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Thrips Monitoring in Blueberries

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Flower thrips belonging to the genus *Frankliniella* affect both rabbiteye and southern highbush blueberries. *Frankliniella bispinosa* is one of the most destructive pest of Florida blueberries (Arevalo et al., 2006). These tiny insects with yellowish to orange coloration and fringed wings progress through two actively feeding larval instars and two inactive instars (often called pupae) during their short life cycle of 18 to 22 days. Thrips damage blueberry flowers and developing fruit by the feeding activities of larvae and adults. Oviposition by female adults and the eventual emergence of larvae can also result in significant damage. Monitoring flower thrips populations in commercial blueberry fields can be a strategy to determine if insecticide applications are necessary. One method of monitoring is to place white sticky traps within the canopy of commercial blueberries during the flowering period. It is recommended that four traps per acre with two in the interior and two on the border portions of the planting. Check traps once per week to determine if the population is approaching the treatment threshold. A more labor intensive method is to collect 20 blueberry flowers per acre and count the thrips present. Studies sponsored by IPM Florida were conducted in commercial blueberry fields in spring 2006 and 2007 to evaluate monitoring methods. The data indicated differences in thrips counts in various commercial blueberry cultivars evaluated in the trial, with 'Emerald' having highest counts on sticky traps.

The acreage of Florida blueberries harvested has increased from 1000 to 2500 between 1993 and 2005 (Pollack and Perez, 2005). In 2005, the value of the Florida blueberry crop was $32,760,000, or 8.6% of the entire United States, ranking seventh in the nation in income from this crop (Florida Department of Agriculture and Consumer Service 2007). New plantings of this important crop continue in several key production areas.

As the blueberry industry has expanded over the past 15 years, insect pests such as flower thrips have been observed causing economic injury to the crop. 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. 2005). The three *Frankliniella* species are pests of both rabbiteye and southern highbush blueberries in Florida (Liburd and Arevalo, 2005). *Frankliniella bispinosa* is the key pest and by far the most abundant, while the others are occasional pests (Arevalo et al. 2006). They infest not only blueberries, but many other crop and non-crop host plants.

In general, flower thrips are very small insects (~1 mm in length) with yellowish to orange coloration. They can be distinguished from other insect orders by their fringed wings. They have a short life cycle that can occur in 18 to 22 d under ideal conditions (Lewis, 1997). Thrips progress though two actively feeding larval instars and two inactive instars (often called pupae) before becoming adults.

Flower thrips damage flowers in two ways. 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. 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.

In Florida, several 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 injury.

Techniques for Monitoring Flower Thrips Populations in Commercial Blueberry Farms

Sticky traps. White, blue, and yellow sticky traps are utilized for the monitoring populations of various insects. A white sticky trap 9 inches long and 5½ inches wide has proven to be the best one for monitoring flower thrips in blueberries because the various insect stages may be difficult to see on a blue or yellow trap. Yellow traps also may attract a large number of beneficial insects that could be present in the field.

Twist ties should be utilized to suspend the sticky trap within the canopy 1 to 2 ft below the top of the bush. The surfaces of the trap should be perpendicular to the plant row. At least four traps per acre are recommended for monitoring purposes two on inside rows and two in the border of the field. Count and record the number of thrips present and replace each trap weekly during blueberry flowering period. Weekly average thrips numbers above 75 per trap have been associated with fruit damage in rabbiteye blueberries (Arevalo and Liburd 2007).

Flower sampling. Tapping flowers on a white board can give an absence or presence reading of thrips in a blueberry field. Liburd and Arevalo (2005) found that collecting 20 randomly chosen flowers per acre can give as good estimate of the thrips population in a field. Arevalo (2006) found a strong correlation between counts from flowers and those from sticky traps. Are-

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valo and Liburd (2007) found that shaking blueberry flowers in vials filled with 70% ethanol and rinsing the flowers on a metal screen above a collection cup and then counting insects was an efficient method to determine the thrips numbers in flowers. In general, flower sampling is involved and possibly not appropriate for most commercial farms.

IPM Florida sponsored thrips monitoring evaluations in commercial highbush blueberry plantings. In the 2006 and 2007 blueberry seasons, "IPM Florida" sponsored work evaluating the use of sticky traps and flower collection in the important commercial blueberry cultivars in the west central Florida blueberry production area. These evaluations were designed to utilize action thresholds of 100 and 200 thrips per sticky card in a 1-week period to trigger applications of insecticides, along with no insecticide treatments. A field day was planned for the 2008 blueberry season to share the results of the trials and to demonstrate how growers could utilize sticky traps to monitor the thrips populations in their fields.

Results

In both years, the cultivar Emerald had higher thrips populations than most of the other cultivars. This cultivar flowered earlier and tended to have a longer flowering period than the others evaluated. This could be important when placing traps in a grower field.

The action thresholds were only reached at one location in 1 year. Even with insecticide applications, there were no significant differences in thrips populations for that site. Fruit numbers with thrips damage or that which was unmarketable was very low at both locations in both years.

Blueberry thrips monitoring field day. On 27 Feb. 2008, a field day with discussions of field trial findings and demonstrations on how growers could utilize sticky traps to monitor thrips populations on their blueberry farms was held. Each attendee was presented with a scouting kit containing sticky traps, twist ties, hand lens and counter sponsored by the IPM Florida Funding.

Literature Cited

Arevalo, H.A. and O.E. Liburd. 2007. Horizontal and vertical distribution of flower thrips in southern highbush and rabbiteye blueberry plantings, with notes on a new sampling method for thrips inside blueberry flowers. J. Econ. Entomol. 100:1622–1632.

Arevalo, H.A., A.B. Fraulo, and O.E. Liburd. 2006. Key to the most common species of thrips found in early-season blueberry fields in Florida and southern Georgia. University of Florida IFAS Ext. ENY-836. <edis.ifas.ufl.edu>.

Arevalo, H.A. 2006. A study of the behavior, ecology and control of flower thrips in blueberries towards the development of an integrated pest management (IPM) program in Florida and southern Georgia, p. xiv+153, Entomology and Nematology. University of Maine.

Florida Department of Agriculture and Consumer Service. 2007. Florida agriculture statistical directory.

Lewis, T. (ed.). 1997. Thrips as crop pests. CAB Intl., New York.

Liburd, O.E. and H.A. Arevalo. 2005. Integrated strategies for controlling flower thrips in southern highbush blueberries. University of Florida IFAS Ext. IPM-140. <edis.ifas.ufl.edu>.

Pollack, S.L. and A.C. Perez. 2007. Fruit and tree nuts situation and outlook yearbook 2007. US Dept. of Agriculture. FTS-2007.

Spiers, J.D., F.B. Matta, D.A. Marshall, and B.J. Sampson. 2005. Effects of kaolin clay application on flower bud development, fruit quality and yield, and flower thrips {*Frankliniella spp*. (Thysanoptera: Thripidae)} populations of blueberry plants. Small Fruits Rev. 4:73–84.

Williamson, J.G. and P.M. Lyrene. 2004. Blueberry varieties for Florida. University of Florida IFAS Ext. HS967. edis.ifas.ufl.edu.