

Potential for Soil Applications of Mycoinsecticides for Supplemental Control of SWD

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Mycoinsecticides have primarily been tested as foliar applications to control SWD but the soil is their natural habitat and all the life stages except for SWD eggs come in contact with the soil for varying periods of time which may increase their potential. Mycoinsecticides are slow acting but SWD 3rd instar larvae drop from fruit and crawl in the soil contacting the spores without the ability to groom them off. Two field trials were performed (26 August, 1 Oct 2015) in fall-bearing red raspberries at WSU NWREC, using 2 mycoinsecticides: Met 52[®] (*Metarhizium brunneum (anisopliae)* Novozymes) and BotaniGard[®] (*Beauveria bassiana*, Laverlam) and 3 pyrethroids: Danitol[®] 2.4 EC (fenpropathrin, Valent), Deadlock[®] G (zeta-cypermethrin, Wilbur Ellis), Brigade[®] 2 EC (bifenthrin, FMC) and in the fall trial, Rimon[®] (novaluron, Makhteshim), replicated 3X. Increased efficacy by combining Entrust[®] (spinosad, Dow) a contact/ingestion poison, with a mycoinsecticide, was investigated based on reports of synergy and its potential for resistance reversal.

Results

Results of the 26th August field application suggest some activity. The 5 treatments on the left side of the graph (Fig. 1) all exhibited a decrease in puparia recovered between the 2nd and 3rd weeks following the 26 August application. These treatments contain Entrust, a mycoinsecticide, or a combination of the two. The right side of the graph consists of the pyrethroid treatments, hydroseeding/mycoinsecticide mixtures and the untreated. These 6 treatments experienced an increase in puparia recovered between the 2nd and 3rd weeks after treatment suggesting decreased efficacy. Despite the fact that there are little differences between the treatments and the UTC these results suggest the following trends: 1) mycoinsecticides may provide some longterm suppression of SWD when applied to the soil compared to pyrethroids; 2) pyrethroid treatments provide better short term efficacy compared to the mycoinsecticides since only Deadlock G and Danitol were statistically different than the UTC, and 3) in this trial, hydroseeding did not enhance mycoinsecticide activity.

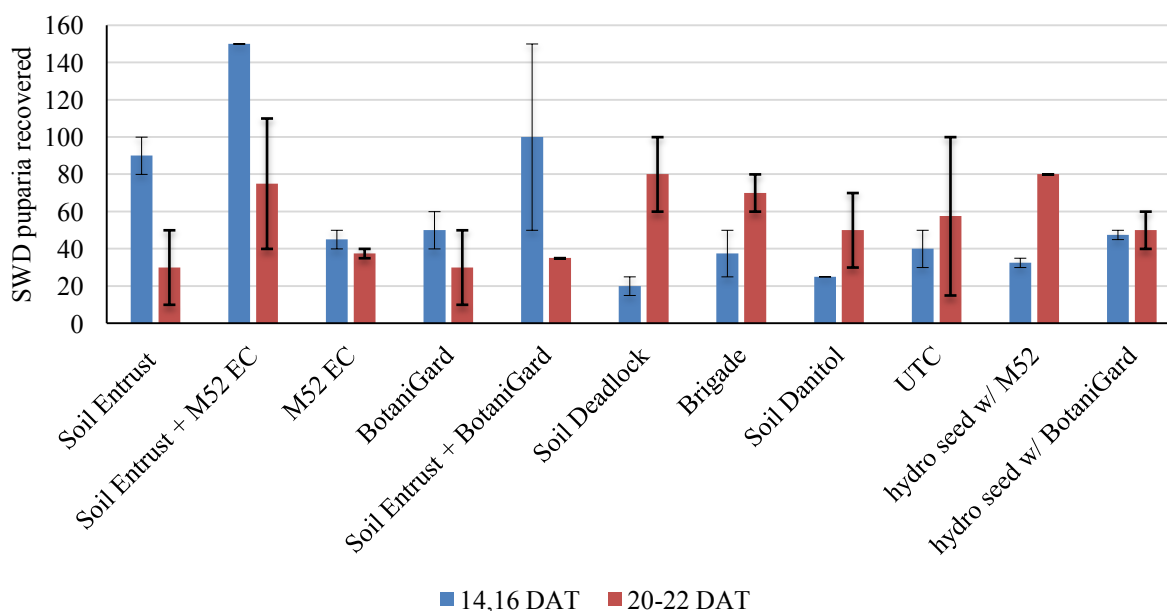


Fig. 1. SWD puparia recovered 2-3 weeks after field application 26 August 2015.

The second application was applied 1 October. Samples were taken 8 October and puparia were held for adult emergence. Rimon, Danitol, Deadlock G and Met52 + Entrust performed statistically better than the UTC.

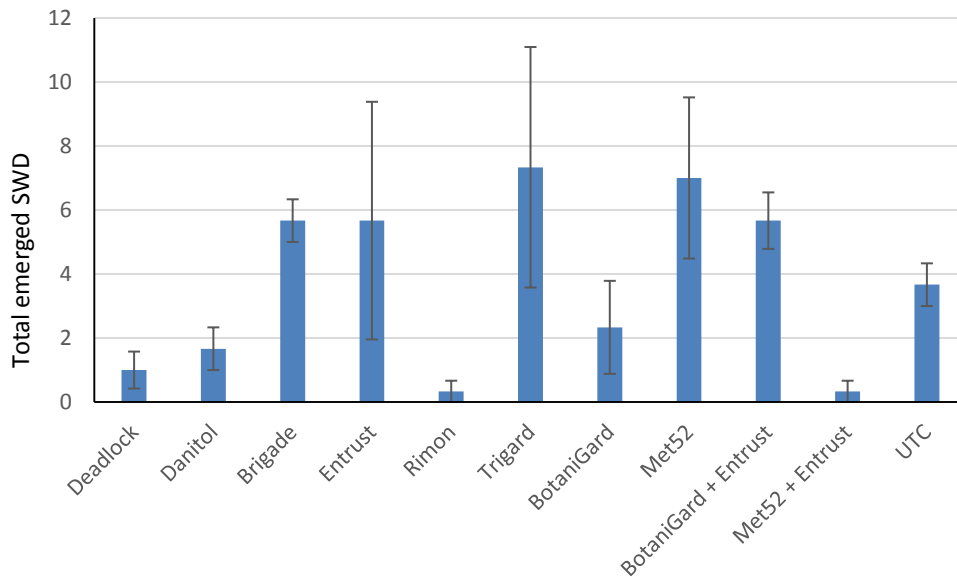


Fig. 2. Adult SWD emergence following 2nd field trial application, 1 October 2015.

Discussion and Conclusion

As with any field trial and particularly with mycoinsecticides, results can be erratic. However there is enough data to suggest ground treatments will affect SWD. These field trials are labor intensive. Soil samples are scraped from the treated areas, puparia are separated using a flotation method then surface sterilized and individually transferred to condiments cups and held for sporulation and/or adult emergence. The limitation of 10 puparia/replicate imposed in 2015 field trials improved manageability making it humanly possible to evaluate results but may have decreased information on the total impact of the treatments. Soil pyrethroids kill larvae dropping into the treated soil but dead larvae are not recoverable, so the results reported here are indirect. The actual effects were likely greater than reported here. Results indicated that pyrethroid activity decreased after 2 weeks. Without the ability to lightly incorporate these pyrethroids they would be subject to UV degradation. Mycoinsecticide activity although not as fast acting as pyrethroids, can provide more longterm suppression of SWD. Rimon may also provide extended suppression. Currently, the zero tolerance for larvae in fruit by the industry does not promote adoption of softer approaches including population suppression techniques. Currently, Danitol has soil-directed applications, for SWD on the label but Danitol is not the industry standard for SWD control and MRLs are not highly compatible. Growers have no economic incentive to add ground-applied treatments to their current weekly management programs however directing nozzles towards the base of the plants when foliar pyrethroids are applied (if registration allows and not an off-label use) will provide additional protection without any added effort or expense.