

Physalia physalis (Portuguese Man o' War)

Order: Siphonophora (Siphonophores)

Class: Hydrozoa (Hydrozoans)

Phylum: Cnidaria (Corals, Sea Anemones and Jellyfish)



Fig.1. Portuguese man o' war, *Physalia physalis*.

[http://news.nationalgeographic.com/news/features/2014/08/140821-portuguese-man-of-war-animal-ocean-science-pictures/assets/img/05_08.jpg, downloaded 12 February 2015.]

TRAITS. Often erroneously identified as a jellyfish, the Portuguese man o' war (Fig. 1) or “blue bottle” is the sole genus belonging to the Family Physaliidae (Kirkpatrick and Pugh, 1984). It is a floating colonial hydrozoan consisting of a group of specialized individuals or zooids: dactylozooids (tentacles for catching prey and self-defence), gonozooids (reproduction), pneumatophore (float) and gastrozooids (feeding) (Kurlansky, 2004). The zooids are incapable of independent survival as they are anatomically and physiologically linked. The characteristic float is an overgrown zooid, translucent with tinges of blue, purple or pink, 9-30cm in length, which lies horizontally on the water's surface. The float has a gas composition with a high concentration (~14%) of carbon monoxide. It is asymmetric, with a longitudinal crest that can be raised to act as a sail running along the top. Tentacles (dactylozooids) can be 10-50

meters in length and appear blue to purple in colour. They bear batteries of venom-filled small and large stinging cells or nematocysts, characteristic of Cnidarians, used for used to paralyzing prey.

DISTRIBUTION. This species lies suspended on tropical to temperate, marine waters worldwide. Generally, colonies are prevalent in warm subtropical and tropical waters of the Gulf Stream, Gulf of Mexico, Indian Ocean, Caribbean Sea, Atlantic coast, the Sargasso Sea and other regions of the Pacific and Atlantic Oceans.

HABITAT AND ACTIVITY. *Physalia physalis* is a pelagic organism with no means of independent propulsion. Locomotion is passive and as such, right-handed and left-handed specimens meander 45 degrees to the left and right of wind direction respectively, or they can drift by ocean currents (Kurlansky, 2004). They can be directed into shallow waters or hauled onto shore by waves. The pneumatophore stays on the ocean's surface (Fig. 2), only submersing in water to prevent desiccation (Sterrer, 1992) or to escape predators. The animal is camouflaged against the backdrop of ocean waves by the transparent blue and purple coloration of its pneumatophore. They can deflate their floats and briefly submerge to avert threats on the surface.

FOOD AND FEEDING. *Physalia physalis* is a carnivorous species with a diet including a variety of fish (flying fish and mackerel), fish larvae, pelagic crustaceans, shrimp and other small marine invertebrates such as chaetognaths, cephalopods, eel larvae (Purcell, 1989). Their mechanism for prey capture is dactylozooids or tentacles, the same mechanism used for self-defence. The feeding tentacles, which can be up to 50m in length, bear nematocysts which deliver power stings (caused by cnidocytes) that paralyze prey (Fig. 3). Due to restricted movement by waves and wind, *Physalia physalis* have several adaptations for survival that include complete extension of tentacles to act as a floating net for prey capture and having pigmented regions on their tentacles that resemble fish larvae and juvenile shrimps which attract prey into their nematocyst-armed mesh of tentacles (Johnsen, 2000). This organism shares mutualistic relationships with *Nomeus gronorii* (man-of-war fish), *Mupus maculatus* (spotted ruff), *Caucrates ductor* (pilot fish), *Macrorhamphosus scolopax* (long snipefish) and *Caranx bartholomaei* (yellow jack), where the fish live within the tentacles feeding on scraps of the meals and regenerative tentacles of *Physalia* without being harmed (Johnsen, 2001). They help lure other fishes into the tentacles. Prey is digested in gastrozooids by secreted enzymes that break it down into macromolecules which are absorbed into the body and circulated throughout the zooid colony. Each *Physalia* has multiple gastrozooids with separate mouths through which undigested remains are expelled (Kurlansky, 2004).

POPULATION ECOLOGY. Each Portuguese man o'war is a complex colony of eusocial animals. It consists of a colony of four kinds of highly adapted individual zooids, integrated so that they behave like a single animal and cannot survive if separated. They show the highest degree of division of labour between the individual zooids of any colonial organism. The specialized zooids are responsible for defence and prey capture (tentacles), reproduction, and digestion. Tasks are coordinated so that energy resources are shared among individuals for efficient functionality of the colony.

REPRODUCTION. The colony is hermaphrodite (having both sexes), but the individual gonozooids are dioecious (male or female), comprising of sacs (gonophores) containing either ovaries or testes. Most reproduction occurs during the fall in the Atlantic Ocean. The stimulus responsible for triggering the spawning cycle in this species is unknown. It is assumed that fertilization takes place close to the surface of open waters since gametes are shed into the water by a chemical response to the presence of individuals in one area, i.e., a critical density may be required for successful fertilization. The sperm and

egg of different colonies fuse (Lee, 2003) and once fertilized, the egg develops into a planktonic larva (Fig. 4) which produces the large colony by asexual budding. *Physalia physalis* also reproduces asexually.

APPLIED ECOLOGY. *Physalia physalis* is not listed by IUCN and is not rare, therefore it not considered as requiring special conservation effort. The tourism industry can be affected in areas where this species is common because tourists can be injured if they make contact with its tentacles in water or on shore (from those that are washed up on the beach). Hence, persons would not pay to visit beaches infested with *Physalia* (Kurlansky, 2004). Stings result in long, linear red marks and intense pain (Hoover, 2015) and in severe cases cardiac problems and anaphylactic shock.

REFERENCES

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Fig. 2. Portuguese man o' war floating on water's surface.

[<http://onemoregeneration.org/wp-content/uploads/2011/11/OMG-Trivia-11-11-11.jpg>, downloaded 16 March 2015]

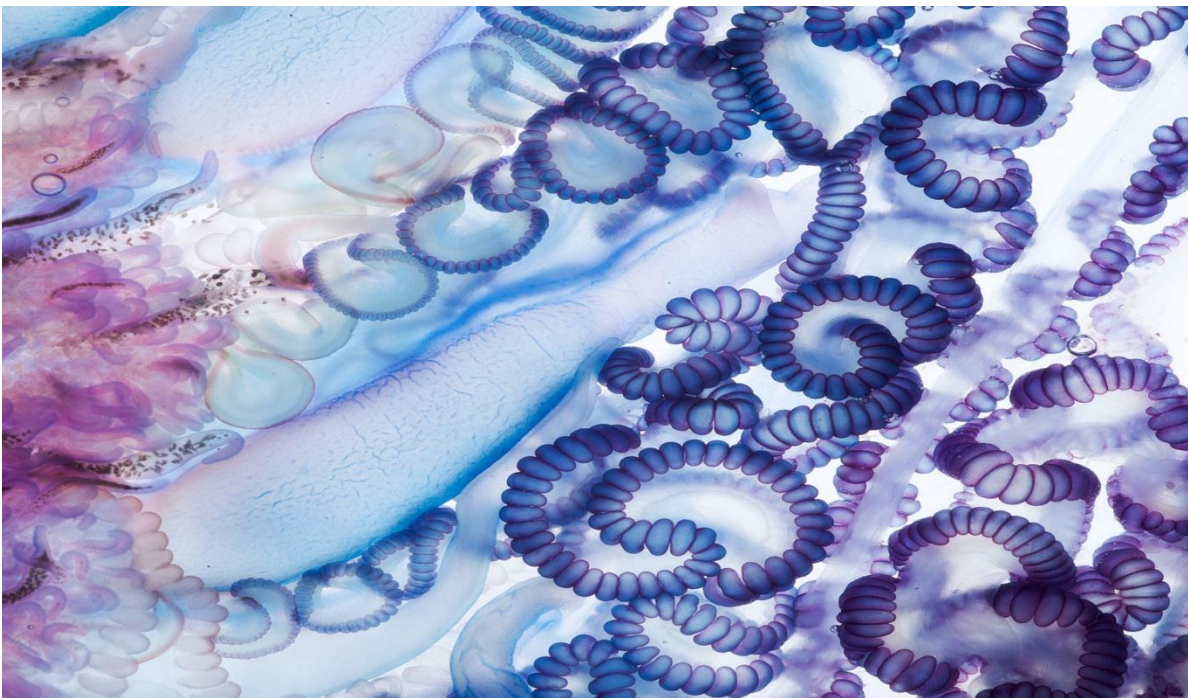


Fig. 3. Stinging tentacles of *Physalia physalis*.

[<http://news.nationalgeographic.com/news/features/2014/08/140821-portuguese-man-of-war-animal-ocean-science-pictures/assets/img/10.jpg>, downloaded 12 February 2015]



Fig. 4. Juvenile Portuguese man o' war.

[<http://griseus.tumblr.com/post/32425576455/physalia-physalis-juvenile-of-portuguese-man-o>, downloaded 16 March 2015]

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