

Bees in peril: pesticides and predators

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CCD = a perfect storm of factors?

Varroa destructor Israeli Acute Paralytic Virus?
 Migrant beekeeping Pesticides

The New York Times **Science**

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Scientists and Soldiers Solve a Bee Mystery

Nosema apis

Iridoviruses (in cell)

Members of a joint United States Army/University of Montana research team that located a virus that is possibly infecting honeybee colonies scanning a healthy hive near Missoula, Mont.

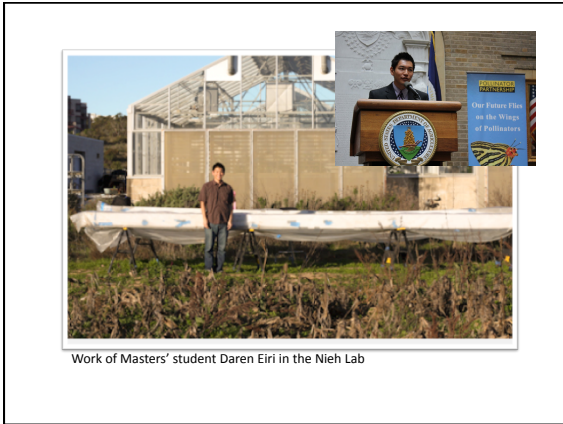
Are pesticides part of the problem?

Related to pesticide seed dressing?

Imidacloprid

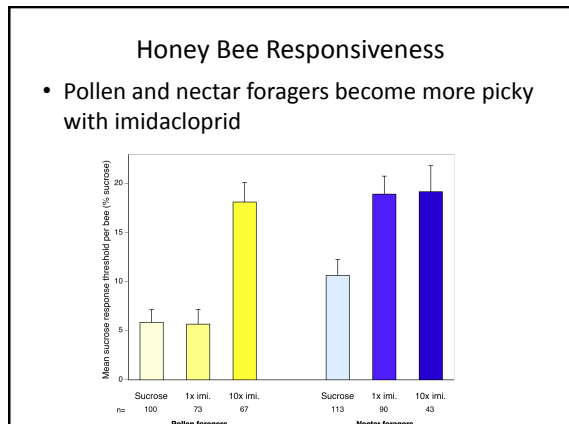
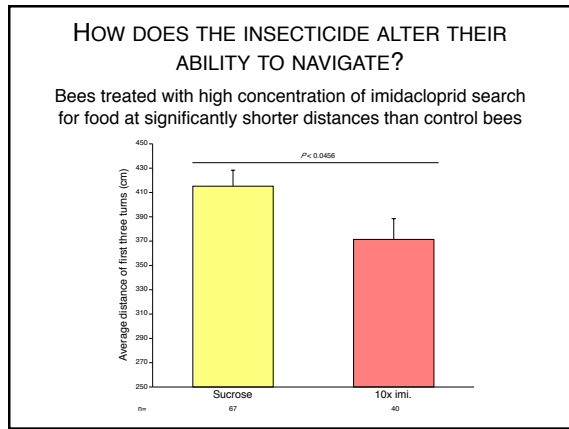
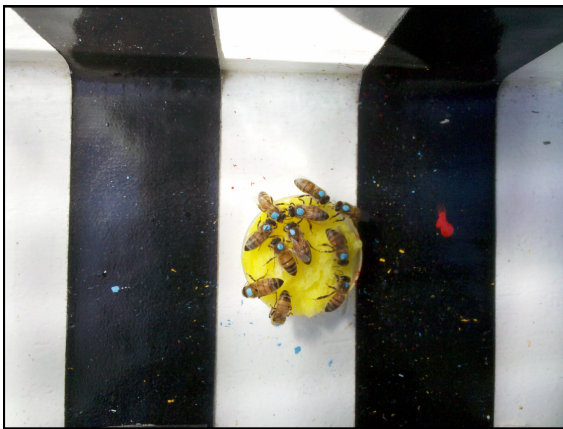
Imidacloprid and its effects on honey bees

- We use very low doses of imidacloprid (0.216 and 2.16 ng/bee) compared to LD₅₀ average of 21.85 ng/bee (Schmuck 2001)
- We test bees' responsiveness to different sucrose concentrations and their ability to navigate



HOW DOES THE INSECTICIDE ALTER THEIR ABILITY TO NAVIGATE?

A flight of 6 m inside a tunnel is equivalent to a flight of 93 m outdoors (Srinivasan 2007)



Sublethal effects of the pesticide imiaclopid on honey bees

- Pesticide-treated bees become more picky and may possibly affect division of labor, affecting colony health
- They also travel shorter distances than untreated bees to a trained location, providing evidence of cognitive disruption



Bird predation : Bee eaters



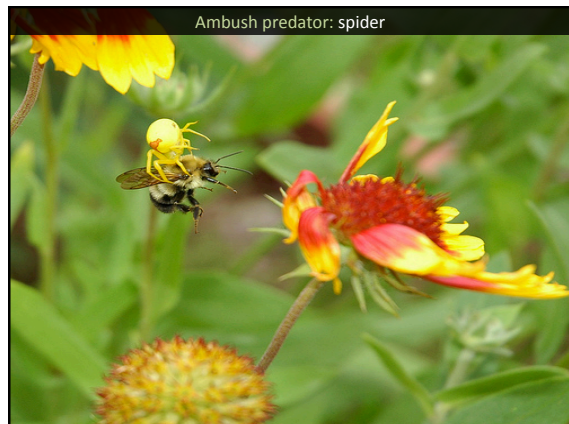
Ambush predator: Praying mantis

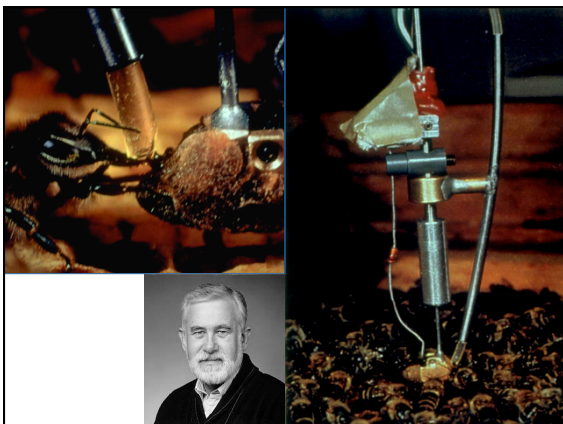
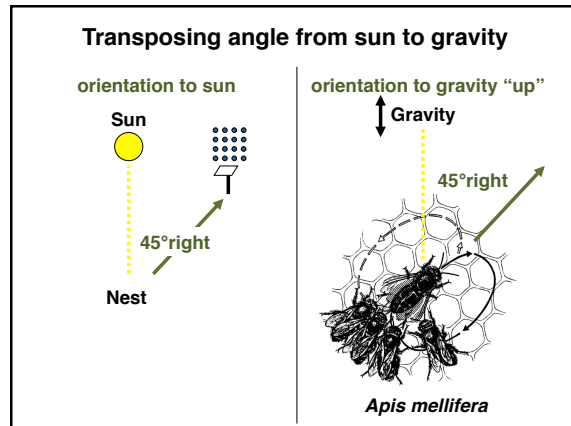
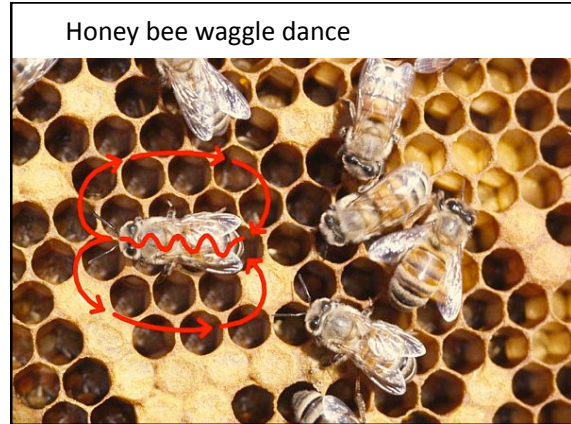
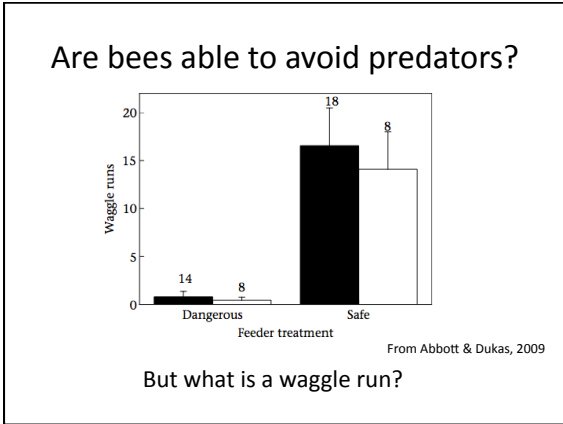


Ambush predator: Ambush bug



Ambush predator: spider





Do bees communicate about predators?

Current Biology 30, 310-315, February 23, 2010 ©2010 Elsevier Ltd. All rights reserved. DOI: 10.1016/j.cub.2009.12.040

Report

A Negative Feedback Signal That Is Triggered by Peril Curbs Honey Bee Recruitment

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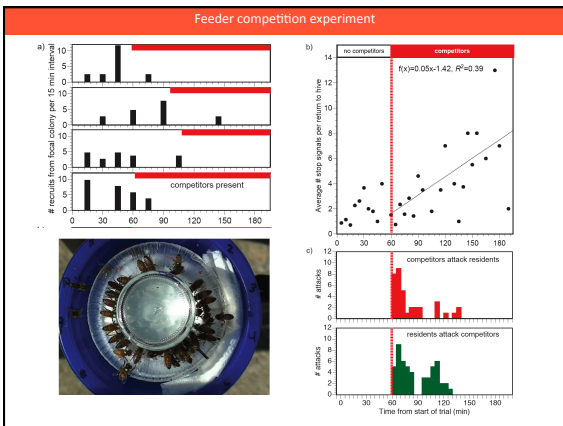
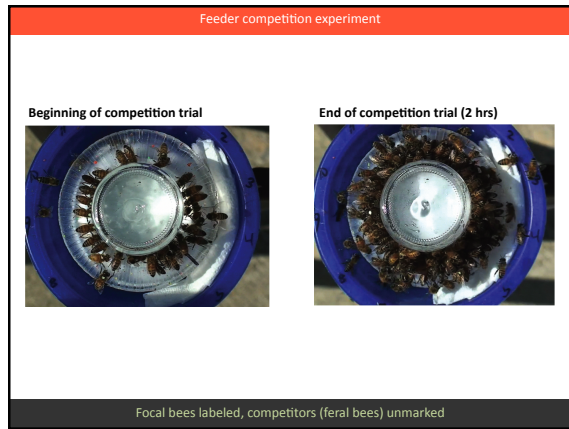
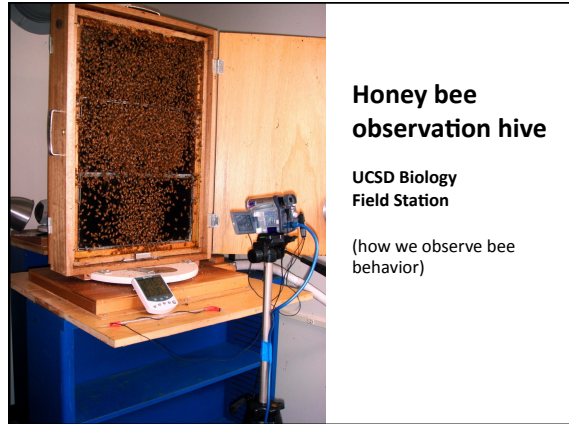
Summary

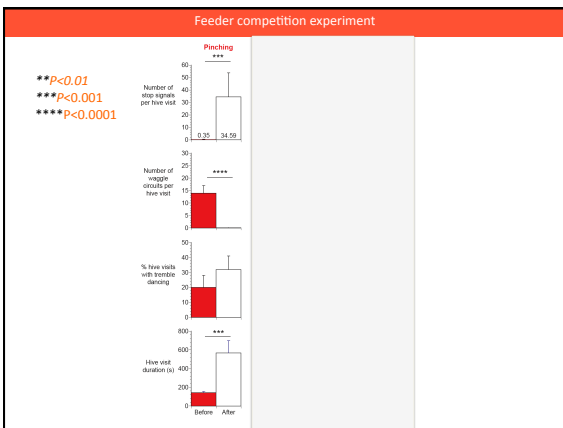
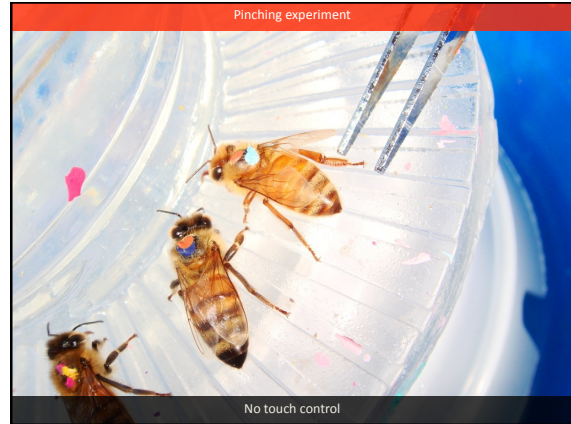
Decision making in superorganisms such as honey bee colonies often relies on self-organizing behaviors. Feedback loops that allow the colony to gather information from multiple individuals and achieve reliable and agile solutions have been well studied in the honey bee. However, the role of negative feedback signals in superorganism is poorly understood. I show that honey bees use a special vibrational signal to produce a stop signal, communication that was known to reduce waggle dancing and recruitment that lacked a clear natural trigger. Signifiers preferentially targeted bees that were actively recruiting to a place.

Work of James C. Neel



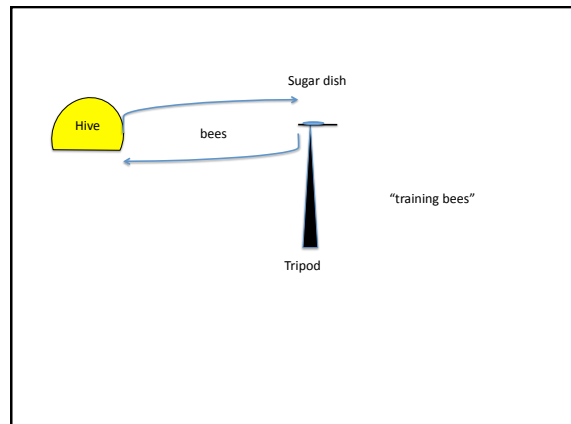
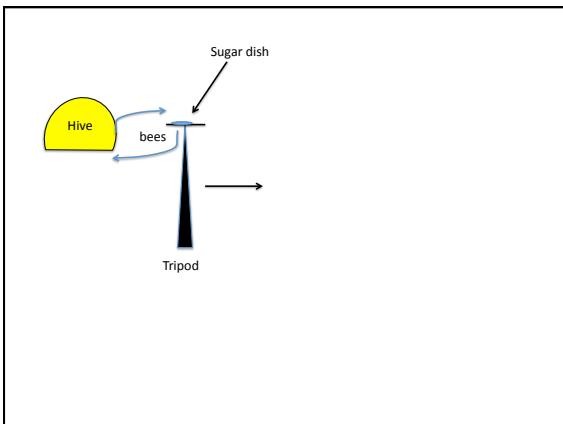
Bees make a special vibrational sound called a stop signal that stops bees from recruiting to a place.

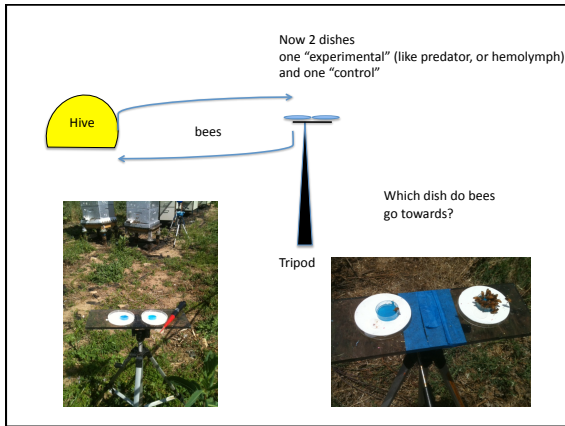




Goals of SD Bee Predator Studies

- What predators prey on bees in SD?
- Can bees avoid predators by picking up their scent, or by seeing them?
- Can bees avoid predators by using the cues of an attack (bee hemolymph)?





Thanks to

- SD Foundation
- Ms. Jesse Wade-Robinson and Mr. David Berggren
- And to you!