

## Bees and Beats

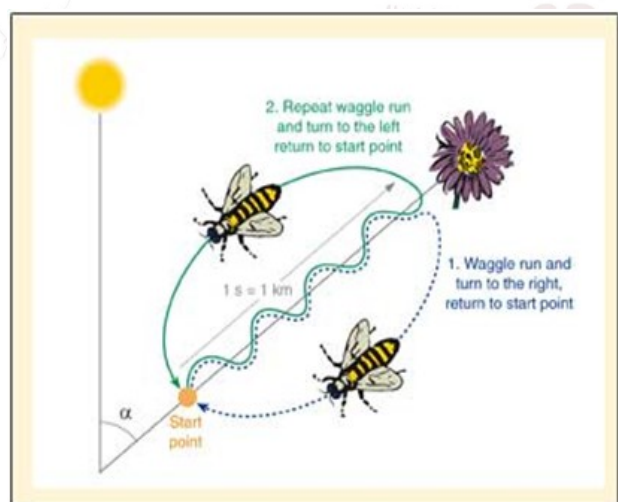
Whether you flee from a stinging bee or are enamored by the sweet honey on your pancakes, there is no way that you can ignore a dancing bee! Bees are quite famous among ethologists for what is termed as a ‘waggle dance’. Nobel laureate Karl Von Frisch was among the first to interpret this rather peculiar behavior of bees. The worker bees perform this curious dance to convey the location of food, nectar, pollen, new nesting spots and water sources to the other members of their colony.

The dance is a biphasic process: the waggle and return phases. The bee does a ‘waggle’ (curved trajectory) to create small figures of ‘8’. The bee performs a waggle run which is directly correlated with the indicated resource in terms of direction and duration. There is a range of behavioral signs and variations shown among different species. For instance, *Apis mellifera* has waggle runs that are made at an angle with respect to the direction of their combs (vertical) so as to indicate the location of flowers corresponding along the direction of the sun. The duration of the dance is to give an estimate of the distance; the more the bee wants to ‘convince’ the others, the more vigorously it dances.



The mechanism is quite effective as the bees accommodate the changing directions of the sun in their waggle dance to make sure they reach the required resource.

So, how do they do it? The bees can develop charges on their wings while flying and they can manipulate the surrounding electric field by emitting frequencies (high and low). The antennae of audience bees are thus stimulated and it has been suggested that their mechanoreceptors play a key role during this interaction. Though the dance is majorly intended to locate foraging sites, Martin Lindaeur has theorized that in the light of evolutionary perspective, the intent of the dance was originally for new nesting sites.



An experiment in 2008 showed that when honeybees of *Apis cerana cerana* and *Apis melliferaligustica* were mixed, the difference in the subtleties of the dance was noticed by the participant bees and soon they learned to interpret the 'dialect' of the other group. This also directs our attention to the fact that different species have different 'dialects' of the waggle dance in terms of the path, time period, etc. Interestingly enough, other members of Hymenoptera also show this ethnological character. Many developers of computer algorithms have already found ways to draw inspiration from this behavior while designing software and coding.

While it all rather interesting, one must also keep in mind the various contradictions and controversies regarding the efficiency of this dance. Some studies suggest that almost 93% of audience bees travel to known foraging sites while some others suggest that the dance just triggers a foraging attitude.

Nevertheless, waggle dance of the honey bees is an area that demands everyone's interest due to its unique nature and the potential evolutionary knowledge we can gather from understanding the origin of such dances and their transformation with time. Humans can learn a lot of things from nature for sure, but who knew that we can also learn to sway to a beat!

**Collector: Aishwarya H. Iyer**