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Field Evaluation of Insecticides for Control of Alfalfa Weevil Larvae

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The alfalfa weevil, *Hypera postica* (Gyllenhal), is a serious pest of alfalfa in Kansas. The large numbers of larvae generally found in alfalfa fields during early spring can completely destroy the first crop and may sometimes retard early growth on the second crop.

A native of Europe, the weevil was first discovered in the United States in 1904 in Utah. For nearly 50 years, it remained confined to 12 western states. In 1952, the weevil was discovered in Maryland and from there it spread rapidly through the East, South, and Midwest. In Kansas, the weevil (western strain) was first discovered in Hamilton and Cheyenne Counties in 1960. By 1969, it had spread into 40 western Kansas counties. In eastern Kansas, the weevil (eastern strain) was detected in Cherokee County in 1967. It spread westward and northward, causing severe damage by 1972.

Both larvae and adults are injurious, but larval feeding causes the greatest damage. The larvae feed on the buds, growing tips, and leaves of alfalfa. The leaves may become skeletonized and dry. A field of alfalfa damaged by heavy populations of alfalfa weevil will take on a grayish-white appearance, similar to

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severe freeze damage. Larval feeding not only lowers yield, but also reduces quality and nutritional value of the hay.

Alfalfa weevils pass through egg, larval, pupal, and adult stages in their development. Usually, there is only one generation a year. Full grown larvae are legless, 3/8" long, and green in color with a shiny black head. A conspicuous white stripe can be seen down the middle of the back. Young weevils are light brown in color, with a dark stripe extending half-way down the middle of the back. As weevils age, they darken in color and become uniformly dark brown to almost black. The adult weevils are approximately 3/16," long and have a short, distinct snout.

Alfalfa growers often must rely on chemical control measures to suppress weevil outbreaks and prevent economic damage to the alfalfa crop. This report presents the results of field tests conducted in 1985 and 1986 to determine the comparative effectiveness of various insecticides for controlling alfalfa weevil larvae.

Procedure

Tests were conducted in fields of Riley alfalfa located at the Southwest Kansas Branch Experiment Station near Garden City. Insecticides were applied with a CO₂-activated backpack sprayer calibrated to deliver 10.5 gallons of water per acre at 30 psi through 4 nozzles (6x) mounted on a 6-foot boom. Plots were sampled for larval densities by counting all living larvae collected from 20 stems randomly selected from each plot. Stems were shaken against the sides of a white bucket to dislodge the larvae from the plants. Data were subjected to analysis of variance for significance, and Duncan's multiple range test was applied to separate pair comparisons.

1985 Test

Plots were 18 x 50 feet, arranged in a randomized complete block design. A single application of 7 insecticides (Table 1) was made on April 20. Alfalfa was 14 inches tall at the time of application. Post-treatment assessments were taken at 3, 7, 14, and 21 days after application.

1986 Test

Plots were 12 x 30 feet, arranged in a randomized complete block design. A single application of 7 insecticides (Table 1) was made on April 11. Alfalfa was 10 inches tall at the time of application. Post-treatment assessments were taken at 3, 7, 12, and 19 days after application.

Results and Discussion

1985 Test

At 3 days posttreatment, all insecticides significantly reduced larval numbers below the untreated check (Table 1). Furadan gave the best control, but it was not significantly better than the other materials, except Lorsban. At 7 days posttreatment, all treated plots continued to have significantly fewer larvae than the untreated check. Furadan and Supracide gave the best control, but they did not differ significantly from the malathion treatment. At 21 days posttreatment, all treated plots had significantly fewer larvae than the untreated check. Furadan and Supracide again were the most effective insecticides, significantly better than the other materials tested.

Leaf spotting was noted in plots treated with methyl parathion, Guthion, and Sevin XLR. Some insecticides may injure tender foliage when they are applied to plants that are wet from either heavy dew or rain.

1986 Test

At 3 days posttreatment, all insecticides significantly reduced larval numbers below the untreated check (Table 1). Furadan gave the best control, but it was not significantly better than Lorsban, Supracide, Capture, or Bathroid. Pydrin and malathion were less effective. Two hard freezes (25°F) occurred between the 3- and 7-day evaluations and, as a result, larval densities declined in the untreated check plots. At 7 days posttreatment, all insecticides continued to give significant reductions in larval numbers compared to the untreated check. Furadan was the best treatment, significantly better than either Pydrin or malathion. All insecticidal treatments gave significant reductions in larval numbers at 14 days posttreatment. Except for Lorsban and malathion, all insecticides provided at least 96% control. At 21 days posttreatment, all treated plots had significantly fewer larvae than the untreated check. Except for malathion, no significant differences existed among any of the insecticides. Plots were not sampled after 21 days because many of the larvae in the untreated plots were beginning to spin pupation cocoons, and further sampling would not have been meaningful.

Conclusions

In these control trials, the best overall results were obtained with Furadan. Supracide provided excellent control through 21 days at the 0.5 lb. rate and appears to be comparable ratewise to Furadan. The synthetic pyrethroids (Capture, Bathroid, and Pydrin) look promising for controlling alfalfa weevil larvae and could be alternative insecticides in the future, if they are registered for use on alfalfa.

Brand names are used to identify products. No endorsement is intended, nor is any criticism implied of similar products not mentioned.

Table 1. *Efficacy of insecticides applied for control of alfalfa weevil larvae (1985-1986)*

Insecticide*	Lb. Al/acre	Mean no. larvae /20 stems after (days)* *			
		3	7	14	21
1985					
Furadan 4F	0.5	0.0a	0.0a	0.0a	4.8a
Supracide 2E	0.5	0.8a	0.3a	0.8a	6.5a
Malathion 5E	1.25	3.3ab	5.3ab	10.8ab	20.5b
Guthion 2E	0.5	4.0ab	4.8ab	14.3b	18.3b
M. parathion 4E	0.5	4.8ab	9.3b	15.3b	20.5b
Sevin XLR 4F	1.0	5.8ab	7.8ab	19.3b	26.5b
Lorsban 4E	0.5	5.8b	12.0b	15.0b	21.5b
Check		31.5C	54.0c	78.0c	49.3C
1986					
Furadan 4F	0.5	4.5a	1.8a	0.8a	2.3a
Lorsban 4E	0.5	6.5a	6.5a	4.8ab	7.0a
Capture 2E	0.04	9.0a	2.0a	1.3a	0.8a
Bathroid 2E	0.045	9.5a	7.3a	2.0a	0.5a
Supracide 2E	0.5	10.8a	4.3a	1.5a	5.8a
Pydrin 2.4E	0.1	18.0b	15.5b	1.5a	4.5a
Malathion 5E	1.25	28.8c	15.0b	7.5b	17.5b
Check	—	82.8d	45.8c	45.0c	43.3C

*Pydrin, Capture, Bathroid, and Guthion are not currently registered in the state of Kansas for alfalfa weevil control and CANNOT be used for that purpose

** Any means in the same column followed by the same small letter are not significantly different at the 5% level (Duncan's multiple range test)