

OCTOPODIDAE

by Steven H. Kramer

Valid name	<i>Octopus cyanea</i> Gray 1849 (Fig. 46)
Synonymy	<i>Octopus marmoratus</i> Hoyle 1885 <i>Octopus horsti</i> Joubin 1898 <i>Polypus marmoratus</i> Hoyle 1905 <i>Polypus horsti</i> Hoyle 1907 <i>Polypus cyanea</i> Massey 1916 <i>Polypus fontianianus</i> (in error) Robson 1920 <i>Octopus glaber</i> Wilker 1920 (from Robson 1929)

Common and vernacular names Octopus; day octopus; day squid; tako; hee

Distribution

Captured in traps in the NWHI from Necker to Kure Atoll at depths from 18 to 91 m. It also inhabits rocky substrates and reef flats shoreward of the NMFS survey area.

Distinguishing characteristics

Body shape variable but usually pyriform, head rather small, narrow, and rounded, sometimes separated from the body by a slight constriction, eyes prominent. Arms subequal (rarely <30 mm difference in length) unless an appendage is missing or regenerated.

A small hectocotylus used to transfer spermatophore located on the distal end of the third right arm of males. Suckers on sexually mature males enlarged at the level of the web on each arm. Funnel organ small, conical. Skeletal structures consist of cephalic cartilages and dorsal stylets. Beak has insertion plate on which is fixed the upper and lower horny jaws. Shape differs little within the genus. Carnivorous type radula. Ink sac on ventral face of liver; gills consist of a number of filaments suspended from opposite sides of a central axis forming two closely opposed series; skin texture usually smooth but can assume a rough matted appearance in life and during preservation. Few large dorsal tubercles can be longitudinally extended. Supraocular cirrhus usually present, sometimes accompanied by subordinate tubercles. Ocellus below eye and between base of third and fourth arms.

Coloration usually cryptic but varies according to animal's physiological state and habitat; most often a warm ochreous red suffused and blotched with purple. Irregular dark dashes often present between suckers on ventral surface of the arms (Robson 1929).

Life history

Hee appears to spawn throughout the year (Van Heukelem 1973). Males copulate by inserting the hectocotylus into the female's oviduct. At the hectocotylus, spermatophores break open and expel sperm. The oviduct contracts and sperm is carried up to lodge in the spermathecae of the oviducal glands. Females do not have to be sexually mature for copulation to take place (Wells and Wells 1970).

Females reach sexual maturity 10-13 months after settling. Strings of 600-1,200 eggs measuring 4-10 cm long are laid in caves or holes. Brooding, which lasts 45-61 days, appears to be dependent on water temperature. Nocturnal hatching, which goes on for 3-5 successive nights, apparently reduces predation on newly hatched larvae. Females die following egg brooding and hatching.

Males develop extra large suckers at the level of the seventh and eighth pair of suckers (from the mouth) about 7-9 months after settling.

For both sexes, the average natural lifespan appears to be 12-15 months. The maximum size reached is associated with feeding and size is attained for the female when the ovaries enlarge and for the male after maximum sucker enlargement. Gonad and sucker development appear to be correlated primarily to age (Van Heukelem 1973).

Larvae are free swimming and pelagic for an undetermined time before settlement. Young settle from the plankton at a body length of about 1 cm and a weight of about 0.33 g (Wells and Wells 1970).

The growth of *O. cyanea* is expressed as:

$$W = 1.28 \times 10^{-6} X^{3.92},$$

where W = weight (g) and X = age in days (Van Heukelem 1973). A reasonable estimate of age can thus be calculated from weight at capture using the above expression.

The diet consists primarily of crustaceans and rarely fish (Van Heukelem 1966). Gastropods may also be included in the diet as evidenced by the use of cowrie shell octopus lures by fishermen. The crepuscular hunting methods of hee comprise either pouncing or *grabbing prey with the arms* (Yarnall 1969). The octopus then either paralyzes the prey with cephalotoxin from the posterior salivary gland or physically pulls the animal out of its shell. To paralyze prey, the octopus either bites with its beak or rasps through the shell using its radula before injecting cephalotoxin (Wodinsky 1969).

Octopus are high level predators in the food chain, preying on crustaceans, molluscs, and occasionally fishes. In turn, they are the prey of a variety of fishes, seals, and man. In the NWHI, octopus constitutes a major part of the diet of the endangered Hawaiian monk seal (Gilmartin 1983). Octopus have also been found to be in the diet of many of the larger predatory fishes found throughout the Hawaiian Archipelago.

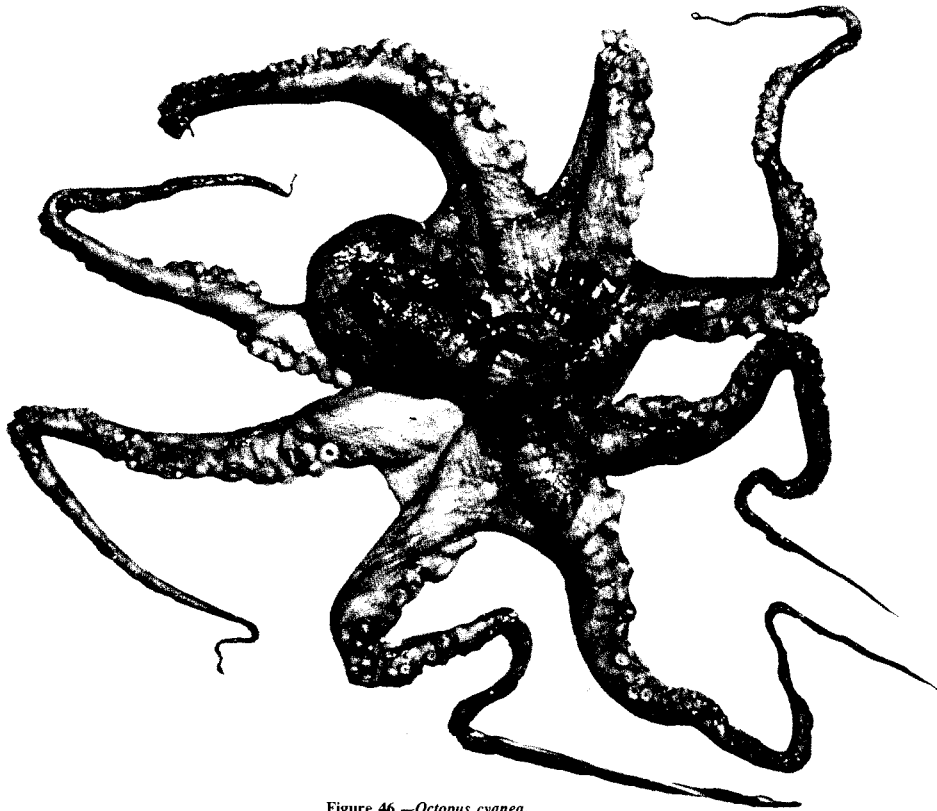


Figure 46.—*Octopus cyanea*.

Gear and catch

There is no major fishery for octopus in Hawaii. In the NWHI, most are caught incidentally in fish and shrimp traps. In the main islands octopuses are caught using spears, traps, and lures. During 1961-79, the annual landings varied between 1,722 and 10,988 kg and averaged 4,611 kg. Since octopus occurs in abundance in the inshore area, recreational harvest probably exceeds reported commercial landings. Octopus is seasonally abundant and most of the catch is made during the summer and fall months.⁶

⁶Okamoto, H. Aquatic Biologist, Department of Land and Natural Resources, Division of Aquatic Resources, Honolulu, HI 96813, pers. commun. December 1984.