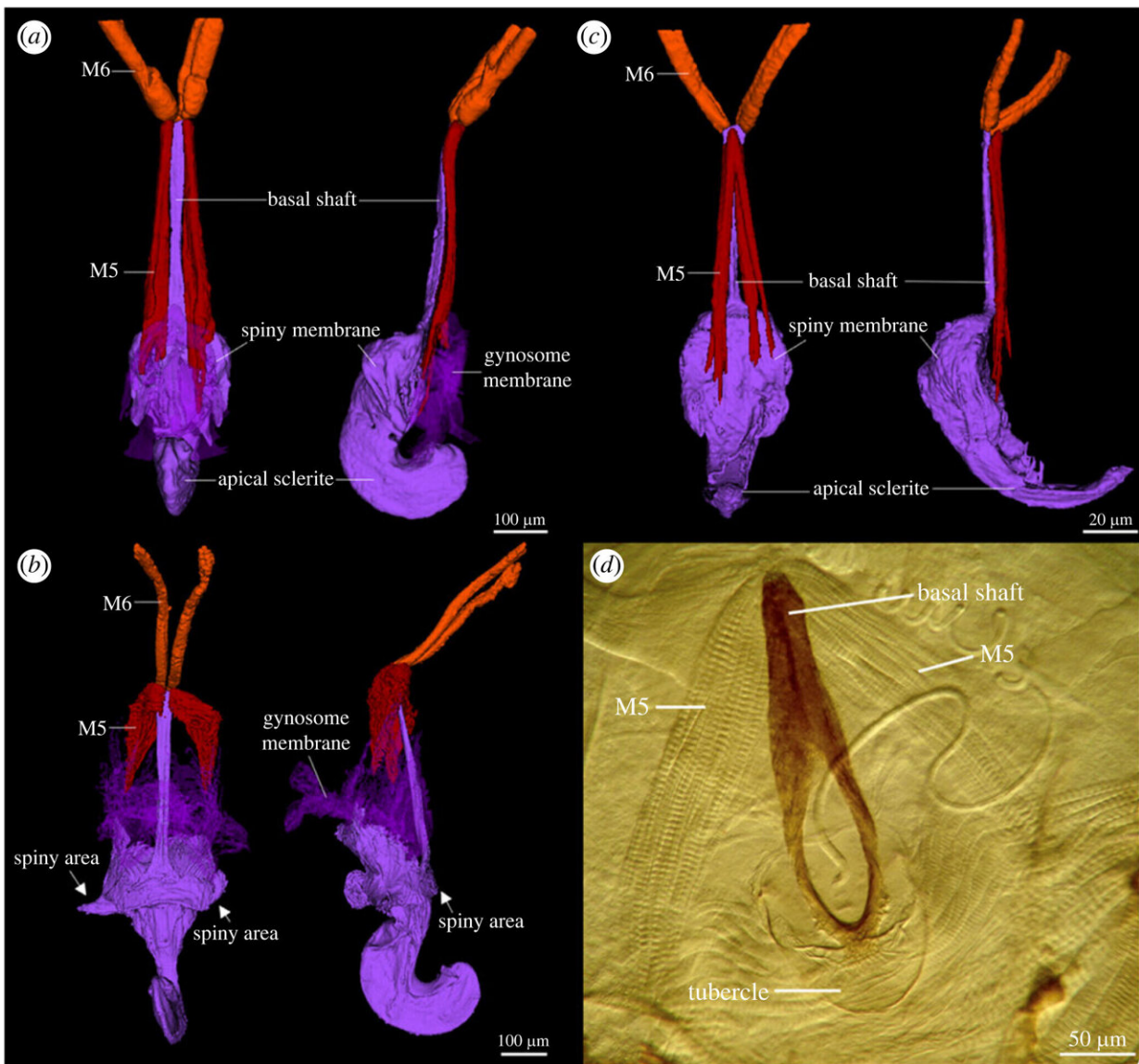


Muscles of female barklice's gynosome revealed using micro-CT scanner

January 12 2023, by Bob Yirka



(a, b) Gynosome of *Neotrogla curvata* (left: ventral view; right: lateral view): (a)

uncopulated state; (b) copulated state. (c) Gynosome of *Neotrogla brasiliensis* in uncopulated state (left: ventral view; right: lateral view). (d) Prepenis and its associated muscles of *Sensitibilla etosha* (ventral view). M5 = muscle 5; M6 = muscle 6. Credit: *Royal Society Open Science* (2023). DOI: 10.1098/rsos.220471

A team of researchers from Hokkaido University and Keio University, both in Japan, working with one colleague from the Federal University of Lavras, in Brazil, and another from the Geneva Natural History Museum, in Switzerland, has discovered the mechanism used by one species of female barklice to capture sperm from potential mates. In their paper published in the journal *Royal Society Open Science*, the group describes using a micro-CT scanner to study the musculature of female barklice.

Prior research has shown that a type of cave-dwelling Brazilian barklice has undergone sex-role reversal. During mating, the female extends a penis-like structure, called a gynosome, when approaching a potential male mate. During [copulation](#), the female inserts the gynosome into a vagina-like opening in the male's body. Once the gynosome is secure, the female engages a clamping action that holds the two insects firmly together during copulation, which can last for up to 70 hours.

While copulating, the gynosome balloons to a much larger size to pull semen from the male. The semen that is collected is then directed into a type of storage tank in the female's body. When it becomes full, she engages a valve that directs the semen to a second storage tank. In this new effort, the researchers studied the means by which the female inflates her gynosome and clamps to her mate.

Studying imagery obtained via micro-CT scanner, the researchers found that there are two groups of muscles involved in controlling the

gynosome. One group worked to make the gynosome taut during copulation, allowing for the ballooning. The other set of muscles worked together in a flaccid part of the gynosome to facilitate hooking together and holding in place the sexual components of both partners. They found that together, the muscles allowed the female to unfurl her gynosome, to copulate and to retract after completion.

According to the study, the anatomy of the barklice suggests that copulating is for more than just reproduction—it also serves to provide the female with nutrition. Food is scarce in the caves where they live; the insects survive mostly by eating bat droppings. Adding nutrients in [semen](#) could provide the energy the female needs to produce offspring.

More information: Zixin Cheng et al, Acquisition of novel muscles enabled protruding and retracting mechanisms of female penis in sex-role reversed cave insects, *Royal Society Open Science* (2023). [DOI: 10.1098/rsos.220471](https://doi.org/10.1098/rsos.220471)

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