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Oceanography

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The Mimic Octopus

Introduction

The shape shifter of the sea, the Mimic Octopus, scientifically known as Thaumoctopus Mimicus, is apart of the Octopidae family under the species of T. Mimicus. It was recently discovered in 1998 off the coast of Sulawesi, India. It was also spotted swimming in the Great Barrier Reef in 2010. It is undoubtedly one of, if not the most amazing species of octopus.

Anatomy of the Mimic Octopus

 The basic anatomy of the mimic octopus is very similar to that of the normal octopus. The mimic octopus can grow up to two feet in length. Its eight tentacles are about 25 centimeters, which is about the width of a pen. Each arm has two rows of suckers that contain a touch sensor and a chemoreceptor, which allows the mimic to feel and taste its food. Like other octopi, it has 3 hearts. Two of the hearts serve to pump blood through its gills and the third heart pumps blood through the body. Although the octopus has a large brain, it has no hearing. It must rely on other senses in order to survive or catch its prey. In order to move around, the octopus uses the siphon in its body for jet propulsion. “A type of jet-propulsion system helps to achieve movement for the octopus. Circular and radial muscles make up the mantle of the octopus. Upon contraction of the circular muscles there is a decrease in the volume of the mantle cavity and valves close to prevent water from moving out of the mantle cavity between the head and the mantle wall. This forces the water to be forced out the narrow funnel called the siphon. There are muscles attached to the siphon that can help to control direction of movement. The cavity’s volume is then increased by radial muscle contraction and the process can begin again.” (Oliverio, 2004) Its body is covered with brown and white stripes or spots; however, when it is in its resting state, the octopus’ body is more of a pale brown or beige color. The pigment sacs on the skin are chromatophores and they contract or expand in order to produce rapid changes of pattern and color. Another distinction of color is that their blood is blue. “Octopus [blood](http://en.wikipedia.org/wiki/Blood) contains the [copper](http://en.wikipedia.org/wiki/Copper)-rich protein [hemocyanin](http://en.wikipedia.org/wiki/Hemocyanin) for transporting [oxygen](http://en.wikipedia.org/wiki/Oxygen). Although less efficient under [normal conditions](http://en.wikipedia.org/wiki/Standard_conditions_for_temperature_and_pressure) than the [iron](http://en.wikipedia.org/wiki/Iron)-rich [hemoglobin](http://en.wikipedia.org/wiki/Hemoglobin) of vertebrates, in cold conditions with low oxygen pressure, hemocyanin oxygen transportation is more efficient than hemoglobin oxygen transportation. The hemocyanin is dissolved in the [plasma](http://en.wikipedia.org/wiki/Blood_plasma) instead of being carried within [red blood cells](http://en.wikipedia.org/wiki/Red_blood_cell), and gives the blood a bluish color”. Unlike many organisms, octopuses have no skeleton. This means that they are highly flexible and they can fit through small places such as a coke bottle. Because of its similar size, shape, color, and habitat, the mimic octopus is often confused with the wonderpus. The two species of octopus may look the same, but their actions differ greatly.

Behavior

Octopuses are extremely intelligent creatures. They have been known to successfully complete mazes and various problem-solving experiments. The mimic octopus may be the smartest of this species. The mimic octopus is known for its amazing defense system. Unlike the typical octopus that uses its morphing ability to camouflage, the mimic octopus uses its ability to mimic other sea creatures and ward off enemies. Mimicry is its survival strategy. This octopus is so brilliant that it observes other animal’s behavior. It studies how predators react to said animals. If a predator is warded off then the octopus knows that mimicking this animal will ward off the same predators. It alters both its shape and behavior to impersonate other creatures. It can mimic up to thirteen animals. Depending on the situation and danger present it will chose one of the various animals it knows to mimic. These animals include the lionfish, sea snake, sole fish, stingray, brittle stars, seashells, jellyfish, mantle shrimp, anemones, giant crabs and more. It has four most noticeable mimicries. With its arms spread wide and swimming well above the sand, it mimics the lionfish. The lionfish is a fish that contains poison in the tips of its spikey fins. Poison from this fish can cause paralysis, breathing difficulties, and death. Clearly this is a fish that many predators are afraid of. When being pestered by a damselfish, the octopus buries all but its eyes and two arms below the sand. It changes its color to black and yellow stripes and waves its two arms around looking like a swimming sea snake, which is one of the most poisonous predators on earth. Another animal it is great at mimicking is the flounder. To impersonate the flounder it changes its color to the light beige color of the sand, pulls all of its arms together, and undulates along the bottom like a flounder. A quick alter from the flounder is he stingray in which it drags one arm behind it to represent the stinger. It will mimic one of its thirteen choices depending on the predators in that area and if all else fails then the octopus can always bury itself under the sand.

Habitat

 The mimic octopus has been found in the Indo- Pacific Ocean in Sulawesi, and Bali. It has also been spotted in the Great Barrier Reef in Australia. The mimic octopus lives in shallow water less than fifteen meters deep in sand or silt. This provides them with a quick escape route as they can bury themselves easily. They can also be found near the mouths of rivers or estuaries. A risk for living so close to the mouth of rivers is that chemicals released into the water may harm this species “Typically octopus live in rocks, coral, or burrows and because they are invertebrates, they can squeeze through narrow passageways giving them a bigger variety of possible homes. They have been known to scatter rocks and shells around their home to help hide themselves” (Justin, unknown).

Feeding

 The mimic octopus typically feeds on small crustaceans or fish. First they stock its prey. They tend to dig around in the sand probing into holes using the tips of their arms to catch fish into their suckers. The suckers grip onto the prey and then eat the prey. Octopuses in general “bite their prey with their hard beak located underneath their head and inject a poisonous saliva into them. If their victim has a shell, they drill a hole into it so they can inject the poison into their bodies. After the poison has taken effect, the octopus finally eats their prey” (Justin, unknown). The mimic octopus will swim into tunnels up to one meter deep to hunt their prey. They are the only octopus known to go to such great depths to catch their prey. Unlike other octopuses, the mimic octopus will hunt for its food during the day. This is dangerous for typical octopus but the mimic octopus can easily imitate a predator and get out of an undesirable situation in seconds.

Reproduction

 As life begins for these octopuses, two lives end. Octopi are dioecious: they have separate male and female sex organs. For reproduction to happen the male octopus inserts its hectocotylus, which is an extended arm into the female’s mantle cavity. He then deposits packets of sperm into the female. The hectocotylus falls off causing the male to die. The female continues on, fertilizing the eggs and carrying them in strings. Larvae hatch and shortly after the female dies. The larvae drift around until them mature and sink to the ground to begin life.

Octopus and Tides

 The mimic octopus was documented for the first time in Australia during low tide June 4, 2012. The mimic octopus lives in shallow waters so it is likely that the tides affect its behavior. Because the mimic is a recently discovered species, there is not a lot of information on them so I will be researching octopuses as a whole and their relation to tides. During low tide some octopuses will crawl out of the water. Octopuses are nocturnal so not many people have seen octopuses out of water. Octopuses will travel out of water to find different types of food such as fish and crustaceans to find a new delicacy such as shellfish and snails. “When the tide goes down many octopus species emerge to hunt in the pools of water left behind by the receding tide” (Harmon, 2011). After an octopus has finished rummaging around a tidal pool, it will continue its hunt for food and hunt in the tide pool over. This process; however, can be very dangerous as octopuses depend on water to breathe. They move much slower on land than in the water. If they end up on dry rocks and hot sun, the octopus may not make it back alive as it can only stay alive for a few minutes without water. The tide can either provide an opportunity for the octopus to find a tasty treat or become a death trap for this creature.

Octopus and Geology/Bathymetry (ocean floor)

 The mimic octopus tends to live in shallower waters no more than fifteen meters deep. They live in sandy or muddy waters so that they can burry and hide themselves easily. It uses the ocean floor as I a hiding place when it encounters cuttlefish and mimics the sea snakes. When mimicking the flounder, it takes on the beige color of the ocean floor as it grazes along it. Most every species of octopus, including the mimic, stay close to the sea floor. Some octopi use coral to hide and camouflage themselves with. Octopuses use the seafloor for shelter. “Octopuses live in dens, spaces under rocks, crevices on the sea floor, or holes they dig under large rocks. Octopuses pile rocks to block the front of their den. The den protects them from predators” (Enchanted Learning, 1999). They use the seafloor to their advantage whether it is in taking shelter or warding off a predator.

Conclusion

 Due to the unique behavior, this species of octopus is on many diver’s (including mine) list of ocean creatures to see. Finding the mimic octopus would be very rare, but definitely an amazing sight. There is also the possibility that many have seen this octopus in action, but was fooled to think it was a different animal. This artist of disguise as most call it is brilliant in its ability to learn, mimic, and successfully fool predators.

More facts about how this octopus is so amazing.

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