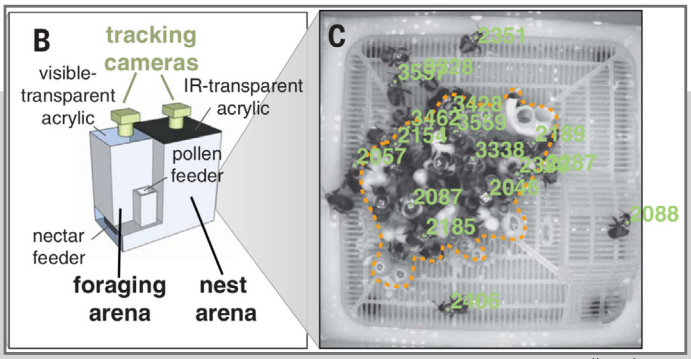
The **Research** Buzz

by Hannah Whitehead, Honey Bee Extension Educator, UMass Amherst, **May 2019**

Welcome back to The Research Buzz, a recurring column where I summarize some of the newest and coolest in bee research. This week, we start with article in *Science* that explores the effects of neonicotinoids on bumble bee nesting behavior. It is the first to document in detail how neonics alter in-hive behavior, so it is relevant to anyone passionate about pollinators (even if it is not specifically about honey bees). You will also learn about research that explores the effect of hive spacing on varroa levels, the impact pollen supplements on colony growth, and the consequences of migratory pollination for bee health. We will end with some fun facts about the nutritional value of honey bee brood as food for humans! You can also read this column on the UMass Extension website.

1

Neonics Affect Bumble Bee Nesting Behavior



Crall et al. 2018

A research team out of Harvard tested the effect of neonicotinoids on bumble bee in-hive behavior. They exposed bees from some colonies to the neonic imidacloprid, and then used a robotic observation platform to continuously track bee movement within the colony. They found that, at night, bees in imidacloprid-exposed colonies spent less time caring for brood and more time at the nest periphery, when compared to bees in non-exposed colonies. They also found that imidacloprid-exposed colonies built less nest insulation and therefore experienced greater in-hive temperature fluctuations. Overall, these results help to explain why neonic exposure slows bee colony growth.

Why is this research important?

Previous research has shown that neonicotinoids reduce colony growth, impair foraging behavior and reduce floral learning in multiple bee species (including honey bees). **This paper is the first to show that neonicotinoids also impair brood care and thermoregulation.** This research is also interesting because it uses a new technology to continuously monitor in-hive behavior, which gives us a window onto the intimate effects of pesticide exposure.

Read the full study here.

2

How Far Apart Should You Space Your Hives?

A 2015 study found that when hives were clustered (1m apart) bees were more likely to drift to the wrong hive and mite levels were higher than when hives were dispersed (21-73m apart). In other words, increasing inter-hive distance reduces varroa mite transmission. **As a beekeeper you might read these results and ask: so how far apart do I need to place my hives to see these beneficial effects?** That's exactly the question that researchers from the University of Georgia sought to answer in a recent study. They set up 15 hive pairs that were spaced either 0m, 10m or 100m apart. They reduced mite levels in all hives to nearly zero, and then inoculated one hive in each pair (the "donor" hive) with 300 female mites. The other hive ("recipient") was not inoculated. **Four months later, they found that 100m-spaced hives had fewer mites on average than 0m or 10 m-spaced hives.** This was true for both the recipient and donor hives in each pair.

Why is this research important?

This study confirms previous research showing that more isolated hives have lower mites; it also tells us that hives need to be spaced pretty far apart (closer to 100m, rather than just 10m) for this effect to be observed. This is bad news for those of us living in bear country, who need to keep hives clustered inside of an electric fence. However, this research also reminds us how important it is to reduce drift in whatever ways we can; other options include rotating hive entrances, painting hives different colors, and placing landmarks like rocks or bushes in between hives.

Read the full study here.

Hannah Whitehead

3

How Beneficial are Protein Supplements?

Researchers from the University of Florida tested the effect of mid-summer protein feeding on colony strength and *Nosema* levels in 75 commercial hives. They compared six treatments: no pollen, four commercially available pollen supplements and wildflower pollen. They found that hives fed supplemental protein were the same size, and had similar *Nosema* levels, as non-supplemented hives.

Why is this research important?

86.5% of beekeepers who answered the BIP management survey from 2011-2017 say that they use commercial protein feed. However, past research has found that protein supplements can have mixed effects on hive strength. A multi-year study found that spring protein supplements cause earlier brood rearing; however, there was no effect on mid-summer hive population or honey production, except in a year with exceptionally bad weather. Other studies found that protein supplements may increase *Nosema*. This paper found no effect of protein supplements on *Nosema*, but also no effect on hive strength. Taken together, this research suggests that protein supplements may only be beneficial in bad weather years. More research is needed to determine the positive and negative effects of protein feeding.

Bryanna Joyce

Read the full study here.

4

Effects of Migratory Beekeeping on Bee Health

Researchers from the University of Vermont and the University of Maryland studied the effect of long-distance transportation (to almond pollination) on hive size and disease for migratory colonies as well as nearby stationary colonies. They found that migratory colonies returned with fewer bees and briefly had higher levels of black queen cell virus. They also found that stationary colonies near the returning migratory bees had more deformed wing virus than isolated stationary colonies.

Why is this research important?

1.5 million honey bee colonies are trucked to California each February to pollinate almonds (that's more than half the total number of commercial colonies in the US). There are many reasons to suspect that bringing bees to almonds negatively impacts their health: they consume a single-source diet, are exposed to pesticides, endure stressful long-distance transport and may pick up diseases from other hives. It is also possible that migratory hives bring diseases back to stationary hives in their home state. However, few studies have looked at the effect of almond pollination on the health of migratory hives or nearby stationary hives. This research showed that bringing bees to almonds can have modest, temporary, negative effects on hive health, and that nearby stationary hives may be at a slightly higher risk for deformed wing virus. It suggests that we need to do more research to understand the effects of migratory pollination on bee health.

Buzzingaccrossamerica.com

Read the full study here.

5

Bee Brood...as Food?

Entomophagy (or eating insects) is one solution that has been proposed to meet future protein needs, which are expected to increase 76% by the year 2050. Honey bee larvae and pupae are eaten in many cultures and are one possible insect protein source. In this paper, researchers tested the nutritional value of brood powder and found that it contains 20-25% protein and high antioxidant activity (for comparison, pork has a protein content of 27.7%). A trained sensory panel described the aroma profile of brood powder as "buttery" and "milky". So instead of feeding drone pupae to the chickens, next time you could bring them inside and fry them up for a protein-rich snack. When your friends give you weird looks, tell them it's high in antioxidants!

Read the full study here.

Contact: Hannah Whitehead, UMass Extension, hwhitehead@umass.edu