

The Giant Pacific Octopus

WILLIAM L. HIGH

ABSTRACT—*Octopus dofleini* is the largest of several octopus species inhabiting coastal waters from California northward to Alaska and across to Japan. It lives in caves and discarded man-made items from the intertidal zone to depths greater than 100 fathoms. Growth appears to be rapid, with individuals reaching weights greater than 100 pounds within about 5 years. Food for the creature includes crabs, clams, and fish. Adults commonly die after breeding activities. Information on its behavior has been increased through the use of scuba diving equipment. Divers routinely handle or capture large specimens without exceptional risk; however, several divers have been bitten. This naturally timid creature has sometimes attacked underwater swimmers, but usually incidents occur only after the animal is seized. There are limited commercial octopus fisheries for both halibut bait and human food. North American landings by all fishing methods are small.

INTRODUCTION

Of all the creatures in the sea, the giant Pacific octopus, *Octopus dofleini*, is perhaps the most reviled and misunderstood. The French author Victor Hugo created a reputation for it that makes people shudder. Hugo condemned the octopus with his description of an eight-armed creature battling a man to the death, while in reality the octopus deserves recognition as an interesting and useful sea animal.

Little was known about the life and habits of the octopus until scuba apparatus permitted man to descend into Neptune's realm. Recreational divers



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in Washington and British Columbia recognized the public attention potential associated with this undersea creature and by 1956, hundreds of divers gathered at Puget Sound, Wash., to compete for the Octopus Wrestling Championship of the World. Soon, divers collectively possessed a far greater understanding of this fascinating and intelligent creature than did the scientific community. Unfortunately, no coordinated effort was made to record the divers' extensive naturalist-type observations. By 1965, most divers sought other undersea adventures, thus leaving studies of the octopus to a few students of its behavior.

DISTRIBUTION

Octopuses are found throughout the world but the giant octopus occurs only along the Pacific rim of North America from California northward through British Columbia and Alaska, and across to Japan (Pickford, 1964). Its center of abundance appears to be Puget Sound in Washington State and British Columbia (High, 1960). Prior to the advent of scuba diving, giant octopuses were occasionally encountered in west coast waters by beachcombers

searching among rock crevasses and caves at low tide and by line fishers who accidentally hooked them. Incidental catches (in trawl nets set at depths to 100 fathoms or more) found a limited market, as did catches made using small trap-like enclosures sought out by the animals as protective dens.

Seclusion and protection seem to be the major criteria for an octopus den. In addition to natural caves and holes dug beneath rock formations (Fig. 1), individuals are often found in the debris of civilization, particularly barrels, jugs, cans, tires, and bottles which lie on the ocean floor. Small octopuses are commonly found inside beer bottles. Like their mechanical counterparts in the movies, octopuses commonly inhabit sunken ship hulls (Fig. 2).

The opening into the den of even a large octopus may be only a few inches high. Since the animal has no bones, it can squeeze into almost any shape to permit passage through small openings (Voss and Sisson, 1971). One specimen weighing over 100 pounds escaped from a cage having a maximum opening of just over two square inches. Often the cave of an octopus has a secondary opening to allow a strategic withdrawal from an attacking predator.

FAST GROWTH—SHORT LIFE

Observations conducted both in the natural environment and aquaria have recently added large pieces to the octopus life history puzzle. Those captured at the World Octopus Wrestling Championship (Fig. 3) fit into what might be well-defined age groups (High, 1963).

Several octopuses in excess of 100 pounds have been encountered and captured. Much larger ones have been



Figure 1.—A well camouflaged octopus begins to emerge from a large den scoured out beneath a 10-foot diameter rock. Several 6- to 10-inch high openings were located around the rock base.

reported but, like the Loch Ness Monster, these usually elude the careful photographer or scientist. Most octopuses weigh less than 70 pounds with a stretched length of 15 feet or less. Overall length between arms is not a suitable measure because of the animal's unusual elasticity.

In the late 1950's, I interviewed a Canadian commercial diver, Jock MacLean of Prince Rupert, B.C. He reported capturing an immense creature weighing 600 pounds and measuring 32 feet from arm tip to top. MacLean's photographs, unfortunately, were of poor quality. Smaller animals, to 400 pounds, were occasionally taken in his commercial octopus fishing endeavor.

Life expectancy appears to be about 4½ to 5 years with both male and female commonly dying after breeding. Breeding males in aquaria die within 3 months, whereas females brood the eggs for several months until hatching, then die within 2 months (Eilene Solie, Univ. Puget Sound, Tacoma, WA 98416, pers. commun.).

Bruce Edney, an engineer with the Honeywell Corporation, spent 9 months of his leisure time observing and photographing the egg brooding process conducted by a female octopus. In that

period, he made 39 day or night scuba dives to the cave site. Thousands of rice-shaped eggs hung in strings from the cave roof around the parent (Fig. 4). The eggs appeared to be newly laid in May when the cave was discovered. The female octopus was present at each visit and did not depart in November when the eggs hatched. The adult's appearance deteriorated near hatching time when the normal red color changed to pale gray. In January, the animal was found dead in the cave.

Several hundred eggs were removed when hatching time appeared near, and they were incubated in an aquarium. After the eggs hatched, the fully formed octopuses were returned to the cave. As those hatched in the aquarium were released in the cave, they immediately began swimming up toward the surface (Bruce Edney, pers. commun.).

MOVEMENTS AND FEEDING

The octopus is highly mobile. It crawls lightly along the bottom using its arms or swims off-bottom utilizing a form of jet propulsion (Fig. 5). Water drawn into the body cavity through the mantle opening during the breathing process can be expelled forcefully

through the siphon, resulting in considerable thrust. A diver must swim rapidly to keep up with a jetting 50-pound animal.

Food for the octopus consists of crabs, clams, and fish—all of which can be captured alive. Octopuses have been observed both in aquaria and in nature to catch several crabs and then hold them with the suction discs until ready to eat. Thus, an octopus could theoretically obtain food for several days at one time and hold it captive until hungry. Clams are dug using a power water jet from the siphon, which can blast away sand and mud. I saw portions of freshly killed rockfish, *Sebastes* sp., twice in octopus caves, confirming their use as a food source. However, rockfish are commonly observed swimming in an undisturbed manner within an occupied den.

Food is carried to the den, permitting the octopus to feed leisurely in safety. Remains, such as shells and bones, are discarded outside the den creating readily detectable refuse piles (High, 1960).

AGGRESSIVE BEHAVIOR EXAGGERATED

The great octopus is by nature a timid animal, generally found hiding deep within its lair or carefully camouflaged against a rock or among kelp fronds. As with most general rules, there are numerous exciting exceptions. On at least two occasions scuba divers were ambushed by large octopuses lying on ledges above the passing swimmers. The creatures descended unnoticed and landed squarely on the divers' backs. In each case it required several seconds for both the frightened diver and his buddy to pull the eight-armed creature free. These might be recorded as unprovoked attacks. It is unlikely the creature considered the divers as anything more than potential meals.

Aggressive behavior is usually observed only when the animals are molested (Fig. 6). Once I was confronted by a 75-pound male when I placed my head into a large cave. The octopus repeatedly drove me away by rushing to the cave entrance. After it was removed by our diving party, a second, larger octopus emerged. Seldom are two octopuses found sharing a single

cave. Perhaps this was a mating pair and the male was defending its territory.

On another occasion an octopus estimated to weigh well over 100 pounds was encountered adjacent to a rock. A speargun carried by the diver was used as a prod to cause the animal to spread out for improved viewing. Instantly, this behemoth seized the gun and bit the heavy propulsion rubber in half with its beak. Discretion prompted the diver to vacate the area.

Divers seldom report being bitten while handling these animals. How-

ever, Snow (1970) documented two incidents when divers, deliberately handling octopuses underwater, were bitten. Also, the author observed two divers being bitten while a group of divers were engaged in capturing several animals. During all four incidents the victims were: wearing diver wet suits, were "attacking" the animals, and all were bitten on the hand or wrist. The divers' skin was not exposed to the bite site since it is standard practice for local divers to wear gloves of wet suit neoprene. Although bleeding was usually profuse and healing

prolonged, no special treatment was required.

Tales of octopuses sucking human blood are contrary to fact. However, the vacuum caused by suction discs can draw blood to the skin's surface. The resulting welt will remain for several hours. Fortunately, the divers' neoprene exposure suit protected nearly all skin from the effect of a secure grip.

HANDLING UNDERWATER

Scuba divers seek out octopuses for both adventure and study. It is a considerable challenge to entice an animal out of its lair. Food placed near the entrance to a den often causes a long arm to appear. Food also causes the octopus to modify its usually timid behavior. Two octopuses observed astride pots containing live Dungeness crabs, *Cancer magister*, were defensive and ignored advances made by divers (High, 1976). The divers touched, pushed, and finally slapped the octopuses as they reached inside the pot for crabs. After being forcibly removed and carried about 15 feet away from the crab pots, one animal returned, crawled between the pot and diver,



Figure 2.—A diver is shown reaching for the suction disc lined arm of a giant octopus beneath the boiler of a sunken ship. Note that two crab carapaces and several clam shells lie adjacent to the den entrance.

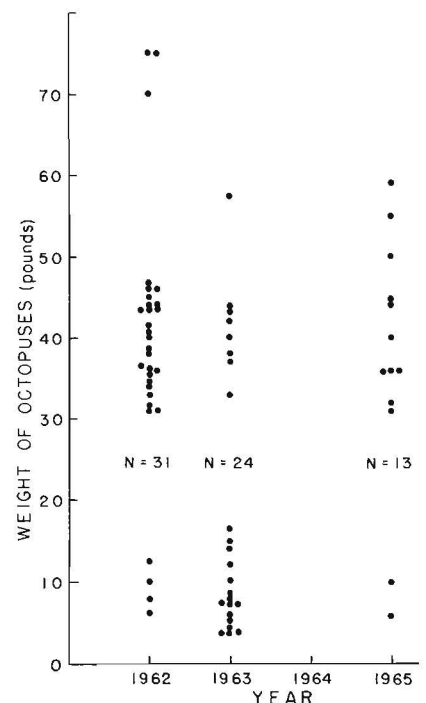


Figure 3.—Weight of octopuses captured by divers during three World Octopus Wrestling Championships held in April at Titlow Beach, Puget Sound, Wash. The 13 octopuses shown for 1965 only represent animals taken by the three top diver teams.

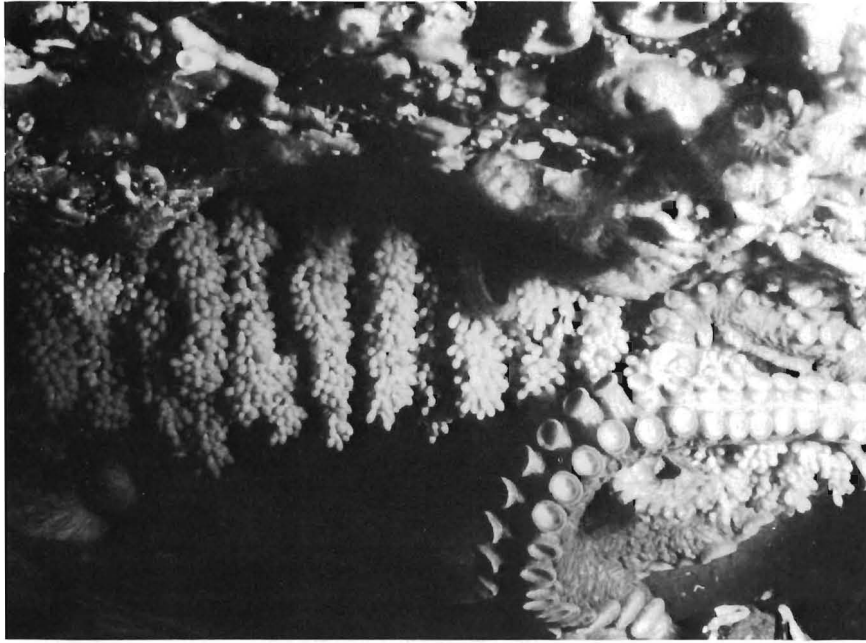


Figure 4.—Strings of eggs attached to a den's ceiling are watched over by a female octopus. Water expelled through the syphon (swimming funnel) aerates and cleans the egg clusters. Photo courtesy of Hydro Photo—Lee Grobe.

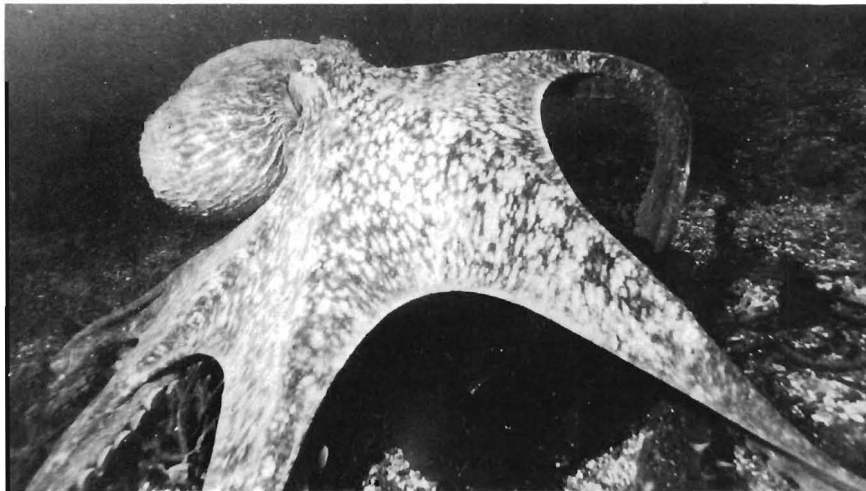


Figure 5.—An octopus weighing about 35 pounds moves across the sea floor supported on its arm tips.

and proceeded to probe for crabs. The defiant octopus left only after being displaced a second time and offered a crab from the pot.

To bring these creatures to the surface, the diver must secure a good hold, generally with both hands on the mantle or around the body, and wrench it free of the bottom. It is often necessary to pull the eight arms, one at a time, from the rocks surrounding the den. A rule of honor among sport

divers is that no action be taken against the octopus that will cause injury. Washington State regulations prohibit use of knives, spears, or other instruments to puncture the skin.

This animal is unpredictable. It may be docile as it is pulled to the surface or it may grasp the diver with one or all eight arms. These naturally timid creatures have pinned divers' legs together, pulled off their face masks, and torn out scuba mouthpieces. Using

all their arms they will try many tricks to free themselves and oftentimes the diver is only too glad to let go and get free from this overpowering giant (High, 1971).

In the event the ocean bottom is composed of small loose rocks, the octopus may cling to more than 50 pounds of rocks and the diver too (Fig. 7). When this occurs, the diver must free himself by letting go of the creature. Fortunately, when the diver releases his hold, the octopus will usually do likewise within a few seconds.

Contrary to many popular stories, the octopus does not generally use its ink as a direct form of defense. When a scuba diver manhandles an octopus, it fights with its arms. Once set free, however, it will straighten out, jet away, and leave an ink cloud behind. This is apparently intended to act as a decoy, creating the illusion that the creature is still there while in fact it is seeking the bottom and safety in a cave.

OCTOPUS FISHERY

A personal-use fishery for octopuses has existed for many years near population centers in Puget Sound, Wash.; British Columbia; and southeastern Alaska. In past years octopuses were taken by hand or gaff from the intertidal zone. These were marketed, primarily in Oriental communities. A cloth bag containing copper sulphate crystals was tied to a stick and then thrust into a cave suspected of harboring an octopus. The dissolving chemical contaminated the water, forcing the creature into view, and then it was gaffed. Both the gaff and chemical are now illegal devices in Washington. A limited market exists for octopuses captured incidentally in otter trawl fisheries.

Following World War II, numerous fishers attempted pot fishing for octopuses in Puget Sound. Others investigated the fishery potential in British Columbia, southeastern Alaska, and the Kodiak Island region because of the great demand for the octopus as halibut bait during the late 1950's and 1960's. Small-scale fisheries attempted by scuba divers were generally short-lived. Divers now may not capture octopuses commercially in Washington.

Figure 6.—An octopus encountered by a diver in the open assumes an uncommon defensive position. In reality, the creature is only a minor threat to an experienced diver.

Fishing devices such as grapples, baited jigs, and lures which are commonly used in Japan (Mottet, 1975) are not likely to be acceptable or successful along the North American coast because of their possible conflict with existing commercial and recreational water use and because they yield a relatively low financial return.

Part-time fisher Ben Frick, fishing octopus pots near Dungeness Spit in Puget Sound, was one of the few successful pot fishers. He tended strings of pots from the late 1950's until his death in 1973. In that year, two other fishers fished octopus pots in Puget Sound, one near Tacoma and the other in Hood Canal. The number of bottom-fish trapping licenses issued in Washington, which also permit the taking of octopuses, increased from 1 in 1969 to 15 in 1974. The increase primarily reflects interest in trapping finfish rather than octopuses.

Landings for the octopus in Oregon ranged from 1,000 to 11,000 pounds from 1969 through 1973. Alaska landing statistics do not identify any octopus landings. Since 1965, landings in Washington have varied between 24,000 and 41,000 pounds, most of which were taken by otter trawl. It is not likely that commercial landings will greatly increase in the near future, unless there is an increase in demand for octopuses. And the question remains whether a substantial increase in the harvest could be sustained because little is known about the size of inshore and offshore populations of this interesting animal.

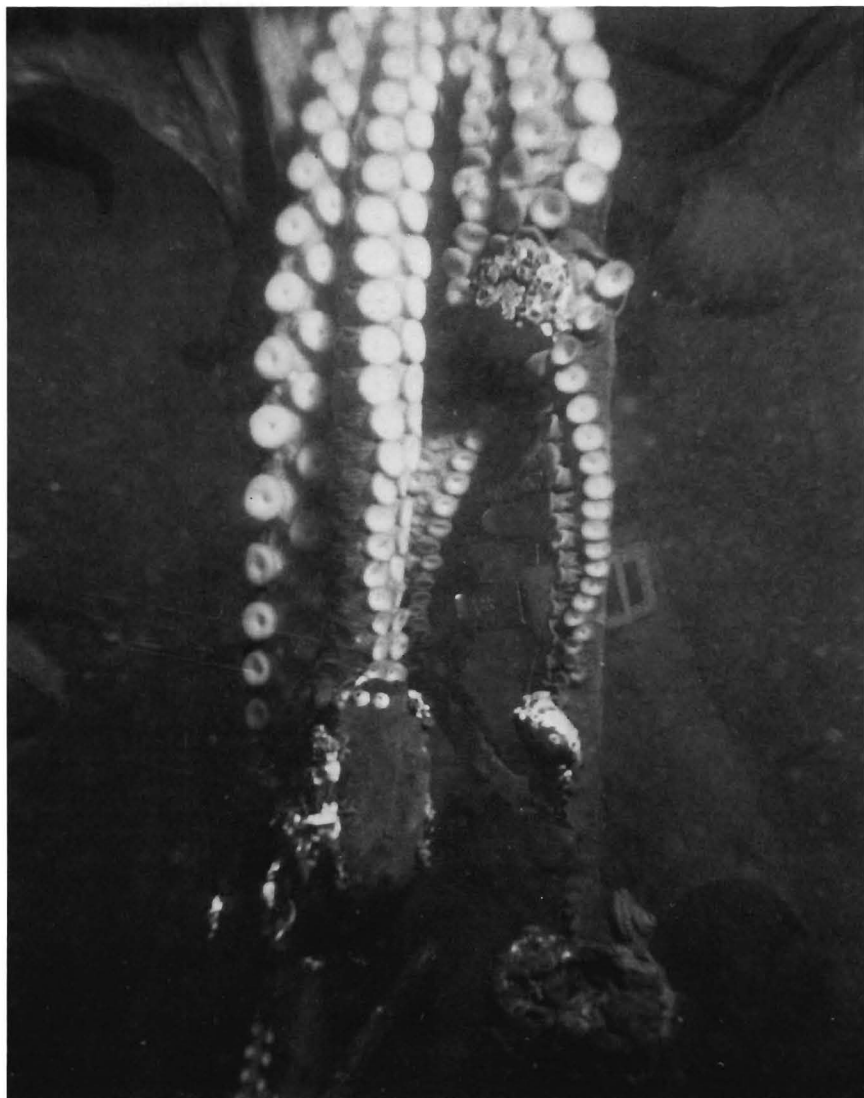
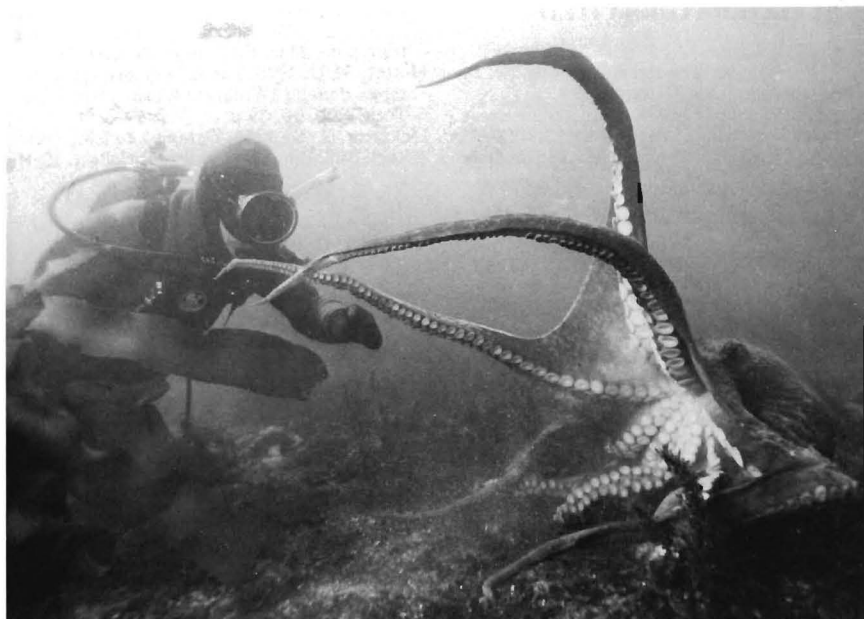


Figure 7.—Several rocks hang from the arms of an octopus lifted from the sea floor by a nearly hidden diver. Occasionally the creature may cling to 50 pounds of rocks or more, making it difficult for a diver to surface with the animal.

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