Center for Agricultural and Rural Sustainability

Donn Johnson

Title: Professor, Department of Entomology

Program Title: Systems-based strategies for organic management of spotted wing drosophila.

Project Goals Description: Spotted wing drosophila (SWD) a new devastating pest of small and stone fruits throughout the US. First discovered in Arkansas in 2012, SWD can cause up to 100% damage to ripening blackberries and raspberries in unsprayed plantings. Prior to the SWD invasion, many Arkansas producers grew blackberries and raspberries without insecticide sprays. Some of these growers have switched to applying conventional insecticides because the organic insecticides are more expensive and less effective than conventional ones. In Arkansas, Michigan, Minnesota, New York, Oregon and Vermont, high tunnels fitted with exclusion netting on the sides and ends have successfully reduced SWD damage in organic blackberry, raspberry and blueberry plantings.

In an effort to increase awareness of SWD and help growers manage it, Johnson has trained growers and county Extension agents to use traps to monitor for SWD flies, beginning just prior to fruit ripening. It is recommended that growers apply three or more weekly insecticide sprays to berry plants as berries begin ripening and continue throughout the harvest period. Johnson also recommends that growers sample harvested fruit weekly to determine if the sprays are protecting the fruit from SWD infestations. When unsprayed harvested berries are left at room temperature, i.e. a customer's kitchen counter, eggs hatch and larvae become apparent in 1 to 2 days. Not a welcomed sight for most customers!

Because of the organic management challenges of this pest and its relative new-ness, the goal of this project is to apply information on biology, ecology, behavior and control of SWD to develop organically appropriate management programs. The specific objectives are to develop odor-based behavioral management tactics for SWD like mass trapping or attract and kill; compare relative susceptibility of berry crops and adjacent wild hosts to SWD; develop cultural SWD control tactics like insect screen or ground cover mulches to reduce SWD damage; evaluate OMRI-approved materials against SWD that do not disrupt biological suppression of pest complexes; and develop an integrated outreach approach

to evaluate the economic feasibility of SWD management practices and implement organic SWD management strategies.

Tools used: Stereomicroscope, high tunnel, insect netting, weather stations, fruit odor baited traps, interactive enterprise budgets for blackberry, blueberry and raspberry used to estimate the economic returns associated with the SWD practices.

Collaborators: Johnson has many regular partners at the UA including Curt Rom, Elena Garcia, John Clark, Jennie Popp and German Rodriguez. Because of the national significance of the SWD, Johnson has many collaborators across the country. These include scientists at the Universities of Georgia, Minnesota, Maryland, and Florida, also Michigan, North Carolina and Oregon State Universities, Cornell and Rutgers Universities and USDA-ARS in West Virginia and Oregon.

Project Timeline: March 2013 to September 2018

Funding: Johnson's SWD research has been supported by the USDA National Institute of Food and Agriculture, Hatch project accession number 223689, USDA-SCRI Arkansas Agriculture Department, University of Arkansas Cooperative Extension Service, and USDA-NIFA-Organic Research and Education Initiative Project No. 2015-51300-24154.

More info: For more information, visit the following links: Fruit/Nut Pest Management:
- http://comp.uark.edu/~dtjohnso/
- Sustainable Blackberries & Raspberries a Self-Assessment Workbook for Growers: http://cars.uark.edu/ourwork/Specialty-Crop-Production-and-Marketing/blackberry-workbook2015.pdf
- http://cars.uark.edu/resources-reports/SWD%20Exclusion%20Johnson%20WERA1021_ESA_CC_200G_350pm17_Nov_15B.pdf

Fruit samples with SWD eggs or larva.