

Stabilizing evolutionary forces keep ants strong

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Hokkaido University researchers are finding evidence of natural selection that maintains the status quo among ant populations.

A type of natural selection, called "stabilizing selection", is thought to maintain functional characteristics in species. But it is difficult to find evidence of this type of selection through research.

"Random genetic drift", on the other hand, where genetic variations occur randomly over time, is an evolutionary process that affects characteristics under "weak selection", implying that maintaining these characteristics is generally unimportant.

Hokkaido University researchers studied two [ant species](#) in Japan and Korea that were molecular-phylogenetically indiscriminate - thus they could be considered one species - and found evidence that there were different selection forces at play on different body parts.

The researchers first observed how ants use a tiny spur that projects from their legs. They found the front spurs were frequently used to clean the antennae, a major sensory organ in ants. By contrast, the hind spurs were only seldom used to scratch the back surface of the abdomen where no important organs were found.

The team assumed that natural selection forces would strongly affect the front spur, due to its relative importance and its special brush-shape as a cleaning organ. They also assumed that the less functionally important

hind spur would be relatively unaffected by natural selection forces.

The researchers found significant genetic differences between ten ant populations of the species, implying there is limited gene flow between them. They also found limited evidence of inbreeding within the populations. This means that any observed morphological differences within and between the populations would reflect how strongly [natural selection](#) acted on each character.

Comparing the spurs in the ant populations, they found significant variations in the lengths of the less important hind spurs, which corresponds to the [random genetic drift](#) that occurs over time. They also found a smaller degree of variation in the length of the front spur among and between the ant populations.

"Our results suggest that stabilizing selection is at play, maintaining these functionally important characteristics in each population, while less important characteristics have diversified over time," says Eisuke Hasegawa, the corresponding author of the paper published in *Scientific Reports*. "Further investigations should help us understand the evolutionary forces that generate diversity and similarity among populations," he says.

More information: Shuichiro Imai et al, Difference in evolutionary patterns of strongly or weakly selected characters among ant populations, *Scientific Reports* (2016). [DOI: 10.1038/srep39451](https://doi.org/10.1038/srep39451)

Provided by Hokkaido University

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