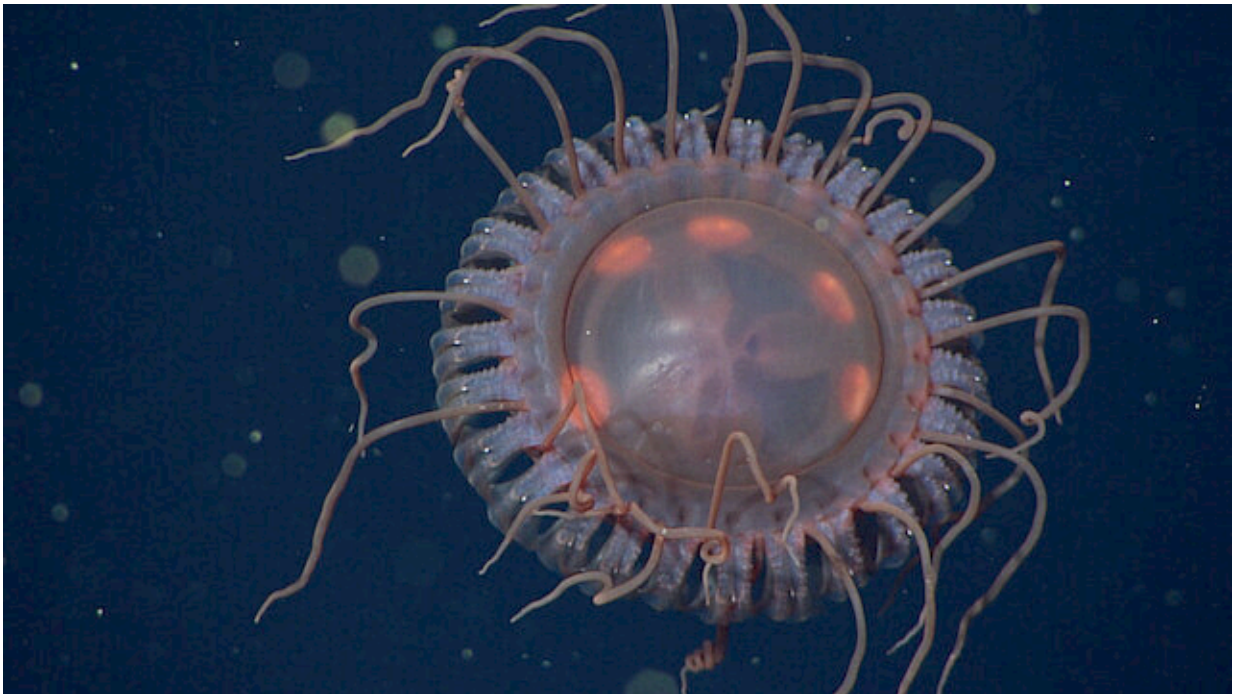


Scientists discover a new species of deep-sea crown jelly in Monterey Bay

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Atolla reynoldsi, a large new species of deep-sea crown jelly with distinctive thorny projections around the margin of its bell. Credit: © 2018 MBARI

The deep-sea crown jelly *Atolla* is one of the most common residents of the ocean's midnight zone. Its bell has a signature scarlet color and bears one tentacle much longer than the rest. So 15 years ago, when MBARI researchers spotted a jelly that looked like *Atolla*, but lacked the telltale trailing tentacle, their curiosity was piqued.

MBARI researchers have now published the scientific description of a large new species of *Atolla* in the scientific journal *Animals*. They have named their discovery *Atolla reynoldsi* in honor of the first volunteer at the Monterey Bay Aquarium, MBARI's education and conservation partner.

"We named this stunning new species in honor of Jeff Reynolds in recognition of the 4.3 million hours of service that he and other volunteers have contributed to the Monterey Bay Aquarium over the past 38 years. They have graciously given their time to educate the public about the wonders of the ocean. Aquarium volunteers have been instrumental in raising awareness about the fragility of the ocean and inspiring the public to care about the health of the ocean," said MBARI Senior Education and Research Specialist George Matsumoto, who was the lead author on the description of this new species.

Matsumoto and his co-authors believe two more previously unknown species of *Atolla* also live in the depths of Monterey Bay, California. They hope to eventually describe these new additions to *Atolla*'s family tree.

The deep-sea crown jelly *Atolla* is found worldwide and can be abundant in deep water. MBARI's archive of more than 27,600 hours of video contains thousands of observations of *Atolla*. To date, scientists recognize 10 species in the genus. *Atolla chuni*, *A. gigantea*, and *A. vanhoeffeni* are the most recognizable—they have unique features that make them relatively easy to identify. But others, even the common and widespread *A. wyvillei*, can be rather difficult to identify. Some characteristics thought to be species-specific have turned out to be less than helpful in separating out the species.

One feature researchers often use to identify *Atolla* is the single elongate—or hypertrophied—tentacle. One tentacle can stretch up to six

times the diameter of the bell. Researchers believe this long tentacle aids in capturing prey. Observations from researchers in Japan suggest the single trailing tentacle helps a hungry *Atolla* snag siphonophores (rope-like gelatinous animals made of specialized segments).

Over the past 15 years, MBARI researchers have observed and collected numerous specimens of three types of *Atolla*-like jellies that lack the typical trailing tentacle. Now, researchers have collected sufficient details about morphological and molecular features to describe one of these three unique jellies: *Atolla reynoldsi*.

A. reynoldsi is relatively large compared to other species of *Atolla*. The largest specimen MBARI researchers collected was 13 centimeters (5.1 inches) in diameter, making this newly discovered species one of the largest in the genus.

Like other deep-sea crown jellies, *A. reynoldsi* has a furrowed bell. A deep groove runs around the bell, separating the domed bell from the wide margin with thick segments, known as pedalia, containing finger-like lappets. The edge of the bell resembles a crown, earning this group of jellies its regal name. The "crown" in *A. reynoldsi* has warty papillae and spiked ridges. Only one other species of *Atolla*—*A. chuni*, known from the South Atlantic and Southern oceans—has a similarly bumpy bell. *A. reynoldsi* also has a distinct gut that is shaped like a Greek cross.

In addition to the lack of the hypertrophied tentacle, *A. reynoldsi* is often observed with its tentacles coiled. MBARI researchers have learned that the number of tentacles may not be a reliable diagnostic tool for identifying individual species of *Atolla*. Tentacle number varies considerably from one individual to the next, and the new *A. reynoldsi* can have anywhere from 26 to 39 tentacles.

A. reynoldsi is not common—MBARI researchers have only observed

10 specimens between April 2006 and June 2021. So far, this species is only known from Monterey Bay and lives at depths of 1,013 to 3,189 meters (3,323 to 10,463 feet).

A. reynoldsi is molecularly distinct from the other *Atolla* species that the MBARI research team was able to collect and is morphologically distinct from all 10 described *Atolla* species, although it shares the presence of papillae with *A. chuni*.

The new species of *Atolla* is named after Jeff Reynolds, the first volunteer at the Monterey Bay Aquarium, and honors the contributions of Aquarium volunteers to inspiring conservation of the ocean.

In 1980, four years before the Aquarium's grand opening, Reynolds guarded a beached whale on Del Monte Beach overnight so that the Aquarium could retrieve it and prepare it for eventual overhead display. Reynolds assisted veterinarian Tom Williams with marine mammal research during the Aquarium's early years. He even helped Williams launch the Aquarium's groundbreaking effort to rescue and rehabilitate stranded sea otter pups.

"This is such an honor to have this new species named after me. It also honors all the fantastic Aquarium volunteers over the decades, I was just the lucky one to be there so early on," said Jeff Reynolds. "Volunteering and working for the Aquarium for 42 years was just such an awesome and rewarding experience. It was especially wonderful being taken in as a 16-year-old kid by mentors like [Aquarium co-founder] Steve Webster and Tom Williams to just do whatever needed being done at the moment, from vacuuming the floor to caring for stranded sea otter pups to assisting with whale necropsies to building exhibit models."

Since its inception in 1984, Aquarium staff have worked alongside a community of committed, enthusiastic, and highly effective volunteers.

Aquarium volunteers experience a unique sense of community, a passionate connection to the Aquarium's mission, and an unusually high quantity of service hours. Since the opening of the Aquarium, volunteers have contributed more than 4.3 million hours of service.

The mission of the Monterey Bay Aquarium is to inspire conservation of the ocean. Aquarium volunteers support this mission both directly and indirectly, in front of and behind the scenes. Volunteers assume a diverse assortment of roles across the institution. Interpretive guides interact with visitors and share the wonders of Aquarium exhibits with the public. Others work behind the scenes to prepare food for Aquarium animals, track otters in Elkhorn Slough, or even dive in Aquarium exhibits to polish the acrylic and maintain the beauty of the exhibits for visitors.

It is impossible to overstate the magnitude of the impact of Aquarium volunteers. Their contributions extend far beyond their activities at the Aquarium—they also become ambassadors in their communities not only for the Aquarium but also for ocean conservation.

"As an Aquarium volunteer myself, it's so rewarding to see visitors fall in love with the ocean. We're privileged to have the Monterey Bay Aquarium as MBARI's education and conservation partner. Together, we brought the deep sea to land in the new Into the Deep exhibition. It's my hope that the volunteers in this exhibition can help inspire future generations to care about an environment that's the largest living space on Earth, but one we still know so little about," said Matsumoto.

Indeed, there is still much to learn about the diversity of life in the deep sea, even in a location as well studied as Monterey Bay.

In addition to the description of the new *Atolla reynoldsi*, the MBARI research team also collected natural history information for two more

unique Atolla that will likely prove to be new species, but the research team did not have enough samples at this time to confirm those suspicions.

One species—for now given the placeholder name of Atolla species A—has only been observed three times, once in 2002 and twice in 2021. Like *A. reynoldsi*, it can be quite large compared to its relatives, with one specimen too large to collect in ROV samplers and another 8.5 centimeters (3.3 inches) across. It too does not have a trailing tentacle and the shape of the gut resembles a Greek cross. However, unlike *A. reynoldsi*, "species A" displays straight—not curled—tentacles and does not have [papillae](#) or spiky ridges on its bell. Its bell is tall with a distinctive large, rounded dome shape.

The second species—known as Atolla species B until it is formally described by researchers—has been seen by MBARI researchers five times in the past 15 years. It occurs in very deep water, with three out of five observations recorded deeper than 3,000 meters (9,800 feet). The largest specimen was 7.4 centimeters (2.9 inches) across. All five specimens displayed coiled tentacles, lacked the trailing tentacle, and had a Greek cross-shaped gut like *A. reynoldsi*, but the bell was white, very flat, and lacked any warts or spikes around the margin.

The three new Atolla-like jellies do not fall within the current taxonomic descriptions of the family Atollidae or the genus Atolla. All three of these unique Atolla may eventually need to be placed into a new genus due to their distinct stomach morphology and the lack of a trailing tentacle. Until further work to determine the morphological features and genetic sequences that define the genus Atolla and the individual species therein is completed, the research team recommends that they remain within the genus Atolla.

A. reynoldsi is just one of millions of species that live in the deep sea,

many of which are still unknown to humans. Over the past 34 years, MBARI researchers have documented more than 225 [new species](#) from explorations in Monterey Bay and beyond, but have barely scratched the surface in revealing the diversity of life in the deep sea.

These discoveries remind us that we still know so little about the ocean, the largest living space on Earth. The ocean is changing rapidly and the same threats that face coastal waters—overfishing, plastic pollution, climate change, and habitat destruction—also extend to the depths below. We must document the diversity of life deep beneath the surface before it becomes lost forever.

"These remarkable new jellies underscore how much we still have to learn about the deep sea. On just about every dive into the depths of Monterey Bay, we learn something new," explained Matsumoto.

"MBARI's work to understand the ocean is more urgent than ever as the deep sea and the animals that live there face a growing number of threats. We cannot protect life in the deep sea unless we understand it first."

More information: George I. Matsumoto et al, *Atolla reynoldsi* sp. nov. (Cnidaria, Scyphozoa, Coronatae, Atollidae): A New Species of Coronate Scyphozoan Found in the Eastern North Pacific Ocean, *Animals* (2022). [DOI: 10.3390/ani12060742](https://doi.org/10.3390/ani12060742)

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