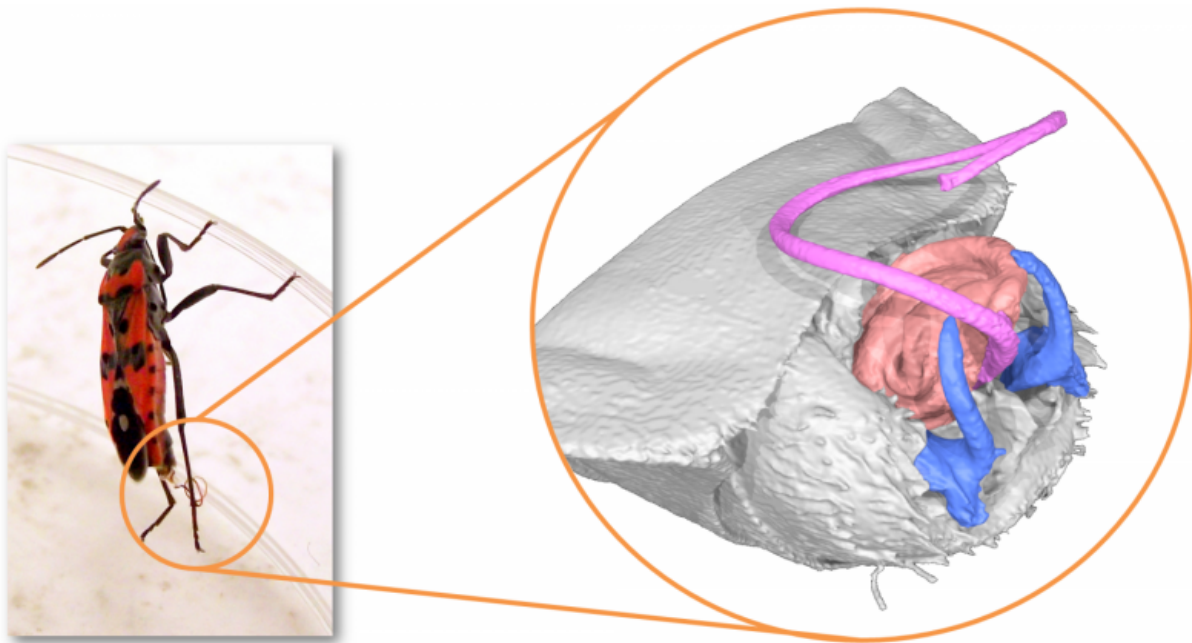


Researchers investigate why seed bugs have evolved extremely long male genitals

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Lygaeus equestris is shown after mating with processus uncoiled and a close-up of the external male genitalia after mating (from a 3-D X-ray scan). Credit: Liam Dougherty

By the looks of it, size should be a big thing when it comes to seed bugs mating, but it only matters when more than one mating partner is around to choose from. That is what researchers Liam Dougherty and David Shuker of the University of St Andrews in Scotland found when

investigating the mating strategies of two closely related black and red coloured seed bugs. The male sexual organs of these insects can be up to two-thirds the length of their bodies. The findings are published in Springer's journal *Behavioral Ecology and Sociobiology*.

Animal genitalia vary greatly in size and complexity across species, and the reasons why specific sizes or shapes of genitals are preferred can be complex. To this end, Dougherty and Shuker set out to analyse the specifics behind mate selection and fertility success in two seed bug species, *Lygaeus equestris* and *Lygaeus simulans*. The [males](#) of both species have very long external sexual organs which end in a hollow tube called the processus. At around 7 millimetres long, the processus is used to ejaculate sperm into a female and can stretch to two-thirds the length of a male's body. Why the processus has evolved to be so long in the first place is still unclear, though the extreme length would suggest that sexual selection has played a role in its evolution.

Two experiments were carried out to assess if males with a longer processus were either more likely to mate with a female, or more likely to fertilise a female's eggs during [mating](#). The social context in which mating takes place was also assessed, to see whether the presence of more than one male or female influenced how important processus length is for males both before and during mating.

Dougherty and Shuker found that processus length did have an influence on a male's chances of mating in one of the species (*L. equestris*), but only in certain contexts. Processus length was most important when a rival male was present during a mating trial. This finding has relevance, because it suggests that in the wild the strength of selection on processus length will depend on the number of males competing to mate with each female.

The length of the processus is also important during mating for both

species. This is because males commonly fail to fertilise any of a female's eggs during mating. In fact, the authors show that males with a medium-length processus are the most likely to successfully fertilise a female. Therefore in both species bigger isn't necessarily better when it comes to genital length.

"The length of the penis in two species of seed bug is subject to complex patterns of selection, varying depending on the social context and whether selection is measured before or after mating," said Dougherty in summarising the findings.

"Our results highlight the fact that genitalia may be subject to both direct and indirect selection at different stages of mating, and that to fully understand the evolution of such traits we should combine estimates of selection arising from these multiple episodes," elaborated Shuker.

More information: Liam R. Dougherty et al. Variation in pre- and post-copulatory sexual selection on male genital size in two species of lygaeid bug, *Behavioral Ecology and Sociobiology* (2016). [DOI: 10.1007/s00265-016-2082-6](https://doi.org/10.1007/s00265-016-2082-6)

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