Octopus Fishery

..... Off Indian NW(Maharashtra)Coast

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Octopuses, popularly known as 'Devil fishes' are marine benthic animals found to live from the sea coastal water down to 1000 m of its depth. The major species of octopuses, which contribute to their global fishery, come under the genera *Octopus, Cistopus* and *Eledone*. As many as 200 species of Octopodidae are known to occur in the world Oceans (Worms, 1983) and of these, about 60 species are known to occur in the Indian Ocean (Roper *et al.*, 1984). Octopuses are exploited from the sea for over 2,000 years (Roper *et al.*, 1984). The world octopod production was 14.6% of the total cephalopod production in 1981 (FAO 1983) with Tapan as the foremost producer. Over all, the world landings of octopuses increased substantially from 35,800 tonnes in 1950 to 3,17,200 tonnes in 2001 (Jereb *et al.*, 2005). Among cephalopod resources, octopods are the least exploited in India, though they occur in fair quantities in different parts of the Indian marine waters.

Sundaram and Dias (2008) gave an account on the traditional methods of capturing octopuses.Octopuses in the continental shelf and oceanic region are caught mainly as a by-catch of the bottom trawl. The most important octopus fisheries and markets are located in Asia (particularly Japan) and in the Mediterranean countries. In India, octopuses constitute incidental catch in shrimp trawlers. The octopuses, considered as a delicacy, are also caught during low tide from oceanic regions by adopting simple fishing methods like trap setting, harpooning or poisoning of the coral rock pools, which they inhabit. In shallow areas they are caught by setting traps and also by using longline, handline and spears. Once caught, octopuses are killed by fishermen and their bodies are turned inside out, thereby forcing gills, heart and viscera out through the wide opening of the branchial chamber. This is known as 'turning its cap' (Hornell, 1917, Sarvesan 1974 and Silas *et al.*, 1985).

Studies on octopus resources in Indian waters are very few. Some among such sparse studies are by Ooomen (1966, 1967, 1971, 1975, 1976 and 1977) in which many new species of octopods from Indian waters were described. Sarvesan (1969) and Paul (1997) recorded the behaviour and the parental care exhibited by octopus. Silas *et al.* (1985) gave an account of octopus resources of Indian waters. Victor and Jayabalan (1988) reported about the landing of a giant octopus from Gulf of Mannar. Varghese (1981) discussed the status of small-scale octopus fisheries in Lakshadweep. Kripa and Joseph (1994) and Kripa *et al* (2000) described the landing trends of octopus from Kochi waters, while Sundaram and Sarang (2004) dealt with these trends from Mumbai waters.

Even though thirty-eight commercial species of octopus have been reported from the Indian seas (Silas *et al.* 1985), a directed effort at fishing for octopus is lacking. However, in recent years, the possibility of export of octopods was tried. This paved way for the emergence of an octopus fishery in some parts of Kerala. Further, it has also picked up in Mumbai waters of Maharashtra. While Octopus products exported are meagre, from 1994 onwards, there has been a rising trend in its exports. According to Kripa and Joseph (1994), *Octopus membranaceous, Octopus dollfusi, Octopus lobensis* and *Cistopus indicus* were the main species that contributed to the octopus fishery in Kerala. Apart from these species *Octopus globosus*, *Octopus cyaneus* and *Octopus aegina* are the main species contributing to the fishery along Indian coasts (Kripa *et al.*, 2000).

There seems to be not much of information on Octopus fishery from Indian waters, especially from the northwest coast. In this background, the present paper deals with the increasing trend in octopus fishing by trawlers from Mumbai waters. This trend is dominated by a single species *Cistopus indicus* (Sundaram and Sarang, 2004). There are a few other octopus species also, but their identity needs to be ascertained. Octopus landings by trawlers were observed throughout the year in Mumbai. However, the catches of Octopus by *dol* nets was very less. The landing data were obtained from the commercial catch landings at three major fish landing centers in Mumbai such as New Ferry Wharf, Sasoon docks and Versova for the period 2001-2006. As the mechanised fishing operations i.e., trawling, were suspended from 10 June to 15 August, due to southwest monsoon and restrictions imposed by the government of Maharashtra, there were no trawl landings during the period.

Catch and effort data for Octopus from trawlers and *dol* netters were collected by randomly observing 10-20% of the boats. The total number of boats and the total quantity of fish landings were obtained from the data files maintained by the Fishery Resources Assessment Division of Mumbai Research Centre of Central Marine Fisheries Research Institute. The catch recorded from the observed number of boats was raised to the total number of boats that landed the catches, which in turn was proportionately raised as for a month, by taking into consideration number of fishing days in a month and subsequently the monthly estimated number of boats, as per Alagaraja (1984).

New Ferry Wharf, Sasoon docks and Versova, as already mentioned, are the major fish landing centres in Mumbai (Singh, 1998). Since Mumbai accounts for 60% of the total fish landings in Maharashtra (Annam and Sindhu, 2005), the catch statistics from Mumbai can be considered as representative of Maharashtra landings.

Fishery at New Ferry Wharf: The landings of Octopus by trawlers in this center ranged between 18.8 t (2001) to 324.5 t (2006). The percentage of Octopus in cephalopods ranged between 0.3% (2001) to 6.3% (2006), with the catch rate ranging between 0.01 kg/hr (2001) to 0.18 kg/hr (2006) and the CPUE ranged from 0.7 kg/unit (2001) to 15.26 kg/unit (2006). The peak period of abundance was during March-April.

Fishery at Sasoon Dooks : The landings of Octopus by trawlers ranged between 18.9 t (2001) to 199.2 t (2006). The percentage in cephalopods ranged between 0.2% (2001) to 2.7% (2006) with the catch rate ranging between 0.02 kg/hr (2001) to 0.20 kg/hr (2006) and the CPUE ranged from 1.13 kg/unit (2001) to 17.49 kg/unit (2006). The peak period of abundance was during March-May.

Fishery at Versova: The landings of Octopus by trawlers ranged between 0.1 t (2001) to 39.9 t (2006). The percentages among cephalopods ranged between 0.01% (2001) to 13.1% (2006) and the catch rate was very less in 2001 which increased to 0.07 kg/hr in 2006 and the CPUE ranged from 0.01 kg/unit (2001) to 4.68 kg/unit (2006). The peak period of abundance was in March.

From the above observations, it will be very clear that the Octopus landings have been on the rise, contributing substantially to the fishery of Maharashtra. The Octopuses landed are taken to the processing units within 4-6 hours. At these units they are degutted, processed and most of them are exported. The catch of Octopus is often badly affected on deck due to exposure to sunlight, resulting in surface drying and sticking of the animals to each other. Fishermen have overcome this problem by keeping the catch in a tank containing chilled seawater resulting in a better state of preservation. Recently, due to the opening of many Chinese restaurants in Mumbai, local demand for Octopus has emerged, having the effect of increase in the price from Rs.13/kg in 2001 (Sundaram and Sarang, 2004) to Rs.60/kg in 2008, at the landing center.

Octopus fishery has a long history in Japan and in some European countries. In contrast, in India, exploitation has just been initiated (from 2000, in Mumbai). They are landed as by-catch in shrimp trawlers. The sudden growth of Octopus fishery indicates the availability of this resource in the fishing grounds off the northwest coast of India. Europe and Japan are the main markets for Indian cephalopods. In Europe, Spain, Italy and France are the main markets. Since there is no local demand for Octopuses, they are sold mainly for export and Greece is one of the major markets, apart from the eastern countries. Frozen, de-headed and whole cleaned Octopuses are the two major items of export. Export was initiated in 1988 when about 72 kg of frozen Octopus was exported to Japan and 19,480 kg of whole cleaned Octopus worth Rs.1.6 lakhs was exported to Greece. In the subsequent years, only frozen Octopus was exported. In 1989 a total of 43,520 kg was exported to Japan, Cyprus and Belgium. The export of Octopus showed an eight-fold increase, when 329 t of the product worth Rs.48 lakh was exported from India. Greece (40%), Spain (31%), Italy (7%) and Canary Island (6%), France (4%), Federal Republic of Germany (4%), Sri Lanka (3.5%), Cyprus (2.5%), Belgium (1%) and Portugal (1%) were the importers of Octopus in 1990 with Japan being the main importer of frozen Octopus for the years 1988 and 1989 (Kripa and Joseph, 1994). During the period 1990-96 about 7,797 t of Octopus worth Rs.3,147 lakh was exported from India (Kripa *et al.*, 2000).

According to Nair *et.al* (1992), the seasons recognised for the cephalopod fishery are the premonsoon (February-May), the monsoon (June-August) and the post monsoon (September-January). The monthly abundance suggests that Octopus fishery is very high during premonsoon seasons in Maharashtra i.e., during February-April. *C. indicus* was the dominant species in Mumbai contributing 80-90% of the total Octopus catch. The dorsal mantle length of *C. indicus* in Mumbai waters during 2001-2006 ranged between 50-140 mm (in trawl catches) and from 15-40 mm (in *dol* catches). According to Kripa and Joseph (1994), *O. membranaceus* was the dominant species (82%) in Kochi waters, followed by *C. indicus* and *O. dollfusi* (6% each). Octopus catches along Chennai coast consisted of *O. dollfusi* and *C. indicus*, whereas along Cochin coast *Octopus vulgaris* was also observed (Meiyappan and Mohammed, 2003). Sivasubramanium (1991) has reported the occurrence of *O. vulgaris* and *C. indicus* from the Bay of Bengal.

Unlike squids and cuttlefishes, Octopuses lead a solitary life and do not form schools. Some Octopuses are known to make seasonal migrations, which are influenced by breeding activity. Octopuses are exclusively carnivorous and they feed on crustaceans, fishes and molluscs (Sarvesan, 1974 and Silas *et al.*, 1985).

Due to the lack of good local market as well as poor export demand, earlier, this resource was underutilised and those caught in the trawl were thrown overboard without being brought to the landing center. But, given the present scenario, due to the increasing export market and the high price they fetch, they are now sought after. This fact makes it highly essential for exploring export possibilities further. As the demand is increasing, over-exploitation due to increased fishing pressure in this area is possible, which may ultimately lead to stock depletion. It is suggested that measures should be taken at this stage itself for rational exploitation of this important resource. Detailed studies on the distribution, population dynamics and especially biology are essential to evolve effective fishery management measures for judicious exploitation of this resource from the northwest coast.

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