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Bumblebees lose sleep looking after the young by napping half as much



Some bees could do with an extra nap

Dietmar Nill/naturepl.com

By Chelsea Whyte

In some ways, bumblebees are just like us. When they are tending to their queen's offspring, they lose significantly more sleep than they do away from the presence of the brood.

In bumblebee colonies, worker bees tend to the queen's eggs as they move into the larval and then pupal stages before becoming adults. To see if this takes a toll on the amount of sleep the bees get, Guy Bloch at Hebrew University in Israel and his colleagues compared the sleep behaviour of bumblebees during periods of caring for the young and time away from the brood.

Using high-speed video, they tracked bees as they moved around, considering a bee to be asleep if it was motionless for more than 5 minutes. Bees that were tending to larvae, the worm-like state that worker

bees feed with honey and pollen, got about twice as much daily sleep as those that were tending pupae, which the worker bees actively groom and incubate by wrapping their legs around it and vibrating their abdomens.

For bees tending pupae, the number of naps they took decreased, but the duration of sleep each time didn't. The presence of a pupa also increased the worker bee's time spent building wax pots, which was correlated with reduced sleep.

Long sleepless nights

Pupae don't need to be fed by the worker bees, so it isn't just the heightened activity of caring for their young that is keeping bees up at night. Just the presence of empty cocoons was enough to impact the bees' sleep.

"Our data suggest that brood care is associated with several changes not only in behaviour, but also in physiology. These include activity around the clock with an attenuation of circadian rhythms, wax building and changes in the sleep pattern," says Bloch. "We hypothesize that brood caring workers show some maternal-like physiology, but without reproducing themselves."

The team found that bees housed with an empty cocoon from which the pupa had been removed slept significantly less than bees without a brood to tend on the first day of the trial, but as the days went by, their sleep gradually increased. Because the effect lost potency over time, Bloch and his colleagues suggest that chemical signals from the pupa may be at work and could degrade over time.

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Some animals compensate for lost sleep during periods of rest where they are less alert but still awake. The team didn't see the same for bees, but it is still unknown whether the reduced sleep of nursing workers compromises their health. Bloch says this is the first evidence of lost sleep due to brood care in insects, but he wouldn't be surprised to see a similar pattern in other social insects such as some wasp or ant species.

"We also study this association in honeybees, and found that care for pupae induced them to be active around the clock, but we didn't find evidence for associated changes in sleep," he says.

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