FIELD EVALUTATION OF MICRO-SPRINKLERS TO CONTROL

SPOTTED WING DROSOPHILA IN BLUEBERRY

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A 30-acre site, divided into six, 5-acre plots was treated with the field rate of Mustang Max®, zeta-cypermethrin (4 fl oz) on 16 August 2012. The site contained 4 highbush blueberry cultivars: 'Draper', 'Legacy', 'Aurora' and 'Bluegold' (Fig. 1). The micro-irrigation system, originally intended for fruit cooling when temperatures reach and exceed 95^0F, was recently retrofitted to allow chemigation of insecticide treatments through the underground pipes for application through Netafim® gray (.061") nozzles (15.3 GPH). The nozzles are on 7' risers, spaced 12' apart on alternate rows with 10' row spacing, for a total of 182 nozzles/A. This nozzle configuration provides overlapping coverage of berry bushes.

The complexity of the irrigation system and the necessity to purge the lines for EPA compliance requires 2 waves of irrigation to complete the insecticide treatment. Initially, a short misting period is required to fill the lines in preparation for the treatment. Once the lines are filled, each 10-acre block receives a 10-minute application in sequence beginning with 'Draper' and ending with 'Bluegold.' In order to adequately test residues in each of the 500' rows on either side of the main line, each row was subdivided into north (A) and south (B) sectors. In the first treatment wave, only 'Draper' 1A in both

north and south sections received the 10 minute treatment of Mustang Max, followed by north and south sections of 'Draper' 2A, then 'Legacy' A, 'Aurora' 1A, 'Liberty' A, 'Aurora' 2A, then 'Bluegold' A. A second wave pushes the insecticide into the "B" sectors in the same sequence as above. A final purge is required to clear the insecticide out of the lines, completing the application. Table 1 provides a visual explanation of the sequential insecticide treatment and purge.

In evaluating the Mustang Max data, it must be noted that temperatures on 16 August 2012 exceeded the 95 ^{0}F limit, necessitating a cooling cycle to be implemented following the treatment regime described above. This cooling cycle of 5 hours began within 2.5 hours after the chemigation event. Clean water is pushing insecticide into B sector and the final system purge may result in "wash-off" in the "A" sectors. Support for this can be seen in our bioassay results. Bioassays evaluating efficacy of Mustang Max at 1DAT and 5 DAT (Fig. 2) revealed the toxicity level of the pyrethroid on both sectors "A" and "B" was adequate to kill SWD at 1 DAT but as the toxins degraded, the lower concentration of the "A" sectors showed less efficacy than the "B" sectors, which did not receive the final purge. This phenomenon was not observed for every insecticide. Danitol$^®$, fenpropathrin (14.5 fl oz) applied on 24 September 2012 and its efficacy did not appear to be affected by the additional water in sector A (Fig. 3). Reasons for these efficacy differences between chemistries are not known.
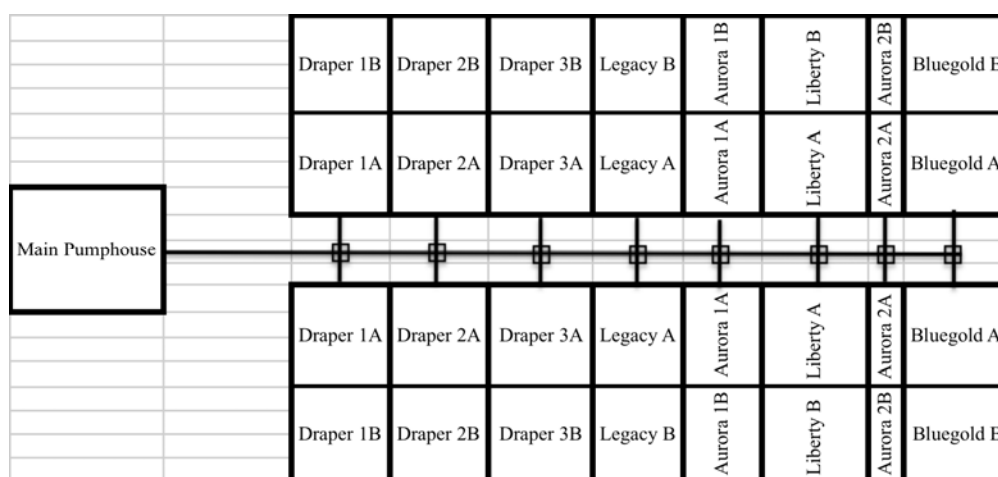

Fig. 1. Salem, OR micro-sprinkler field map, 2012.

Table 1. One-hour treatment cycle Pan America 16 August 2012. Treat = Mustang Max, Water = no insecticide, Dry = neither water nor insecticide.

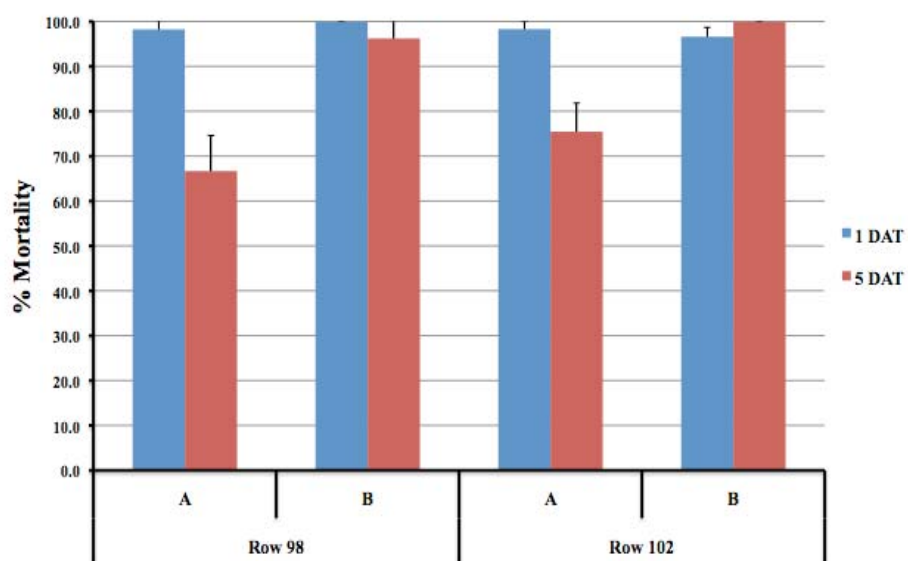| Cultivar	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes	10 minutes
Draper A	Treat	Dry	Dry	Water	Dry	Dry
Draper B	Water	Dry	Dry	Treat	Dry	Dry
Legacy/Aurora A	Dry	Treat	Dry	Dry	Water	Dry
Legacy/Aurora B	Dry	Water	Dry	Dry	Treat	Dry
Bluegold A	Dry	Dry	Treat	Dry	Dry	Water
Bluegold B	Dry	Dry	Water	Dry	Dry	Treat

Fig. 2. Mustang Max micro-sprinkler leaf bioassay for field-aged residues to SWD.
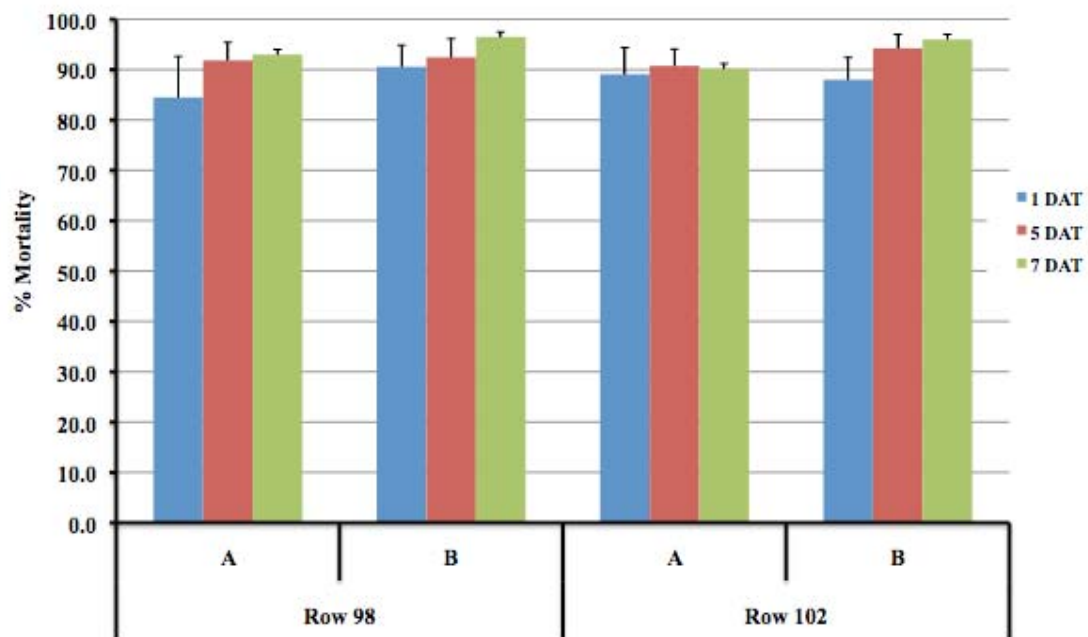
Fig. 3. Danitol 2.4EC micro-sprinkler leaf bioassay for field-aged residues to SWD.