

Male spiders show their sensitive side

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Araneus diadematus. Credit: André Karwath/Wikipedia

The sensory capacity of male spiders during mating may be higher than previously thought, a study in the open access journal *Frontiers in Zoology* suggests.

In most species, [nervous tissue](#) is considered to be an inherent property

of male copulatory organs. In spiders, these organs are situated on appendages in front of the four walking legs. They were previously thought not to possess any nerves, muscles or [sense organs](#), because they were thought to develop from the same cells that also make up a spider's claws, which are devoid of nervous and muscular tissue.

Peter Michalik, one of the corresponding authors of the study said: "Male spiders do not have direct [sperm](#) transfer organs, but transfer sperm via the tip of their pedipalps, which are transformed leg-like structures at the front of their bodies. They were thought to be numb and only recently two studies on two distantly related spider species suggested otherwise. Here, we show that the copulatory organs of [male spiders](#) have nerves and even contain sensory organs."

The research team, led by General and Systematic Zoology group of the University of Greifswald, Germany used a series of imaging techniques, including micro-CT. The authors tested the hypothesis that innervation of the spider copulatory organs may be part of the ground pattern of spiders, which means that it can be observed in all spiders. The authors showed that the copulatory organ in all species investigated in this study contained nervous tissue, which was located close to the glandular tissue of the spermatheca, where sperm are stored before transfer into a female's body.

Sensory feedback provided by nervous tissue from the copulatory organ could be advantageous to male spiders in different ways, including adjusting their investment in the [mating](#) process, depending on whether a female mated previously or not, or to allow them to manipulate rival sperm already stored in the female's [reproductive organs](#).

Peter Michalik said: "Our findings shed new light on the possible interactions between male and female spiders during mating. Males generally move their pedipalps during mating which might allow the

male to transfer sperm and to assess the females during mating. The movement may even help in removing a predecessor's sperm from the female's sperm storage site, as happens in some species. In light of our findings, our current understanding of mating strategies in spiders needs to be revisited."

The findings pave the way for unravelling the sensory interaction of spider genitalia during mating and may help solve a mystery of [spider](#) reproductive biology; the uptake and release of sperm from the spermophor.

More information: The innervation of the male copulatory organ of spiders (Araneae) - a comparative analysis Dederichs et al. *Frontiers in Zoology* 2019 [DOI: 10.1186/s12983-019-0337-6](https://doi.org/10.1186/s12983-019-0337-6)

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