Press Information

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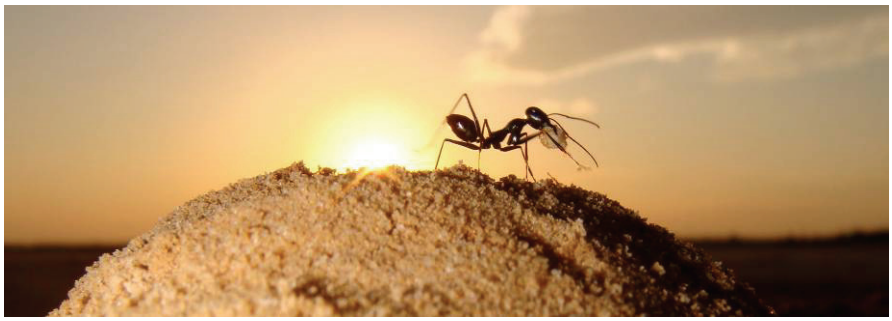
Desert ants smell their way home

Humans lost in the desert are well known for going around in circles, prompting scientists to ask how desert creatures find their way around without landmarks for guidance. Now research published in BioMed Central's open access journal *Frontiers in Zoology* shows that Desert Ants input both local smells and visual cues into their navigation systems to guide them home.



Foraging Cataglyphis fortis: Its brain is equipped with a navigation system which uses visual as well as olfactory landmarks for homing.

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Until now researchers thought that the Desert Ant *Cataglyphis fortis,* which makes its home in the inhospitable salt pans of Tunisia, was a pure vision-guided insect. But Kathrin Steck, Bill Hansson and Markus Knaden from the Max Planck Institute for Chemical Ecology in Jena, Germany used gas chromatography to verify that desert microhabitats do have unique odour signatures that can guide the ants back to the nest.

After having identified some odours of these signatures the researchers trained ants in field experiments to recognise these odours pointing to a hidden nest entrance. Ants learned to associate their nest entrance with a single odour and discriminated the training odour against non-training odours. They even picked out the training odour from a four-odour blend. The ants were less focused when faced with a blend rather than the pure scent of home, but still performed better in their search than those tested with the solvent control.

The use of environmentally derived olfactory landmarks has been shown for pigeons, while most ants rely rather on self generated pheromone trails. However *Cataglyphis* roams for over 100 meters in search for food in a habitat where high temperatures and changeable food locations make pheromone trails

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ineffective. This might be the reason, why these ants better go for stable olfactory landmarks that they learn at the nest entrance.

"We are amazed to discover that while keeping track of the path integrator and learning visual landmarks, these ants can also collect information about the olfactory world," said Knaden, who hopes to investigate the interaction between visual and olfactory information in future research. [C. Webber, BioMed Central]

Citation:

Kathrin Steck, Bill S. Hansson, Markus Knaden:
Smells like home: Desert ants, Cataglyphis fortis, use olfactory landmarks to pinpoint the nest.

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Access during embargo:
http://www.frontiersinzoology.com/imedia/1892332520237504_article.pdf?random=362714

Access after expiration of embargo:
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The Max Planck Institute for Chemical Ecology in Jena, Germany,

consists of five departments constituting five independent working areas. The Department of Evolutionary Neuroethology by Prof. Bill S. Hansson was inaugurated in April 2006. It concentrates on the functional and evolutionary analysis of arthropod chemosensory systems. In addition, two departments focus on plant biology: Molecular Ecology (headed by Prof. Ian T. Baldwin) and Biochemistry (Prof. Jonathan Gershenzon). The department of Bioorganic Chemistry (Prof. Wilhelm Boland) specializes in chemosynthesis protocols and analytical techniques, and the department of Entomology (Prof. David G. Heckel) focuses on insect genomics. Two independent Service Groups (Mass Spectrometry and Nuclear Magnetic Resonance Spectroscopy) support the scientists from all five departments with further analytical skills and measurement services.

[JWK]