RESEARCH REPORT TO THE OREGON PROCESSED VEGETABLE COMMISSION

Title: Cutworm Control in Processed Beets

Project Leaders:

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Funding History:

Project initiated 1987
Funding, 1987: $3595.00
Funding, 1988: $4015.00
Funding, 1989: $4015.00
Status: Completed.

Approximate distribution of funds received: 1989

Salaries and wages (student)	1200.00
Other payroll expenses (OPE) at 5%	60.00
Supplies (traps, chemicals)	800.00
Travel (State vehicle, 300mi/week)	1955.00
Total	4015.00

Specific objectives for 1989:

1. Evaluate the role of planting date on cutworm colonization.

2. Evaluate the role of plant height/age in cutworm colonization.

3. Determine the best time to apply insecticides for the black cutworm based on 1 and 2.

Planting date and cutworm colonization:

Pheromone traps baited with black cutworm pheromone were placed in or near ten fields, that were going to be planted with beets, during the first week of March 1989. One trap was placed per field and monitored weekly for black cutworms.

Results

Trapping

No black cutworms were detected until April 19 when most of the traps had at least one (fig 1.). Most of the table beets were planted during the last two weeks of April 1989 when black cutworms were actively flying into the area. Black cutworm catches remained high until the beginning of June. Thus, the immigration of the black cutworm into the Willamette Valley spanned the period of time when all of the beets were planted and had germinated. The migration pattern observed in 1989 is likely to be representative of an "average" year so it is unlikely that the time of planting will influence the level of the black cutworm population in an individual field.

Plant height/age

Black cutworm damage became easily observable in beets 2 to 3 inches tall. At this stage in plant growth the cutworms were second and third stage larvae. This implies that eggs were laid on beet plants as early as the appearance of the second pair of true leaves. Also, the cutworms in an individual field typically varied from second stage through fifth stage larvae suggesting that eggs were laid over a period of at least 1 - 2 weeks.

Insecticide applications

We tested Sevin (carbaryl), Lannate (methomyl), Javelin(Bt), and BioSafe(nematodes) for their efficacy against the black cutworm. The four treatments and an untreated check (water) were replicated 8 times in a black cutworm infested field. The treatments were assigned at random to forty 30 foot rows of beets. One row was left untreated between each treated row. Treatments were applied on June 20. Lannate was applied at 0.45 lbs ai. /acre, Sevin at 2.0 lbs ai./acre, and Javelin at the rate of 1.25 lbs of formulated material per acre. Applications of these treatments were made with a CO_2 powered backpack sprayer at the equivalent of 40 gallons per acre of water. BioSafe was applied at the rate of 500 infective juveniles per square inch to a six inch wide strip on each row of beets. Treatments were evaluated 5 days later by removing the beets in the rows and sifting the soil for larvae. Soil was removed to a depth of 4 inches with a seven inch wide shovel and sifted in the field. Cutworm larvae and cadavers were counted and returned to the laboratory. Live cutworms were placed in cups with artificial diet and observed for mortality. The numbers of cutworms dying were compared for treatment effects.

Results

Approximately 60% of the cutworms collected alive after 5 days were parasitized. Cutworms yielding parasites were counted as surviving the treatments. Since parasitism frequently stops cutworm feeding and cutworms that didn't feed encountered less insecticide, the differences in the treatments described below were probably much greater than is indicated. Only the Lannate treatment was significantly different from the check with 1.4 cutworms per 30 feet of row versus 2.8 for the check (table 1.). This contrasts with the results from 1988 where both Lannate and Sevin provided highly significant control of the black cutworm. Neither Javelin nor BioSafe provided significant control of the black cutworm.

Conclusions

Black cutworms are typically present in most table beet fields every year. They migrate into the Willamette Valley about the time beets are being planted (fig. 2). Eggs are deposited on young beet plants, as early as the appearance of the second pair of true leaves. Larvae cause damage by cutting young plants off at the base and scarring or tunneling older beet roots.

The black cutworm can be controlled with either Sevin or Lannate if applications are timed correctly. Early detection of the black cutworm by observation of wilted leaves and cut plants prior to the first cultivation is critical. Damage becomes more difficult to detect and the larvae are deeper in the soil after cultivation. Applications of insecticide should be made if there are more than two damaged plants in ten feet of row. Apply either Sevin or Lannate before cultivation.

Figure 1.

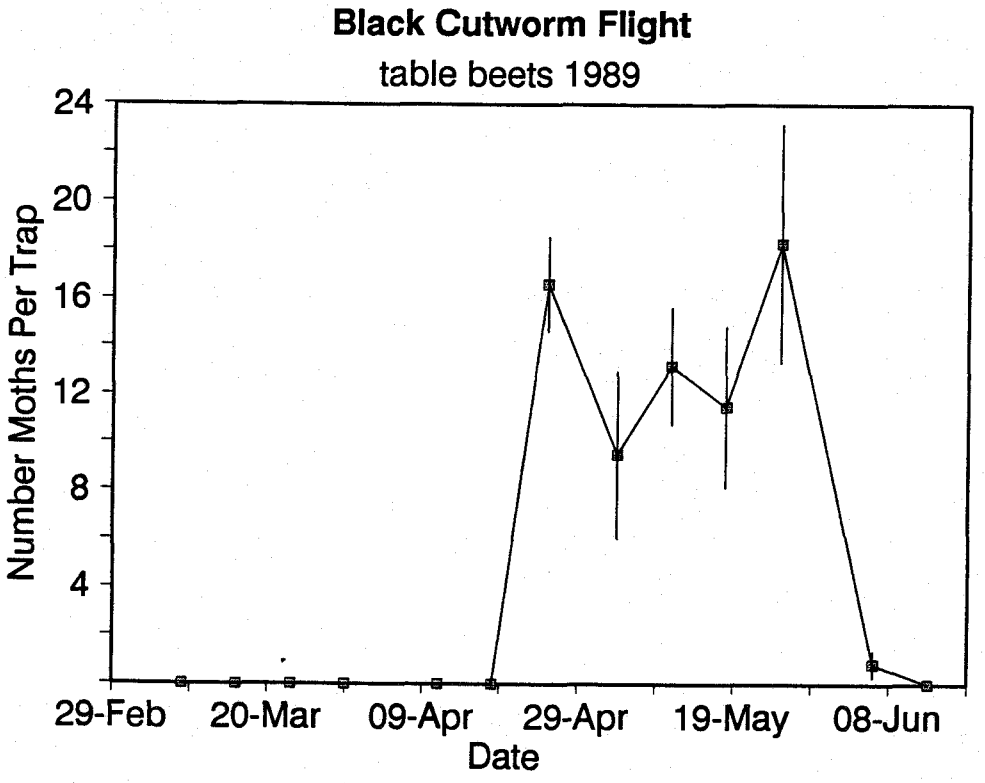

Figure 2.

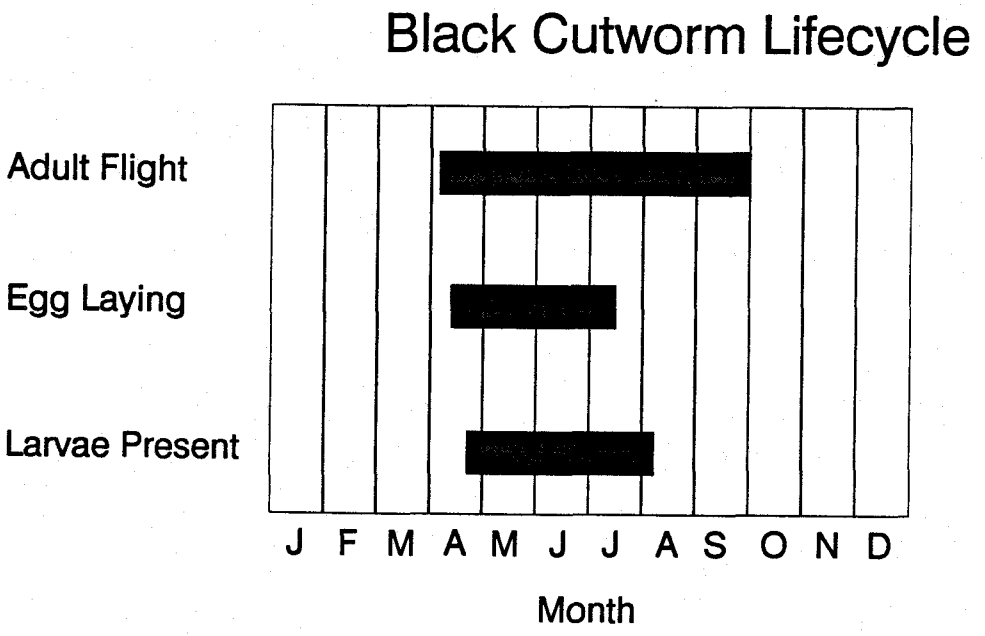

Table 1. Test of insecticides to control the black cutworm in table beets, results from trials conducted during 1988 and 1989.

Black Cutworm Control Trials

Chemical	Rate	# larvae 1988	# larvae 1989
Lannate	0.45 lbs ai/a	0.88a[1]	1.375a
Sevin	2.00 lbs ai/a	0.88a	2.0a
Javelin	1.25 lbs form.	*	4.25c
BioSafe	500./sq in	*	2.125ab
Check (water)	-	5.14b	2.75b

* not tested
[1] means followed by different letters are significantly different (FPLSD 0.05).

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