

Study shows Australian jack jumper ants navigate using landmarks

June 26 2013, by Bob Yirka

(Phys.org) —A trio of researchers from The Australian National University has found that solitary foraging jack jumper ants take mental snapshots of the terrain as they move around. This allows the ants, the team notes in their paper published in the journal *Proceedings of the Royal Society B*, to find their way home using landmark identification.

Ants are known to use various methods to find their way home after foraging, most notably path integration. This is where ants record distance traveled and in what direction as they march around and then use that information to help them find their way home. In this new effort, the researchers found that when foraging relatively close to home, jack jumper ants also note landmarks as they travel that they can use to create a mental map that leads back to their nest.

In a [prior study](#) carried out by researchers at Australia's Vision Centre, it was found that bull ants had more difficulty finding their way home in the dark than in the light of day. This suggested they use landmarks as [navigation aids](#). Building on these findings, the researchers in this new study collected 50 jack jumper ants and moved them various distances from the nest, then watched (using differential GPS) to see if they could find their way home. The group found that at distances of 10 meters or less, the ants were able to look around them then head straight for home. In contrast, when the researchers carried the ants 100 meters from their nest, the ants were confused and attempted to use path integration to orient themselves.

These findings suggested the ants were using landmarks to find their way home. To add credence to their theory, the team used cameras to study the terrain in which the ants had been released; these cameras allowed the researchers to look around from the vantage point of the ants. Doing so allowed them to very clearly see that various landmarks provided the ants sufficient information to guide their trip home. As the distance from the nest was increased, however, the team found it more and more difficult to use landmark information to create a return map.

Based on their observations, the researchers conclude that the ants do indeed use [landmarks](#) as a form of navigational aid. They note also that this simple ability far outstrips the abilities of current robots, thus jack jumper ants may serve as a model for robot builders looking to improve navigational skills in their creations.

More information: Mapping the navigational knowledge of individually foraging ants, *Myrmecia croslandi*, Published 26 June 2013
[doi: 10.1098/rspb.2013.0683](https://doi.org/10.1098/rspb.2013.0683)

Abstract

Ants are efficient navigators, guided by path integration and visual landmarks. Path integration is the primary strategy in landmark-poor habitats, but landmarks are readily used when available. The landmark panorama provides reliable information about heading direction, routes and specific location. Visual memories for guidance are often acquired along routes or near to significant places. Over what area can such locally acquired memories provide information for reaching a place? This question is unusually approachable in the solitary foraging Australian jack jumper ant, since individual foragers typically travel to one or two nest-specific foraging trees. We find that within 10 m from the nest, ants both with and without home vector information available from path integration return directly to the nest from all compass directions, after briefly scanning the panorama. By reconstructing

panoramic views within the successful homing range, we show that in the open woodland habitat of these ants, snapshot memories acquired close to the nest provide sufficient navigational information to determine nest-directed heading direction over a surprisingly large area, including areas that animals may have not visited previously.

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