



OCTOPUS FACT SHEET



KINGDOM:
Animalia

PHYLUM:
Mollusca

CLASS:
Cephalopoda

SUBCLASS:
Coleoidea

SUPERORDER:
Octopodiformes

ORDER:
Octopoda (Leach, 1818)

The octopus is a cephalopod of the order Octopoda that inhabits many diverse regions of the ocean, especially coral reefs. The term may also refer to only those creatures in the genus Octopus. In the larger sense, there are

289 different octopus species, which is over one-third the total number of cephalopod species.

PHYSIOLOGY:

Octopuses are characterized by their eight arms (not tentacles), usually bearing suction cups. These arms are a type of muscular hydrostat. Unlike most other cephalopods, the majority of octopuses — those in the suborder most commonly known, Incirrata — have almost entirely soft bodies with no internal skeleton. They have neither a protective outer shell like the nautilus, nor any vestige of an internal shell or bones, like cuttlefish or squids. A beak, similar in shape to a parrot's beak, is their only hard part. This enables them to squeeze through very narrow slits between underwater rocks, which is very helpful when they are fleeing from morays or other predatory fish. The octopuses in the less familiar Cirrata suborder have two fins and an internal shell, generally lessening their ability to squeeze into small spaces.

Octopuses have a relatively short life span, 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. However, reproduction is a cause of death: males can only live for a few months after mating, and females die shortly after their eggs hatch, for 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. Less efficient than the iron-rich hemoglobin of vertebrates, the hemocyanin is dissolved in the plasma instead of being bound in red blood cells and gives the blood a blue color. Octopuses draw water into their mantle cavity where it passes through its gills. As a mollusc, octopus gills are finely divided and vascularized outgrowths of either the outer or the inner body surface.

DEFENSE:

Three defensive mechanisms are typical of octopuses: ink sacs, camouflage, and autotomising limbs. Most octopuses can eject a thick blackish ink in a large cloud to aid in escaping from predators. They also have specialized skin cells, called chromatophores, for both color changing and light reflection and refraction. They use this ability to blend into the environment to hide, communicate with other octopuses, or warn other octopuses. The very poisonous Blue-ringed Octopus becomes bright yellow with blue rings when it is provoked. When under attack, some octopuses can autotomise their limbs, in a similar manner to skinks and other lizards. The crawling arm serves as a distraction to would-be predators; this ability is also used in mating. A few species, such as the Mimic Octopus, have a fourth defense mechanism. They can combine their highly flexible bodies with their color changing ability to accurately mimic other, more dangerous animals such as lionfish and eels.

REPRODUCTION:

When octopuses reproduce, males use a specialized arm called a hectocotylus to insert spermatophores (packets of sperm) into the female's mantle cavity. The hectocotylus is usually the third right arm. 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 roughly 200,000 eggs (this figure dramatically varies between families, genera, species and also individuals). The female hangs these eggs in strings from the ceiling of her lair, or individually attached to the substratum depending on the species. After the eggs hatch, the young larval octopuses must spend a period of time drifting in clouds of plankton, where they feed on copepods, larval crabs and larval seastars until they are ready to sink down to the bottom of the ocean, where the cycle repeats itself. In some deeper dwelling species, the young do not go through this period. This is a dangerous time for the octopuses; as they become part of the plankton cloud they are vulnerable to many plankton eaters.

INTELLIGENCE:

Octopuses are highly intelligent, probably the most intelligent of any of the invertebrates, with their intelligence supposedly comparable to that of the average housecat. Maze and problem-solving experiments show that they have both short- and long-term memory, although their short lifespans limit the amount they can ultimately learn. An octopus has a highly complex nervous system, only part of which is localized in its brain. Two-thirds of an octopus's neurons are found in the nerve cords of its arms, which have a remarkable amount of autonomy. Octopus arms show a wide variety of complex reflex actions arising on at least three different levels of the nervous system. Some octopuses, such as the mimic octopus, will move their arms in ways that emulate the movements of other sea creatures. Octopuses can be readily trained to distinguish between different shapes and patterns. They are able to open jars after learning from observation. Octopuses have also been observed in what may be described as play; repeatedly releasing bottles or toys into a circular current in their aquariums and then catching them. Octopuses often break out of their aquariums and sometimes into others in search of food. They have even boarded fishing ships and opened holds to eat crabs.

SENSATION:

Octopuses have keen eyesight. Although their slit-shaped pupils might be expected to afflict them with astigmatism, it appears that this is not a problem in the light levels in which an octopus typically hunts. Surprisingly, they do not appear to have color vision, although they can distinguish the polarization of light. Attached to the brain are two special organs, called statocysts, that allow the octopus to sense the orientation of its body relative to horizontal. An autonomic response keeps the octopus's eyes oriented so that the pupil slit is always horizontal. Octopuses also have an excellent sense of touch. The octopus's suckers are equipped with chemoreceptors so that the octopus can taste what it is touching. The arms contain tension sensors so that the octopus knows whether its arms are stretched out.

LOCOMOTION:

Octopuses move about by crawling or swimming. Their main means of slow travel is crawling, with some swimming. Their only means of fast travel is swimming. Their fastest movements only occur when provoked by hunger or if in danger. They crawl by walking on their arms, usually on many at once, on solid surfaces, while supported in water. They swim by expelling a jet of water from a contractile mantle, and aiming it via a muscular siphon.

CAPTIVITY:

Though octopuses are hard to keep in captivity, some people keep them as pets. Octopuses often escape even from supposedly secure tanks, due to their intelligence and problem solving skills. Octopuses are also quite strong for their size. Octopuses kept as pets have been known to open the covers of their aquariums and survive for a time in the air in order to get to a nearby tank and gorge themselves on the fish there. They have also been known to catch and kill some species of sharks. A common belief is that when stressed, an octopus may begin to eat its own arms. However, limited research conducted in this area has revealed that the cause of this abnormal behavior may be a virus called "autophagy" that attacks the octopus's nervous system. Thus this behavior may be more correctly labeled as a neurological disorder. Octopuses are intelligent, emotional creatures and should not be kept in captivity for human amusement or "research".