Project Title: Evaluation of Sampling Data to Reduce Frequency of Insecticide Application for Flower Thrips Control in Commercial Highbush Blueberry Plantings

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Several species of flower thrips, including the Florida flower thrips {*Frankliniella bispinosa* (Morgan)}, Western flower thrips {*F. occidentalis* (Pergande)}, Eastern flower thrips {*F. tritici* (Fitch)}, and *Scritothrips ruthveni* Shull, have recently become known as pests of cultivated blueberries (Spiers *et al*. 2004). The three *Franklinella* species are pests of both rabbiteye and southern highbush blueberries in Florida (Liburd and Arevalo 2005). They infest not only blueberries, but a wide variety of other crop and non-crop host plants.

Flower thrips damage blueberry flowers in two ways. Both larvae and adults feed on all parts of the flowers including ovaries, styles, petals, and developing fruit. This feeding damage can reduce the quality and quantity of fruit produced (Fig. 1a). Females also cause damage to fruit when they lay their eggs inside flower tissues. The newly hatched larvae bore holes in flower tissue when they emerge (Fig. 1b).

a b

Fig. 1: Thrips damage on blueberry caused by a) feeding and b) larval emergence.

In Florida, several different southern highbush blueberry varieties are grown together on the same farm. These varieties differ in fruit and flower characteristics and in the timing and length of flowering period (Williamson and Lyrene 2004), which may lead to differences in thrips numbers and thrips injury among them.

During 2005-06, we started to investigate the relationship between thrips numbers and marketable yield. Samples were taken from two commercial farms in Hernando Co., referred to as A and B respectively. At the A farm, samples were taken from nine different varieties: Emerald, Gulfcoast, Jewel, Millennium, Misty, Saphire, Sharpblue, Star, and Windsor. At the B farm, samples were taken from three varieties: Jewel, star, and Windsor.

Objective: ***To determine if different varieties of southern highbush blueberries respond differently to thrips infestation***

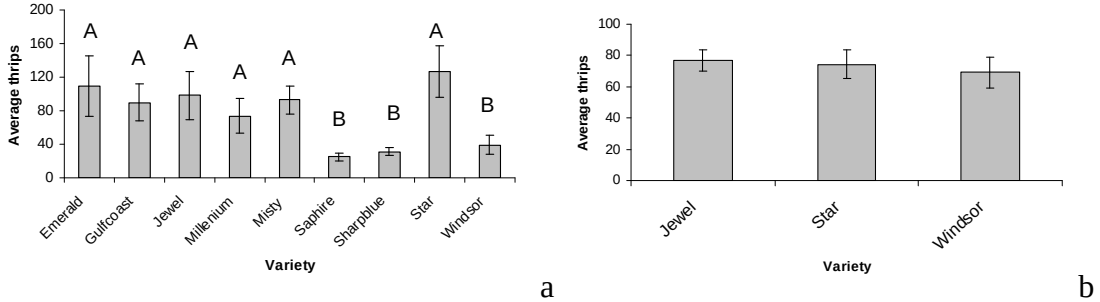
Thrips sampling

Two techniques were used for sampling: 1) white sticky traps and 2) collecting and dissecting flowers. At the A farm, a white sticky trap was hung from each of two plants from each variety. Each week throughout the flowering season sticky traps were collected and replaced with fresh traps and five flowers were collected from each plant. At the B farm, six plants from each variety were sampled using the same procedure.

All samples were sent to the Small Fruit and Vegetable IPM Laboratory at the University of Florida in Gainesville for processing. There, the flowers were dissected under a dissecting microscope and immature and adult thrips were counted and preserved in 1 dram glass vials in 70% ethanol. Other insects, such as ants and aphids, found in the flowers were noted and also preserved.

Results

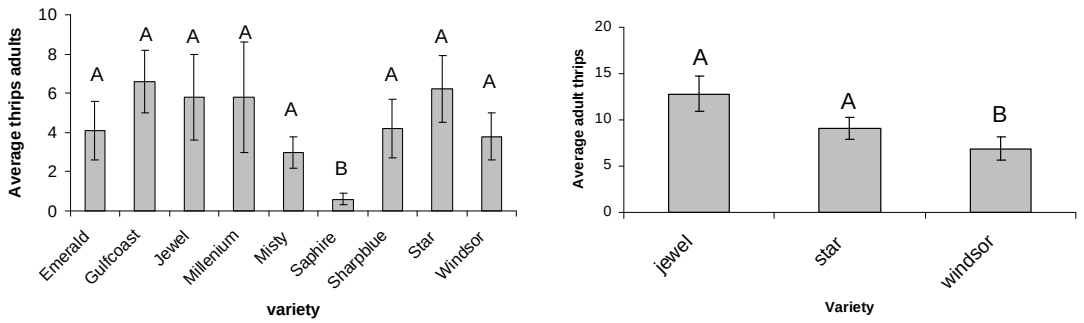
At farm A, Saphire, Sharpblue, and Winsor had significantly less thrips per sticky trap than all of the other varieties (fig. 3a). In contrast, the number of thrips per sticky trap did not differ among the three varieties at the B farm (fig. 3b).



a b

Fig. 3. Average number of thrips per sticky trap from the a) A and b) B farms during the 2005 season. Varieties with the same letter are not significantly different from each other by LSD. Values were considered significant if $P < 0.05$.

Different trends were observed in the flower samples. At the A farm, Saphire had significantly less thrips per flower than all of the other varieties (Fig. 4a). 'Saphire' flowers at a later date and has a shorter flowering period than many of the other varieties. This may explain why thrips numbers per trap and per flower were significantly lower for this variety. At the B farm, there were significantly less thrips per flower in the Winsor flowers compared with both the Jewel and Star flowers (fig. 4b).



a b

Fig. 4. Average number of thrips per flower collected from the a) A and b) B farms during the 2005 season. Varieties with the same letter are not significantly different from each other by LSD. Values were considered significant if $P < 0.05$.

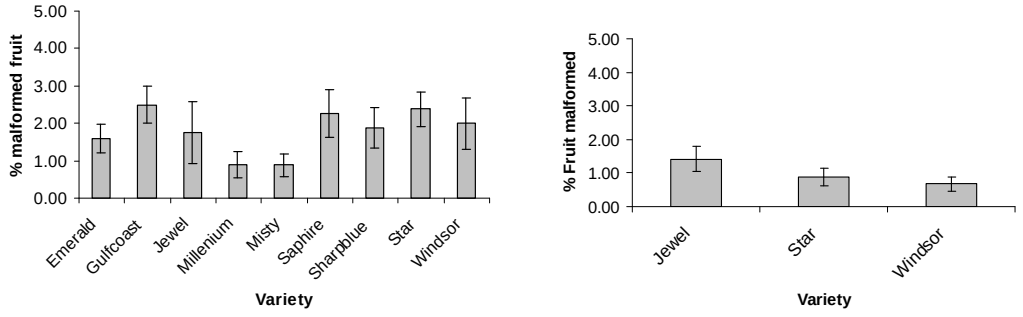
Although some adults are collected from flowers, the majority of thrips collected were immatures. In contrast, sticky traps collected only adults. This may explain the difference in the two trends.

Fruit injury sampling

At harvest time, four plants adjacent to each sticky trap were sampled. Twenty five fruit from each plant were examined for thrips injury. The number of fruit injured to the point of being unmarketable was also noted.

Results

Very few fruit were injured to the point of being unmarketable. The average number of injured fruit (injured marketable + unmarketable) did not differ significantly among varieties at either location. This was probably because thrips numbers did not reach damaging levels during the season. Thrips levels were probably low due to the very dry weather this past spring (2006) and a flowering period that occurred early and was truncated. However, there was a trend towards Millennium and Misty having less injured fruit than the other varieties at the A farm and a trend towards Windsor having significantly less damage than Jewel at the B farm (Fig. 5a and b).



a b

Fig. 5. Average number of injured fruit sampled from the a) A and b) B farms during the 2005 season. Varieties with the same letter are not significantly different from each other by LSD. Values were considered significant if $P < 0.05$.

The varieties differed from each other in number of thrips per trap and per flower. Although not statistically significant, there were numeric differences in the numbers of injured fruit among varieties. These results lead us to believe that different varieties may respond differently to similar levels of thrips infestation.

References,

Liburd, O. E., and H. A. Arevalo. 2005. Integrated strategies for controlling flower thrips in southern highbush blueberries. EDIS. UF/IFAS IPM-140/IN637 University of Florida, Gainesville, FL. http://edis.ifas.ufl.edu/IN637.

Spiers, J. D., F. B. Matta, D.A. Marshall and B. J. Sampson. 2004. Effects of kaolin clay application on flower bud development, fruit quality and yield, and flower thrips [Frankliniella spp. Thysanoptera: Thripidae) populations of blueberry plants. Proceedings of the 9th North American Blueberry Research group. The Haworth Press, Inc. Binghamton, NY.

Williamson, J.G. and P.M. Lyrene. 2004. Blueberry varieties for Florida. EDIS. UF/IFAS HS967. University of Florida, Gainesville. FL.