

Scientists discover bioluminescent 'green bombers' from the deep sea

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The transparent body of the worm *Swima bombiviridis* allows examination of internal anatomy without dissection. The purple arrow points to the several bioluminescent bombs still attached to the segments immediately behind the head. Credit: Casey Dunn

(PhysOrg.com) -- In the latest proof that the oceans continue to offer remarkable findings and much of their vastness remains to be explored, scientists at Scripps Institution of Oceanography at UC San Diego and their colleagues have discovered a unique group of worms that live in the depths of the ocean.

The discoveries feature worms—nicknamed "green bombers"—that can release body parts that produce a brilliant green bioluminescent display.

The discovery is described in the August 21 issue of the journal *Science* and is led by Karen Osborn of Scripps Oceanography.

The researchers introduce seven previously unknown species of

swimming worms in the annelid phylum ranging from 18 to 93 millimeters (.7 to 3.6 inches) in length. They were discovered by the scientists using remotely operated vehicles at depths between 1,800 and 3,700 meters (5,900 and 12,140 feet). The first species described in the paper has been given the scientific name *Swima bombiviridis*, referring to its swimming ability and the green bombs.

Osborn says one key aspect of the discoveries is that the newly found worms are not rare. Opportunities to witness such animals and collect and study them, however, have been extremely rare.



This is a video image of a species of *Swima* (as yet undescribed) with arrows indicating the animal's large bombs. Credit: Monterey Bay Aquarium Research Institute

"We found a whole new group of fairly large, extraordinary animals that we never knew anything about before," said Osborn, a post-doctoral

researcher in the Marine Biology Research Division at Scripps. "These are not rare animals. Often when we see them they number in the hundreds. What's unique is that their habitat is really hard to sample."

Largely transparent except for the gut area, the worms propel themselves with fans of long bristles that form swimming paddles.

"The depths between 1,000 and 4,000 meters (3,280 and 13,120 feet) form the biggest habitat on Earth and also the least explored," said Scripps Professor Greg Rouse, a coauthor of the paper and curator of Scripps Benthic Invertebrate Collection. "With fairly limited time on submersible vehicles, mainly off California, we've picked up seven new species. It goes to show that we have much more exploration ahead and who knows what else we'll discover?"

Each of the species features a variety of elaborate head appendages. Five of them are equipped with luminescent structures, the "bombs," that are fluid-filled spheres that suddenly burst into light when released by the animal, glowing intensely for several seconds before slowly fading.

Due to the bright lights of the submersible, scientists were not able to witness bomb-casting in the worm's natural habitat, but rather on ships after the animals were captured. While the scientists speculate that the bombs are used as a defensive mechanism against potential predators, more studies are needed to fully understand the process.

Rouse says the green bombers in the newly discovered clade, (a common ancestor and all its descendant organisms), are fascinating from an evolutionary standpoint. Looking closely at their relatives that live on the seafloor, it appears the bombs were once gills that evolutionarily transformed over time.

"The relatives have gills that appear to be in exactly the same places as

the bombs," said Rouse. "The gills can fall off very easily so there's a similarity of being detachable, but for some reason the gills have transformed to become these glowing little detachable spheres."

Osborn continues to probe many of the various adaptations the worms have made since evolving into swimming species. The challenges faced by animals living in a three-dimensional open water habitat above the seafloor are very different than those faced by animals living on the seafloor. These include locating new food sources, finding ways to maintain optimal depth and grappling with predators that come from various directions.

"I'm interested in how animals have evolved in the water column," said Osborn. "These worms are great examples. How does a worm transform into a wonderful glowing animal?"

Source: University of California - San Diego ([news](#) : [web](#))

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