Honeybee dance breaks down cultural barrier

June 4 2008

Asian and European honeybees can learn to understand one another's dance languages despite having evolved different forms of communication, an international research team has shown for the first time. The findings are published this week in the journal PLoS ONE.

The nine species of honeybees found worldwide separated about 30 to 50 million years ago, and subsequently developed different dance 'languages'. The content of the messages is the same, but the precise encoding of these languages differs between species.

Now researchers from Australia, China and Germany have discovered that the two most geographically distant bee species – the European honeybee Apis mellifera and the Asian honeybee Apis cerana – can share information and cooperate to exploit new food sources.

'We know that the members of a honeybee colony routinely exchange information via dance about the location of newly discovered locations, like feeding places, water or new nesting sites," explains Dr Shaowu Zhang from the Research School of Biological Sciences at The Australian National University.

"The scouts perform the so-called bee dances inside the nest. The coordinates of distant locations are encoded in the waggle phase of this ballet, with the direction and distance to the food source indicated by the orientation and duration of the dance. This duration differs across honeybee species, even if they fly the same distance in the same environment. It's these differences which we can think of as distinct

languages."

The research team is the first to successfully study the behaviour of a colony containing a mixture of two different species of bees. One of the first findings of this novel approach was that Asian and European honeybees, after some time of adjustment in the mixed colony, could share information and work together to gather food. Asian honeybees followed the dances of European forager bees, and deciphered the encoded information correctly.

"The dance language of honeybees is among the best studied communication systems in the animal kingdom. Nevertheless, surprises are still possible, as we have shown," Dr Zhang said. "This work has potentially major implications for our understanding of animal communication. Next we plan to study exactly to what extent variation is a factor between different bee dance languages."

Citation: Su S, Cai F, Si A, Zhang S, Tautz J, et al. (2008) East Learns from West: Asiatic Honeybees Can Understand Dance Language of European Honeybees. PLoS ONE 3(6): e2365. doi:10.1371/journal.pone.0002365

Source: Public Library of Science