

## New order of marine creatures discovered among sea anemones

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This sea anemone, *Actiniidae* sp., was photographed in Algoa Bay, Port Elizabeth, South Africa. Credit: ©Bernard Picton/National Museums Northern Ireland

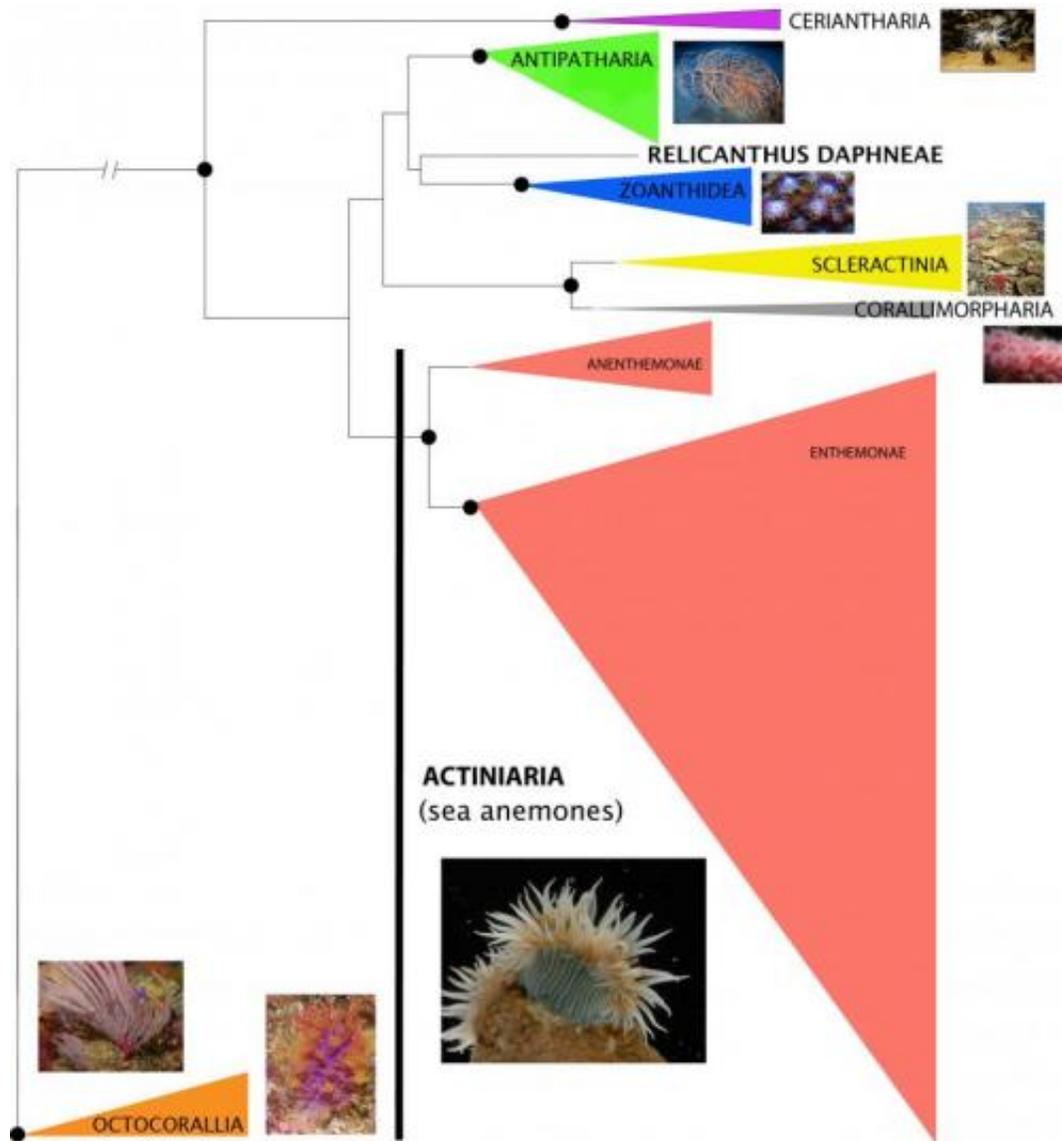
A deep-water creature once thought to be one of the world's largest sea anemones, with tentacles reaching more than 6.5 feet long, actually belongs to a new order of animals. The finding is part of a new DNA-

based study led by the American Museum of Natural History that presents the first tree of life for sea anemones, a group that includes more than 1,200 species. The report, which is published today in the journal *PLOS ONE*, reshapes scientists' understanding of the relationships among these poorly understood animals.

"The discovery of this new order of Cnidaria—a phylum that includes jellyfish, corals, sea anemones, and their relatives—is the equivalent to finding the first member of a group like primates or rodents," said Estefanía Rodríguez, an assistant curator in the Museum's Division of Invertebrate Zoology and the lead author of the new publication. "The difference is that most people are far more familiar with animals like chimpanzees and rats than they are with life on the ocean floor. But this amazing finding tells us that we have so much more to learn and discover in the ocean."

Rodríguez, along with an international team of researchers, conducted a four-year study to organize sea anemones in a "natural," or phylogenetic, way, based on their evolutionary relationships. Sea anemones are stinging polyps that spend most of their time attached to rocks on the sea floor or on coral reefs. Although they vary greatly in size and color, anemones have very few defining structures. As a result, classifying these animals based on morphology alone can be difficult.

"Anemones are very simple animals," Rodríguez said. "Because of this, they are grouped together by their lack of characters—for example, the absence of a skeleton or the lack of colony-building, like you see in corals. So it wasn't a huge surprise when we began to look at their molecular data and found that the traditional classifications of anemones were wrong."



This figure shows the new phylogenetic reconstruction of the sub-class Hexacorallia, which includes stony corals, anemones, and black corals. The position of *Relicanthus daphneae*, previously thought to be a giant sea anemone, was found to be outside of that group, in a new order of animals. Credit: E. Rodríguez/AMNH; Octocorallia images and sea anemone image courtesy of Bernard Picton/National Museums Northern Ireland

The researchers compared particular sections of DNA of more than 112 species of anemones collected from oceans around the world. Based on

genetic data and the organization of their internal structures, the scientists reduced the sub-orders of anemones from four to two.

They also discovered that one of species that they analyzed is not a sea anemone at all. This animal, previously called *Bolocerooides daphneae*, was discovered in 2006 in the deep east Pacific Ocean and labeled as one of the largest sea anemones in existence. But the new study shifts it outside of the tree of life for anemones. Instead, the researchers placed it in a newly created order—a classification equal to carnivoria in mammals or crocodilia in reptiles—under the sub-class Hexacorallia, which includes stony corals, anemones, and black corals. The new name of the animal, which lives next to hydrothermal vents, is *Relicanthus daphneae*.

*Relicanthus daphneae* is a classic example of convergent evolution, the independent evolution of similar features in species of different lineages.

"Even though this animal looks very much like a [sea anemone](#), it is not one," Rodríguez said. "Both groups of animals lack the same characters, but our research shows that while the anemones lost those characters over millions of years of evolution, *R. daphneae* never had them. Putting these [animals](#) in the same group would be like classifying worms and snakes together because neither have legs."

For now, *Relicanthus daphneae* is the only species in the new order, but researchers hope to change that. "Although we've long known about the existence of this giant animal, it's only in recent years that we're really starting to understand where it fits into the tree of life," Rodríguez said. "So imagine what else is still out there to discover."

Provided by American Museum of Natural History

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