
PROJECT 1:
CLOCK
Mary Phelan

Process

SPOKE WITH A FRIEND WHO TOLD ME ABOUT THE RESEARCH FINDINGS

BEGAN RESEARCH ON STUDIES DONE ON THE BEES

FOUND AN ARTICLE EXPLAINING THE STUDIES DONE

EXPLAINER

Minding Their Own Beeswax

How busy are bees, really?

BY FORREST WICKMAN JUNE 19, 2012 • 7:21 PM

They're pretty industrious but not as busy as some other animals. A honeybee might work anywhere from just a few hours a day to about 12, depending on its role in the beehive. For example, worker bees tasked with the daily foraging of nectar or pollen generally spend nearly every hour of daylight outside—but as soon as it gets dark they get to head back to the nest and relax. (Honeybees don't sleep the same way that humans do—they don't have eyelids, for one—but they do stop moving, relax their muscles, and let their antennae gradually slump.)

Worker bees whose duties lie within the nest don't have it easy, either—they stay a little busy around the clock, tending to the honeycombs, fanning their wings to keep the nest cool, but they do take frequent breaks. Queens are also busy, if relatively immobile, laying more than 1,000 eggs each day. Drones, by contrast, are quite lazy. They don't leave the hive until early afternoon, at which time they carouse around in packs, and when they get home just a few hours later, they rely on the worker bees to feed them.

To remain as efficient as possible, bees take the day off when there's ugly weather—if the temperature drops into the 50s, or if it looks like it's going to rain, or if there are strong winds (above about 15 mph). Also on cold winter days, honeybees stay back in the hive, where they clump together to stay warm—though staying warm, which involves bees taking turns buzzing their wings to warm the others, is a lot of work. On the other hand, on nice days honeybees may be asked to work overtime: If the flowers are particularly rich with nectar, or if there's lots of pollen that's ripe for collection, forager bees will go back to the hive to recruit even more numbers.

Vanderbilt Article

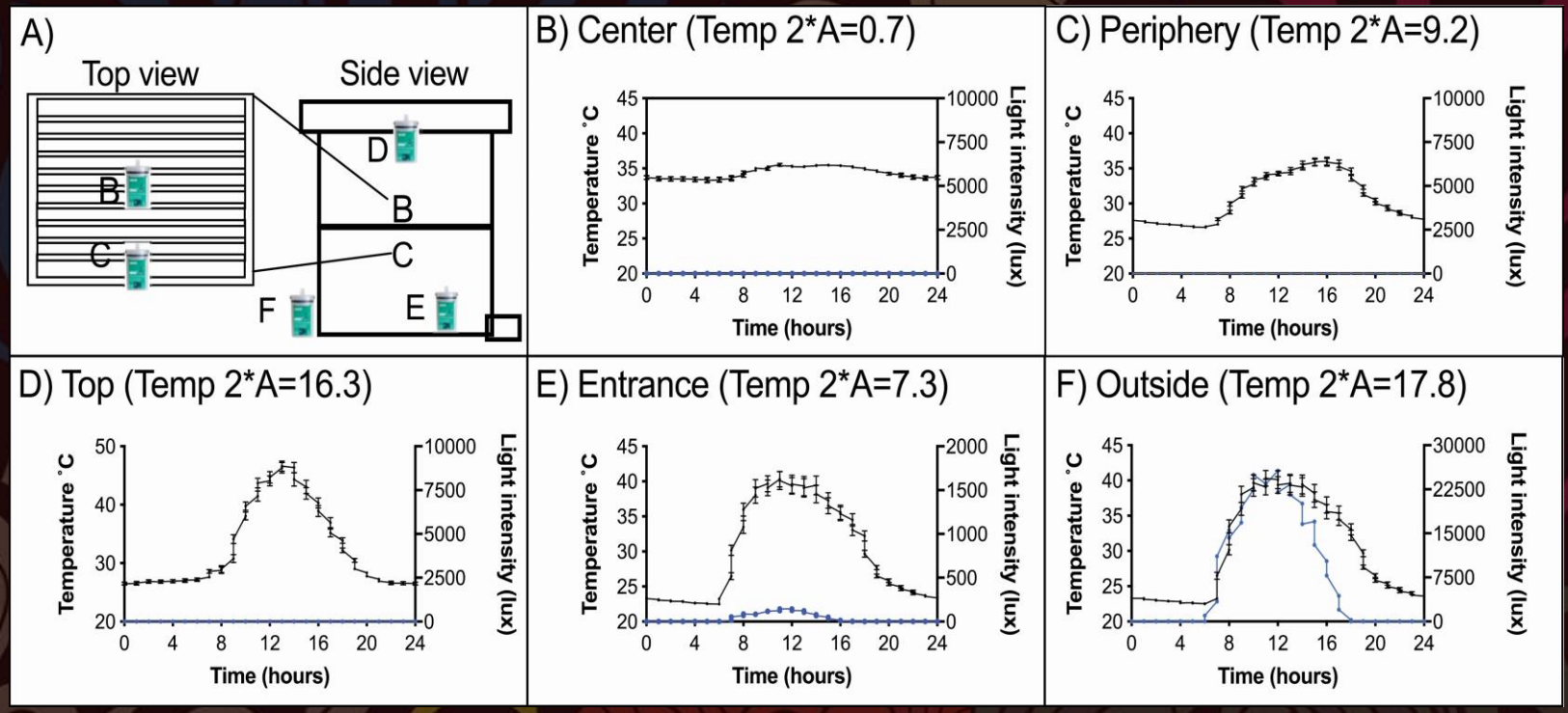
Manuel Giannoni-Guzmán

To understand how important this temperature cycle was to a bee's activity, the researchers put bees in constant and total darkness while exposing them to the temperature cycles they observed within the colony. Six days later, the scientists shifted the temperature cycle back by six hours. "We saw that the bees shifted their activity with the temperature, meaning their daily routines were responsive to temperature," Giannoni-Guzmán said.

The discovery that bees can tell accurate time from temperature cycles inside the hive shows that on a cloudy day or when bees aren't going outdoors, they have other means to tell time accurately. This will affect the way that researchers understand, interpret and integrate what they know of bee behavior.

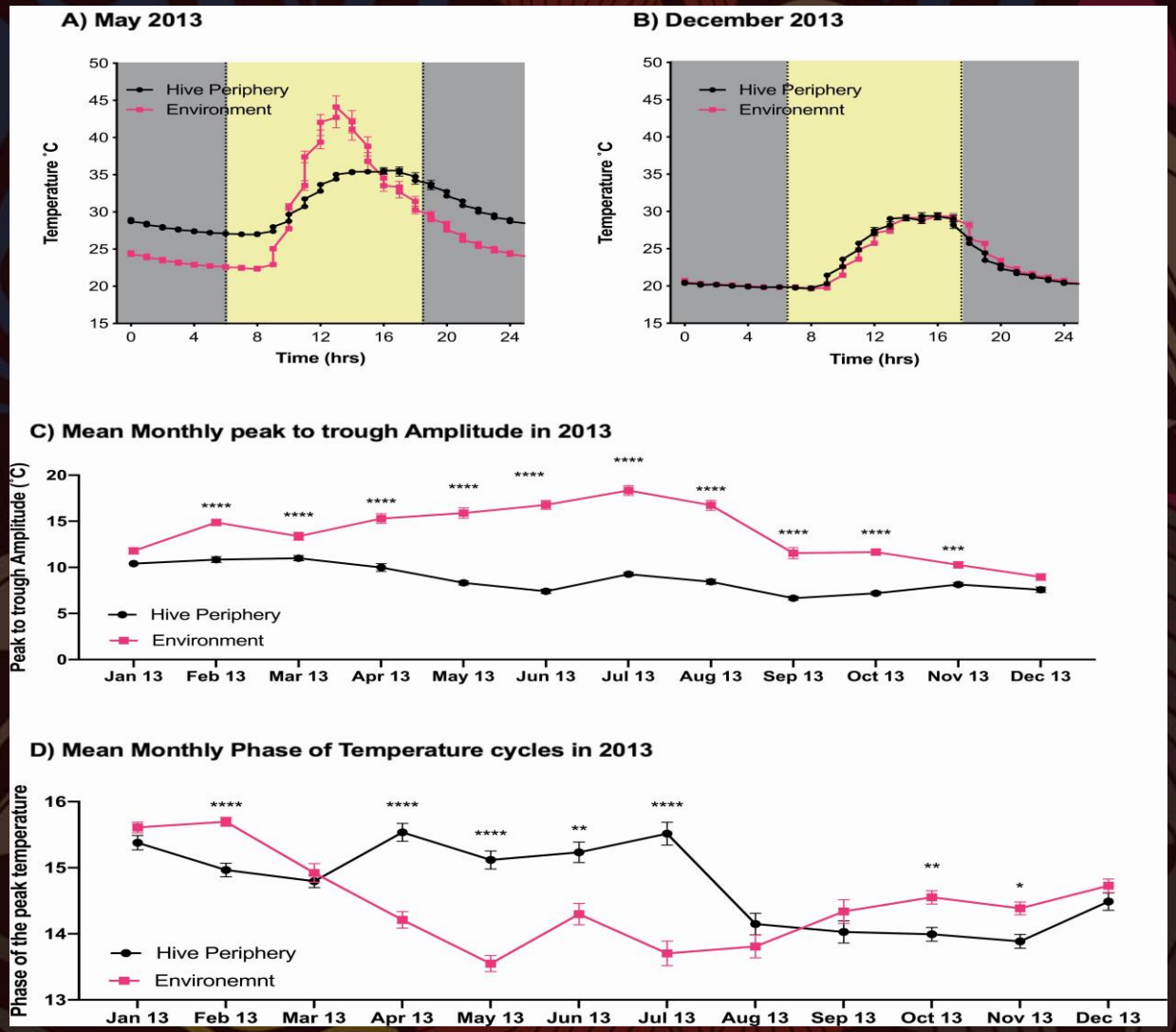
The article, "The Role of Colony Temperature in the Entrainment of Circadian Rhythms of Honey Bee Foragers," was published in the journal *Annals of the Entomological Society of America* on May 26.

Fig. 1. Temperature oscillates with a 24 h period in the periphery of the colony. (A) Top and side view of a ...

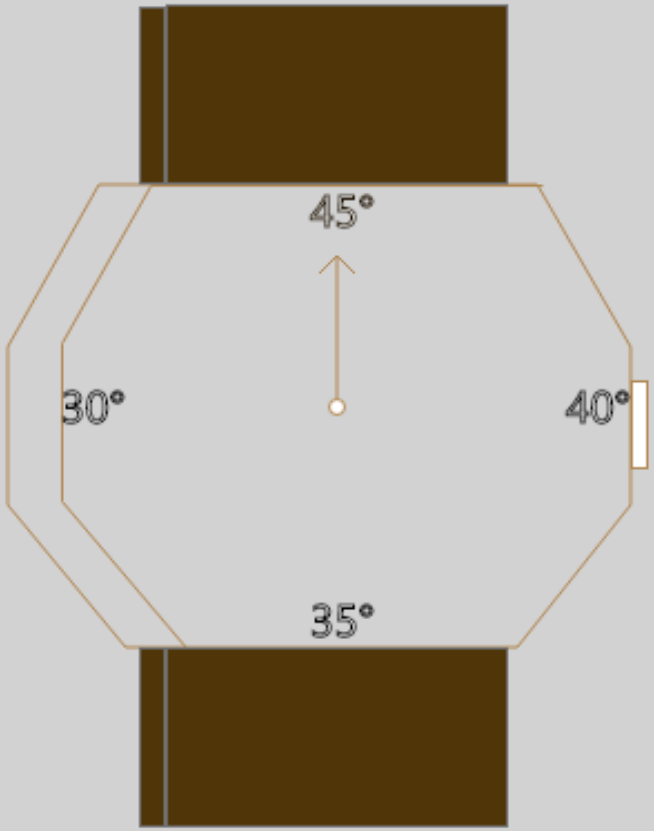


Ann Entomol Soc Am, Volume 114, Issue 5, September 2021, Pages 596–605, https://doi.org/10.1093/aesa/saab021

Fig. 2. Bees actively regulate the phase and amplitude of temperature oscillations in the hive periphery. Average ...



Ann Entomol Soc Am, Volume 114, Issue 5, September 2021, Pages 596–605, https://doi.org/10.1093/aesa/saab021


45°
30°
40°
35°

graph fluctuates as time passes