils lay no more eggs. Cutting then does not injure alfalfa, but it removes most of the weevil eggs.

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Information here provides preliminary guidelines for farmers, producers, colleagues, industry cooperators, and others. It is not a recommendation or endorsement and does not contain all approved or effective insecticides. It is based on 1 year of research.