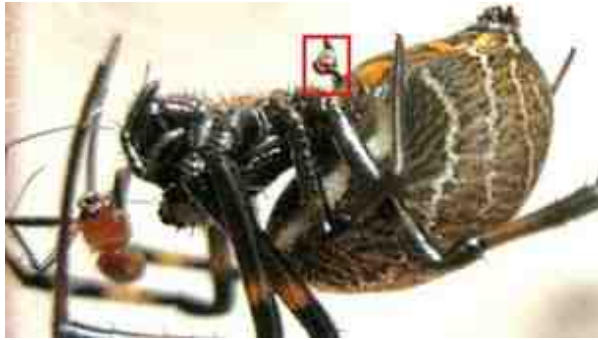


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# Male spiders break off sex organ to boost paternity



The red box shows a broken male organ lodged in the female spider

Some male spiders voluntarily "castrate" themselves during sex in order to increase their chances of fathering offspring, a new study shows.

The males break off the entire sex organ while it is still in the female, allowing it to keep injecting sperm long after they have scuttled away.

A quick getaway is understandable; the females often eat their male mates.

Writing in *Biology Letters* journal, a team now says castration increases the amount of sperm transferred.

This boosts the chances of paternity from this pairing, explaining a behaviour had been a puzzle to biologists because, on the face of things, it renders the spiders sterile.

Breaking off the tip of the palp during sex is fairly common in spiders. It is thought to function as a "plug" to stop other males from later mating with the same female, and potentially fathering offspring with her instead. It also makes sense in light of the female propensity for cannibalising males after sex.

But full emasculation was not considered necessary for making an effective plug.

So scientists had come up with other theories to explain the behaviour, known as the "eunuch phenomenon".

These have included the so-called better fighter hypothesis; eunuchs are more aggressive and agile compared with males sporting intact organs.

Arms race

But Daiqin Li, from the National University of Singapore, and colleagues decided to test whether castration resulted in continued sperm transfer to females of the *Nephilengys malabarensis* species.

They dissected the spiders and counted sperm from the reproductive parts under a microscope.

Their results show that sperm transfer from the broken palp continued after sexual intercourse had been terminated. The longer the broken spider organ was left lodged in the female before its removal, the more sperm were transferred.

They also discovered that while the percentage of organ breakages initiated by the female spider and those initiated by the male spider did not differ greatly, those initiated by the female generally resulted in a shorter intercourse time and fewer sperm transferred.

This reduces the male spider's reproductive potential.

So the authors think that voluntary castration evolved as a response to both female cannibalism of male spiders after sex and to counter the female's desire to control the duration of sexual intercourse.

Breaking off the whole palp allows sperm transfer to continue after the male spider has bolted and allows males to monopolise the female for longer.

But writing in *Biology Letters*, the team does not rule out that other benefits, such as the enhanced aggressiveness of castrated spiders, further justify the cost of sterility.

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## Study sheds light on spider sex

By Rebecca Morelle  
Science reporter, BBC News





Mating behaviour in jumping spiders

**Spiders "talk" to potential mates using a type of light not visible to the human eye, scientists report.**

A team found that male jumping spiders (*Phintella vittata*) are using ultraviolet B (UVB) rays to communicate with females.

While UVA rays are often used in animal communication, this is the first evidence that UVB light is also being used, the researchers said.

The study is published in the journal *Current Biology*.



It is unclear how the females detect the UVB light

The team found that male spiders were reflecting the ultraviolet B rays from their bodies.

The researchers discovered that females were more likely to mate with males that could "talk" to them with UVB compared with spiders sitting in chambers where UVB light had been blocked with filters.

Professor Daiqin Li, from the National University of Singapore, said: "UVA and UVB make up a small fraction of the Sun's rays, but humans cannot see them.

"Most previous studies have focused on UVA in animal communication, but this is the first study of UVB on any animal.

"Until now, scientists have assumed that animals cannot 'see' UVB, but we have found that this is not the case."

Spiders have complex eyes and although scientists know that they have UVA receptors, it remains unclear how they can detect the ultraviolet B light.