

2014 Empire Producers EXPO SWD Session Presentation Summaries

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Assessment of Lures for Monitoring Adult SWD - Greg Loeb, Stephen Hesler, Johanna Elsensohn, and Ash Sial, Department of Entomology, Cornell University

Spotted Wing Drosophila (SWD) *Drosophila suzukii*, originally from Asia, is a new invasive fruit pest that became established in NY and surrounding states in 2011. Unlike other fruit flies that typically only infest overripe and rotten fruit, female SWD can oviposit in ripe fruit thereby making them unmarketable. Soft-skinned fruit, particularly berry crops, are at greatest risk. Berry growers are facing numerous challenges with regards to SWD. An effective monitoring program that provides an early warning of imminent infestation is of paramount importance. The standard adult monitoring tool, using a deli cup with apple cider vinegar as the attractant, eventually captures many SWD and other fruit flies. However, our results for 2012, as well as the results of other investigators, indicate that adult flies are often first caught after infestation has already occurred. In the absence of a better early warning system, growers are probably better off to initiate insecticide treatments as soon as vulnerable fruit begins to ripen, even though this could result in unnecessary costs (economic and environmental). Therefore, in 2013 we initiated a project in New York, along with colleagues in other states across the country, to assess the effectiveness and practicality of new lures and/or lure placement as an early warning of impending infestation.

Our experiment was conducted at two sites in the Finger Lakes Region of NY with a history of SWD infestation and high populations in the fall of 2012. Site 1 was a mixed planting that included June-bearing strawberries, florican-fruited raspberries and various stone fruits. Site 2 was an isolated blueberry planting bordered by woods and soybeans. Adult SWD were monitored using standardized deli cup traps baited with one of five lure treatments: apple cider vinegar, fermenting yeast-sugar-water mixture, separate fermenting whole wheat mixture with apple cider vinegar-ethanol drowning solution, DroskiDrink (apple cider vinegar-red wine-raw sugar mixture), and a water control. At site 2 a sixth synthetic lure treatment was included. This was a prototype lure that is currently not commercially available. Traps were deployed the week of 27-May 2013 with the exception of the synthetic lure baited traps that were deployed the week of 1-Jul. Replicate traps were monitored and serviced weekly for 12 weeks, thru the week of 19-Aug. In addition, four replicates of each lure treatment were placed along the wooded perimeter of both sites in close proximity to the fruit plantings. Potential wild hosts, including wild black raspberry, wild blackberry, bush honeysuckle, dogwood, pokeweed, and buckthorn, were noted in the wood perimeter of both sites. When the respective crops began to ripen, fruit samples were collected from each site and held in rearing containers under ambient laboratory conditions until adult emergence at which time total adult fruit flies were quantified. Similar methods were used by our cooperators in New Jersey, North Carolina, Michigan, Maine, Arkansas, Minnesota, Oregon, Washington, and Wisconsin.

The seasonal occurrence of SWD followed a similar pattern as had been observed during the season of 2012. First detection was from the week of 10-Jun in a trap baited with the separate fermenting dough mixture in a woods perimeter (Table 1). This date was 3 weeks earlier than recorded in 2012. In 2012 the trap lure used was apple cider vinegar. The date of first capture in 2013 using apple cider vinegar was within 7d of the calendar date of first capture in 2012. Results comparing different lures (Table 1) indicates that the separate fermenting bait + apple cider vinegar drowning solution lure provided the first capture at both sites, and generally captured the most flies during each sampling interval. In weeks that the synthetic lure was deployed at site 2, captures were comparable, and sometimes surpassed, total captures in fermenting dough +apple cider vinegar baited traps. Other baits including apple cider vinegar, yeast-sugar-water mixture, and DroskiDrink consistently captured fewer flies than either the fermenting bait + apple cider vinegar or synthetic baited traps. Overall total captures of adult SWD in traps was greater in the raspberry crop compared to blueberry.

Date for first trap catch and first reared SWD from raspberry fruit for site 1 occurred in the same week. It should be noted that the grower did elect to treat with insecticide after detection of SWD. Higher rates of infestation were found in fruit at the end of the fruiting season as fruit was becoming scarcer, and the grower was no longer harvesting. Date for first trap catch at site 2 was on 11-Jun, from a woods trap. First trap catch from traps in the crop occurred the week of 15-Jul. First reared SWD from blueberry fruit for site 2 occurred the week of 22-Jul.

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Table 1. Total number of spotted winged drosophila captured in four 32-oz. deli-cup traps with different bait treatments), from different habitats at two sites in Geneva, NY. Shade color shows density (higher numbers in orange to red).

Week-->	27-May	3-Jun	10-Jun	17-Jun	24-Jun	1-Jul	8-Jul	15-Jul	22-Jul	29-Jul	5-Aug	12-Aug	19-Aug	Grand Total
Site 1	0	0	0	0	0	1	1	14	60	89	224	529	1130	2048
Raspberry	0	0	0	0	0	1	0	4	4	19	110	403	530	1071
Apple Cider Vinegar	0	0	0	0	0	0	0	0	0	0	2	62	62	126
DroskiDrink	0	0	0	0	0	0	0	1	0	10	14	102	99	226
Fermenting Bait + ACV/ETOH	0	0	0	0	0	1	0	1	2	2	62	153	281	502
Water/Control	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Yeast +Sugar	0	0	0	0	0	0	0	2	2	5	32	86	88	215
Strawberry	0	0	0	0	0	0	0	0						0
Apple Cider Vinegar	0	0	0	0	0	0	0	0	x	x	x	x	x	0
DroskiDrink	0	0	0	0	0	0	0	0	x	x	x	x	x	0
Fermenting Bait + ACV/ETOH	0	0	0	0	0	0	0	0	x	x	x	x	x	0
Water/Control	0	0	0	0	0	0	0	0	x	x	x	x	x	0
Yeast +Sugar	0	0	0	0	0	0	0	0	x	x	x	x	x	0
Woods	0	0	0	0	0	0	1	10	56	70	114	126	600	977
Apple Cider Vinegar	0	0	0	0	0	0	1	1	0	14	6	15	26	63
DroskiDrink	0	0	0	0	0	0	0	0	14	17	33	15	80	159
Fermenting Bait + ACV/ETOH	0	0	0	0	0	0	0	5	25	11	46	50	433	570
Water/Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yeast +Sugar	0	0	0	0	0	0	0	4	17	28	29	46	61	185
Site 2	0	0	1	0	0	0	0	3	58	204	465	660	1645	3036
Blueberry	0	0	0	0	0	0	0	3	21	137	301	449	542	1453
Apple Cider Vinegar	0	0	0	0	0	0	0	0	1	4	7	41	59	112
DroskiDrink	0	0	0	0	0	0	0	0	1	32	44	51	82	210
Fermenting Bait + ACV/ETOH	0	0	0	0	0	0	0	1	12	26	116	88	119	362
Scentry Lure	x	x	x	x	x	0	0	1	5	52	55	103	107	323
Water/Control	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Yeast +Sugar	0	0	0	0	0	0	0	1	2	23	79	165	174	444
Woods	0	0	1	0	0	0	0	0	37	67	164	211	1103	1583
Apple Cider Vinegar	0	0	0	0	0	0	0	0	0	2	3	57	48	110
DroskiDrink	0	0	0	0	0	0	0	0	22	13	50	13	171	269
Fermenting Bait + ACV/ETOH	0	0	1	0	0	0	0	0	4	13	50	59	388	515
Scentry Lure	x	x	x	x	x	0	0	0	5	29	17	30	425	506
Water/Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yeast +Sugar	0	0	0	0	0	0	0	0	6	10	44	52	71	183
Grand Total	0	0	1	0	0	1	1	17	118	293	689	1189	2775	5084

Early season monitoring with various lure treatments provided some important information concerning our objective of using monitoring as an early warning for SWD infestation. Fermenting bait + ACV drowning solution and the synthetic lure provided higher rates of SWD capture than other baits assessed in this trial. At site 1 trap catch in the crop and woods preceded measured fruit infestation by three days. At Site 2 trap catch in the crop preceded measured fruit infestation by 7 days and trap catch in the woods preceded infestation by over a month. Trap captures in crops and infestations occurred within one week of each other at our two study sites. At this time the level of infestation was relatively low (4 to 17 berries per 1000). Hence, traps baited with an attractive lure such as fermenting dough may be adequate as an early warning in susceptible crops such as summer raspberry and blueberry to initiate control measures under some circumstances, although this needs to be tested at more sites over more years.

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