

Table 2. Percent Infested Plants (Mean/Treatment)

Treatments	Rate Lbs/A	10/6*	10/9	Date 10/20*	10/23*	10/27
Check	--	21.3	42.5 a	78.8	85.0 a	82.5 a
Methomyl	0.45	17.5	11.3 c	60.0	13.8 c	5.0 c
Cymbush	0.06	18.8	2.5 c	56.3	12.5 c	0.3 c
Cymbush	0.12	17.5	1.3 c	56.3	11.3 c	0.3 c
Kryocide	8.00	13.8	8.8 c	67.5	25.0 c	11.3 c
Furadan	1.00	17.5	22.5 b	70.0	58.8 b	35.0 b
Pay-off	0.08	15.0	6.3 c	58.8	47.5 b	25.0 b
ZR 3210	0.10	16.3	8.8 c	65.0	66.3 b	38.8 b

*Pre-treatment

Treated: 10/7, 10/21 and 10/24.

Means followed by the same letter are not significantly different at the 5 percent level.

Effects of Beet Armyworm Feeding on Sugarbeet Root Yields

Dale Fullerton

Summary

The effects of foliar feeding by larvae of the beet armyworm in relationship to root yields were studied for the second consecutive year. In a comparison test of treated and non-treated plots, data indicated that foliar feeding damage, where plant stands are not affected, does not significantly reduce root yields.

Methods and Materials

In 1980-81, a continuing effort to determine the effects of beet armyworm feeding on root yields was conducted at the Mesa Experiment Farm. Two treatments were again utilized; untreated treatments and a treatment where an insecticide was used to keep beet armyworms to a minimum. Eight applications were necessary in treated plots to maintain low levels of infestation.

In previous studies, yields initiated in December and continued at monthly intervals did not show significant root yield reductions. To determine if weight differences actually occurred at the peak of beet armyworm feeding, yields were initiated on October 14 and continued at periodic intervals. Plant stand counts were also taken to measure plant mortality as a result of foliar damage.

Results and Discussion

The mean number of larvae per plant is shown in Table 1. It indicates a consistent difference in population levels between treated and untreated plots. Population peaks in both treatments occurred on October 21 when 2.63 larvae per plant infested the untreated plants and only 0.28 larvae on treated plants. Significant population differences first occurred on October 13 and continued until the natural population decline in November.

Table 2 shows the percent of plants infested by 1 or more larvae during the primary period of beet armyworm infestation. It also demonstrates the magnitude of population differences between treated and untreated plants. These population differences resulted in obvious visual differences between treated and untreated plots. Most of the plants in the untreated plots were either partially defoliated or completely defoliated. When populations declined in November, new leaves were produced and the damaged plants began to develop normally.

Larval populations were larger in 1980 than in 1979. However, plant stands were still not reduced by foliar feeding as indicated in Table 3. No significant loss of plants occurred during peak feeding or after population decline occurred. This would indicate that even severely damaged plants were able to survive.

Previous greenhouse research has shown that 3-5 larvae per plant is necessary to cause plant mortality. In this test, the largest infestation was 2.63 larvae per plant and this number did not result in a plant stand reduction.

In 1979-80, yields were initiated in December and did not indicate a significant yield reduction. Table 4 shows the results of yields taken and the significance of those yields. The initial harvest on December 3 was taken after peak feeding and after natural population decline.

In 1980-81, yields were initiated in October in an effort to determine if weight differences in the roots were apparent during larval feeding. Table 5 shows the results of those yields and the statistical significance for each of the harvest periods. It was apparent that stunting of the plant occurred during larval feeding resulting in weight differences in the roots. On October 14, the roots of treated plants weighed three times as much as roots of untreated plants. Two weeks later there was a five fold difference.

Immediately after population decline in November there was still a significant yield difference. However, when the plant began to produce new leaves and develop at a faster rate, the stunting effect was eliminated. On December 15, a difference in root weight was still apparent but it was not a significant difference. Although root weight difference may remain, these differences become economically insignificant as the root becomes larger.

Based on two years of study and without secondary factors involved it would appear that larval feeding on sugarbeet leaves by populations of this magnitude do not cause economic yield losses. However, larger populations that might reduce plant stands, insect complexes, certain herbicides, diseases and other secondary factors could combine with beet armyworm feeding to reduce root yields.

Table 1. Mean Larvae per Plant - 1980

Treatments	Sample Dates					
	10/1	10/6	10/13	10/21	10/24	10/29
Treated*	0.05	0.05	0.08	0.28	0.08	0.09
Untreated	0.05	0.41	1.18	2.63	1.94	1.16

*8 applications of Methomyl at 0.45 lbs/A applied between October 1 and October 30.

Table 2. Percent of Plants Infested by Beet Armyworm Larvae - 1980

Treatments	Sample Dates					
	10/1	10/6	10/13	10/21	10/24	10/29
Treated*	3.8	5.0	6.3	17.5	6.3	7.5
Untreated	5.0	28.8	53.8	88.8	87.5	76.2

*8 applications of Methomyl at 0.45 lbs/A applied between October 1 and October 30.

Table 3. Number of Plants per Acre - 1980

Treatments	Sample Dates			
	10/21	10/28	11/5	11/21
Treated	22,110 a	22,110	22,110	22,043 a
Untreated	22,445 a	22,445	22,311	22,244 a

Means followed by the same letter are not significantly different at the 5 percent level.

Table 4. Mean Root Yields in Grams/Root - 1979

Treatments	Date of Yield Sample			
	12/3	1/7	2/12	3/10
Treated	120.1 a	207.9 a	333.2 a	549.3 a
Untreated	103.5 a	200.7 a	330.5 a	553.8 a

Means followed by the same letter are not significantly different at the 5 percent level.

Table 5. Mean Root Yields in Grams/Root - 1980

Treatments	Date of Yield Sample						
	10/14	10/30	11/21	12/15	1/17	2/14	3/12
Treated	0.16 a	3.2 a	63.0 a	184.0 a	231.2 a	354.0 a	599.7 a
Untreated	0.06 b	0.7 b	32.8 b	155.7 a	206.1 a	339.2 a	580.0 a

Means followed by the same letter are not significantly different at the 5 percent level.