What's the Buzz?

Author: Lundmark, Cathy

Source: BioScience, 55(10) : 920

Published By: American Institute of Biological Sciences

URL: https://doi.org/10.1641/0006-3568(2005)055[0920:WTB]2.0.CO;2

What's the Buzz?

POTENTIAL HABITAT FOR BEES

Times are tough for bees and other pollinators. The US Department of Agriculture declared a pollination crisis a decade ago, but bee populations, which pollinate nearly a third of the food crops we eat, have continued to decline. The extent of the decline is difficult to quantify for native or wild species; nevertheless, data from domesticated honeybees in the United States show populations dropping by as much as 50 percent in recent decades. This species has been particularly hard hit by two kinds of parasitic mites introduced in the 1980s, but all 4000 native species in North America have been facing habitat loss and excessive use of pesticides since the 1950s.

There is some good news on the horizon for native bees, according to scientists studying bees at the Patuxent Wildlife Research Center (PWRC), a 10,000-acre wildlife refuge in Laurel, Maryland. Kim Russell of the American Museum of Natural History, Harold Ikerd of Utah State University, and Sam Droege of PWRC investigated the potential of power-line rights-of-way, when managed properly, to serve as bee habitat. The potential is enormous, as there is more land area devoted to power-line easements than to any single national park in the continental United States.

The study, published in the May 2005 issue of *Biological Conservation*, compared the number and diversity of bees caught in traps at eight power-line sites on the refuge, managed for minimal impact on wildlife, with those caught at eight sites in nearby fields mowed once a year. The survey showed that, although the difference was less striking than expected, bee communities were more diverse in scrubby power-line habitat than in the tall grass fields. Of the 107 species collected, 98 were found in power-line sites and 70 in grassy sites. Rare species—those found at just 1 of the 16 sites—were far more likely to be found in power-line sites (21 of 28 species). When the data were analyzed for different behavioral subsets of species, the power-line sites exhibited more diversity, though differences were not always significant.

If power companies were to change the way they manage the millions of acres of right-of-ways under transmission lines, it would add substantially to the habitat needed for bees and other pollinators, particularly in highly developed and otherwise inhospitable areas.

Tagged bee visits a rape flower. © Biotechnology and Biological Sciences Research Council and Rothamsted Research.

DANCE AND OLFACTORY BEE-HAVIOR

Forty years ago, Karl von Frisch described the dances honeybees use to communicate the location of food sources to fellow foragers. The round dance announces there is nectar in the immediate vicinity of the hive; the waggle dance directs honeybees to food more than 100 meters (m) away. But questions have lingered about the type of information the displays convey and its precision, because bees that observe a waggle dance often take longer than expected to find a food source.

Some of those questions have now been answered by Joe Riley and fellow scientists from the United Kingdom and Germany, who used radar to track bees (*Nature,* 12 May). The colony they studied was equipped with a clear panel so they could observe bees watching a waggle dance, trap them as they were leaving the colony, and attach radar transponders to track their movements. Radar tracking showed that bees flew in the direction indicated by the waggle dance and then began searching the area at the appropriate distance from the hive; few bees alighted on the feeder located there, which is consistent with studies employing unscented feeders.

When recruits were captured, tagged, and then released 200 to 250 m away from the hive, they flew the distance and direction indicated by the waggle dance from their new location. The transplanted bees missed the feeder entirely but demonstrated that the information conveyed by the waggle dancer—distance and direction—guided the bees to the point where visual and olfactory cues could take over.

How bees respond to scents is another area pioneered by von Frisch and the subject of a recent study by researchers at the Centre de Recherches sur la Cognition Animale, in Toulouse, France (*PLoS Biology,* April). Martin Giurfa and colleagues trained honeybees to associate the odors of certain chemicals with a sucrose reward. They then tested how the conditioned bees responded to chemically related odors, creating a perceptual map for honeybees.

Bees in this study were trained to recognize a single chemical and then tested for their ability to generalize, or respond to another chemical. The pairwise comparisons for 16 molecules showed that bees generalize odors better by functional group, such as aldehydes or alcohols, than by carbon-chain length. Asymmetries were seen between some pairs, suggesting that for those scents, bees generalize better in one direction than in the reverse. The perceptual map generated in this study corresponds closely with previous studies of neuronal activity in bees exposed to the same combinations of odors.

Cathy Lundmark (e-mail: clundmark@aibs.org).