Foliar Insecticides for Control of Crucifer Flea Beetles in Pak choy - 2019

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Background and Objectives

Several conventional and OMRI-listed organic insecticides were compared for control of crucifer flea beetles (*Phyllotreta cruciferae* Goeze) in fresh-market pak choy production. Materials tested included one rate each of Entrust SC (spinosad 1SC, Corteva Agrosciences, OMRI-listed = Organic Materials Review Institute), Surround WP (95% kaolin, Tessenderlo, OMRI), PyGanic 5.0 (5% pyrethrins, Valent/MGK, OMRI), M-Pede (49% potassium salts of fatty acids, Gowan, OMRI), SuffOil-X (80% mineral oil, BioWorks, OMRI), Molt-X (azadirachtin 0.28EC, BioWorks, OMRI), Assail 30SG (acetamipridm UPI), Warrior II (lambda-cyhalothrin 2.08EC, Syngenta), Harvanta 50SL (cyclaniliprole 0.42SL, Summit Agro). Unsprayed blocks were used as a control.

Methods

Treatments were compared in a large-plot field experiments on transplanted pak choy at the Long Island Horticulture Research and Extension Center (LIHREC) in Riverhead, NY. On July 20, 2019, pak choy seeds were sowed in Speedling trays. Trays were maintained on a greenhouse bench with overhead irrigation as needed including a commercial soluble fertilizer (15-5-15 Cal-Mg, 150 ppm N, Jack's Professional). On August 22 (pak choy) seedlings were transplanted to the field spaced 11" apart in 34". Four 30' rows (approximately 340 sq. ft.) per replication and four replications per treatment were used for the experiment. One day after transplanting the area was treated with Devrinol 50DF (2 lbs/A) for weed control. Treatments were assigned randomly to plots and arranged in a randomized complete block design.

Treatments were applied as foliar sprays to coat the leaf surface using a CO2-powered backpack sprayer fitted with TJ60 8003EVS nozzles operating at 40 psi. Because of the high crucifer flea beetle population in the area at the time of transplanting, a twice per week treatment schedule was followed for the first 3 applications and a 4th (final) application was applied at 7 days after the 3rd application. Treatments were applied on 8/26, 8/29, 9/3, and 9/10/2019. Number of crucifer flea beetles per plant and % foliage feeding damage from flea beetles (0 – 100%, following guidelines from www.canolawatch.org) to new growth (since previous application) were taken from 10 randomly selected plants per replication at several schedule on 8/26, 8/30, 9/3, 9/10, and 9/27. Plant quality data were collected at harvest including above-ground plant height, width, and weight on 9/27. Marketable quality ratings (0 – 5, 0 = dead plants, 3 = marketable, 5 = excellent) were also done at harvest. ANOVA and multiple comparisons among treatments were performed on data using Tukey's HSD (JMP Pro 14.0 SAS Institute). Treatments and data are shown in figure 1 and 2.

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Results & Discussion

From the very beginning of the trial, we saw significant differences in flea beetle damage across the mulch treatments (Figure 2). The black plastic, paper, and reflective plastic mulches showed consistently less damage than other mulches or the bare ground control, but the reflective plastic mulch stood out as

At the end of the season, we harvested whole plants to assess overall plant growth, since broccoli crowns could not be harvested. Only the reflective silver mulch increased harvest weight, relative to the bare ground control.

Pretreatment cabbage flea beetle populations were extremely high in the study area and foliage feeding was started right after transplanting the 4 weeks old seedlings. As a result, treatment application was started within 72 hours of transplanting. Cabbage flea beetle populations were similar among treatment plots at the pretreatment counts on 8/26 (average 30.55 adult/plant). Plots treated with conventional insecticides Warrior II and Harvanta had significantly fewer flea beetles throughout the trial period. Entrust and Assail was moderately effective. The residual activity of Assail and Entrust appears to last only a short period (2 - 3 days) and that may explain why these two insecticides were less effective on a fast-growing crop like pak choy—we observed many new pak choy leaves between treatment applications. Last year we found some of the OMRI-listed insecticides were partially (at some time-points) effective in reducing flea beetle damage but this year because of the high population the effect from the OMRI-listed material were not much evident in this trial. Although some treatments had significantly lower numbers of flea beetle on plants, the foliar damage was relatively high, inconsistent with the number of flea beetles seen on plants. The inconsistent numbers of flea beetles in plots could be due to repellency and/or lack of green foliage, but % foliage feeding data, which were done on the new growth, suggest more effectiveness of the treatments. Percent leaf area with feeding damage by flea beetles was significantly lower in plots treated with conventional insecticides (Assail, Warrior, and Harvanta) compared with untreated plants. Of the OMRI-listed materials Entrust reduced foliar damage significantly greater than the other OMRI-listed materials and to the untreated control. It is important to note that the study area had a high flea beetle population at the time of the trial and the small plots were bordered by other less effective treatments and untreated plants, which would not be typical for a commercial setting where the entire field would be treated with a single insecticide with usually no untreated area. In such cases, the efficacy of some less effective products may be greater than that observed in this particular trial.

Plant quality such as height, width and weight were generally higher in the effective treatments (Warrior, Harvanta, Assail, and Entrust) at least partly due to less flea beetle damage. Marketable quality was also generally higher in the effective treatments.

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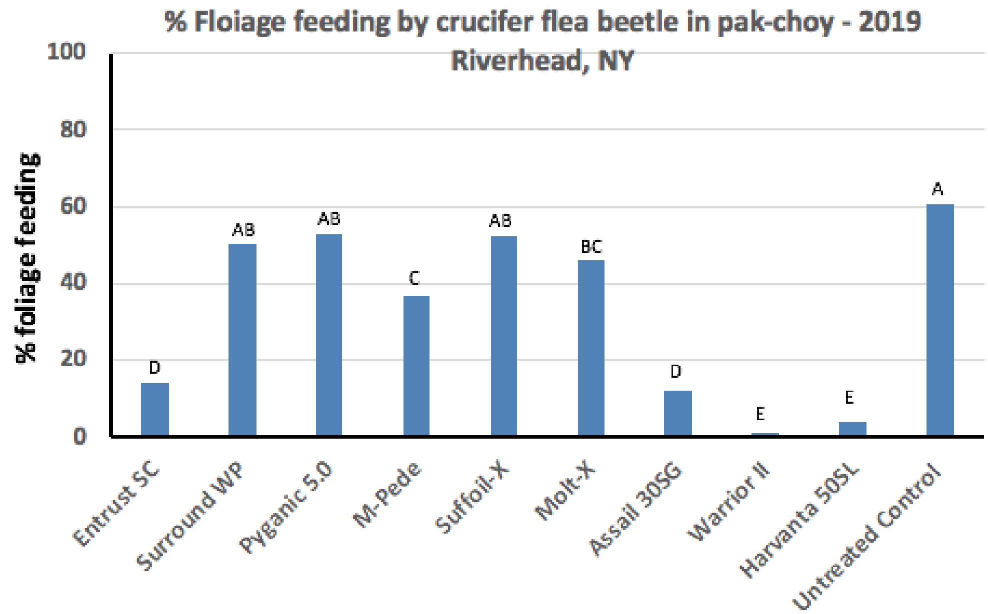

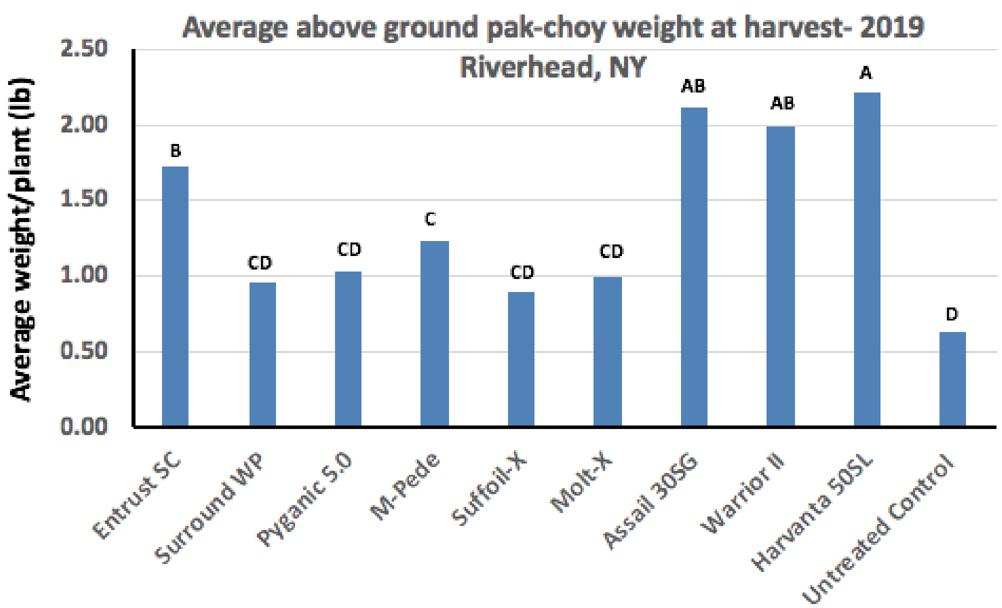

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