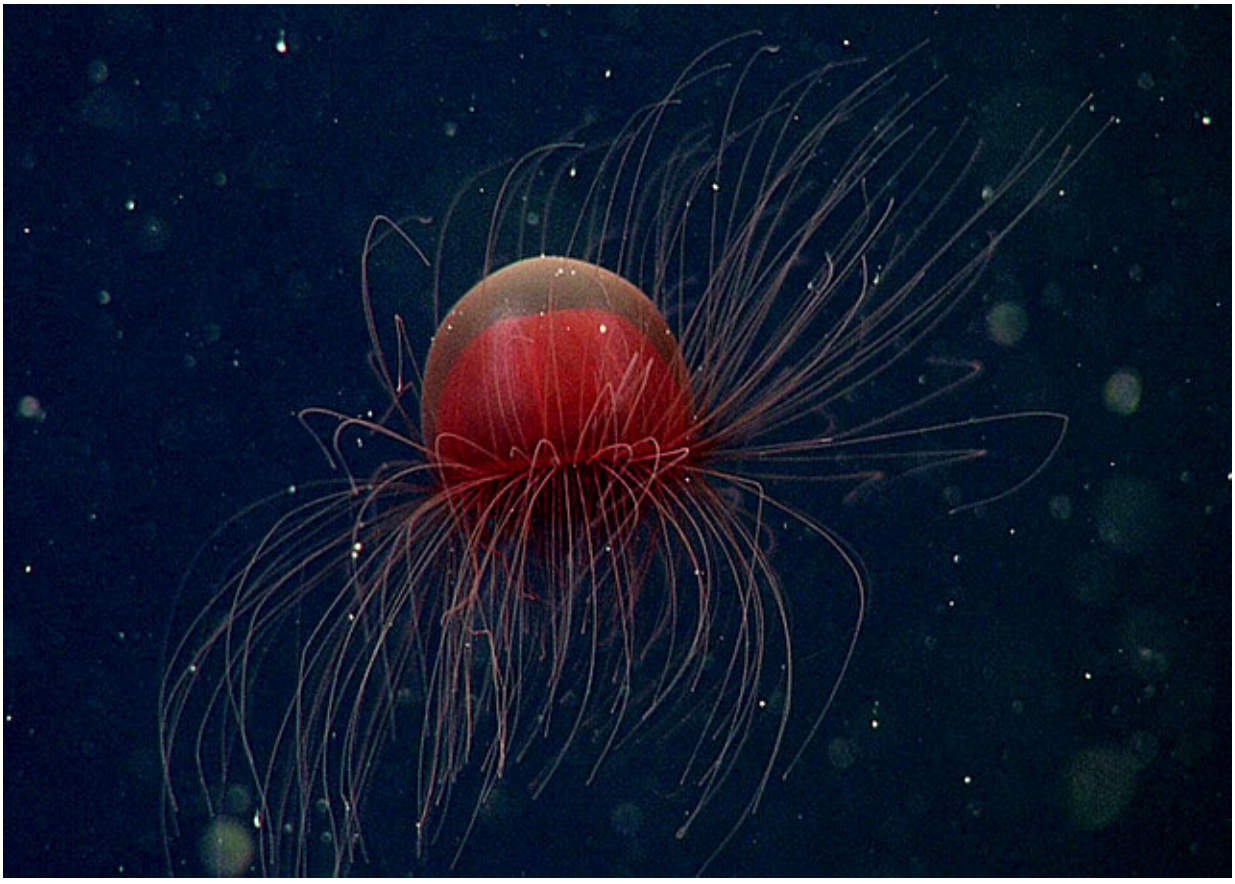
Mysterious little red jellies: A case of mistaken identity

January 17 2020



This beautiful red jelly, Crossota rufobrunnea, has long, whispy tentacles. Credit: MBARI

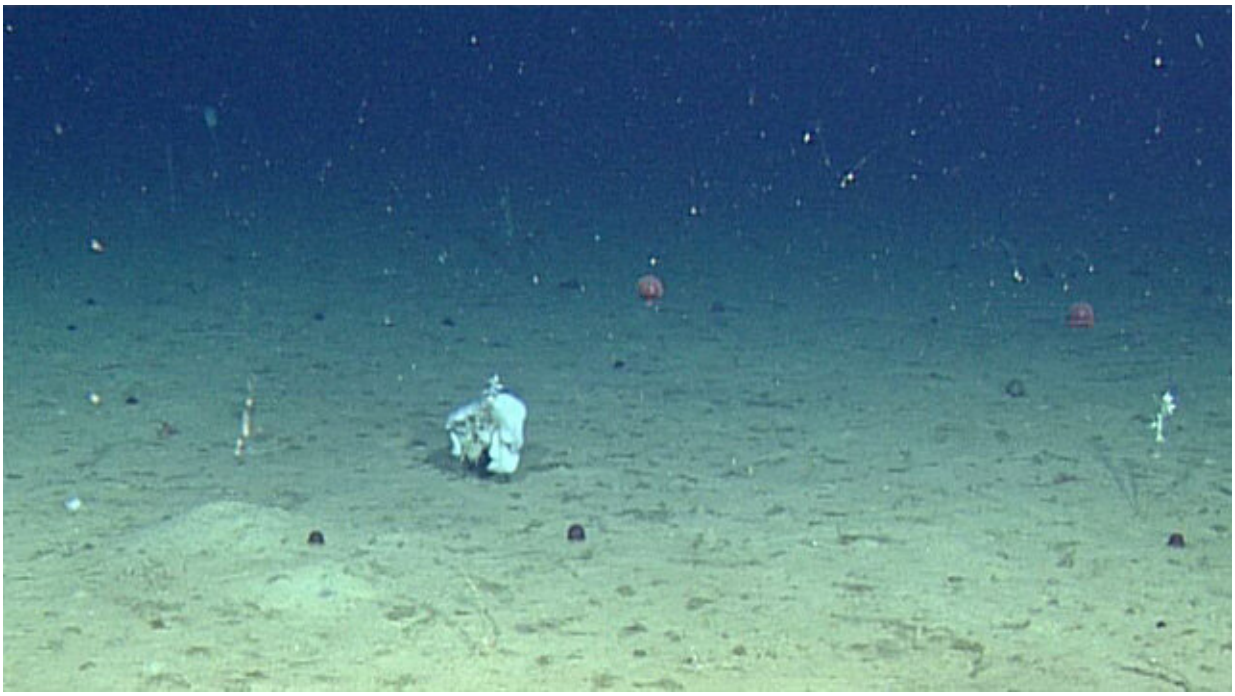
Little red jellies are commonplace near the deep seafloor in Monterey

Bay and around the world. Most of them are small—less than five centimeters (two inches) across—and a ruddy red color, but we know little else about them. Though MBARI researchers have observed them for decades, their role in the food web, what they eat, and what eats them, still largely remain mysteries. Now scientists are finding that even their evolution and relationships to one another are probably incorrect.

MBARI biologist George Matsumoto is one of the researchers untangling the complicated red-jelly family tree. In this month's issue of *Frontiers in Marine Science*, Matsumoto and his colleagues present a key to help scientists tell these look-alike species apart through their physical differences, depth distribution, and behavior.

"For 30 years now we've been seeing lots of these jellies, little red jellies, just above the bottom and in the water column," said Matsumoto, "and it turns out that historically, even though we thought we knew what they were, many of the initial papers had the wrong identification."

As the jellies were described (given scientific names) over the years, scientists corrected each other and renamed the species several times. The family tree became so convoluted that even experts were getting confused. Matsumoto, one of MBARI's jellyfish experts, first noticed this when a paper of his was corrected by colleagues for mistaking one species for another. However, upon further investigation, Matsumoto found literature suggesting that the proposed species classification was based on an incomplete description of the animal.



Large numbers of little red jellies sometimes appear near the seafloor at Station M, a deep-sea monitoring site about 4,000 meters (2.5 miles) below the ocean surface and 220 kilometers (124 miles) off the California coast. Credit: 2016 MBARI

"When you describe an animal, you collect a specific animal in the group you've described and you put it in a museum, so you and others can go back and look at it for reference," explained Matsumoto. The museum's specimen becomes known as the type specimen—a sample that represents the defining features of its species or type. Matsumoto traveled to the Smithsonian Institution to look at the type specimen of the little red jelly in question and found a big red flag: one type specimen was being used for more than one jellyfish species.

"When I started looking into the type specimen, and I found out that the type specimens were the same for the two genera, that meant something

was really off," he said. "That made me start questioning all of the red jellies."

The researchers began combing through MBARI's database of video from remotely operated vehicle (ROV) dives to find all of the little red jellies of Monterey Bay and determine which species were which. Over the next four years, they used MBARI ROVs to capture additional video footage of the red jellies and to collect a number of specimens for genomic analysis to confirm their true identities.

Though their similar appearances do pose a challenge, it is still possible to distinguish the species from one another based on their shape and form. The researchers validated nine species in Monterey Bay, which fall into three genera: Crossota, Benthocodon, and Pectis.

In previous research papers, this little red jelly, Pectis profundicola, was incorrectly identified as Voragonema pedunculata and Benthocodon pedunculata. Credit: MBARI

Crossota species sometimes boast wild-looking tentacles akin to exploding fireworks, and swim via strong pulses followed by a peaceful drift. UFO-shaped Benthocodon are often seen bobbing just above the seafloor. They start to sink when resting but can maintain their relative positions by pulsing every few seconds. Pectis, (previously referred to as Voragonema) is identified by its centripetal canals and a pointed bell top, and takes shorter breaks between bouts of pulsing.

Based on their identifications and analysis, the researchers created a new, tentative genetic tree for the little red jellies. But there are probably many new species still to be found outside of Monterey Bay. "These little red jellies are in every ocean basin in the world and potentially have a large role in the food web," Matsumoto said. "We should know more about them, but we don't. We've just gotten a little glimpse of how complex the story is."

Matsumoto considers this experience a great example of the scientific process at work. "That's the way science should work. That's why we publish papers, why we share things—so that we can try to get things right." With further research, it is possible that these species classifications will change again, but for now, we are at least one step closer to understanding the true identities of these little red jellies.

More information: George I. Matsumoto et al. "Little Red Jellies" in Monterey Bay, California (Cnidaria: Hydrozoa: Trachymedusae: Rhopalonematidae), *Frontiers in Marine Science* (2020). DOI: 10.3389/fmars.2019.00798

You can see video of some of these little red jellies on the Frontiers web site here: www.frontiersin.org/articles/1 … pplementary-material

Provided by Monterey Bay Aquarium Research Institute