Potential Impacts of Irrigation and Biocontrol on Spotted-wing Drosophila Populations

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Wasp helps control SWD

Biocontrol (biological control) is the use of a living organism to control a pest problem. This publication explains how a naturally occurring parasitic wasp in Oregon can help control spotted-wing drosophila in Oregon blueberry production.

Water delivery, and the environmental conditions that water delivery creates, can significantly affect biocontrol in production units. In particular, drip irrigation provides a variety of advantages compared to overhead sprinkler irrigation by affecting SWD development while accurately delivering water and nutrients and reducing weed management costs.

*Pachycrepoideus vindemmiae* is present in Oregon and able to successfully attack and kill SWD in the field (Figure 1a and Video 1, page 2). These tiny wasps attack pupae of many fly species, and help to control SWD in Oregon.

Under laboratory conditions, an adult *P. vindemmiae* female can kill up to 600 SWD pupae during its lifespan. This wasp lives longer when water and sugar are available. Adult wasps receiving water and honey lived up to 60 days; those fed on honey alone lived about 30 days. Those provided only water and no honey lived about 10 days.

When other food sources are less available, female parasitoids are able to feed on SWD pupae to obtain the required nutrients. This process, known as “host-feeding,” kills SWD pupae (Figure 1b and Video 2, page 2). Host-feeding occurs after a female wasp stings an SWD pupa and starts feeding on the pupal blood (hemolymph) to supplement water and other nutrients.

Low water availability and low relative humidity result in significantly higher death rates of SWD and reduced egg laying (Figure 2a and Figure 2b). The same conditions increase *P. vindemmiae* host-feeding on SWD pupae (Figure 2c, page 2).

In dry environments, parasitoids prey at higher rates on SWD than when water is present. Irrigation practices, pruning and other cultural practices including the use of weed fabric, may reduce SWD reproduction and survival. Drip irrigation, particularly, may contribute to the drier conditions that encourage the wasp to attack

Key points from this fact sheet

- Overhead irrigation increases humidity—creating more favorable conditions for the development of spotted-wing drosophila (SWD) pest populations.
- Drip irrigation can limit conditions that favor SWD population increase.
- *Pachycrepoideus vindemmiae* is a parasitic wasp (parasitoid) that attacks SWD by laying its eggs on SWD pupa. Drip irrigation may increase parasitism by *P. vindemmiae*.
- Adult parasitic wasps also lower SWD populations by directly feeding on SWD pupae (host-feeding). Host feeding can increase under drip irrigation.
- The parasitic wasp is well-adapted to attack SWD and may contribute to its control in Oregon.
SWD pupae. These lab and field tests indicate that growers who maintain drier conditions in the fields may see reduced SWD reproduction and survival in their fields.

Further readings


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We acknowledge contributions from multiple funding sources and collaborators. Oregon State Blueberry Commission, United States Department of Agriculture (USDA), National Institute for Food and Agriculture awards #2010-51181-21167, #2015-51181-24252, USDA OREI #2014-51300-22238, USDA NWCSFR, and Oregon State University Agriculture Research Foundation. We also thank Drs. Bernadine Strik, Chad Finn, Dave Bryla and Wei Yang for providing blueberry plots. We thank the many growers who have collaborated with us to better understand this pest. We thank OSU NWREC, OSU MCAREC and Lewis-Brown research farm staff, WSU Research and Extension Center Staff, Prosser, WA for assisting in field setup, maintenance, trials and sample analysis.

About this series

This publication is one of a series of nine publications focused on strategies for controlling spotted-wing drosophila in Oregon. Find them at https://catalog.extension.oregonstate.edu/. The publications in this series include:

- EM 9262: Cultural Control Strategies to Manage Spotted-wing Drosophila
- EM 9263: Host Range and Characteristics Affecting Fruit Susceptibility to Spotted-wing Drosophila
- EM 9264 Alternate Reproductive Substrate Used By Spotted-wing Drosophila
- EM 9265: Chemical Control of Spotted-wing Drosophila: Spray applications
- EM 9266: Chemical Control of Spotted-wing Drosophila: Insecticide Efficacy
- EM 9267: Monitoring Techniques for Spotted-wing Drosophila
- EM 9268: Potential Impacts of Irrigation on Biocontrol on Spotted-wing Drosophila Populations
- EM 9269: Biocontrol of Spotted-wing Drosophila

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Published December 2019