

[crickets]

[cymbal plays]

[chime]

[birds chirping]

[music playing]

[BOLT (voiceover):] I love observing and photographing insects. Wild creatures can't speak for themselves, so I use my camera to tell their stories. Lately I've gotten interested in bumble bees. Like most species of bees, they eat pollen and nectar from flowering plants. But as humans transform natural habitats into agricultural and urban landscapes, are we affecting bees' ability to find enough food? I went to Madison, Wisconsin to visit a scientist who's looking to answer that question.

[music plays]

[BOLT (on camera):] You know what I really like? When some other bee comes next to one on a flower and they do that little karate kick thing with their middle leg?

[HEMBERGER:] [laughs] Yeah. That's the way that they kind of signal that, "You're too close and I'm not comfortable with it," is they throw up a middle leg, which is, I mean, remarkably similar to what we do as humans, at least in America... the middle finger.

[BOLT (on camera):] Yeah, exactly!

[BOLT (voiceover):] Jeremy Hemberger is a graduate student at the University of Wisconsin, and he wants to understand how bumble bees forage in different habitats. He took me to see his study colonies, which live in plastic boxes in a nearby orchard.

[bees buzzing]

[HEMBERGER:] So these are my colonies... We can't ask them, "Hey, how do you like this prairie? How do you like this suburban area?" We have to rely on some form of the bee's behavior to tell us something about what they're feeling or what they're going through. What we've come up with, this design here, is asking, how long are they out gathering the resources they need? And what does that tell us about the surrounding landscape? Does that relate in some way to the amount of flowers, to the amount of resources they have available to them?

[BOLT (voiceover):] Once Jeremy places his bumble bee colonies in a study area, he wants to track individual bees as they come and go from the nest. The first step is capturing and tagging some bees, and Jeremy's got some special tools to do it.

[vacuum whirs]

[HEMBERGER:] I get to use these pretty fancy devices, which are "bee vacs." It's basically a modified dust buster that has these little tiny capsules inside that we can suck bees into as they're coming back into the nest. And then we quickly anesthetize them and tag them. We actually use radio frequency identification tags, which are these little tiny passive tags that we glue on to the bees. And when they come through this entrance, they go through an array of antennae, essentially. And that just reads that tag as they walk through.

[BOLT (voiceover):] The bees pass two detectors whenever they enter or exit the nest. Based on which detector a bee passes first, Jeremy can tell whether the bee is leaving or returning. And by comparing the bee's departure time and arrival time, he can calculate the duration of that bee's foraging trip. Every tag has a different ID number, so Jeremy can track the comings and goings of many bees in the same nest.

[HEMBERGER:] I feel like an alien abducting a human, like all the stories you hear about. I put them under a light. I glue something to them. Then they wake up like, "Whoa, what's on me?"

[BOLT (on camera):] They try to tell their friends and nobody believes them.

[HEMBERGER:] They've got evidence glued to their back.

[BOLT (voiceover):] The tags are small enough to allow the bees to move and fly freely.

[music plays]

[BOLT (voiceover):] Jeremy's first question was whether the abundance of flowers affects the duration of the bees' foraging trips. He placed bumble bee colonies near cranberry marshes, where the bees could forage on cranberry flowers and on nearby wildflowers. Before the cranberries began blooming, the bees foraged away from the nest for about 39 minutes per trip. Once the cranberry crop came into bloom, the bees' foraging trips became much shorter. That suggested the bees gathered the food they needed more efficiently when all the cranberry plants were blooming. The results aren't conclusive, but they're consistent with the hypothesis that the abundance of resources affects the foraging time of bumble bees. In his next experiment, Jeremy wants to measure foraging times in different habitats.

[HEMBERGER:] So we have... at least this experiment has three major habitat types. It's urban areas, agricultural areas, and kind of natural areas. Basically, what I'm doing with them is trying to figure out what types of landscapes and what types of habitats bees really like.

[BOLT (voiceover):] Understanding how long bees spend gathering their food in different habitats will help scientists like Jeremy Hemberger understand what kinds of environments native bees can thrive in. And that knowledge can help guide conservation efforts as we develop natural landscapes.

[music plays]

[HEMBERGER:] I never would've thought, as a kid, that I would be looking at bumble bees. I thought bumble bees are... They must understand everything about them already, because they're so common! But there's so many things that we don't know, like you said. There's just so much, you could... you could never get sick of looking and studying them.

[music plays]