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
Status: Completed for 1988.

Approximate distribution of funds received: 1988.

Salaries and wages (student)	1200
Other payroll expenses (OPE) at 5%	60
Supplies (traps, insecticides)	800
Travel (State vehicle, 300 mi/week)	1955
TOTAL	4015

Specific objectives for 1988:

2. Continue investigation of pheromone traps to predict cutworm infestations.

1. Test efficacy of registered insecticides for control of the black cutworm, emphasis on detection and timing.

3. Test insecticide bait for detection and control of black cutworm.

4. Determine when black cutworm gets into to table beets, overwintering and migration.

Further evaluation of pheromone trapping:

Pheromone traps were used again this year to determine the flight activity of the three species. Twelve fields were selected shortly after beets were planted. One trap was placed per field for the black and variegated cutworms. Adult flight activity was monitored weekly thereafter until the crop was harvested. Egg laying activity was monitored by counting egg masses placed on the pheromone traps and weeds in the field.

Results

As in 1987, peak trap catch of the variegated cutworm was well correlated to egg laying activity. We believe pheromone traps can be used to time insecticide treatments for this species if necessary, but threshold levels should be developed for young larvae on table beets. The best time to treat for variegated cutworm would be two weeks after peak trap catch, around the first week in July. Pheromone trap catches of the black cutworm were extremely variable and not correlated to any particular event in the cutworm life cycle. Traps can be successfully used to determine the beginning of adult black cutworm migration in the spring but this event occurred well before beets were planted in 1988.

Insecticide Rescue Trial

Sevin (carbaryl) and Lannate (methomyl) were tested for their efficacy as rescue treatments in a black cutworm infested field. Beets damaged by cutworms displayed very characteristic wilting symptoms that made early detection of larval infestations quite easy. It seems to us that visual observation would provide an efficient and effective means of detecting a potential black cutworm infestation. Three treatments consisting of Lannate 0.45lb ai/acre, Sevin 2.0lbs ai/acre and an untreated check were replicated eight times. Treatments were assigned at random to twenty four thirty foot rows of beets on June 27th. One untreated row was used between each successive treatment. Chemical applications were made with a CO_2 powered backpack sprayer (at the equivalent of 40 gpa water). Treatments were evaluated one week later by removing the treated beets in all 30 row feet and sifting the soil for cutworms. Soil was removed to a depth of four inches with a 7 inch wide shovel and sifted in the field. All cutworms were placed on artificial diet in cups and observed for mortality in our laboratory. The numbers of live, dead (cadavers) and "sick" cutworms were recorded and analyzed for treatment effects.

Results

Both pesticide treatments provided highly significant control over the untreated check ($p < 0.0001$). Cutworm numbers averaged less than 1 for the treated rows (0.88 in 30ft.) and over 5 (5.14 per 30ft.) in the untreated check rows. Cadavers were found in both treated plots. Also, all larvae found alive in the treated rows died within three days in the lab. No cadavers or sick larvae were found in the untreated check. Larvae reared from the untreated check completed development or yielded parasites in the lab.

5% Carbaryl Bait Trial

The efficacy of carbaryl bait for control of the black cutworm in table beets was tested. Five replicates of three treatments consisting of a check, bait at 1lb ai/acre, and bait at 2lb ai/acre were constructed in a commercial beet field. The trial was initiated June 7th when second and third stage black cutworms were found cutting plants. A heavily infested area of a field was selected. Five rows were divided into ten foot lengths with one foot border lengths on each end. Border rows were left between each treatment. Treatments were assigned randomly and applied with a shaker-can.

Treatments were evaluated by counting cutworms. Cutworms were located in the soil by observing cut plants and leaves and dug out of the soil for observation. Numbers of dead, sick and live cutworms and the incidence of damage were recorded and analyzed for treatment effects. There were no significant differences between any of the three treatments ($p=0.86$). No evidence of any cutworm mortality was observed. It is likely that the bait is less attractive to the cutworms as the growing beet plants.

Summary

Some black cutworms were present in most fields examined in 1988. The infestations this year appeared to be the result of eggs laid by adults migrating into Oregon from the south based on the age of the cutworm larvae and the time beets were planted. The black cutworm life-cycle is shown in fig 1. Last season the adults flew and laid eggs throughout the time the beet seeds were planted and germinating. Eggs were laid in the beet fields one to two weeks after plants germinated. The larvae hatched and began to feeding on the foliage. By the second stage the larvae were cutting entire leaves and young plants off at the base.

Conclusions

1. Pheromone traps will predict the time of variegated cutworm occurrence in beet fields. Damage caused by the larvae will become apparent two to three weeks after peak trap catch.

2. Pheromone traps are not helpful for determining black cutworm problems in individual beet fields.

3. Black cutworm problems are easily detected two weeks after plants germinate by observing "wilting" caused by feeding larvae.

4. Insecticide control of the black cutworm is effective with either Sevin or Lannate. However, since the larvae occur in the soil and usually early in the growth cycle of the beets, treatments must be applied early on the young cutworm larvae which are typically more susceptible to insecticides and before much damage occurs. **Early detection is extremely important with the black cutworm** as they become difficult to find and reach with insecticides as the crop canopy closes.

Black cutworms will cause yield loss by thinning young plants as well as downgrading the harvested crop. The effect of plant thinning on yield loss has not been estimated. Threshold levels of infestation of young larvae remain to be established for both root and foliar cutworms.

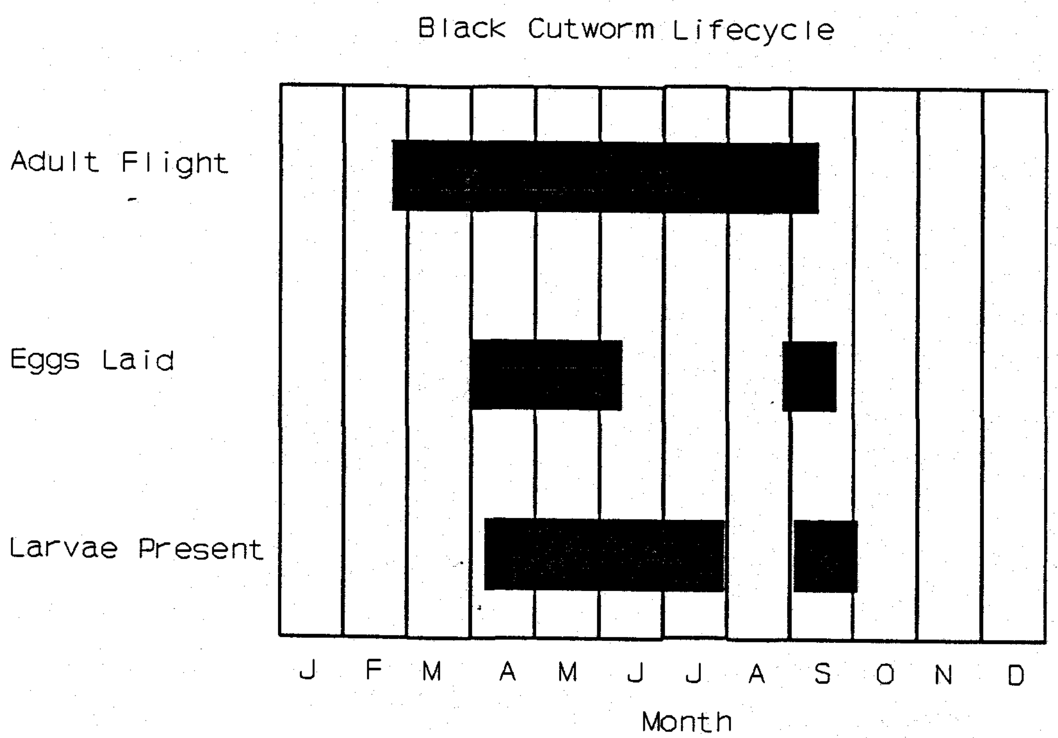

Fig 1. Black cutworm life cycle in western Oregon

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Project Leader | Date

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Additional investigators | Date

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Additional investigators | Date

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Department Head | Date