

CEPHALOPODS



Dr. P. SANTHANAM

Assistant Professor

Marine Planktonology & Aquaculture Lab.,

Department of Marine Science, School of Marine Sciences

Bharathidasan University, Tiruchirappalli-620 024, Tamil Nadu.

E-mail: santhanam@bdu.ac.in

Website: www.mpalbdu.weebly.com

A cephalopod (Greek:kephalópoda) "head-feet" is any member of the mollusc class Cephalopoda, characterized by prominent head, and a modification of the mollusk foot

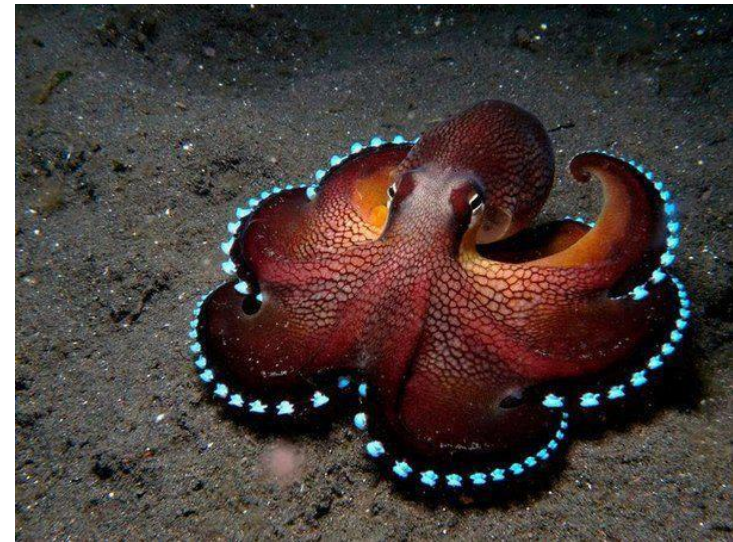


OCTOPUS

The **octopusm** (eight-footed) is a cephalopod of the order **Octopoda**.

The octopus inhabits many diverse regions of the ocean, especially **coral reefs**.

There are around 300 recognized octopus species, which is over one-third of the total number of known cephalopod species.



OCTOPUS

Octopuses are characterized by their eight arms, usually bearing suction cups. The arms of octopuses are often distinguished from the pair of feeding tentacles found in squid and cuttlefish.

Both types of limbs or muscular hydrostats.

The majority of octopuses have almost entirely soft bodies with no internal skeleton.

They have no protective shell like the nautilus, or any internal shell or bones, like cuttlefish or squid.



OCTOPUS

Octopuses move about by crawling or swimming. Their main means of slow travel is crawling, with some swimming. Jet propulsion is their fastest means of locomotion, followed by swimming and walking.

Octopuses are bilaterally symmetrical, like other cephalopods, with two eyes and four pairs of arms. All octopuses are venomous, but only the small blue-ringed octopuses are deadly to humans.

Octopuses have a relatively short life, and some species live for as little as six months. Larger species, such as the North Pacific Giant Octopus, may live for up to five years under suitable circumstances.







OCTOPUS

Males use a specialized arm called a **hectocotylus** to insert spermatophores into the female's mantle cavity. Males die within a few months of mating. In some species, the female octopus can keep the sperm alive inside her for weeks until her eggs are mature. After they have been fertilized, the female lays about 2,00,000 eggs. Females die shortly after their eggs hatch. They neglect to eat during the (roughly) one month period spent taking care of their unhatched eggs.

Octopuses have three hearts. Two pump blood through each of the two gills, while the third pumps blood through the body. Octopus blood contains the copper-rich protein hemocyanin for transporting oxygen.





OCTOPUS

Octopuses are highly intelligent- they do have both short and long-term memory.

For defense against predators, most octopuses can eject a thick blackish ink in a large cloud to aid in escaping from predators. The main colouring agent of the ink is melanin.

The young larval octopuses spend a period of time drifting in clouds of plankton, where they feed on copepods, larval crabs and larval starfish



CUTTLEFISH

Cuttlefish are order **Sepiida** belonging to Mollusca. Despite their common name, cuttlefish are not fish but molluscs. Recent studies indicate that cuttlefish are among the most intelligent invertebrates.

Cuttlefish have an internal shell (the cuttlebone), large W-shaped pupils, and eight arms and two tentacles furnished with denticulated suckers, with which they secure their prey.

Cuttlefish generally range in size from 15cm to 25cm, with the largest species, *Sepia apama*, reaching 50cm in mantle length and over 10.5kg in weight.

Cuttlefish eat small molluscs, crabs, shrimp, fish, octopuses, worms, and other cuttlefish. Their predators include dolphins, sharks, fish, seals and other cuttlefish. Their life expectancy is about one to two years.





Thierry R.

CUTTLEFISH

Cuttlefish are sometimes referred to as the chameleon of the sea because of their remarkable ability to rapidly alter their skin color at will. Their skin flashes a fast-changing pattern as communication to other cuttlefish and to camouflage them from predators. This color-changing function is produced by groups of red, yellow, brown, and black pigmented chromatophores.

Cuttlefish eyes are among the most developed in the animal kingdom.



CUTTLEFISH

The blood of a cuttlefish is an unusual shade of green-blue because it uses the copper-containing protein hemocyanin to carry oxygen instead of the red iron-containing protein hemoglobin.

Cuttlefish have ink, like squid and octopuses. This ink was formerly an important dye, called sepia. Today artificial dyes have replaced natural sepia.

Cuttlefish are caught for food in the Mediterranean, East Asia, the English Channel and elsewhere. Although squid is more popular as a restaurant dish all over the world, in East Asia dried shredded cuttlefish is a highly popular snack food.



CUTTLEFISH

Cuttlefish is especially popular in Italy, cuttlefish and squid ink for the marine flavor and smoothness it provides; it is included in dishes such as rice, pasta and fish stews.

In Portugal, it is the regional dish of the city of Setubal and surrounding areas, where it is served as deep-fried strips with red kidney beans.



SQUID

Squid are of the order **Teuthida**, which comprises around 300 species. Like all other cephalopods, squid have a distinct head, bilateral symmetry, a mantle, and arms.

Squid have eight arms and two longer tentacles arranged in pairs. (The only known exception is the bigfin squid group, which have ten very long, thin arms of equal length.)

The main body mass of the squid is enclosed in the mantle, which has a swimming fin along each side. These fins, unlike in other marine organisms, are not the main source of locomotion in most species.

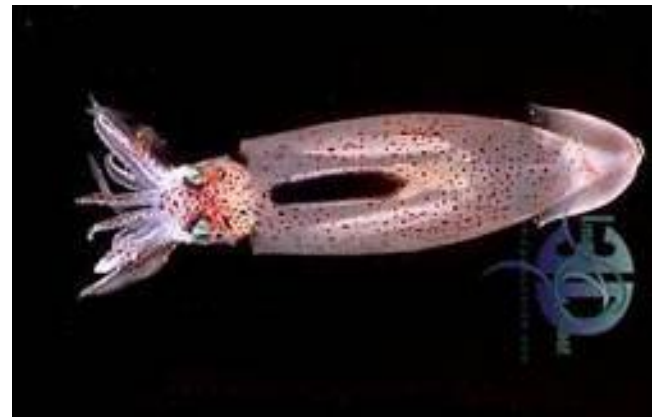


SQUID

The skin of the squid is covered in chromatophores, which enable the squid to change color to suit its surroundings, making it effectively invisible.

The underside of the squid is also almost always lighter in color than the topside, to provide camouflage from both prey and predator.

Squid contains the gills (ctenidia) and openings to the excretory and reproductive systems. At the front of the mantle cavity lies the siphon, which the squid uses for locomotion via precise jet propulsion.



SQUID

Females have a large translucent ovary, situated towards the posterior of the visceral mass.

Male have a large testis and a spermatophoric gland and sac. In mature males, this sac may contain spermatophores, which are placed inside the mantle of the female during mating.

The majority of squid are no more than 60cm long, although the giant squid may reach 13 metres.



SQUID

In 2003, a large specimen of an abundant but poorly understood species, *Mesonychoteuthis hamiltoni* (the Colossal Squid), was discovered. This species may grow to 14 metres in length, making it the largest invertebrates. It has the largest eyes in the animal kingdom.

In February 2007, a Colossal Squid weighing 495 kg and measuring around 10 metres in length was caught by a New Zealand fishing vessel off the coast of Antarctica.



SQUID

Many species of squid are popular as food in cuisines as diverse as Greek, Japanese, Italian, Spanish and Korean.

Individual species of squid are found abundantly in certain areas, and provide large catches for fisheries.

The body of squid can be stuffed whole, cut into flat pieces or sliced into rings. The arms, tentacles and ink are also edible; in fact, the only parts of the squid that are not eaten are its beak and gladius (pen).

Squid is a food high in Selenium, Vitamin B₁₂, and Riboflavin.

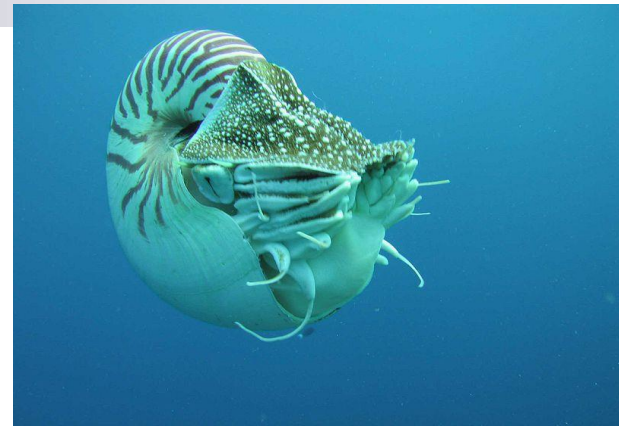


Nautilus

Nautilus (from Greek, 'sailor') is the common name of any marine creatures of the cephalopod family **Nautilidae**, the sole extent family of the suborder Nautilina. It comprises six species in two genera, which is the genus Nautilus.

Having survived relatively unchanged for millions of years, nautiluses represent the only living members of the subclass Nautiloidea, and are often considered to be “living fossils“

The shell is internally divided into chambers, the chambered section being called the phragmocone. The phragmocone is divided into camerae by septa, all of which are pierced in the middle by a duct, the siphuncle. As the nautilus matures its body moves forward, sealing the camerae behind it with a new septum.

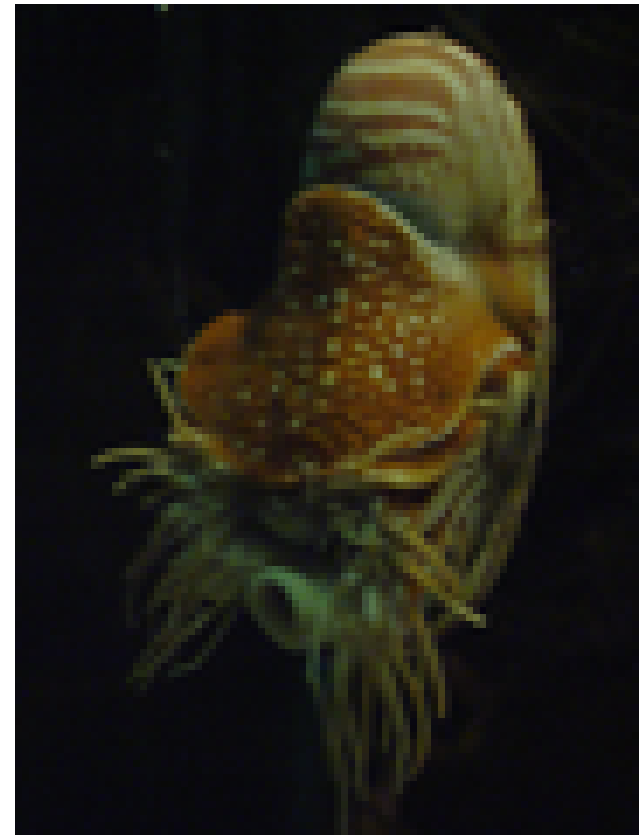


NAUTILUS

In order to swim, the nautilus draws water into and out of the living chamber with the hyponome, which makes use of jet propulsion. When water is inside the chamber, the sipuncle extracts salt from it and diffuses it into the blood. When water is pumped out, the animal adjusts its buoyancy with the gas contained in the chamber.

In the wild, nautilus usually inhabit depths of about 300 m, rising to around 100 m at night for feeding, mating and egg laying. The shell of the nautilus cannot withstand depths greater than approximately 800 m.

Nautilus are only found in the Indo-Pacific, from 30° N to 30° S latitude and 90° to 185° W longitude. They inhabit the deep slopes of coral reefs.





CEPHALOPOD FISHERY

- Squid constitute approximately 70% of the present catch of cephalopods and estimates indicate that the harvest could be increased appreciably.
- The potential world catch of squid is estimated to be 10 million tonnes annually.
- Many of the abundant squid species are extensively fished and from a major source of human food in some countries.
- In 1981, the Japanese began to using drift net fishing to harvest squid in the Pacific Ocean.

CEPHALOPOD FISHERY

- According to the FAO, the total cephalopod catch for 2002 was 31,73,272 tonnes. Of this, 21,89,206 tonnes, or 75.8 percent, was squid.
- At night the nets were placed vertically in the open ocean and allowed to drift with the winds and currents for about 8 hours to catch squid and fish.
- Japan, Korea and Taiwan were deploying about 800 drift net in the Pacific and harvest 3,00,000 tonnes of squid annually.
- 200 other vessels are operating in the Atlantic and Indian Oceans.
- In Japan, about 5,00,000 tonnes of *Todarodes pacificus* are caught each year using a techniques that captures only squid.