Fungicide Impact on Honey Bee Development

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Introduction

Almonds are the first stop in the annual pollination cycle for most honey bee colonies

- Most beekeepers leave almonds with healthy happy bees
- Some beekeepers report die offs in the holding yards. Nearly 40% of respondents to a recent survey reported occasional or frequent die-offs at almonds.
- Some beekeepers report problems with honey bee development during or after almonds

Many fungicides are used in almonds. Some of these fungicides have been found to be toxic to developing bee larvae in the laboratory.

Iprodione (Rovral)
Found in pollen and wax
Toxic to larvae in laboratory studies

Chlorothalonil (Bravo, Echo, Dachonil)
Found in pollen and wax
Toxic to larvae in laboratory studies

Ziram (Ziram)
Requires special testing, unknown if accumulates
Toxic to larvae in laboratory studies

Boscalid/Pyraclostrobin (Pristine)
Found in pollen and wax
Guilty by association?

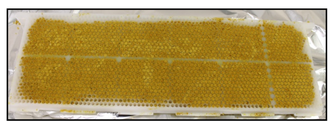
Do laboratory results translate to the field?

Methods

Semi-field experiments

We built flight cages

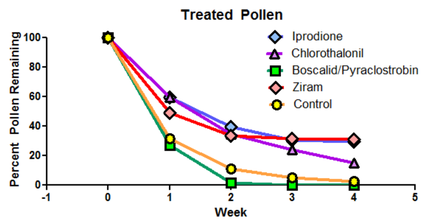
The fungicide active ingredients were mixed into pollen, and packed into a plastic comb (Permacomb). The pollen frame was placed inside the colony, and the colony was confined inside the flight cage for one week.



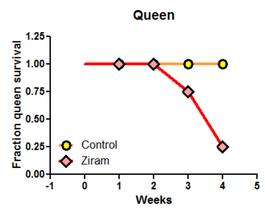
We evaluated the colonies For presence of the queen, quantity of eggs, larvae capped brood, bees pollen, nectar, and consumption of treated pollen before the treatment, and for four weeks after

Results

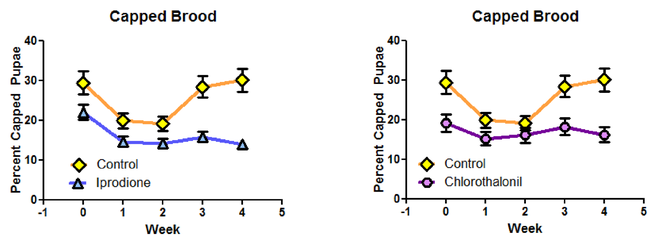
- Bees ate less of the Iprodione, chlorothalonil, and ziram pollen than boscalid/pyraclostrobin and control



- Colonies treated with ziram exhibited higher queen mortality compared to controls



- Colonies treated with iprodione and chlorothalonil exhibited decreased percentage of capped brood over time compared to controls



- Boscalid/pyraclostrobin was not significantly different from controls

Conclusions

- **Delayed effects fit with some beekeeper reports**
- **These results may be important and experiments need to be repeated**
- **More work needs to be done to measure field exposures**
- **Many stressors affect bees in the field**

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