

Spotted Wing *Drosophila* (SWD) Monitoring and Control on Sweet Cherry Recommendations for Eastern Washington for 2016

April 2016

Monitoring: Several monitoring tools from commercial companies are now available, and are generally more effective and easier to handle than their home-made counterparts. Synthetic lures are available from Trécé, Scentry, and AlphaScents; the Scentry lure has consistently shown the highest trap capture of spotted wing drosophila (SWD); however, it also captures large numbers of other *Drosophila* species, making sorting the samples laborious. In place of the liquid bait (e.g., apple cider vinegar), the new traps use a “drowning fluid” to collect the adults; this is simply water, with a little dish soap added as a surfactant, and sodium benzoate or borax as a preservative. The chemical components of the lure are contained in pouches, from which the odor diffuses; these should be suspended above the surface of the drowning fluid, and aligned in the center of the entrance holes of the trap. The entrance holes are covered with a mesh that prevents entry of larger insects, and permits the odor of the lure to diffuse out of the trap. Unlike liquid baits, which must be changed weekly, the synthetic lures can remain in place for at least 4 weeks. However, the drowning fluid must still be collected and replaced weekly.

There are also traps available from the same manufacturers as the synthetic lures, as well as a number of other companies. Most are jars with lids of about a 1 quart capacity, with a means to suspend the lure in the trap, and suspend the trap from a tree limb. Traps of similar size and diffusion capacity should perform similarly; after that, cost, sturdiness, and convenience of use are the main considerations.

Two other traps take a different approach. The first is the Trappit Dome, which has a liquid reservoir surrounding a bottom funnel in which the flies enter. Although quite different in design from the jar traps, this trap also works well, but generally has lower captures than the jar traps. The sticky panels (both yellow and white) are familiar from trapping many other pest species (e.g., codling moth, leafrollers, tephritid fruit flies), and work surprisingly well for SWD. The lure is attached between the two sides of the back-folded trap with two sticky surfaces exposed. Both yellow and white traps are effective, although preliminary tests indicate the yellow trap may be slightly more attractive. This trap has two advantages: 1) adults can be counted in the field rather than collecting and replacing the bait or drowning fluid; and 2) the trap is quite selected for the target species, SWD, relative to other *Drosophila*. One other feature of the sticky trap is that capture is biased towards males. We are in the early stages of research on this, but this may be a drawback early in the season, when the population is biased towards females; likewise, it may be advantageous later in the season when the sex ratio is closer to 50:50. Males are fairly easy to see on the trap surface because of the spots on their wings; females must often be manipulated to see the ovipositor, which is mostly easily done with magnification.

Spray thresholds based on trap captures have yet to be established; until that time, we recommend that crop protection measures begin as soon as SWD is captured, and the fruit is in a susceptible stage (straw color through harvest).

Conventional Cherries: Recommendations are based field and laboratory data from Washington, Oregon, and California. We have limited pesticide efficacy field data from Washington; most of our information comes using laboratory-reared flies exposed to field-applied residues. However, we have several years of tests that fruit become susceptible to SWD at about the same time as it does to cherry fruit fly; the only question is if SWD is active at that time.

SWD control can be integrated into the cherry fruit fly (CFF) control program, in terms of timing of sprays and period of coverage. CFF programs normally begin at straw color, and continue every 7-10 days through harvest. You can start the season with your normal CFF sprays until the first SWD is found in your area (and cherries have reached straw), then alter your choice of pesticide to make sure SWD is controlled. If there are few or no traps in your area, the conservative approach is begin SWD control at straw, the same as CFF.

Materials that control SWD will control CFF, but the reverse is NOT true – in particular, **do NOT rely on GF-120 alone for SWD control**. Recent tests show this material has some effect, but does not provide commercial control. The neonicotinoids have some systemic effect on SWD in the fruit, but do prevent adults from ovipositing. For now, do NOT count on neonicotinoids for SWD control. They are still effective against CFF.

Once SWD spray protection has begun, continue spraying every **7-10 days** until harvest (observing the minimum re-treatment interval and preharvest interval (PHI) for the material you are using; see Table below). Until we have more information on pesticide efficacy, use the full label rates. As always, the materials sprayed close to harvest must be chosen on the basis of their PHI (see MRL Issues below). The choice of protective sprays during this period include:

- organophosphates (diazinon, malathion)
- spinosyns (Success, Entrust, Delegate)
- pyrethroids (Warrior)

Recent tests also indicate that some members of the diamide class (Exirel) provide control of SWD, although other members of this class (Altacor) do not. Field-aged residue tests with Sevin indicate that it is also effective against adults, with slightly longer residual than Fyfanon.

Resistance Management: The longer we deal with SWD as a pest, the more we need to be concerned about insecticide resistance, and incorporate the principles of resistance management into our programs. Consider rotation of materials among these different classes to the extent possible. See the table below for PHIs, REIs, and the maximum number of applications/season.

MRL Issues. Pesticide residues are a significant concern in cherries for export. MRLs may vary by country of export for each pesticide. Work with your packinghouse to choose a SWD spray program most compatible with the fruit's destination. The cherry MRL table on the Northwest Horticultural Council's website may also be helpful: <http://nwhort.decisionaid.systems/ui#usmrl>. See also the USDA/FAS website: <http://www.fas.usda.gov/maximum-residue-limits-mrl-database>.

Post-harvest Sprays. Preliminary field tests indicated that both dimethoate and imidacloprid kill eggs and/or larvae in fruit on the tree; dimethoate was the stronger of the two materials, however, it has phytotoxicity issues with some cultivars of cherries. If you normally apply a post-harvest clean-up spray for CFF with either of these insecticides, you can expect an additional benefit to SWD control. It is doubtful if post-harvest sprays will provide a long-term clean-up for SWD that will carry over to the following year; there are too many other hosts. However, an argument can be made for a post-harvest spray if a significant amount of fruit is left in the orchard, and there are vulnerable unharvested crops nearby (later harvested varieties, blueberries, or caneberries). The concept of sanitation (whether through pesticides or physical means) has not yet been demonstrated to be of value in commercial production, although research is ongoing.

Organic Cherries. SWD control in organic cherries may be challenging. Entrust is one of the few effective materials that is registered for use in organic orchards; PyGanic may provide some knockdown, but residual is likely non-existent. Note that the Entrust label specifies that you may not make more than 2 consecutive applications of Group 5 insecticides (spinosad and spinetoram) without rotation to "an effective product in a different group" for at least 2 applications. The treatment schedule for this material is quite complicated; see the Entrust SC 24(c) label.

Organic growers should consider continuing a GF-120 program even though Entrust and PyGanic are used as the primary controls for SWD. SWD adults that feed on the bait are killed; it is likely more a question of rate: the numbers of droplets/acre versus the number of flies per acre determine the likelihood of flies encountering bait. Unlike cherry fruit fly, SWD does not have a significant preoviposition period, thus damage could happen before they can find and feed on the bait.

Conventional Insecticides for SWD

Trade Name	AI	Chemical class	REI	PHI	max per applic.	max/acre/yr	Re-treatment interval	Notes
Success 2F	spinosad	spinosyn	4 h	7 d	8 fl oz	29 fl oz	See Notes	There is a limit of 3 applications on the total number of Group 5 insecticides (Entrust, Success, Delegate).
Entrust 2SC	spinosad	spinosyn	4 h	7 d	8 fl oz	29 fl oz (0.45 lb ai)	7 d	Note Resistance Management restrictions for Group 5 insecticides.
Entrust 2SC 24c	spinosad	spinosyn	4 h	3 d (with many restrictions)	6.4 fl oz	25.6 fl oz	7 d	*See 24(c) label. Three or four applications may be allowed depending on the treatment schedule and rotation sequence.
Delegate 25WG	spinetoram	spinosyn	4 h	7 d	7 oz	28 oz/4 apps	3-7 d (thrips/other)	There is a limit of 4 applications on the total number of Group 5 insecticides (Entrust, Success, Delegate).
Fyfanon	malathion ULV	organophosphate	12 h	3 d	16 fl oz			
Diazinon 50W	diazinon	organophosphate	4 d	21 d	4 lb			Maximum of 2 applications/year, one in the dormant period, one as in-season foliar. A closed cab is required on cherries.
Dimethoate 2.67EC (Postharvest)	dimethoate	organophosphate	14 d*	NA	4 pt	4 pt	NA	*14 d REI if average annual rainfall <25 inches/year, otherwise REI is 10 days. Make a single application a minimum of 7 days after final harvest (or if "no harvest" decision is made).
Sevin 4F	carbaryl	carbamate	12 h	3 d	3 qt	14 qt		Do not apply this product to target crops or weeds in bloom. If weed or cover crop bloom is present, mow orchard floor or between rows prior to applying this product.
Danitol 2.4EC	fenprothrin	pyrethroid	24 h	3 d	21.33 fl oz	42.66 fl oz	10 d	See MRL information on Northwest Hort Council website.
Warrior 2.08CS	lambda-cyhalothrin	pyrethroid	24 h	14 d	2.56 fl oz	See Notes	5 d	12.8 fl oz/10.24 post bloom

Organic Insecticides for SWD

Trade Name	AI	Chemical class	REI	PHI	max per applic.	max/acre/yr	Re-treatment interval	Notes
Entrust 2SC	spinosad	spinosyn	4 h	7 d	8 fl oz	29 fl oz (0.45 lb ai)	7 d	Note Resistance Management restrictions for Group 5 insecticides.
Entrust 2SC 24c	spinosad	spinosyn	4 h	3 d (with many restrictions)	6.4 fl oz	25.6 fl oz	7 d	*See 24(c) label. Three or four applications may be allowed depending on the treatment schedule and rotation sequence.
Pyganic 1.4E	pyrethrin	botanical	12 h	0 d	2 qt			Some knock down only
GF-120	spinosad bait	spinosyn	4 h	0 days	20 fl oz		7-14 days	Do NOT use a stand-alone product for SWD. maximum of 0.45 lb ai/acre/season for all spinosad products