



MYSTIC AQUARIUM INSTITUTE FOR EXPLORATION

Giant Tube Worm (*Riftia pachyptila*)

Size: The Giant tube worm can grow to over 6 feet tall (over 2 meters in length).

Range/Distribution: Found around deep sea hydrothermal vents in the Pacific Ocean approximately 1 mile (5280 ft.) below the water surface.



Photo by Woods Hole Oceanographic Institution

Appearance: The body of the giant tube worm is colorless and holds a trophosome (a large sack that contains the animal's organs); a tough tube made of chitin protects this soft body. A large red plume projects from the tube's opening; hemoglobin, an oxygen carrying protein, gives this plume a distinctive red color. This plume is used to collect nutrients from the surrounding water. Tube worms have no mouth, stomach, or eyes.

Habitat: As the tectonic plates along the ocean floor move, cracks are formed. Cold seawater seeps deep down into the openings. The sea water is heated by molten rock in the Earth's mantle, below the crust. As the water heats, chemical reactions occur, oxygen, magnesium, potassium, and other minerals are removed from the seawater. The deeper the fluid goes, the hotter it gets. Copper, zinc, iron, and sulfur from the crust dissolve into the fluid. The super-heated fluid, now laden with dissolved metals, rises. As the hot fluid gushes out onto the ocean floor, it meets cold, oxygen-rich seawater, which spurs more chemical reactions. Hydrogen sulfide (a compound toxic to most organisms) forms and minerals "rain out" from the fluid; these create the hydrothermal vent areas that are home to the giant tube worm. When a hydrothermal vent stops flowing, the organisms around the vents disappear or die off.

Prey: Tube worms do not have a mouth or stomach so are unable to eat. However, the trophosome inside of the tube worm is packed with bacteria – about 285 billion bacteria per ounce of tissue. Hydrogen sulfide is filtered from the water by the worm's plume and transports it to the bacteria. In return, the bacteria convert the hydrogen sulfide into compounds that nourish the worm. This process is known as chemosynthesis.

Predators: There are few predators of the tube worm; it is thought that deep sea crabs and shrimp will feed off of the tube worm's red plume.

Life Span: The giant tube worm has the fastest growth rate of any known marine invertebrate. In less than two years, these animals can grow from a larval stage to almost 5 feet in length. The maximum life span of a tube worm is unknown because when a hydrothermal vent stops flowing, the tube worms will die off.

Mating Behaviors: By slowly retracting their red plume, female tube worms will release eggs and males will release sperm bundles into the water column where fertilization will occur. The larva will float through the water until a hydrothermal vent is located. They will then settle and attach to the rocky bottom.

Unlike adults, young tube worms do have a mouth and gut for the bacteria to enter. As the worm matures, the mouth and gut will disappear.

Conservation Status: Not Evaluated

Threats: Direct human contact and interactions are not a major threat to the giant tube worms at this time but they are constantly threatened by natural forces. Underwater volcanic eruptions and vent flow stopping are both natural occurrences which can have a negative effect on the hydrothermal vent communities.

Fun Facts:

- An adult giant tube worm will remain in one spot for their entire life.
- Sitting on the ocean floor at 1 mile below sea level, the tube worm can endure water pressure at over 2000 pounds per square inch.
- Since 1977, when hydrothermal vent communities were first found, over 300 new species have been identified.