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F95-84

SARE Producer Grant FNE95-84 Final Report

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1. Objective 1- Nematode Efficacy: Determine the efficacy of nematodes for controlling flea beetle larvae in the soil on Chinese cabbage roots.
Objective 2 - Trap Crop: Determine if Chinese cabbage will attract more adult flea beetles than broccoli.

2. Farm Information:

In 1995 I grew nine acres of several vegetables that were marketed through a Community Supported Agriculture, one farmers market, and a couple of local restaurants. Twenty acres of hay were harvested. Due to the drought, only one cutting of hay was taken and several acres of sweet corn , squash, and pumpkins were not harvested.

3. Cooperators:
Jeff Bird, Cornell Cooperative Extension - Washington County. Jeff was going to assist in the outreach portion of this project. However, due to lack of results, no outreach is planned for 1995.
Mike Hoffmann, Department of Entomology, Cornell University. Dr. Hoffmann analyzed the data which I collected. These results are included in this final report.

4. Procedures which were completed:

Objective one was not fully completed due to the drought. Only nematode survival was monitored for four weeks. Nematode efficacy in controlling flea beetle larvae was not completed. Objective one proceeded as follows:

May 13 - 126 Chinese cabbage and 526 broccoli plants were transplanted. Seedlings for treatments one and three received one tablespoon of nematode suspension (2136 nematodes) before transplanting. All seedlings were hand watered after transplanting.

May 16 - Soil samples were taken from all four treatments of the Chinese cabbage to

determine survival of the applied nematodes. Soil samples were put in a two ounce plastic cup containing three wax moth larva. Wax moth larvae were evaluated two to three weeks later for nematode infection. Slide number 26 show the things used for collecting soil samples.

May 16 - Another soil sample was taken to determine nematode survival. The same procedures were followed as on May 16.

May 29 - Chinese cabbage plants in treatments two and three were drenched in the field with nematodes. One cup of water was drenched on each Chinese cabbage plant of treatments one through four. One cup of nematode suspension was drenched onto treatments two and three (3,888 nematodes per plant) followed by one cup of water. Treatments one and four received an additional two cups of water.

June 5 - Soil samples were taken to determine nematode survival. The same procedures were followed as on May 16.

At this point two problems arose. The supplier of wax moth larvae did not send the final shipment of wax moth larvae. The drought became worse and I was unable to correct my irrigation problem until it was too late. As a result, the broccoli and Chinese cabbage were severely damaged by the drought. No data was collected on flea beetle control by the nematodes.

Objective two - White sticky traps (8 ounce plastic cups) were set out among the broccoli, Chinese cabbage, and border of bush beans to determine if Chinese cabbage is most attractive to adult flea beetles. Slide #8 and # 14 show white sticky traps in newly planted rows and after the plants have grown. Procedures were followed as outlined in the original proposal, except as noted below:

May 13 - Traps were set out and flea beetle counts were made on May 15. Bush beans had not yet emerged.

May 23 - Traps were set out and collected on May 25. Rotenone was applied on May 25.

June 5 - Traps were set out and collected on June 7. Rotenone was applied on June 6 and June 15.

June 18 - Traps were set out and collected on June 19. Broccoli was beginning head

development. Rotenone dust was applied on June 27.

June 29 - Traps were set out and collected on June 30. Broccoli was beginning to head.

5. Results.

Objective one: See figure one. Nematodes survived in the soil for at least one week. Dry soil conditions made it unreasonable to draw any strong conclusions relative to nematode survival. It is common knowledge that moist soil is a requirement for nematode survival. Mulching plants may be a good cultural practice for use with nematodes to enhance their survival.

Objective two: See table one. In this part of the experiment, Chinese cabbage did not attract significantly more adult flea beetles than broccoli except on June 29 to June 30. Trap counts within each treatment (broccoli, Chinese cabbage) varied so much that only very large differences in their averages are statistically different. Traps among the bush beans had significantly less flea beetles than broccoli and Chinese cabbage on all dates. It is a normal practice to apply insecticide (I used rotenone) to the trap crop (Chinese cabbage), but the white rotenone dust may interfere with the attraction of plant surface to adult flea beetles. I bring attention to this on observations of trappings on June 5 to June 7. Overall, flea beetle populations were very high. Frequent sampling is needed to manage high pest populations when using trap crops. Also, proper insecticide selection may be important so that the attractiveness of the trap is not reduced.

6. Is there any specific site information relevant to your project or the results?: No.

7. What were your economic findings?: No economic analysis was performed.

8. Have results generated new ideas?:

I think that it is advisable to use a mulch in conjunction with nematode applications. Dust formulations of insecticides may be inappropriate for trap crops.

9. Continued use of this practice?:

Even though, I had unclear results in 1995, I will continue to use trap crops and nematode applications for flea beetle control in broccoli. These procedures will probably need revision as I gain more experience with these practices.

10. What do I tell other producers about my project and the results?:

I tell others that the results of this project are inconclusive.

11. Outreach:

I have not done any outreach, since another season of the completed project is needed to obtain more results to draw a conclusion.

12.Slides:

#8 - (Left to Right) Slide taken on May 13. Three rows of broccoli, one row of Chinese cabbage, two rows of unemerged bush beans (string beans). Five white-cup traps per row, in left-most row of broccoli, row of Chinese cabbage, and right-most row of bush beans.

#14 - White cup traps among plants after plants have grown.

#26 - Soil sampling materials for determining nematode survival:

- home-made metal soil borer.
- jar of isopropyl alcohol to clean borer after each use.
- jar of water to wash off alcohol.
- jar of water for final rinse after the first water wash.
- blue cup of wax moth larvae that was purchased and shipped via mail. Larvae are in wood shavings with wax shavings.
- two-ounce plastic cup with soil sample.
- two-ounce plastic cup with soil sample, three wax moth larvae, and wax moth . media

Table 1. Objective Two: Chinese Cabbage Trap Crop

Adult Flea Beetles Caught on Sticky White-Cup Traps[1]

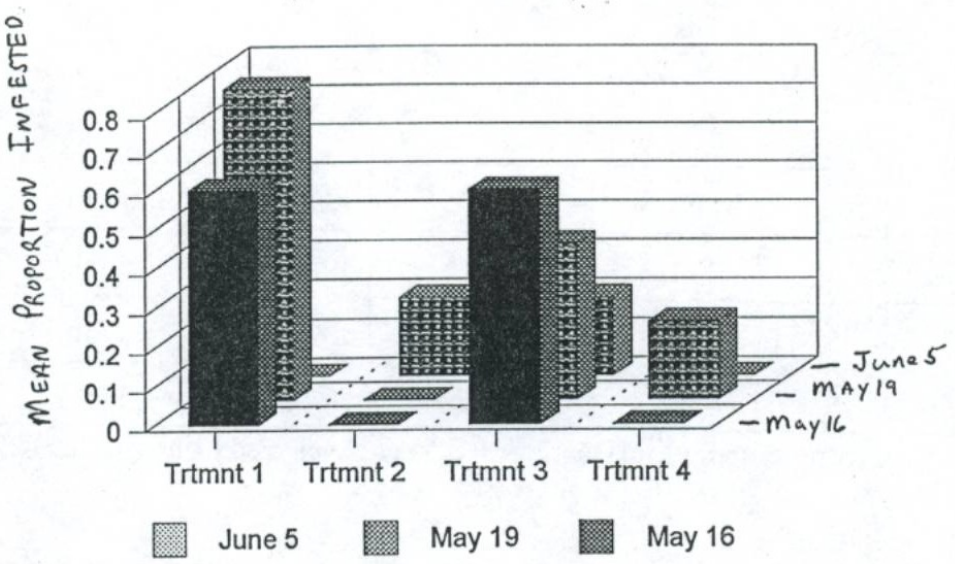
Date of Trap Count

CROP	counts	May 17	May 25	June 7	June 19	June 30
Chin. Cabbage	5	.824a[2]	1.997b	1.458b	1.567b	1.747c
Broccoli	5	.346a	1.907b	1.899b	1.975b	1.067b
Bush Beans	5	.456a	1.217a	.169a	.214a	.485a

1. Means were transformed using log(Beetle # + 0.5) and analyzed using Fischer's Protracted LSD.

2. Transformed means followed by the same letter, within each column, are not significantly different.

Figure 1. Objective One: Nematode Survival



Treatment 1: Seedlings drenched with nematodes before transplanting.

Treatment 2: Plants drenched with nematodes in the field two weeks after transplanting.

Treatment 3: Seedlings drenched with nematodes before transplanting and drenched in the field with nematodes two weeks after transplanting.

Treatment 4: Control