Researchers document new species of carnivorous sponge (w/ Video)

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Credit: MBARI

(Phys.org)—Researchers working with a team from the Monterey Bay Aquarium Research Institute have confirmed that a species of sponge first spotted off the coast of California in 2000 by a team of geologists, is indeed new. They describe their work in studying the sponge –

Chondrocladia lyra – in their paper published in the journal *Invertebrate Biology*.

Scientists have known for almost twenty years that some species of sponge are carnivorous; instead of absorbing organic material in ocean water like other sponges, they actually catch their prey and then use chemicals to break them down. It wasn't known if Chondrocladia lyra, discovered by geologists exploring deep water off the coast of California, was a meat eater or not, due to the depths at which it lives – almost two miles down. In this new research, the harp sponge, as it's been nicknamed due to its physical similarity to the musical instrument, has been found to be not only carnivorous but able to mate via sperm package delivery.

The researchers studied the sponge using deep sea vehicles and in so doing found that they look like multi-vaned harps, each with balls on the top ends of its "strings." The strings have Velcro-like hooks for catching invertebrate prey. Captured prey is channeled to an enclosure where it is covered in chemicals that break it down for absorption. But the balls also serve another purpose; each contains packets of spermatophores that are released into the surrounding water where they are carried to other sponges by currents. Other sponges are fertilized when they capture them.

The researchers also found that the harp sponge are anchored to the sea floor by what are known as rhizoids, which resemble a root system and that the number of vanes individual specimens can have, vary from sponge to sponge, ranging from 1 to 6. They noted too that once a sponge is fertilized, eggs that sit at the midpoint of the strings between the base and balls swell up as new sponges develop.

The researchers theorize that the harp sponge developed its elaborate structure as a means of maximizing surface area to allow for catching the

most possible prey.

More information: Lee, W. L., Reiswig, H. M., Austin, W. C. and Lundsten, L. (2012), An extraordinary new carnivorous sponge, Chondrocladia lyra, in the new subgenus Symmetrocladia (Demospongiae, Cladorhizidae), from off of northern California, USA. *Invertebrate Biology*. doi: 10.1111/ivb.12001

Abstract

Chondrocladia (Symmetrocladia) lyra subgen. nov., sp. nov., is described from northeast Pacific sites at Escanaba Ridge and Monterey Canyon at depths of 3316–3399 m. Two retrieved specimens are described in detail, while variations are described in ten photographed or videotaped specimens. The basic structure, termed a vane, is harp- or lyre-shaped. From 1 to 6 vanes extend by radial growth from the organism's center. The orientation among the vanes is approximately equiangular, such that together they display pentaradiate, tetraradiate, triradiate, or biradiate symmetries. Each vane is formed by a horizontal stolon supporting a series of upright, equidistantly spaced branches each of which terminates at its apex in a swollen ball in all observed specimens except the paratype. Swellings occur midway along the branches in the holotype, but not in the paratype. A linear row of filaments project from the sides, front, and back of each branch, and also from the tops of each stolon. The terminal balls are the sites of spermatophore production and release; mid-branch swellings are sites of oocyte maturation. The two megasclere spicule types have specific distributions; styles support rhizoids, stolons, and branches, while subtylostyles support filaments and terminal balls. Anchorate isochelae cover all surfaces. Enclosed crustacean prey on branches and stolons provide direct evidence of carnivory. The structure of the vanes maximizes surface area for passive suspension feeding. Increased surface area could also maximize spermatophore capture, with the sigmas projecting from the spermatophore surface being caught by projecting isochelae on filaments. Swellings on filaments are snared

spermatophores, firmly fused to recipient tissues and undergoing destruction. Spermatophores on filaments are present in branch swellings containing early and mature oocytes. Oogenesis and maturation occur only in proximity to branch swellings, suggesting that development is induced by spermatophore reception. Symmetrical development of uniserial branched stolons (the vanes) characterized members of the new subgenus Symmetrocladia.