



LEFT: A close-up view of the newly discovered siphonophore reveals several of the glowing red lures and tentilla

INSET: Close-up view of the lure. It closely resembles a swimming copepod

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Photos courtesy of
Monterey Bay Aquarium
Research Institute

Glowing Jellyfish

Glowing red lures are used by deep-sea jelly to catch fish

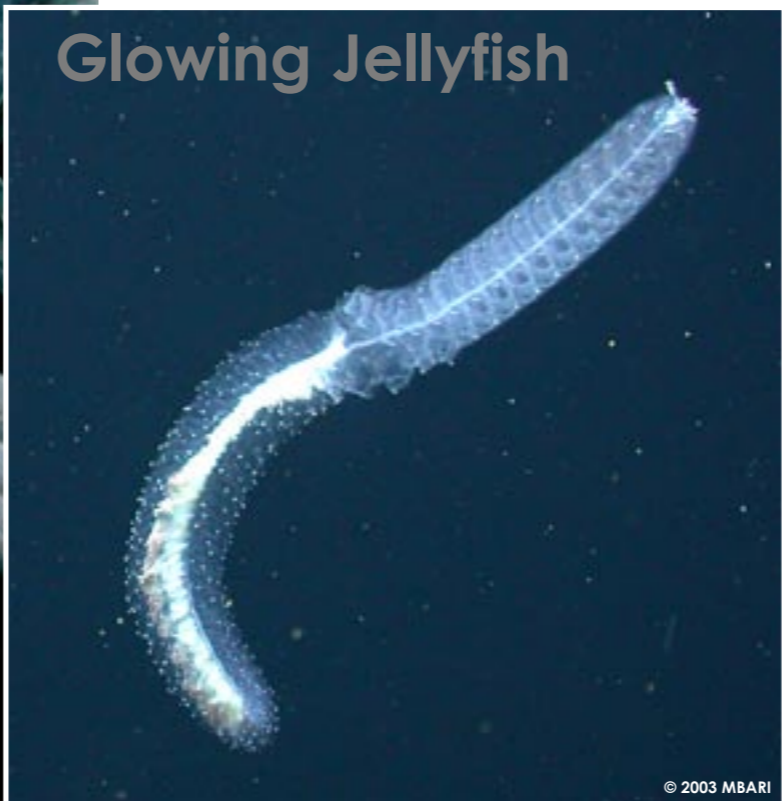
ROV observes siphonophores in their native habitat

Probably about 90 percent of deep-sea animals are bioluminescent. Some jellies use bioluminescence as a defense, i.e. they glow when disturbed in order to light up their predators, making their attackers vulnerable to even larger animals. A few deep-sea fishes and squids have glowing organs that look like lures, but even these animals have never been observed actually using their glowing organs to capture prey.

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Glowing Jellyfish

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LEFT: The deep-sea siphonophore is around 45 cm (18 inches) long. Swimming bells that pulse like jellyfish make up the upper half of the colony and keep the colony moving through the water. White stinging tentacles make up the lower half. The tentacles capture small deep-sea fishes

a major food item for small deep-sea fish, and were flicked back and forth repeatedly so that the glowing lures darted through the water just like swimming copepods. Finally, at least one siphonophore's digestive system contained both fish and lures, suggesting that the lures were ingested along with the fish.

Erenna's glowing red lures may

also force scientists to take a new look at the role of red light in the deep sea. Red bioluminescence is extremely rare, and the prevailing view among marine biologists has been that most deep-sea animals cannot detect red light at all. However, because deep-sea fishes are so hard to bring to the surface intact, we know very little about their physiology. Haddock's work suggests that some deep-sea fishes may not only see red light, but routinely use it in finding food.

It is strange that in the deep sea they are using red light, which doesn't travel very far. Possibly the red light might be drawing in fish because they could be mistaking it for the red glow that comes from the algae in the stomachs of shrimp-like copepods, their prey.

The red fluorescent lights of Erenna are only found on the animals' fully grown, branch-like stalks. When the stalks are

immature they only give off blue-green luminescence, but as they mature, the blue-green luminescing parts become surrounded by tissues containing red fluorescent material.

Further details can be found in the July 8, 2005 issue of Science magazine ■

sparsely inhabited environment. Most siphonophores set a big web of tentacles to catch animals that happen to swim by. But this jelly doesn't deploy its tentacles very far. It uses deception to attract fish instead of casting a wide net to capture them.

Microscopic examination showed that interspersed among their stinging tentacles were thin rod-like structures which were tipped with red, glowing blobs. Several lines of evidence eventually led to the conclusion that these red blobs served as lures for small deep sea fish. The first clue lay in the siphonophore's behaviour. Jellies that use bioluminescence for self defense tend to have lights distributed all around their body, which flash brightly when disturbed. The Erenna siphonophores, however, keep their bioluminescence very localized and under tight control, suggesting that their lights had an entirely different function.

In addition, the red, glowing blobs were shaped remarkably like the bodies of deep-sea copepods,

siphonophores. Related to the typical round "jellyfish" that sometimes wash up on beaches, siphonophores are colonial animals, arranged in chains that in some species can be dozens of meters long. The members of a colony specialize at different tasks. Some form swimming bells, which pulse slowly, pulling the colony through the water like a long, fluid freight train. Others specialize in feeding, and sport stinging tentacles. Siphonophore colonies are difficult to study

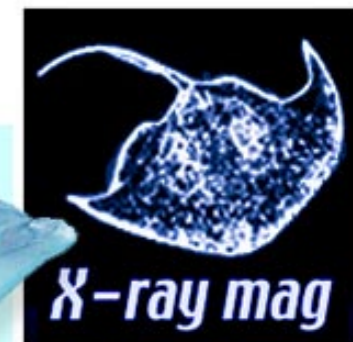
as they often break into pieces when disturbed or captured, and they were therefore also studied in their native habitat, thousands of meters down, using an ROV.

The siphonophore discussed here, an unnamed species in the genus Erenna, lives at depths of 1,600 to 2,300 meters, where fish are few and far between. It was therefore surprising to observe small fish in their guts because how could these jellies capture enough fish to survive in their

Now a new species of jelly-fish has been discovered in the deep sea that attracts fish by wiggling hundreds of glowing red lures. This is the first time any marine invertebrate has been found to use a bioluminescent lure or to display red bioluminescence.

Marine biologist Steven Haddock of the Monterey Bay Aquarium Research Institute (MBARI) has studied glowing marine animals, focusing on gelatinous animals such the

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