

## *Aplysina insularis* (Yellow Tube Sponge)

Order: Verongida (Spicule-less Sponges)

Class: Demospongiae (Common Sponges)

Phylum: Porifera (Sponges)



**Fig. 1.** Yellow tube sponge, *Aplysina insularis*.

[<http://oceana.org/marine-life/corals-and-other-invertebrates/yellow-tube-sponge>, downloaded 26 February 2016]

**TRAITS.** Yellow tube sponges can be found growing in coral reefs, and are native to the Caribbean region. They are characteristically joined at the base and grow in an upwards direction (Fig. 1). They are open at the top and closed at the base, and are immobile (Animals.mom.me, 2016). The length of the tubes are commonly 1m, but the length of the tubes can vary based on the depth of the body of water they inhabit. The organisms are yellowish in colour but sometimes they appear to be iridescent bluish-yellow at deeper depths (D'Aloia, Majoris and Buston, 2011). When exposed to the atmosphere, the sponges turn purple then black and die. The surface of the tubes are finely conulose (with tent-shaped projections) and it does not show the deep set, curving channels of *Aplysina lacunosa* (Kensley and Heard, 1991). *Aplysina insularis* was formerly known as *A. fistularis* (Species-identification.org, 2016).

**DISTRIBUTION.** Yellow tube sponges are indigenous to the Caribbean region and the Gulf of Mexico, from Florida to northern Brazil (Species-identification.org, 2016). They can be found in countries such as Trinidad and Tobago, The Bahamas, and Bermuda.

**HABITAT AND ACTIVITY.** Yellow tube sponges primarily live on coral reefs (Fig. 2) and on the ocean floor. They thrive best in areas of the ocean where there are strong currents. Sponges do not have specialized cells. This means that the sponges do not have tissues that can be compared to any other organism (D'Aloia, Majoris and Buston, 2011); any cell can be made to do the job of any other cell in the body. Many species of reef fish eat the yellow tube sponges but the main predator is the hawksbill turtle (Oceana, 2016). *Aplysina insularis* provide a nursery for juvenile aquatic organisms. Yellow tube sponges are immobile but they interact with other organisms should they come close to them. They do not have a specific time of day during which they are active (Species-identification.org, 2016).

**FOOD AND FEEDING.** The sponges feed by filtering water through their body wall and by trapping fragments of food such as algae, plankton, dead organic material and bacteria to consume (Pawlik, 2011). They are primary consumers. The water enters the sponge via microscopic pores along the body of the tube. Tiny hair-like structures can be found on the inside of the tubes of the sponge, keep the water circulating by beating back and forth rhythmically (Kensley and Heard, 1991). This movement allows the sponge to filter the maximum amount of food out of the water. The filtered wastewater leaves the sponge via the large opening at the top of the sponge called the osculum (Oceania, 2016). The sponges absorb oxygen from the water during the feeding process.

**POPULATION ECOLOGY.** *Aplysina insularis* is distributed non-randomly across coral reefs. The species is typically found growing at intermediate depths of 15-30m. The yellow tube sponge morphology varies across the reefs based on the depth at which they were located. The sponges growing at deeper levels in the ocean had three tubes per group and they were greater in length, whilst those near the surface had tubes that were shorter and more abundant in the number of tubes per group (five tubes) (Species-identification.org, 2016). Sponges near to the surface were sparsely distributed whilst those at greater depths were more abundant. This species of yellow tube sponge does not grow at depths below 100m (D'Aloia, Majoris and Buston, 2011).

**REPRODUCTION.** *Aplysina insularis* reproduce sexually by giving off a large volume of sperm into a body of water (D'Aloia, Majoris and Buston, 2011). The sperm comes into contact with the female reproductive organ that houses eggs in another individual sponge. It is located in the tissue wall of the yellow tube sponge. Once fertilization occurs, tiny larvae are formed (Pawlik, 2011). The larvae are released into the water and a new yellow tube sponge begins to grow on the surface that the larva anchors itself to. On average there are 100 larvae released. Asexual reproduction also occurs, via budding. A piece of yellow tube sponge simply attaches itself to a hard stable surface and it begins to grow again. The reproduction period is typically between the months of August to November (Pawlik, 2011).

**BEHAVIOUR.** *Aplysina insularis* do not move around as they are fixed to one location; the sea floor or on coral reefs. Juveniles grow rapidly after the larva implants itself on a sturdy surface. Yellow tube sponges have an anti-predator response system. They produce chemicals that give their tissues an unappealing flavour (Animals.mom.me, 2016). These chemicals prevent other creatures such as barnacles and algae from attaching themselves to their tubes as well as it discourages oceanic organisms from eating them (Oceania, 2016). The yellow tube sponge has highly specialized behaviours. Should any of the sponges be knocked over, the creatures will alter their cells to create an upright tube (Kensley and Heard, 1991). This species also has antimicrobial

properties. They can fight off most infections or poisons from other animals that bite them. They do not communicate with each other (D'Aloia, Majoris and Buston, 2011).

**APPLIED ECOLOGY.** The yellow tubed sponge is the home of microbial symbionts which scientists believe are important nitrogen and carbon fixers for environments that have a low nutrient content. They are the primary organism responsible for carbonate bio-erosion on coral reefs (Species-identification.org, 2016). Scientific studies have shown that the yellow tube sponges are important in maintaining the framework of the reef (Pawlik, 2011). The cells of the yellow tube sponges are very specialized. Scientists shredded a yellow tube sponge that was grown in their lab, in a blender, within eight hours the cells had formed themselves back into a tube. Yellow tube sponges have been harvested to be used for domestic purposes in the past but the practice has been discontinued due to the use of artificial sponges (Pawlik, 2011).

#### REFERENCES

- Animals.mom.me, (2016). *Yellow Tube Sponge Facts*. Available at: <http://animals.mom.me/yellow-tube-sponge-3365.html> [Accessed 27 Feb. 2016].
- D'Aloia, C., Majoris, J. and Buston, P. (2011). Predictors of the distribution and abundance of a tube sponge and its resident goby. *Coral Reefs*, [online] 30(3), pp.777-786.
- Kensley, B. and Heard, R. (1991). Studies on the Crustacea of the Turks and Caicos Islands, British West Indies I. Four New Marine Isopod Crustaceans from the Vicinity of Pine Cay. *GCR*, 8.
- Oceana, (2016). *Yellow Tube Sponge*. Available at: <http://oceana.org/marine-life/corals-and-other-invertebrates/yellow-tube-sponge> [Accessed 26 Feb. 2016].
- Pawlik, J. (2011). The Chemical Ecology of Sponges on Caribbean Reefs: Natural Products Shape Natural Systems. *BioScience*, 61(11), pp.888-898.
- Species-identification.org, (2016). *Marine Species Identification Portal: Yellow tube sponge - Aplysina fistularis*. Available at: [http://species-identification.org/species.php?species\\_group=caribbean\\_diving\\_guide&id=436](http://species-identification.org/species.php?species_group=caribbean_diving_guide&id=436) [Accessed 27 Feb. 2016].

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**Fig. 2.** Fish and divers swimming around yellow tube sponges on a coral reef.

[<https://www.deepbluediverscayman.com%2Fdeep-blue-image-gallery.html>, downloaded 26 February 2016]

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