Vampyrotheuthis infernalis (Vampire Squid)

Order: Vampyromorphida (Vampire Squid)
Class: Cephalopoda (Octopuses, Squid and Cuttlefish)
Phylum: Mollusca (Molluscs)

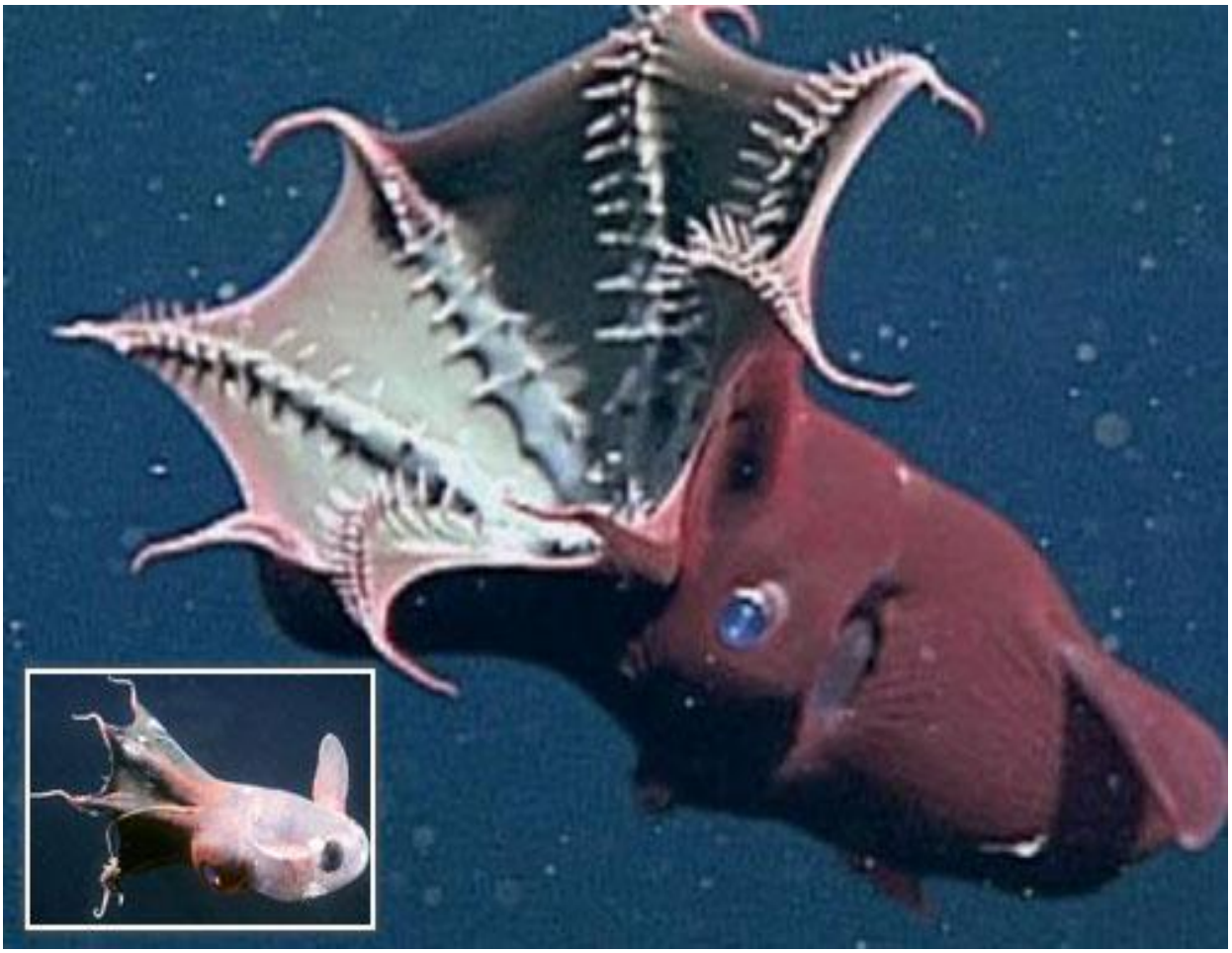

Fig. 1. Vampire squid, *Vampyrotheuthis infernalis.*

[http://1.bp.blogspot.com/_Br1rQvAweME/TJTLKbvZQoI/AAAAAAAAAGo/N18dDS0hWHw/s1600/Vampire+Squid+yawn.jpg, downloaded 15 March 2015]

TRAITS. The vampire squid grows to a maximum of approximately 30cm in length, and has eight arms each of which is lined with fleshy spines called cirri (Wikipedia, 2015). Unlike octopuses, the arms of the vampire squid are connected by a skin-like webbing which reminds people of a cape-wearing vampire. The mouth of the squid is powerful and found at the centre of the webbed arms. Each arm is lined with small suction cups. In addition to the eight arms, *V. infernalis* has two long, thin filaments similar to tentacles that increases the squid's total limb number to ten (Real Monstosities, 2010). Colour pale reddish to black depending on the light (Wikipedia, 2015), skin gelatinous. Eyes globular and large relative to body size (2.5cm), allowing it to see in the

dark, deep water it inhabits and may appear red or blue in different lighting (Real Monstosities, 2010). In the fully developed adult, two fin like projections are seen on either side of the mantle (Fig. 1). The vampire squid (or vampire squid from hell, the meaning of the scientific name) is the only species in the order Vampyromorphida.

DISTRIBUTION. Found in temperate and tropical oceans such as in the Caribbean as well as in the waters off central California (Hoving and Robinson, 2012). Individuals are known to be fixed in one geographical area, not migratory. Although there is no direct references and observations of *V. infernalis* in Trinidad and Tobago waters, this organism is likely to be found in the area (Fig. 2) due to its tropical characteristics and suitable water depths.

HABITAT AND ACTIVITY. The vampire squid is found in the waters within the depth range of 600-900m or the darkest areas of the ocean and where the oxygen levels are at minimum levels (Hoving and Robinson, 2012). This is described as a 'mesopelagic oxygen minimum zone' and may occur beneath areas that have a great surface productivity and where circulation levels are low. All in all, these two characteristics are ideal habitat conditions for this squid species. In addition, these organisms also favour waters that range from about 2-6° C.

FOOD AND FEEDING. The diet of the vampire squid includes 'sinkers' or faecal pellets of other aquatic organisms that live above and any other dead material that may drift down known as 'marine snow' (Hoving and Robinson, 2012). The two long filaments found on the vampire squid are equipped with a sensory function; they are responsible for the detection of food items or potential predators (Fig. 3). When a potential meal comes into contact with a filament, the *Vampyroteuthis* uses its arms to transfer the material into its mouth, coating it with mucus it produces from its suckers on the way (Choi, 2012).

POPULATION ECOLOGY. Typically solitary. Population density is unknown, although they are not rare: between 1992 and 2012, a total of 170 *Vampyrotheuthis* were found and observed within the Monterey Bay region (Hoving and Robinson, 2012).

REPRODUCTION. It is believed that the female vampire squids are fertilised by the males which transfer the spermatophores (capsules of sperm) through their funnels (Encyclopedia of Life, 2015). The mature, non-transparent eggs of the vampire squid reaches to a maximum size of approximately 4mm and unlike other aquatic organisms, a small number of these eggs are laid at a time; this is due to their uniquely small oviducal glands which is associated with egg production (Encyclopedia of Life, 2015). Upon hatching, a juvenile appears very similar to the adults except the placement of the fins which is seen at the lower lateral surface of the animal's mantle in its early stages. This fin pair however is resorbed and regrown to the upper end of the mantle as the organism matures. Young vampire squids are found at deeper regions of the oceans than the adults and this has led scientists to believe that this occurs since spawning (the release of eggs) occurs in very deep waters (Encyclopedia of Life, 2015). Females die following the birth of offspring, this doesn't hamper the life of the juvenile however since they are able to be self-nourished by a stored internal yolk (Squid World, 2015). Studies show that *Vampyrotheuthis infernalis* lay eggs year-round therefore they don't have a specific mating or reproduction period.

BEHAVIOUR. Very little is known about the juvenile behaviour of the vampire squid since they are found in deeper regions of the ocean than the adults. *Vampyrotheuthis infernalis* are generally slow animals since they have a low metabolic rate which allows them to conserve energy (Real

Monstosities, 2010). This physiological adaptation of the animals is as a result of their oxygen-deficient habitat. They are mainly seen swimming or 'gliding' through the water horizontally, using their fins. The feeding filaments are removed from their storage pockets one at a time and extend behind the organism as it glides through the waters.

Antipredator behaviour: On occasions when the vampire squid is in contact with a predator, is alarmed or startled, the organism may turn itself inside out revealing its black underside which comprises of harmful-looking cirri; this is described as the pineapple or pumpkin posture (Fig. 4). Since they are covered in bioluminescent photophores (Fig. 5), these organisms may glow a bluish-green colour (National Geographic, 2010). Another protective mechanism they possess is by using this bioluminescent characteristic to escape predators (National Geographic, 2010). Other occasions when bothered by organisms these creatures may squirt a sticky bioluminescent substance from its arm tips at predators which confuses them, this gives *V. infernalis* time to disappear into the surrounding darkness of the ocean (Real Monstrosities, 2012).

APPLIED ECOLOGY. *Vampyrotheuthis infernalis* is not listed by the IUCN. Due to the depths inhabited by theses aquatic organisms very little is known/published of human interaction with them. On very rare occasions, a fisherman may accidentally capture one (Squid World, 2015).

REFERENCES

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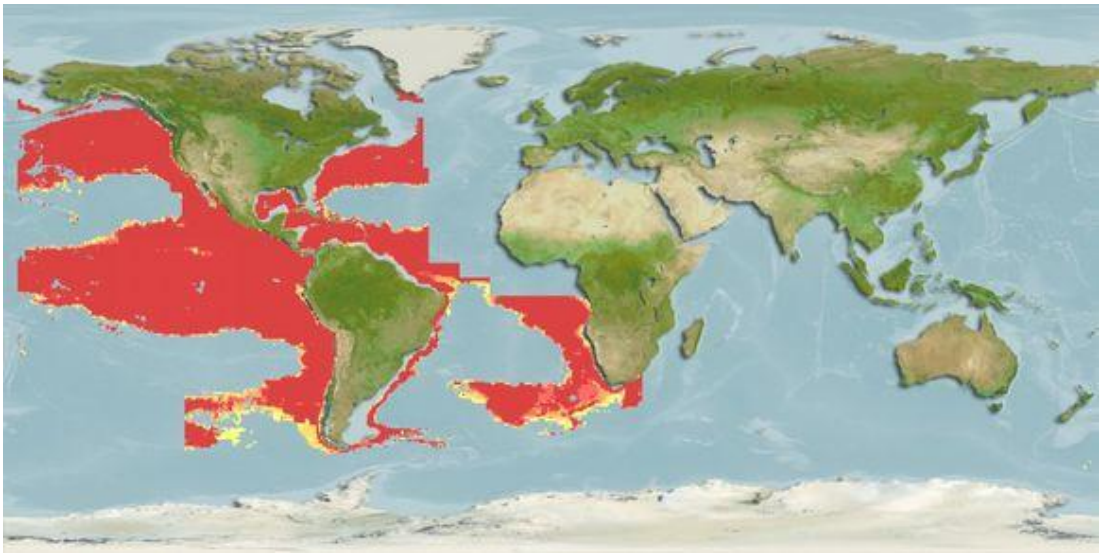

Fig. 2. Geographic distribution of the vampire squid.

[http://hoopmanscience.pbworks.com/w/page/89928620/Michael%20Troka%20Vampire%20Squid, downloaded 15 March 2015]

Fig. 3. Vampire squid with extended filament used for feeding.

[http://news.discovery.com/animals/endangered-species/vampire-squid-120925.htm, downloaded 15 March 2015**]**

Fig. 4. Defensive pineapple posture of vampire squid.

[https://www.tonmo.com/community/pages/cephalopod-armature/, downloaded 15 March 2015]

Fig. 5. Bioluminescence in vampire squid.

[http://animal-kid.com/bioluminescent-vampire-squid.html, downloaded 15 March 2015]