

Research shows that millipedes use a sucking pump to ingest liquid food

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The tropical boring millipede *Rhinotus purpureus* is often found on fungi, which it presumably feeds on with the help of a sucking pump in its small pointed head. Credit: Leif Moritz

Whether it involves nectar-sucking butterflies or blood-sucking mosquitoes, the ingestion of liquid food has long been known for many insects and other arthropods. A research team from Germany and Switzerland, led by the Leibniz Institute for the Analysis of Biodiversity Change (LIB) and the University of Bonn, now shows that millipedes also use a sucking pump to ingest liquid food. The sucking pump has thus evolved independently in different groups of organisms over several 100 million years. In the process, astonishingly similar biomechanical solutions for ingesting liquid food have evolved in widely distant animal groups. The study results have now been published in the journal *Science Advances*.

Like insects, crustaceans and arachnids, millipedes belong to the megadiverse group of [arthropods](#). While liquid-based diets have been for insects and arachnids, it was previously only suspected that some millipedes also feed on liquid food. A team led by scientists Leif Moritz (Leibniz Institute for the Analysis of Biodiversity Change, University of Bonn), Dr. Thomas Wesener (Leibniz Institute for the Analysis of Biodiversity Change) and Prof. Dr. Alexander Blanke (University of Bonn) has now studied the heads of representatives of the species-poor and exotic Colobognatha.

Using high-resolution tomography as well as histological methods and electron microscopy, the researchers discovered a sucking pump in millipedes that is strikingly similar to those of insects. It consists of a chamber that is widened by strong muscles to suck in liquid food. "Together with the protractible mouthparts, the sucking pump enables

these millipedes to ingest more or less [liquid food](#)," explains Leif Moritz, a doctoral student at the University of Bonn and the LIB.



Some millipedes, like this siphonophorid, have a long beak with mouthparts that can be moved back and forth like a saw. Credit: Leif Moritz

The research team was able to show that the functional tools for a diet

with liquid nutrients have evolved several times independently in all major subgroups of arthropods. "The biomechanical-morphological similarities between the groups of organisms indicate the strength of selection as soon as a food source provides even a slight evolutionary advantage," elaborates Alexander Blanke, head of the working group for evolutionary morphology at the University of Bonn.

The study also provides insights to better understand the origin of species diversity. This is because in contrast to the very species-rich sucking insects with over 400,000 species, the group of Colobognatha millipedes comprises only about 250 species. "Consequently, liquid-based feeding alone is not a general driver of species richness," adds Thomas Wesener, head of the Myriapoda section at LIB. Because these millipedes mostly rely on moist habitats and cannot fly, their dispersal options appear limited, and they are more vulnerable to environmental change. "Today's sucking [millipedes](#) are probably a relict group and the remnant of a once much larger diversity," Alexander Blanke assumes.

More information: Leif Moritz et al, A previously unknown feeding mode in millipedes and the convergence of fluid feeding across arthropods, *Science Advances* (2022). [DOI: 10.1126/sciadv.abm0577](https://doi.org/10.1126/sciadv.abm0577)

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