

## How Bees Communicate

Beekeepers know that exposing honey outdoors in the vicinity of hives soon attracts bees in ever increasing numbers, eager to lap up this easy source of food and take it back to the nest.

How do they find it?

It takes just one bee scouting or cruising by to smell it, sample it by taste and hurry back home with the news. There she quickly tells the mates all about it, the direction and distance from the hive and the richness of the food source. That this one bee can do this was demonstrated experimentally in the early 1900's in Europe by Maurice Maeterlinck. He captured and marked a bee foraging at a honey bait and then allowed her to fly home to the nearby hive. There he waited for her to emerge, captured her again and prevented her leading other bees to the honey. But they still found it!

So how did she tell all the other bees about it?

This was extensively researched later by another European, Karl von Frisch whose results were published as recently as the 1967 in a book called "Dance Language and Orientation of Bees," Harvard University Press. Using a glass observation hive he was able to observe their communication methods.

He showed that they communicate visually by dances (even though it is dark inside an ordinary beehive!), and by smell and taste. He described three dances in detail.

First, the "Round Dance."

By this dance the returning bee tells of a food source a short distance away, less than 15 metres. She turns in small circles, reversing frequently and passing samples of the food to observing recruits, the vigour of the dance reflecting the richness of the source. This gives no indication of direction, the recruits having to find it themselves by circling, aided perhaps by a pheromone smell left at the site by the first bee.

Second, the "Waggle Dance."

This tells of a source further away, and the instructions are more specific, indicating both direction and distance as well as the value of the find. The bee runs quickly forward on the comb for a short distance, shaking her body vigorously from side to side making a buzzing sound, then turning to a particular angle to the vertical (remember she is on the side of a vertical comb). This angle indicates the direction of the source in relation to the position of the sun, while the length of the run, over several cells, gives the distance.

A third dance described by von Frisch is the Dorso-Ventral-Abdominal-Vibration (DVAV) dance. This has more to do with communicating with the queen in preparation for swarming than with orientation.

Even more dances have been recognised by researchers but are not fully elucidated.

In addition to these visual methods, the passing of samples from bee to bee gives information by smell and taste.

These communication techniques are obviously imprecise, but in one experiment 89% of bees present at a briefing found a close food source in five minutes. For longer distances, a directional error of 9-12 degrees has been estimated, and distance error of 2-10%

Still very clever! I suspect that we humans have a greater error rate when interpreting simple directions!

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