

Isotope study shows which urban ants love junk food

March 31 2015



Temnothorax rugatulus. Credit: Arizona State University

Research from North Carolina State University finds that some - but not all - of the ant species on the streets of Manhattan have developed a taste for human food, offering insight into why certain ants are thriving in urban environments. The findings stem from a study that tested isotope levels in New York City ants to determine the makeup of their diet.

"We wanted to learn more about why some ant species are able to live alongside us, on sidewalks or in buildings, while other species stay on the outskirts of human development," says Dr. Clint Penick, lead author of a paper on the work and a postdoctoral researcher at NC State. "This could also help us determine which species are doing the most to clean up our

trash."

The researchers collected more than 100 ant samples, representing 21 species, at dozens of sites on sidewalks, street medians and parks in Manhattan. The ant samples were then analyzed to determine the isotope content of their bodies. Also used for carbon dating, isotopes are variations of the same element that have differing numbers of neutrons.

Animals, including humans, incorporate the carbon in their food into their bodies. One type of carbon, called carbon-13, is associated with grasses, such as corn and sugar cane. Because corn and refined sugar are present in everything from hamburgers (corn-fed beef) to processed foods, ants that eat a lot of human food have higher levels of carbon-13 than ants that avoid human food.

The researchers found that the most common ant species on sidewalks and medians, the pavement ant (*Tetramorium* Sp. E), had the highest levels of carbon-13. And, in general, the species found in medians had higher carbon-13 levels than those species found in parks. The ants living in closest contact with humans, Penick says, look more like us in terms of their isotope content.

"Human foods clearly make up a significant portion of the diet in urban species," he says. "These are the ants eating our garbage, and this may explain why pavement ants are able to achieve such large populations in cities."

There is, however, an exception to the urban ant trend of eating people food.

An [ant species](#) called *Lasius cf. emarginatus* - only found in NYC within the past five years - is thriving on Manhattan's medians, and is one of the few species other than the pavement [ants](#) to be found in high numbers on

the city's sidewalks. But Penick's isotope analysis found that *L. emarginatus* has no preference for human food.

Instead, *L. emarginatus* appears to split its time between subterranean nests and foraging in the branches of trees along NYC streets.

"This highlights the complex nature of urban ecosystems and how much we still have to learn about how these species relate to each other and to the environment," Penick says.

More information: "Stable isotopes reveal links between human food inputs and urban ant diets," *Proceedings of the Royal Society B*: rspb.royalsocietypublishing.org/doi/10.1098/rspb.2014.2608

Provided by North Carolina State University

Citation: Isotope study shows which urban ants love junk food (2015, March 31) retrieved 19 April 2024 from <https://phys.org/news/2015-03-isotope-urban-ants-junk-food.html>

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