Spotted wing drosophila in Maine wild blueberry, 2016

Projects:

1. **Action threshold study** – a study involving 14 grower fields was conducted to test action thresholds. Three treatments were evaluated: Early harvest (prior to detecting SWD)(n=4 growers), threshold of 3 male SWD (n=4 growers), threshold of 9 SWD (n=6 growers). Three years of prior data suggested that early harvest prior to the detection of SWD in traps will result in no detectable infestation, a threshold of 3 SWD will result in a 3 % likelihood of infestation the week after an average of 3 male SWD are detected in traps in the field, a threshold of 9 male SWD will result in a 10% likelihood of infestation the week after the threshold of 9 male SWD are detected in traps in the field. RESULTS: early harvest resulted in no infestation and less than 2 % crop loss due to unripe fruit being harvested. Growers using a threshold of 3 SWD obtained no SWD infestation by the time of harvest. Growers using a threshold of 9 SWD resulted in low levels of percent infestation of fruit prior to insecticide protection of the crop and harvest (0.21% $\pm$ 0.12 (se)), although two growers had no detectable infestation using a threshold of 9 male SWD by the time they harvested. We intend to replicate this study next year so that a reliable recommendation can be made for the tactic of early harvest and so that an action threshold can be developed for wild blueberry growers.

2. **Three year netting study** – For the third year we found excellent prevention of SWD fruit infestation with netting. In all three years netting resulted in less than 0.1 % infestation of fruit relative to non-netted plots where infestation ranged from 5-12% infestation. However, our economic analysis reveals that based upon the value of organic wild blueberries that Anti-insect Netting®(mesh #25) is not cost effective even if a grower gets 10 years of use and the cost is depreciated over this time horizon. Remay sold as Agribon® netting also works exceptionally well for preventing fruit infestation and is an order of magnitude less expensive on a per acre basis than Anti-insect netting, but we were disappointed that after one season (2 months in the field) there was little hope of using the row cover for a second year because it became extremely brittle and in addition this row cover delayed ripening and resulted in a reduction in yield.

3. **Fungal pathogen study** – We tested the susceptibility of adult *D. suzukii* to infection by four species of entomopathogenic fungi in the laboratory: *Beauveria bassiana* (Bals.) Vuill., strains GHA and HF-23; *Isaria fumosorosea* Wize strains FE-9901 and Apopka 97; *Metarhizium anisopliae* var *anisopliae* (Metschn.) strain F-52; and *Metarhizium robertsii* (Clavicipitaceae) strain DW-346. We found *B. bassiana* (GHA) and *M. anisopliae* (F-52) to be the most virulent in lab. A replicated field study with *B. bassiana* (GHA) did not show promise of providing adequate control of SWD and prevention of fruit infestation.

4. **Alternative non-crop hosts** - For the second year we sampled alternative hosts in and around wild blueberry fields and have found 16 fruit species as well as mushrooms to be hosts that SWD can reproduce in. The most commonly utilized plants in and around wild blueberry fields in order of fruit infestation rates are: shadbush, dewberry, invasive honeysuckle, blackberry, raspberry, bunchberry, and black cherry. Wild fruit infestation

in and around blueberry fields often tends to reach peak with the onset of wild blueberry fruit ripening and susceptibility to SWD attack.

5. **Predation in the field** – For the third year high levels of SWD pupa predation in the field have been recorded (ranging from 93-100% per 7 days based upon sentinel pupae). This high rate of predation occurs independent of whether the pupae are on the ground surface or under the leaf litter in the field. We have determined through time-lapse photography that the major predators are ground beetles (*Pterostichus* and *Bembidion* spp.) and field crickets (*Gryllus* spp.). Fucntional response studies in the laboratory have demonstrated that field crickets are by far the most voracious of the predators tested. In the laboratory each cricket, if provided enough prey, consumes an average of 80 pupae per day. While this level of predation still might not be sufficient to provide biological control alone, we believe that it is responsible for dampening infestation rates and allowing action thresholds to be used in our production system.

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