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The Language of Bees

Bees communicate their floral findings in order to recruit other worker bees of the hive to forage in the same area. There are two main hypotheses to explain how foragers recruit other workers; the "waggle dance" theory and the "odor plume" theory. The dance language theory is far more widely accepted, and has far more empirical support. Honeybees do not only waggle dance to tell hive mates the whereabouts of good eats, they also bump and beep to warn others when big trouble awaits at some of those floral diners according to a recent study.

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In 1947, Karl von Frisch correlated the runs and turns of the dance to the distance and direction of the food source from the hive. The orientation of the dance correlates to the relative position of the sun to the food source, and the length of the waggle portion of the run is correlated to the distance from the hive. Also, the more vigorous the display is, the better the food.

There seem to be two types of dances: the circle for food less than 100 meters distant and the figure 8 for longer distances.

Now there is the discovery of the "stop" or warning signal as the first negative or "inhibitory" message ever found in bees.

Previously the only recognized messages were all about how good and where the nectar was at various locations relative to hive.

"Originally people called it a begging signal," said bee researcher James Nieh of the University of California at San Diego, regarding what was for 20 years considered a mysterious behavior. "It's usually produced by butting the head and giving a short beep" to another bee that is in the middle of providing information to the hive about a specific feeding site.

Another researcher thought perhaps this had something to do with overcrowded feeding areas, said Nieh. But others saw the same behavior in uncrowded hives as well.

"That got me thinking about what there could be in common. What if they were being attacked?"

So Nieh and his assistants devised a series of experiments to simulate attacks by predatory crab spiders or by bees from competing colonies.

"In all causes we found yes, they all significantly increased 'stop' signals," Nieh confirmed. His results are reported in the February. 23 issue of the journal Current Biology.

What's more, the bees delivering the stop signals are not wasting time: They target the message directly at those bees that are trying to recruit for the specific locations where the attacks are happening, said Nieh. They do this, as their experiments confirmed, by identifying odors that the bees got from those specific locations, he explained.

Ants also have a similar "stop" signal. Pharaoh ant colonies can redesignate pheromone trails with a scent that says "Don't follow this trail!" when the way is no longer safe or worthwhile.

The negative signals the bees and ants brings them that much closer to operating exactly like a multicellular organisms which use positive and negative feedback signals all the time between cells.

For further information: http://news.discovery.com/animals/bees-colony-behavior-signals.html or http://en.wikipedia.org/wiki/Bee_learning_and_communication