Project 14-POLL 16
Pettis
Poster location 7
Exhibit Hall A+B

THE EFFECT OF APPLICATION TIME ON FUNGICIDE EXPOSURE TO HONEY BEES IN ALMONDS

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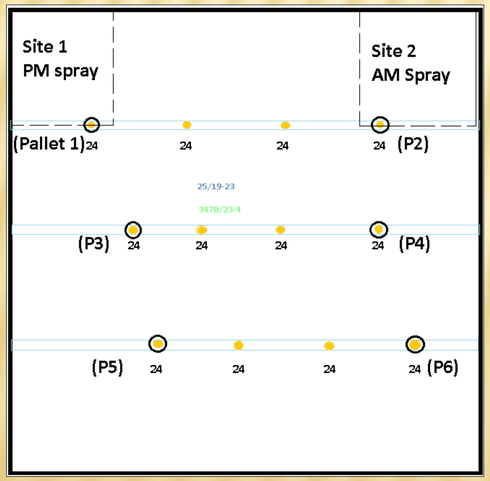
Background: Fungicides may pose a threat to honey bee health. Recent studies have revealed synergistic toxic effects from the combination of insecticides and fungicides at field relevant doses (Johnson et al. 2013) and a positive correlation of fungicide-contaminated pollen with the gut pathogen *Nosema* (Pettis et al. 2013). Our objective was to determine if spraying fungicide at different times of day (AM vs. PM) leads to differences in the exposure levels to foraging honey bees and bee-collected pollen.

Approach: Counts of bee presence among nearby blooms and of foraging traffic at the entrances of hives on nearby pallets were collected as a metric of honey bee health after spray events. Iprodione, as Rovral 4F, was sprayed according to label at a uniform rate using an air blast ground rig either at 6pm on Day 1 in Zone 1, or at 11am on Day 3 in Zone 2. Day 1 yielded pre-treatment data, Day 2 post-PM treatment, and Day 3, post-AM treatment. Pollen was trapped from 5pm to 5pm of the following day. Foragers were counted for 3 min. in flowers (1m^2 area) and at hive entrances. Bloom density was measured by bloom count within the meter^2.



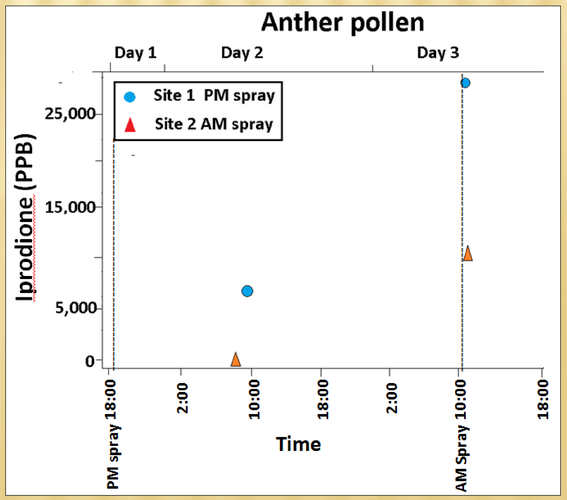
The almond orchard (map above) was located at Ranch 3470, Paramount Farms, so. California. Fungicide contamination was analyzed at the USDA-AMS laboratory, Gastonia, NC.

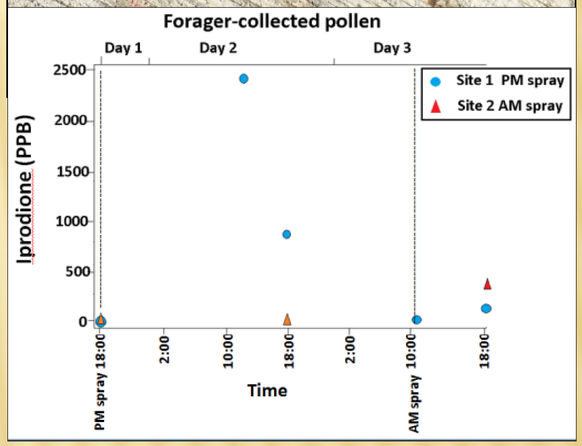
Results:

Foraging Counts

	Day 1	Day 2	Day 3
Pollen Foragers	39	27	13
Nectar Foragers	114	105	219
Foragers in Trees	6	3.6	2.8

Foraging activity decreased from Day 1 to Day 3 as the almond bloom density declined. Anther pollen sampled after the AM spray had the highest overall concentrations of iprodione in this study despite detectable spray drift. As expected, anther pollen collected immediately after the AM spray had contaminant levels significantly higher than anther pollen collected the morning after the PM spray, which had no detectable spray drift. Counter to expectations, contaminant concentration in forager-collected pollen was significantly higher following PM spray than following AM spray.





Conclusions: The simultaneously high loads of iprodione in anther pollen and the low loads in bee-collected pollen following AM spray may be a reflection of declining forager activity within the contaminated sites rather than a difference in iprodione in available forage. In future studies, this question should be addressed during a period of more consistent bloom.

Bibliography:

Johnson, RM, Dahlgren L. , Siegfried BD, Ellis MD (2013) Acaricide, Fungicide, and Drug Interactions in Honey Bees (*Apis mellifera*). PLoS ONE 8(1): e54092. doi:10.1371/journal.pone.0054092

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