



## Giant Pacific Octopus

Kingdom: Animalia  
Phylum: Molluska  
Subphylum: Invertebrata  
Class: Cephalopoda  
Order: Octopoda  
Family: Octopodidae  
Genus: *Enteroctopus*  
Species: *dofleini*



Photo courtesy of Karen Marzynski

### Habitat

- **In the Wild:** Giant Pacific Octopuses range throughout the temperate waters of the Pacific Ocean from southern California to Alaska, and west to the Aleutian Islands and Japan. The water depth in which they live ranges from the shallow coastal waters to about 330 feet deep, living on the ocean floor.
- **Exhibit Location:** Upper lobby at the entrance to USS Antiquities

### Characteristics

- Length across: 16 feet (average), 30 feet (record); Weight: 110 pounds (average), 600 pounds (record)  
The giant Pacific octopus is the largest of octopus species.
- Each of its 8 arms may measure over 6 feet.
- Mature giant Pacific octopuses have 280 suckers on each arm; each sucker contains thousands of chemical receptors.
- The giant Pacific octopus has a huge, bulbous body (or mantle) that is generally reddish-brown in color.
- Females are generally larger than males; males are usually darker than females.
- Giant Pacific octopuses can change their appearance to mimic rocks and highly patterned coral. They use special pigment cells in their skin to change colors and texture.
- Their soft, fleshy bodies lack shells, allowing them to squeeze into tiny spaces. Their skin is not smooth but rather covered in several skin folds.
- They have a beak much like a parrot that is made of keratin, the same substance that forms our fingernails.
- Giant Pacific octopuses have highly developed eyesight and are extremely strong. Using all 8 arms, an octopus can move more than 700 pounds.
- They have 3 hearts and blue blood:
  - 2 hearts pump blood to the gills; 1 heart pumps blood to the rest of the body
  - The nervous system consists of a central brain and a large ganglion (a center of nerve cells where nerve impulses are controlled) at the base of each arm that controls movement.
  - Its blood contains a copper-rich protein that is more efficient than hemoglobin (what we have) for transporting oxygen at low temperatures and low oxygen levels.
- You can tell a male from a female by looking at the tip of its 3<sup>rd</sup> arm on the right (starting between the eyes and going clockwise). Males have a special tip on this arm that has no suckers on the last few inches. This is even seen in young octopuses.
- **Lifespan: In the Wild** 3-5 years; **In Captivity** 3-5 years

### Behaviors

- Giant Pacific octopuses hunt at night, exploring grounds by sight and extending their sucker-studded arms to explore the area by touch.
- When it makes a prey discovery, it lunges and delivers the prey to its mouth.

- Octopuses have several tools for penetrating stubborn prey shells:
  - They use their hard beaks to break up food and a barbed tongue-like organ called the radula to scrape up juicy prey.
  - An organ called the salivary papilla, located below the radula, is covered with small teeth that can bore through shells.
  - It also delivers salivary secretions to the drilled hole that further corrodes the shell. The saliva weakens the shell and detaches the prey from its shell.
- They establish dens in crevices, under rocks, or in man-made objects like flowerpots. They use these dens to lay eggs and hide from predators.
- Giant Pacific octopuses are cannibals. They will readily kill and eat smaller octopuses.
- Usually a solitary species (living alone), they will come together for a short time during mating.
- The octopus can rapidly draw water into its mantle and expel it forcefully out through its tubular siphon, propelling it backwards.
- When threatened, giant Pacific octopuses shoot out an inky substance that creates an instant “smokescreen,” allowing it to escape from predators.
- They are timid and rarely display aggressive behavior towards humans.
- Individuals in captivity are known for having unique temperaments and personalities, from playful to destructive. Their high level of intelligence and desire to interact with their human caretakers have earned captive giant Pacific octopuses the reputation as escape artists.
- Unusually adept at navigating by using landmarks in the wild and at adapting objects as tools, they are the only invertebrate known to use their vision to learn through observation.
- **Enrichments at the Zoo:** plastic containers, kongs, rubber dog toys, hamster balls, Mr. Potato Head

## Reproduction

- They can reproduce at any time of the year with a spawning peak during the winter months.
- Males have a modified sex arm called a hectocotylus that stores long ropes of sperm, up to 39 inches long. During mating, the rope of sperm is inserted into the female’s oviduct. Mating takes 2-3 hours.
- Males breed with several females, but females mate only once in their lifetime.
- The female lays 20,000-100,000 eggs in several strings that she hangs in her den. She broods obsessively, cleaning and aerating the eggs and not eating until they hatch about 7 months later.
- Female octopuses can wait months after mating to fertilize their eggs.
- Males die soon after breeding; females live long enough to take special care of their eggs and die soon after they hatch.
- A cooler temperature during brooding lengthens incubation time.
- Larvae hatch from a cluster of eggs. They are limited swimmers and move to the surface to live for 1-3 months. The juveniles then descend to the bottom where they grow rapidly. They continue to grow until they mate.

## Diet

- **In the Wild:** shrimp, clams, lobsters, sharks, birds, crabs, smaller octopuses, scallops, abalones, moon snails, rockfish, flatfish, sculpins
- **At the Zoo:** smelt, herring, clams, scallops, shrimp, mussels

## Conservation Status

- **IUCN status:** not listed; **CITES Appendix:** not listed
- The population numbers of the giant Pacific octopus are not known and do not currently appear on any lists of endangered or vulnerable animals.
- The giant Pacific octopus is sensitive to environmental conditions and may be suffering from high pollution levels in their range.
- With their love for crabs and den-like enclosures, octopuses mistake crabbers' nets as hunting and hiding ground, where they are accidentally caught. If the octopus kills and eats the crabbers' catch, many fishermen have responded by killing the octopus.
- Predators: harbor seals, sperm whales, sea otters, wolf eels, halibut, humans

## Did You Know?/Fun Facts

- A 50-pound octopus can squeeze through a hole only 2 inches in diameter. If the beak fits, it can get through.
- Octopuses are about 90% muscle.
- Fishermen used to cut off the tip of the octopus' arm and use it for halibut bait because it continues to wiggle even after being cut off.
- Octopuses frequently lose an arm to predators, but it grows back.
- All octopuses have venom, some deadly to humans. The venom of the giant Pacific octopus is *not* deadly to humans. (Australia's blue-ringed octopus' venom *is* deadly to humans)
- Considered one of the most intelligent of all invertebrates, they therefore require significant enrichment activities to avoid boredom in captivity.
- The correct plural form of octopus is octopuses (not octopi). This is because it comes from the Greek root rather than a Latin root.

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