ARC Centre of Excellence in Vision Science

MEDIA RELEASE

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Honeybees can learn 'foreign' languages

In an amazing discovery about the remarkable honeybee, scientists have found that Asian and European bees are capable of learning and understanding one another's secret dance languages.

"Honeybees gauge the distance flown to a food source using a 'visual odometer' that logs the objects that flow past their vision as they fly," explains Dr. Shaowu Zhang, a Chief Investigator at ARC Centre of Excellence in Vision Science and Australian National University.

"On their return to the hive they transfer this information to their hive-mates using a tail-waggle dance, where the speed and pattern of the beats indicates the distance and direction of the food."

However different species of honey bee use different dances to signal the location of their food, and scientists have long debated whether the different species of honeybee were 'speaking' a different dialect, in other words logging the visual information differently – or simply using different dance styles to convey the same data.

"We also wanted to find out whether different species of honeybee can learn from, and communicate with, one another," Shaowu says.

With colleagues Professors Songkun Su and ShengClu Chen of Zhejiang University, China, and Prof Juergen Tautz of Wurzburg University, Germany , the team bred a mixed-species bee colony at Zhangzhou, in Fujian province, China, composed of the Asiatic bee *Apis cerana cerana* (*Acc*), and the European bee *Apis mellifera ligustica* (*Aml*). The scientists then used video cameras to record and analyse how the "multicultural" bee colony behaved.

The mixed colony consisted of an Asian queen bee, Asian and European workers. The team was pleasantly surprised how harmoniously the bees were able to coexist in the mixed-species colonies.

"We were often able to observe both species of foragers dance in the mixed colony and saw the other species of bees following the dancing bee" Shaowu says.

"The first thing the team observed was that the Asiatic and European bees had quite distinct dances even when they were foraging in the same environments. The team measured the

waggle duration of the dance for both species in the mixed colony and found that they danced differently even though they had flown back from same food source in identical environments. It was as if they were speaking different dialects about the same things, then, after a time, it became clear that the Asian bees were able to decode the dances of the European bees.

“The team found that in the mixed colony Asian bees can be recruited by the European dancer to find the food source that the European bees had visited. We watched the Asian bees set out for and successfully locate the food.

“The same applied to the European bees, proving that the two species are able to communicate with one another despite their native ‘language barrier’,” Shaowu says.

“We concluded that Asian and European honeybees can learn to understand one another.” The researchers’ findings have been published in the journal PLOSONE **3** No. 6 e2365 1-9 and is entitled East Learns from West: Asiatic Honeybees Can Understand Dance Language of European Honeybees.

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