

Spider mite males undress maturing females to win the first mating

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Credit: *iScience*/Schausberger et al

In males of many species, it pays to identify females that are nearing maturity to be the first in line for mating. Now researchers reporting in the journal *iScience* have found a remarkable example: male spider mites guard and then actively strip off the skin of premature females that are

soon to molt and mature to make them accessible for mating sooner.

"Our study documents an exceptional male [behavior](#) in the [animal kingdom](#), namely that male [spider mites](#) strip off the skin of premature females that are close to molting into adulthood," said Peter Schausberger from the University of Vienna, Austria.

"Such undressing behavior by the male is adaptive—that is, it increases their [reproductive success](#)—because it would be an enormous cost to the guarding male if a rival would take away the female and inseminate her instead of the male that invested time and energy in guarding her. The guards would have invested hours in guarding a potential future mate without any reward."

In spider mites, the competition for first mating is especially intense, Schausberger explained. That's because the first copulation partner of a female is the one that sires all the offspring. In fact, the males only sire the daughters because sons arise from unfertilized eggs. Because of this intense competition to be number one, spider [mite](#) males guard premature females for several hours before the females molt to the adult stage.

"For about one or two hours before molting, the females take on a silvery appearance because of air filling the gap between the old skin, called exuvia, and the new skin; in this phase the guarding males change their behavior—sometimes they drum with their forelegs on the females, possibly to stimulate the females to initiate the molting process, and make the females bulge and crack the exuvia," Schausberger said.

"Upon cracking the exuvia, the guarding male becomes highly active and pulls on the hind part of the old skin with his pedipalps until it is removed from the [female body](#) and the genital opening of the female, which is located on the underside of the tip of her abdomen, is exposed

so that the male can slip beneath the female and insert his aedeagus," he continued. "Females that are undressed by a male first get rid of the hind part of the old skin because of male pulling, whereas females that molt without the help of a male first pull out from the front part of the old skin."

Schausberger and colleagues are generally interested in sexual selection in spider mites, and especially alternative reproductive tactics by males, including fighting and sneaking. While observing and videotaping many male-male and male-female interactions, they noticed the undressing behavior they've now described in detail.

The findings offer yet another example of the fascinating behaviors that are driven by [sexual selection](#), according to the researchers. They're also a reminder that even tiny arachnids have highly sophisticated behaviors.

In future work, they hope to study the undressing behavior in more detail to find out whether fighting males differ from sneakers in this behavior. They also want to find out what happens when males in the process of undressing a female have to contend with rivals and whether the undressing behavior acts as a signal to [females](#) of a male's quality.

More information: Peter Schausberger, Spider mite males undress females to secure the first mating, *iScience* (2023). [DOI: 10.1016/j.isci.2023.107112](#). [www.cell.com/iscience/fulltext ... 2589-0042\(23\)01189-6](http://www.cell.com/iscience/fulltext...2589-0042(23)01189-6)

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