

Imperfect mimicry in spiders and insects mainly shaped by adaptive processes rather than constraints, finds study

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Some ant mimics and putative models. An accurate ant mimicking insect (immature Alydid sp., top left) and presumed model (*Oecophylla smaragdina*, bottom left). An accurate ant-mimicking spider (*Myrmarachne macleayana*, top right) and putative ant model (bottom right, *Polyrhachis robsoni*). Photographs, Jim McLean. Credit: *Biology Letters* (2024). DOI: 10.1098/rsbl.2023.0330

Two natural scientists at Macquarie University, working with an evolutionary specialist at the University of New South Wales, all in Australia, have found that imperfect mimicry in spiders and insects is likely mainly shaped by adaptive processes rather than constraints, or chance.

In their [study](#), published in the journal *Biology Letters*, Donald McLean, Gerasimos Cassis and Marie Herberstein collected multiple specimens of ant-mimicking [spiders](#) and insects and compared them to learn more about any constraints that may have led to their imperfect mimicry.

Prior [research](#) has shown that many [insect species](#) have evolved to resemble [ants](#). This, scientists suggest, is because ants are less likely to be eaten by predators due to their foul taste and the tendency of ants to retaliate as a group. Research has also shown that some spiders have evolved in similar ways for similar reasons.

But researchers have assumed until now that insects would do a better job of it than spiders because they are evolutionarily closer to the ant model. In this new effort, the research team has found that not to be the case.

Evolution is driven by successful reproduction efforts by individuals with advantageous traits over others of their kind. Such traits are then passed on to their offspring, leading to changes over time. But some research has shown that such changes can be prevented from happening by constraints that are too large to overcome—the body weight of humans, for example, would make it impossible to develop wings for flight, even if it might allow people to gain food or to reproduce more easily.

Such constraints are believed to affect spiders. To find out if that is the case, the research team studied prior work and then ventured out into the

field to find and collect spiders and insects that resemble ants.

The researchers found that the ant-mimicking spiders looked just as much like ants as ant-mimicking insects, suggesting that major constraints may not always prevent creatures from evolving dramatically. They did find one interesting difference, however. The spiders tended to be worse mimics when viewed laterally—they have longer bodies and tails. The researchers suggest this is because their predators came from the air, rather than the ground, and so lateral mimicry was not as relevant.

More information: Donald James McLean et al, Morphological ant mimics: constrained to imperfection?, *Biology Letters* (2024). [DOI: 10.1098/rsbl.2023.0330](https://doi.org/10.1098/rsbl.2023.0330)

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