A SYNTHESIS OF INSECTICIDE RANKINGS TO COMPARE THE EFFICACY AND CONSISTENCY OF INSECTICIDES FOR CONTROL OF SPOTTED WING DROSOPHILA

Compiled by Dr. Rufus Isaacs, Michigan State University. With input from applied entomologists at Land Grant Universities in nine U.S. states[1]

Spotted wing Drosophila, *Drosophila suzukii,* (SWD) continues to cause major economic implications for the berry and cherry industries of North America, with potential for effects in grape too. There continue to be significant losses in both the large-scale production systems as well as in small-scale farms. Impacts include lower harvestable yields, fruit rejections by processors, lost sales at markets, higher spray program intensity and cost, greater non-target risk, berry farmers getting out of the business, and reduced demand for nursery stock of susceptible crops. This pest has put IPM progress back decades in the susceptible crops, and it is truly a 'game-changer', causing multi-million dollar economic stress and having far-reaching repurcussions across the communities where SWD-susceptible crops are grown.

While research is underway to develop biological, cultural, and genetic approaches to reduce populations of SWD within IPM programs, chemical control is the primary approach currently being used to protect fruit crops from this pest. Depending on the region, crop system and the previous pest pressure, SWD has caused growers to start spraying, spray more intensively, and switch to broad spectrum insecticides. Many growers have the additional challenges of managing multiple harvests and irrigation during the period of SWD activity. Fruit for export has the added complication of needing to meet the criteria for Maximum Residue Limits in the destination country.

There has been some recent progress on increasing the availability of insecticides for use against SWD in berry crops, including 2ee, 24c, and Section 18 labels granted for use of insecticides against pest. However, growers in some situations still are reaching the seasonal maximum use allowed for key insecticides, they cannot use many products due to long PHIs, or they are restricted due to the need to meet export MRL requirements. Consequently, there remains an urgent need for additional insecticide tools for meeting the pest management goals and product standards for domestic/international markets.

In fall 2013, a group of Land-Grant university entomologists pooled their efficacy ratings to provide an overview of rankings for product efficacy against SWD. This done in preparation for the WERA 1021 committee on Spotted Wing Drosophila Biology, Ecology, and Management meeting held in Austin, TX in November as part of a presentation on current management techniques. The information is instructive for understanding the current level of confidence that extension specialists and grower advisors have for the various registered and not-yet registered insecticides.

Each contributor was asked to rank the list of insecticides for their level of efficacy against SWD, based on a rating scale of 0 (no activity), 1 (weak activity), 2 (fair), 3 (good), and 4 (excellent). If not information was available from their state, or they had no experience, they were asked to leave the ranking blank. Half scores, e.g. 2.5, were allowed. Rankings from separate crops were encouraged, and five states provided information from more than one crop. Depending on the contributor, the ranking scores reflect experience from semi-field efficacy trials, from full field scale trials, from experience under grower use on farms, or a combination of these three. Values were averaged and the standard error calculated for each insecticide that a ranking was provided for.

---

[1] Information included in this synthesis was provided by Mark Bolda and Bob Van Steenwyk (University of California); Amy Dreves, Peter Shearer, and Joe DeFrancesco (Oregon State University); Rufus Isaacs and Larry Gut (Michigan State University); Greg Loeb (Cornell University); Cesar Rodriguez-Saona (Rutgers University); Hannah Burrack (North Carolina State University); Ash Sial (University of Georgia); and Oscar Liburd (University of Florida).

Rankings were received from 9 states, for blueberry (7 states), caneberry (5 states), strawberry (4 states), and cherry (3 states). The summary of those rankings is provided in Figure 1, below.

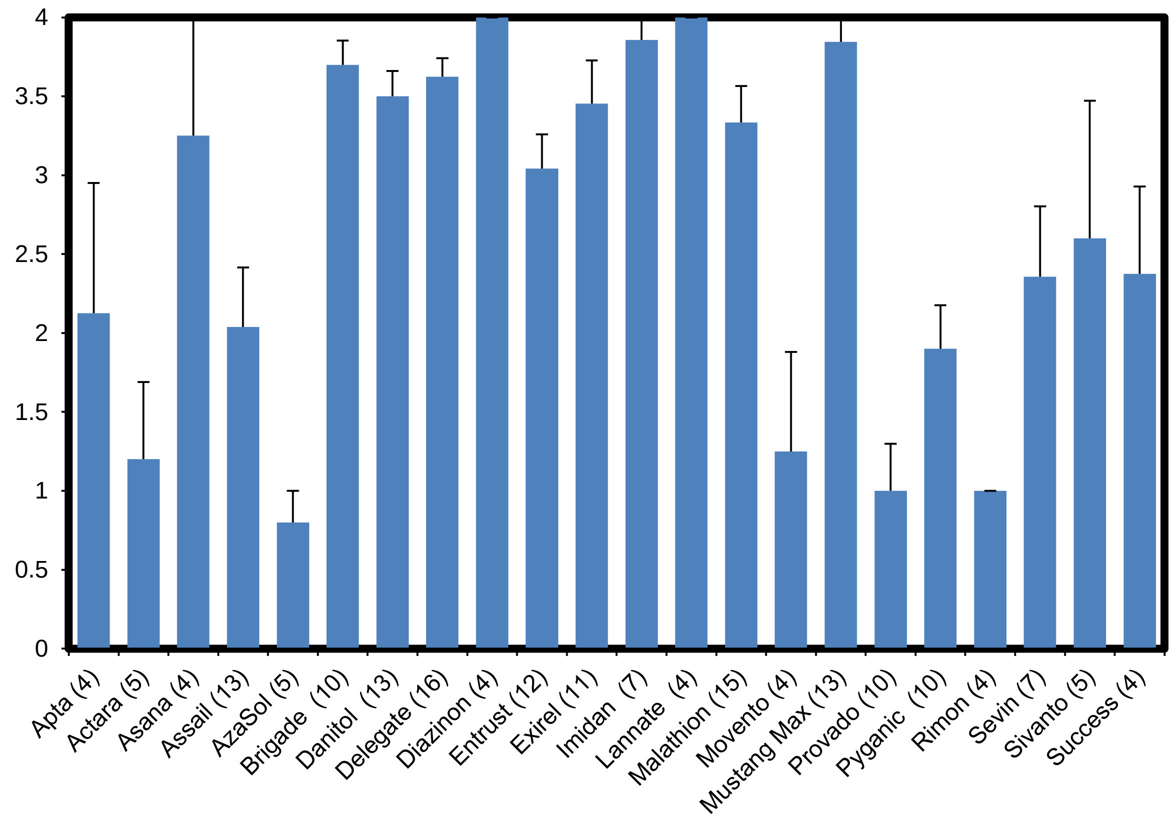

Figure 1. Average ± S.E. efficacy rankings for 22 insecticides that have been tested against SWD in various fruit crops. Insecticides were ranked as not effective (score = 0), weakly active (1), fair (2), good (3), or excellent (4). Only insecticides that had 4 or more submitted are included in the figure, and the number of entries is shown in parentheses below the bars.

This synthesis of current rankings of insecticide efficacy for SWD highlights that pyrethroid and organophosphate insecticides are consistently ranked as having good to excellent efficacy. Additionally, the carbamate Lannate was consistently ranked as excellent. The spinosyn Delegate had consistently high rankings between excellent and good, with the organic spinosad (Entrust) ranked as being less effective, but still good-excellent. The 11 rankings for Exirel also show the high degree of confidence in this currently unregistered new insecticide. Other products on this graph had lower efficacy that would result in less confidence in their use against SWD. However, it should be emphasized that some of the new insecticides (e.g. Apta) have relatively little testing to date, and so the use patterns are still being determined for some of the products listed here.

Some insecticides that received fewer than four submissions also had average rankings at 3.5 or higher, including Bifenture (3.7), Dimethoate (4), Endigo (4), and Hero (3.5).

Thanks to all the colleagues who provided insecticide rankings for this efficacy synthesis.