

Kern/Tulare

GWSS Update



A project of the Glassy-winged Sharpshooter Task Force of Kern and Tulare Counties. Participants: Agricultural Commissioner's Offices of Kern and Tulare Counties, California Department of Food and Agriculture, University of California-Cooperative Extension, U.S. Department of Agriculture (APHIS and ARS Divisions).

GWSS can negatively affect orange groves

Does the glassy-winged sharpshooter (GWSS) affect yield, size and quality of orange fruit as well as tree vigor?

A recent study led by Dr. Raymond Hix of the Department of Entomology at the University of California, Riverside indicates that high levels of GWSS can have negative impacts on orange groves.

Hix and his team studied four key issues between July 2001 and October 2003. Among their findings:

- Size distribution of citrus was “statistically significant” for trees with high and low populations of GWSS. Significantly more orange cartons of sizes 72, 88, 113 and 138 were packed from trees with low (nearly zero) GWSS populations than from trees with high levels of the pest. When taking into account the oranges that were relegated to the juice market, the overall yield by weight was also higher for the low population trees. The study was conducted in Mentone, Calif., in San Bernardino County.

- In evaluating the effects of high GWSS populations on fruit quality, Hix found that rind pitting is seemingly a post-harvest disorder and is not caused by direct damage from GWSS.

- The research team found “significant evidence” that 1) the peel nutrient status of navels and valencias is reduced in a manner related to GWSS population density, and 2) peel metabolic concentrations indicative of stress also change as a result of high levels of the pest.

Peels from navel oranges collected at the time of intensive GWSS feeding on shoots in the high-level GWSS treatment had “significantly lower” concentrations of calcium, magnesium and NO₃ (nitrates) than peels gathered from the low-GWSS block. “The results are consistent with reports . . . that high concentrations of calcium and magnesium are found in GWSS excretions,” Hix notes.

In addition, peel arginine concentration was “significantly greater” for fruit from the high GWSS treatment than the trees with fewer GWSS populations.

“It is worth noting that arginine, an amino acid, tends to accumulate in parallel with the build-up of GWSS population over time,” adds Hix.

Elevated arginine concentrations are indicative of biotic and abiotic stress conditions. The accumulation of arginine in navel orange peels in response to increasing GWSS population density also paralleled the increase in peel putrescine concentration. Arginine is the immediate precursor for the biosynthesis of putrescine, which is also known to accumulate under stress conditions. Depending on the regulation found in different plant species, concentrations of spermidine increase, decrease or remain the same during stress. Spermine, typically found in lower concentrations than putrescine and spermidine, is usually unaffected by stress.

“These results strongly suggest that high GWSS populations cause significant stress,” Hix says. He also adds that trees in the high GWSS blocks tended to have fewer commercially valuable large size fruit.

- Hix and his team did not find that Admire® enhances fruit size, tree health or vigor in the absence of GWSS. In post-treatment samples, taken from a Valencia orchard in Woodlake, Calif., about a year after an Admire application, “very little difference in fruit quality, size or quantity was found between treated and untreated areas,” Hix reports. There was a significant difference only in the sugar-acid ratio, which was slightly higher in the Admire-treated blocks. Admire is a systemic chemical material.

Cooperators on the project included Mary Lu Arpaia and Carol Lovatt, Department of Botany and Plant Science at the University of California/KAC; Beth Grafton-Cardwell, Department of Entomology at the University of California/KAC; and Phil Phillips, UC-Cooperative Extension, Ventura County. Funding was provided by the California Citrus Research Board and the University of California Pierce’s Disease Grant Program.

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- www.co.kern.ca.us/kernag/
- http://cekern.ucdavis.edu/Custom_Program444/

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—Raymond Hix,
University of
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