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### **Entomologist Seeks Solution for Citrus Thrips Damage to Blueberries**

After blueberry growers in the San Joaquin Valley reported that citrus thrips were causing extensive damage to their crops, a research team led by University of California Statewide Integrated Pest Management (IPM) Program Advisor David Haviland developed monitoring and treatment guidelines to help growers avoid using unnecessary pesticide applications.

In 2006, Haviland and his research team began a three-year study of citrus thrips damage to blueberries with funding from the UC IPM Program.

"Citrus thrips are best known for the scarring damage they cause to navel oranges in the San Joaquin Valley, but with the recent plantings of blueberries, this pest has taken damage to a whole new level," says Haviland.

"With the high value of blueberries and potential damage in the thousands of dollars per acre, management of this pest is critical. Current practices are to spray fields multiple times with insecticide after harvest through fall. However, with the propensity of citrus thrips to develop resistance to insecticide, and spinosyn-based insecticides being the only effective products registered for blueberries, alternate approaches are needed."

Unlike flower thrips that prefer to feed within blossoms, citrus thrips prefer to feed on new growth. This makes blueberries an excellent host because they constantly produce new, tender growth at the end of their shoots from June through October.

Citrus thrips feeding on blueberry foliage results in a wide range of symptoms including crinkled or misshapen leaves, stem scarring, stem discoloration, shortened internodes, and even death of the shoot tip. In some cases, tip death causes lateral buds to push, giving the shoot the appearance of an upside-down witch's broom.

Haviland and his team showed that an average of 35 thrips on a shoot tip for a one month period in August caused a 52 percent reduction in the length of new shoots. However, damage didn't stop there. Blueberry fruit during the spring develops at the tips of the shoots from the previous year. This means that citrus thrips feeding causes reduced growth, which results in less fruiting wood, and, therefore, less fruit. This was confirmed when harvest data revealed that for every 10 citrus thrips per shoot tip over a one month period in August 2006, there was a 5.3 percent reduction in yield at harvest in 2007. For the field where the research took place, this was the equivalent of an 18.4 percent yield loss in the untreated fruit.

The UC research team is developing an IPM program for this destructive pest. To date, they have developed information on the seasonal biology of citrus thrips in blueberries, a monitoring program, and treatment guidelines. They are also investigating alternatives to insecticides, such as the use of repeated applications of high pressure water to knock immature thrips off of the plants, and the use of *Beauverria bassiana*, a fungus that acts as a parasite of the pupal stage of the thrips that reside in the soil. ■