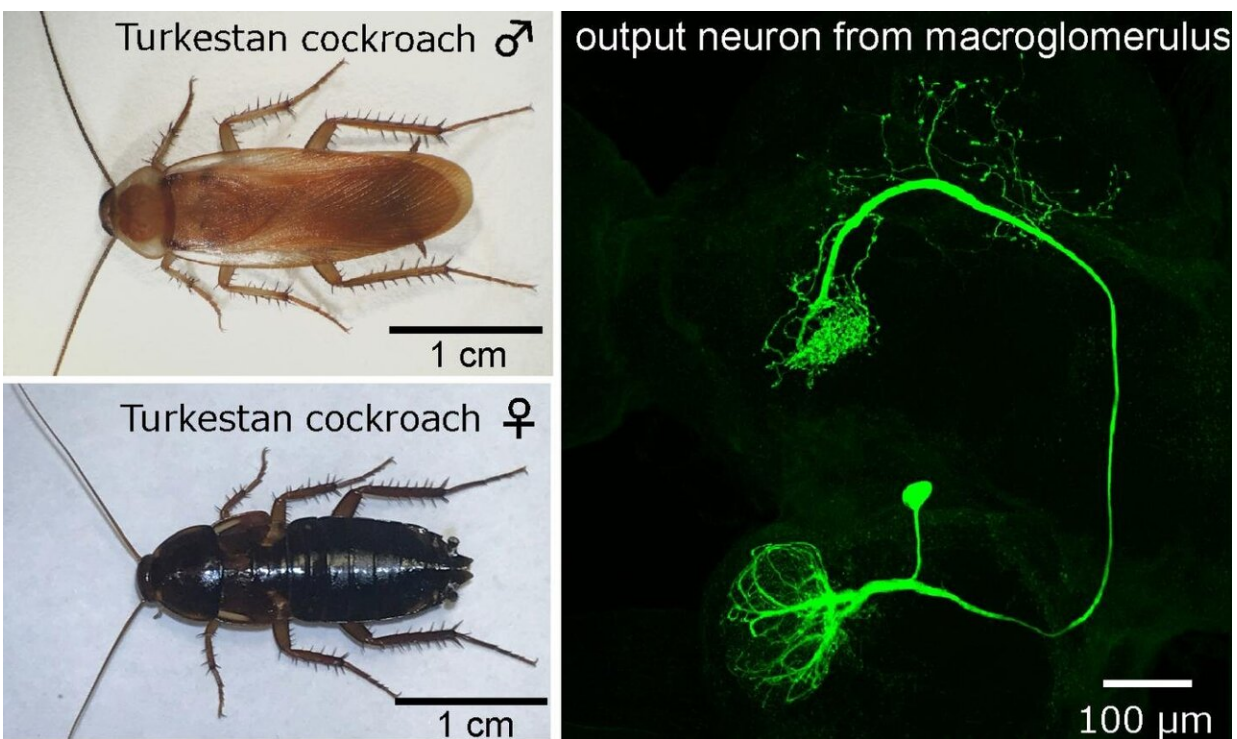


# Turkestan cockroach selling online is a companion of the common household cockroach

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A male and female Turkestan cockroach (left panels), and an output neuron from its enlarged glomerulus (right panel). (Domae M., et al., *Neuroscience Letters*, June 8, 2019) Credit: Domae M., et al., *Neuroscience Letters*, June 8, 2019

Many nocturnal animals including insects use a species-specific smell, that is, a sex pheromone, to locate and attract potential mates. For

example, female American cockroaches emit sex pheromones called "periplanones" with unique chemical structures. Males that detect them with their antennae orientate towards the pheromone source, perform courtship rituals, and mate.

The Turkestan cockroach, *Blatta lateralis*, also known as the red cockroach, has received increasing attention as a world-wide invasive pest, especially in the southern United States. Its origin is temperate to subtropical zones of the Middle East. "The Turkestan cockroach is popular as live food among reptile breeders and can be easily purchased online. So, this would be the first species that expands its habitat via the internet," says Hiroshi Nishino of Hokkaido University.

Recent molecular genetic studies have shown that the Turkestan cockroach is phylogenetically close to the American cockroach in the genus *Periplaneta*, despite their morphological and habitational differences.

This study, led by Hiroshi Nishino and published in *Neuroscience Letters*, found that the Turkestan cockroach uses periplanones or similar substances as sex pheromones. The experiments showed a male Turkestan cockroach has an extremely large glomerulus that specifically processes sex pheromones in a part of the brain called the antennal lobe. The glomerulus was three times larger than that of American cockroaches, suggesting it has more sensory cells for processing [sex pheromones](#). Accordingly, the output neuron from the large glomerulus was extremely sensitive to periplanones. As little as 0.1 femtograms of [pheromone](#) contained in a [filter paper](#) was sufficient to excite the output neuron when the paper contacted a very small region (approx. 1mm) of the antenna. This sensitivity to periplanone was more than 100 times higher compared to that of the American cockroach.

Researchers also found that a male Turkestan [cockroach](#) was attracted to

periplanone, but, unlike American cockroaches, the pheromone alone did not trigger courtship rituals. Courtship rituals started only after coming into contact with a female of the same species. This implies that a low volatile substance on the female's body plays an important role in preventing the species from mating with other species.

"Turkestan cockroaches adapt to inground containers where odor molecules diffuse very slowly and this could be why they have evolved an enlarged glomerulus to detect tiny packets of pheromones," says Hiroshi Nishino. He added, "We need exercise caution when handling Turkestan cockroaches because they are a member of the genus *Periplaneta*, in which most have become household pests worldwide.

**More information:** Mana Domae et al, Functional unification of sex pheromone-receptive glomeruli in the invasive Turkestan cockroach derived from the genus *Periplaneta*, *Neuroscience Letters* (2019). [DOI: 10.1016/j.neulet.2019.134320](https://doi.org/10.1016/j.neulet.2019.134320)

Provided by Hokkaido University

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