Section I
Invasive & Emerging Pests

USING LANDSCAPE ECOLOGY TO INFORM SPOTTED WING DROSOPHILA MANAGEMENT PRACTICES

Amanda Ohrn and Amy J. Dreves
Crop and Soil Science Department, Oregon State University, Corvallis, OR
Amanda.ohrn@oregonstate.edu, Amy.Dreves@oregonstate.edu

Drosophila suzukii (SWD), an invasive vinegar fly native to SE Asia, made its first appearance in Oregon in the fall of 2009. Since then, SWD has been confirmed in 17 Oregon counties. The pest is known to lay eggs in an extensive range of small and stone fruits, resulting in crop losses if not managed. In addition to commercial crops, the host plant range of SWD includes wild fruits and berries found in many areas of the Pacific Northwest. Development of sound, effective management practices therefore requires a thorough understanding of SWD behavior not only in cultivated crops but in adjacent trees and wildlands, as these areas may act as a refuge and alternative food source for the fly.

In this study, we examined the spatial and temporal distribution of SWD in a 6-acre, no-spray, commercial blueberry field and the surrounding landscape, located in Corvallis, OR (Benton county; mid-Willamette valley). Beginning in June 2011, red traps baited with a yeast/sugar or apple cider vinegar/soap mixture were placed in blueberry plants, along the perimeter of the blueberry crop, and in trees adjacent to the crop. Traps were serviced and the contents counted weekly, though counts of trap contents were carried out once every two weeks during the late fall-winter period. Traps in blueberry plants were placed at various distances from the edge of the field. Traps in trees were placed at 3 levels, including ground, 6 feet (2m), and over 13 feet (4m).

Initial SWD trap catches were observed in June, in traps placed in trees. Over time, trap catches rose within blueberry plants and along the perimeter of the crop, becoming more evenly distributed through the crop during the blueberry harvest period (Fig. 1). Trap catches in regions adjacent to the blueberry crop were highest in areas with greatest plant diversity, protection, and shade, particularly those associated with Himalayan blackberry. Throughout the study, SWD abundance in traps placed in trees was positively correlated with trap height.

SWD abundance in crop, perimeter, and tree trapping locations increased through mid-November, long after blueberry harvest was complete (Fig. 2). This is consistent with the results of a mass-trapping study at the same site conducted between June 2010 and June 2011, in which trap catches peaked in November and declined after a 12-hour period of freezing temperatures (Fig. 3). Evaluation and analyses of landscape data will continue through the winter of 2011 and well into 2012.

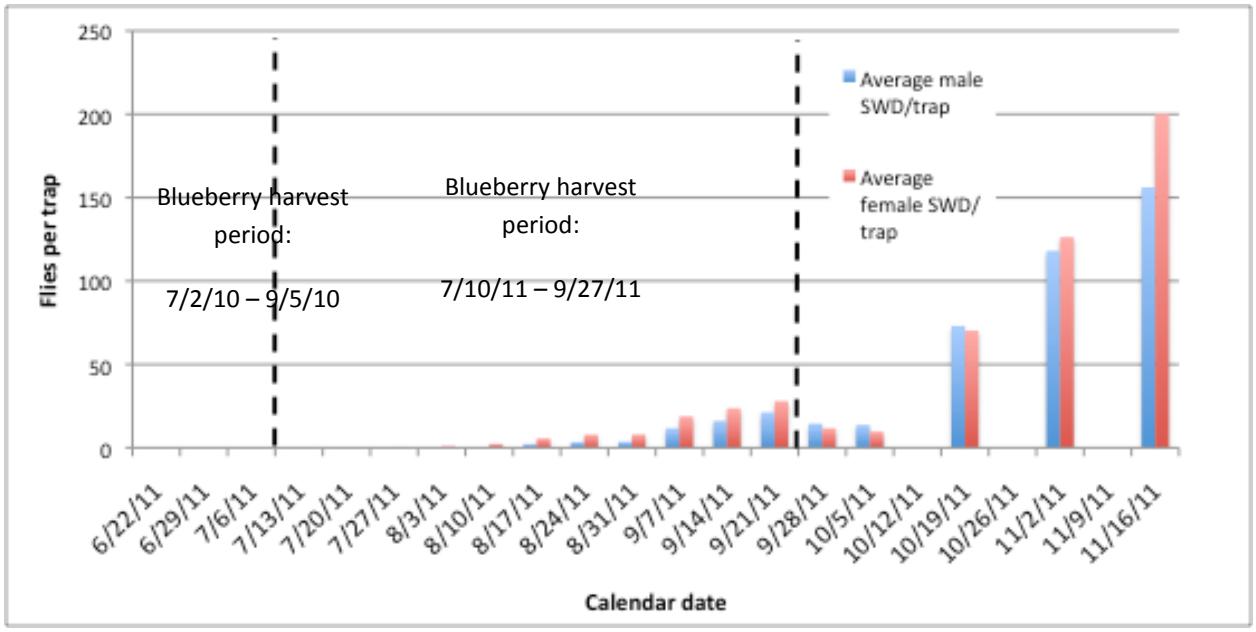

Figure 2. Seasonal phenology of male and female SWD in a mass-trapped blueberry field between 6/15/11 and 11/16/11.

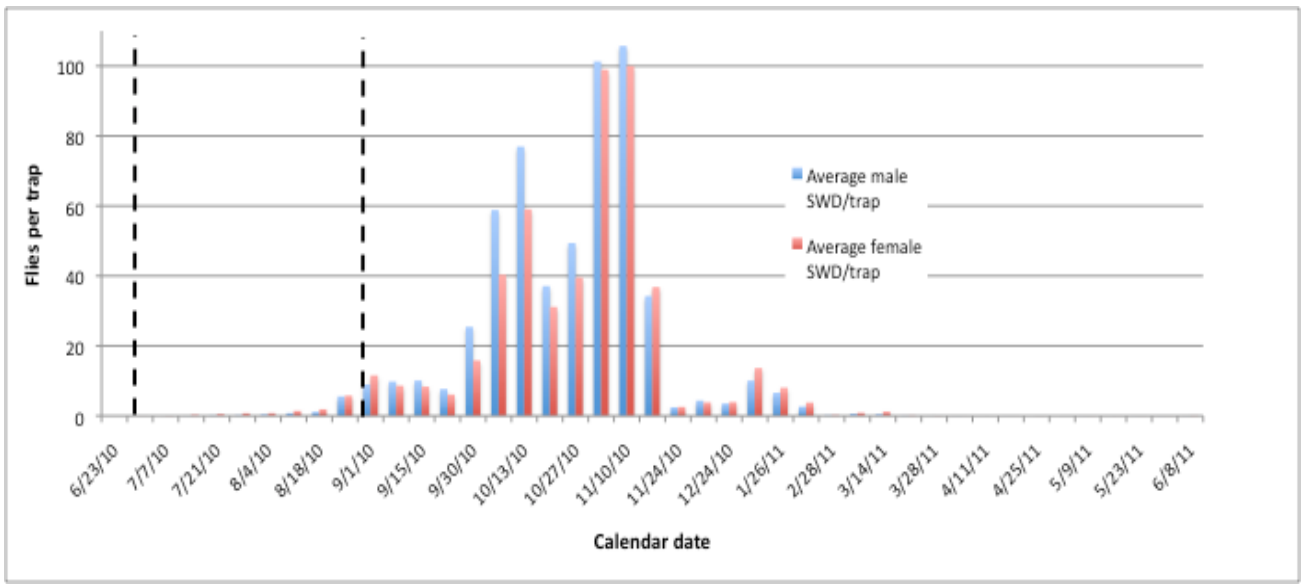

Figure 3. Seasonal phenology of male and female SWD in crop and perimeter traps placed in a blueberry field between 6/23/10 and 6/8/11.

22 June 11
Pre-harvest

17 Aug 11
Mid-season harvest

19 Oct 11
Post-harvest

Figure 1. Spatial and temporal mapping of SWD trap catches in blueberry crop, perimeter, and tree trapping locations during pre-harvest, mid-season harvest, and post-harvest periods. Trap catches per week are represented by the following color scale: no color to light gray (0-5 flies); medium gray (5-20 flies); dark gray (20-500 flies); very dark gray (over 500 flies).