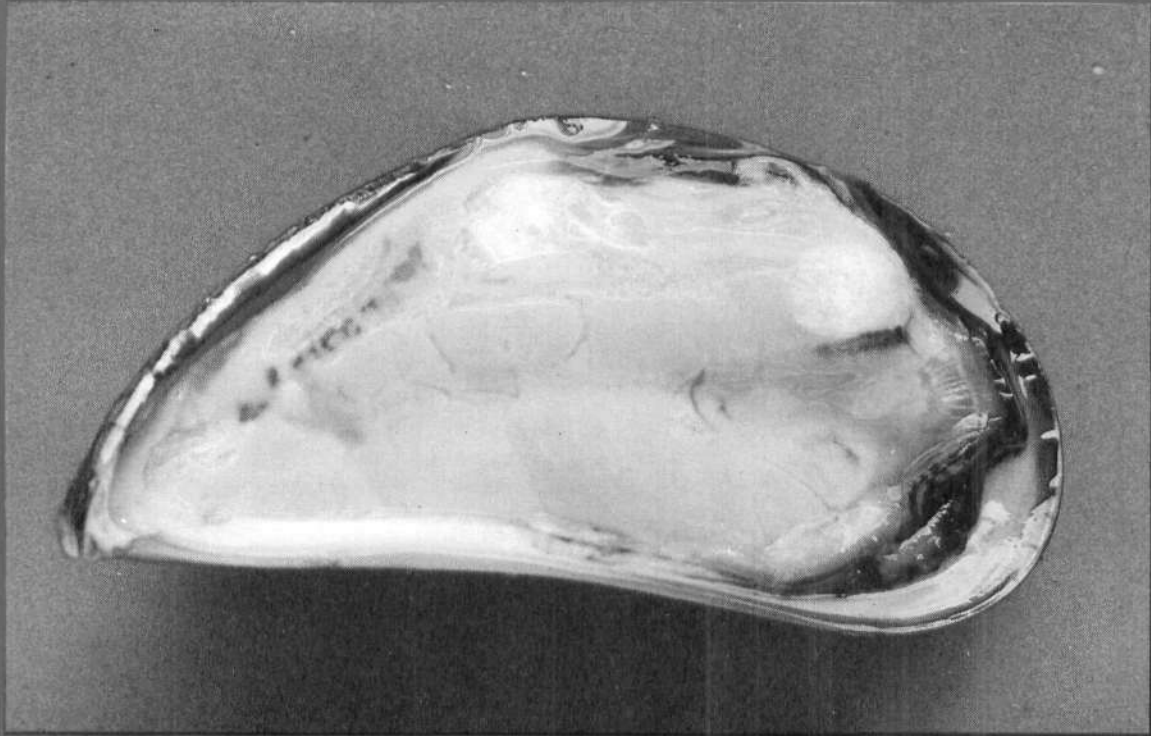




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V. Kripa, Babu Philip, K.K. Appukuttan and Mathew Joseph

Central Marine Fisheries Research Institute, Cochin - 682 014, India

Introduction

Popularly known as the 'devil-fish', the octopuses are considered a delicacy and are commercially exploited from most oceanic regions. Out of the world cephalopod production of 2.8 million tonnes the octopus production in 1995 was of the magnitude of 3,21,897 t (11.3%), the foremost producer being Japan. The major species of octopuses which contribute to world octopus fishery come under the genera *Octopus*, *Cistopus* and

Eledone. The most important octopus fisheries and markets are located in Asia and in the Mediterranean countries.

Octopuses are carnivorous benthic marine molluscs which commonly inhabit the shallow coastal waters. They are known to lead a solitary life, preferring to hide among rocks, stones and crevices. Some octopods like *Berrya* spp. occur in the deep waters along the continental shelf and upper continental slope, while some large sized

species like the *Paroctopus dolferi* are oceanic. Octopuses in the continental shelf and oceanic region are caught mainly as bycatch in the bottom trawl. In shallow areas they are caught by setting traps and by using longline, hand lines and spears. Different species of octopuses are reported to occur in the seas around India, of which 38 species are identified as commercially important (Silas, et al., Bull. Cent. Mar. Fish. Res. Inst., No. 37, p. 137-140, 1986). Octopuses are considered as a non-conventional resource in India and they are fished to be used as bait and also support a subsistence fishery in the Lakshadweep and Andaman and Nicobar Islands. *Octopus dollfusi* (Robson); *Octopus globosus* Appellof, *Cistopus indicus* (Orbigny), *Octopus cyaneus* Gray, *Octopus vulgrais* Cuvier, 1797 and *Octopus aegina* Gray are the common species in these areas contributing to fishery along the Indian coasts. In the present account the details of octopus fishery along south west coast, at Neendakara (Fig. 1) for 1994 and 1995 and Cochin fishing centres for the period from 1991 to 1994 are given.

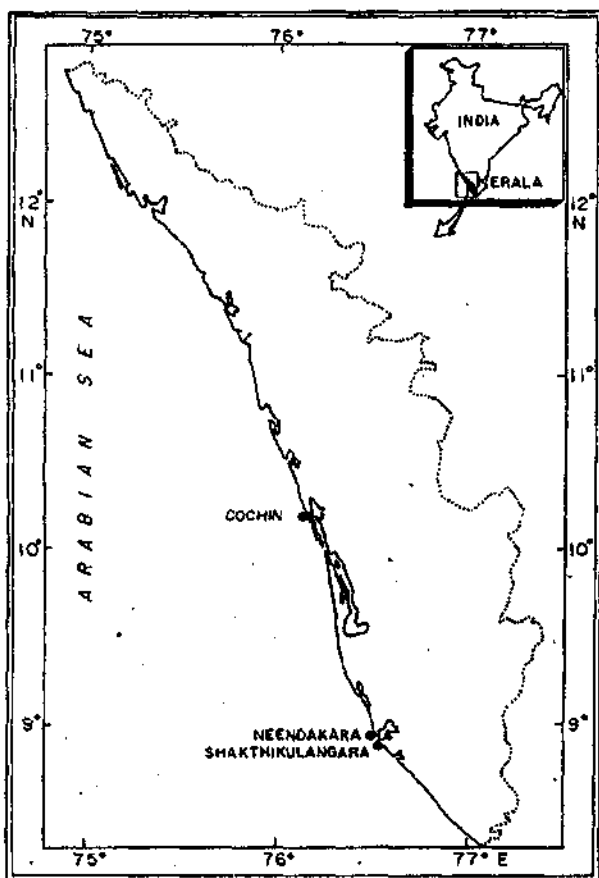


Fig. 1. Map showing the main octopus landing centres in Kerala.

Cephalopods have contributed about 9 to 17% of the marine fish landings of Kerala. (Kripa et al., Mar. Fish. Infor. Serv., T & E Ser., No. 139, p. 1-5, 1994). Among the three main groups of cephalopods viz. cuttlefishes, squids and octopuses, only the first two were considered to be commercially important till a decade ago. The growing demand for octopuses in the international market served as the objective for the rise of an "octopus fishery" in Kerala. The fishing harbours at Neendakara and Sakthikulangara in Quilon district and at Cochin in Ernakulam district of Kerala are two main landing centres of the State where octopuses are landed and marketed.

Species composition in commercial catches

Octopuses come under the order Octopoda. About 21 genera in three subfamilies, octyodinae, Eledoninae and Bathypolypodinae have been currently recognised (Rooper, et al., FAO Fish. Synop., (125) 3, 277 pp., 1984). The commercially important octopuses in Kerala were identified as *Octopus membranaceus* Quoy and Gaimard, *Octopus lobensis* Castellanos and Menni, *Cistopus indicus* and *Octopus dollfusi*. The identifying characteristics of these four octopuses are given in Table 1.

The major octopus species contributing to the fishery in Kerala is *Octopus membranaceus* Quoy and Gaimard. (Fig. 2). This species has a dark ringed ocellus at the base of the right arm

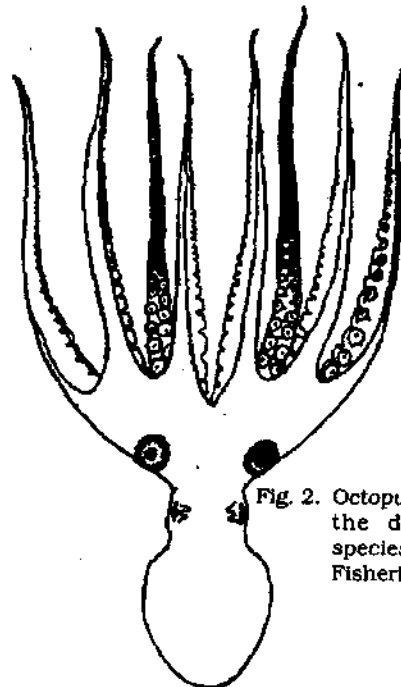


Fig. 2. *Octopus membranaceus* the dominant octopus species landed at Cochin Fisheries Harbour.

TABLE 1. Identifying characteristics of the four commercially important octopuses landed in Kerala

Species	<i>Octopus membra-naceous</i>	<i>Cistopus indicus</i>	<i>Octopus dollfusi</i>	<i>Octopus lobensis</i>
Common name	Webfoot octopus	Old woman octopus	Marbled octopus	Lobed octopus
Mantle	Saccular to elongate	Elongate	Oblong to enlongate	Broad, short, globular width 71 to 110% of length
Distinctive characteristics	Small close set tubercles over head, mantle and arms; dark ringed ocellus	A small pouch occurs on each segment of the web between the bases of arms	Mantle head and arms covered with numerous large warts interspread with smaller papillae, distinct reticulate pattern	Funnel organ distinctly VV shaped
Neck	Short	Narrow	Small, no eye cirrus	Globular
Arms		Long, slender attenuate tips, 1 st dorsal arm always longest and stoutest, 4 th shortest	Moderately long and stout	Moderately long, very robust at bases
Ligula	Slender, long, 4 to 6% arm length	Small 3% of arm length	Spermatophoric groove very strong, ligula 8 to 10 % of arm length	Very small, indistinct, 1.5% of arm length

Source: Rooper et al., 1984.

and two cirri or warts over each eye (Rooper et al., 1984). It is known as 'Jidako' in Japan where it supports a minor fishery. At Cochin Fisheries Harbour *O. membranaceus* was the dominant species contributing to 82% of the octopus catch. Octopus of 20 to 90 mm mantle length (95 to 440 mm total length) and weighing 8 to 190 g contributed to the fishery. Mature specimens were more during April, June and August. At Neendakara-Sakthikulangara area also *O. membranaceus* was the dominant species, throughout the year.

Octopus lobensis (Fig. 3) was the second dominant species in the fishery contributing to 12% of the total octopus catch. It has a broad and short globular mantle having a width which is 71 to 110% of its length. Arms moderately long and very robust at bases *Octopus lobensis* (Fig.3) of mantle length 35 to 136 mm (105 to 540 mm total length) and weight 5 to 400 g were noted in the landings.

Cistopus indicus and *Octopus dollfusi*, (Fig. 4

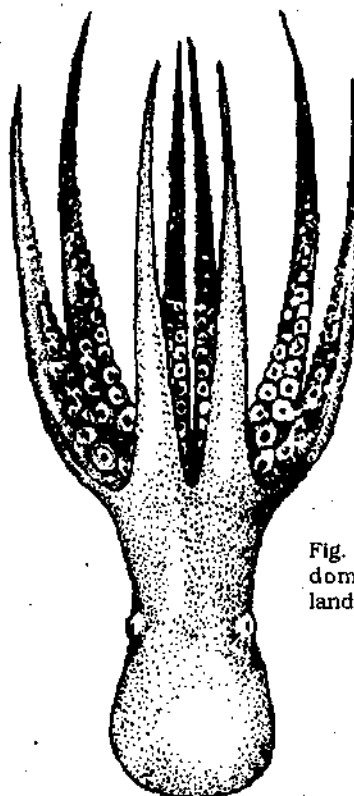


Fig. 3. *Octopus lobensis* the dominant octopus species landed at Neendakara harbour.

and 5) formed about 3% each of the total octopus landed at both the centres. Another *Octopus* sp. with extremely long fourth arm, about 85 to 87% of the total length was observed in stray numbers in Cochin Fisheries Harbour landings.

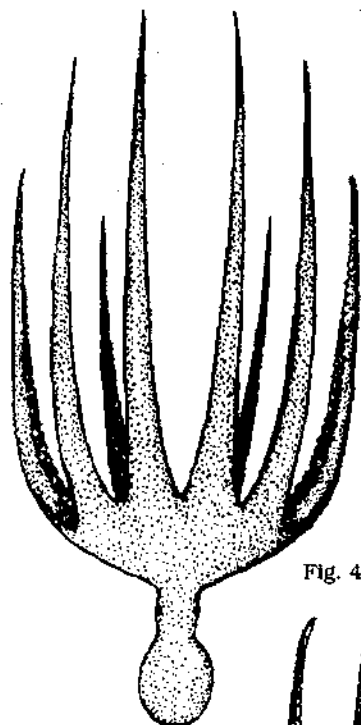


Fig. 4. *Cistopus indicus*

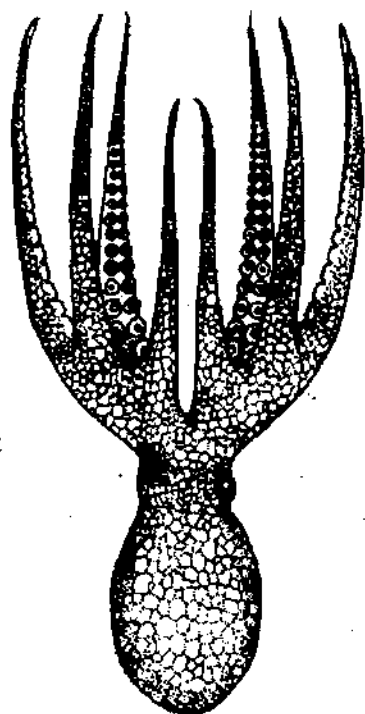


Fig. 5. *Octopus dollfus*

Octopus fishery at Neendakara - Sakthikulangara

Octopuses are landed by trawlers as a by-catch. Stray landings of octopus was noted during 1991-1992 at Neendakara and it rose to 241 t in 1993 with an average catch per unit effort (CPUE)

of 5 kg. The total octopus catch in 1994 was 630 t landed by 92,876 units which came down to 581.5 t in 1995 landed by 38,233 units. The average annual CPUE increased from 6.01 kg in 1994 to 19.46 kg in the following year. The fishery details of octopuses landed during 1994-1995 are given in Table 2.

The monthly octopus landing fluctuated widely throughout the year. In 1994 low landings were observed in July (2.9 t) and January (5.3 t). Maximum landing of 286.7 t was noted in August which was followed by a declining trend in the following months: 91.1 t in September, 72.7 t in October, 37.5 t in November and 21.5 t in December. In 1995 the highest landing was 116.3 t in May. The landings were low during February (19.9 t), October (9.2 t) and December (12.0 t). Prominent seasonal variation in octopus landings was not evident, but peak landings were observed during August and September in both these years.

The average monthly CPUE for octopus during 1994-1995 is given in Table 2. The average monthly CPUE was negligible and ranged between 0.002 kg and 7.42 kg in 1993. The CPUE was the lowest, 0.50 kg in July 1994, while in 1995 the minimum CPUE was 5.1 kg in November. In both the years, the highest CPUE 14.27 and 22.7 respectively were observed in August.

Octopus fishery at Cochin Fisheries Harbour

Octopuses caught in the shrimp trawlers operating from Cochin Fisheries Harbour started landings in 1991 (Kripa and Mathew, *Mar. Fish. Infor. Serv., T&E Ser.*, No. 126, p. 7-9, 1994). During the period 1991-1994 about 990 t of octopus was landed by 3,86,495 units with an average CPUE of 2.5 kg. The details of monthly landings of octopus at Cochin Fisheries Harbour during the period 1991-1994 is given in Table 3.

The octopus catch was 154 t in 1991 with an average CPUE of 1.25 kg. The landings increased in the following year reaching the peak of 499 t in 1992 which was landed by 90,570 units with an average CPUE of 5.5 kg. However in 1993 the oc-

TABLE 2. Fishery details of Octopus landed at Neendakara and Sakthkulangara during 1994-'95

Month	Catch in tonnes				Catch per unit effort (kg)			
	1994	1995	Total	Average	1994	1995	Total	Average
January	5.30	100.00	105.30	52.65	1.12	44.80	45.92	22.96
February	11.20	19.90	31.10	15.55	1.70	9.40	11.10	5.55
March	14.30	49.80	64.10	32.05	2.13	18.70	20.83	10.42
April	21.70	23.70	45.40	22.70	6.07	17.10	23.17	11.58
May	45.80	116.20	162.00	81.00	14.27	62.70	76.97	38.45
June	18.70	30.90	49.60	24.80	9.08	13.90	22.98	11.49
July	2.90	35.50	38.40	19.20	0.50	5.40	5.90	2.95
August	287.60	90.40	378.00	189.00	10.03	8.70	18.73	9.36
September	91.10	62.20	153.30	76.65	7.76	14.00	21.76	10.88
October	72.70	9.20	81.90	40.95	9.00	5.10	14.10	7.05
November	37.50	31.70	69.20	34.60	6.94	22.70	29.64	14.82
December	21.50	12.00	33.50	16.75	3.49	11.00	14.49	7.24
Total	630.3	581.5	1211.8		72.09	233.5	305.59	
Average	52.52	48.46		50.49	6.01	19.46		12.73

TABLE 3. Fishery details of octopus landed at Cochin Fisheries Harbour during 1991-'94

Months.	Catch in tonnes						Catch per unit effort (kg)					
	1991	1992	1993	1994	Tot.	Ave.	1991	1992	1993	1994	Tot.	Ave.
Jan.	1	58	0	12	71	17.75	0.10	5.94	0.00	0.37	6.42	1.60
Feb.	3	204	0	130	337	84.25	0.35	20.7	0.00	3.90	24.9	6.24
Mar.	10	61	0	21	92	23	0.90	6.49	0.00	0.56	7.95	1.99
Apr.	9	65	0	23	97	24.25	0.89	7.47	0.00	0.65	9.01	2.25
May	20	62	0	49	131	32.75	1.73	5.11	0.00	1.06	7.89	1.97
Jun.	30	40	0	10	80	20	2.27	4.73	0.00	0.30	7.30	1.83
Jul.	10	2	3	13	28	7	1.59	1.30	0.29	0.60	3.78	0.95
Aug.	5	3	30	63	101	25.25	0.94	0.70	3.89	1.76	7.29	1.82
Sep.	64	0	8	36	108	27	5.91	0.00	1.27	1.14	8.32	2.08
Oct.	1	7	0	28	36	9	0.22	0.72	0.00	1.07	2.01	0.50
Nov.	0	0	0	56	56	14	0.00	0.00	0.00	2.12	2.12	0.53
Dec.	1	0	0	7	8	2	0.11	0.00	0.00	0.25	0.36	0.09
Total.	154	502	41	448			15.0	53.1	5.46	13.7	87.4	
Aver.	12.8	41.8	3.4	37.3			1.25	4.43	0.45	1.15	7.28	

topus landing recorded a steep decline as only 41 t was landed by 92,152 units with a very low CPUE of 0.45 kg. In 1994 the fishery recovered with the landing of 448 t with an average CPUE of 1.15 kg. At Cochin Fisheries Harbour octopus was landed throughout the year in 1991 and 1994, whereas in 1993 the fishery was noted only during July-September. During this period the highest landing was 204 t in February 1994.

Processing and marketing

There was no local demand for octopuses, hence octopuses were sold mainly for export @ Rs.3 to 5 per kg in 1991-'92 which rose to Rs.10 to 15 per kg in 1994-'95. Octopuses landed are taken to the processing unit within 4 to 6 hrs, where they are degutted and processed. Octopuses having all the arms intact are usually exported as 'whole cleaned octopuses' while those with broken arms are deheaded, graded and packed separately to be exported as frozen products. The commonly followed commercial grades for octopus is given in Table 4. Among these grades the most popular size is 2-3 kg Grade (T2.)

TABLE 4. Commercial grading for octopus

Grade	Wt.Pc
1.(T1)	4kg
2.(T2)	3-4 kg
3.(T2)	2.3 kg
4.(T2)	1.5-2 kg
5.(T2)	1-1.5 kg
6.(T2)	0.5-1 kg
7.(T2)	0.3-0.5 kg
8.(T2)	Under 0.3 kg

Source: ADB/INFFOFISH Global industry update, Cephalopods (1991).

Octopus was first exported from India on a trial basis in 1988. Frozen deheaded and whole cleaned octopus are the two major items

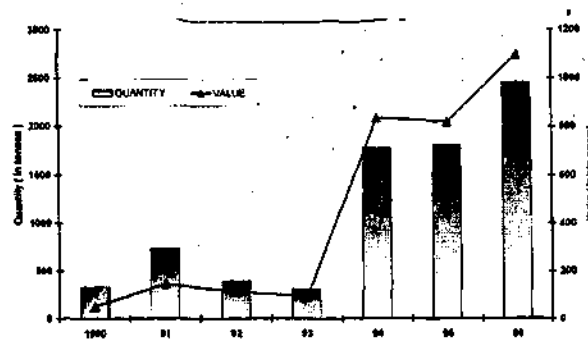


Fig. 6. Export pattern of octopus from India.

of export. During the period 1990-'96 about 7,797 t of octopus worth Rs. 3,147 lakh was exported from India (Fig.6). From 1989 to 1991 the quantity of octopus exported increased from 43.5 to 738 t in 1991 indicating a 16 fold increase. In 1992 and 1993 the octopus export declined by 50% as only 392 and 307 t were exported. However, from 1994 to '96 there was a steady increase. The export figures rose to 2,450 t in 1996 registering 56.3 fold increase from the quantity exported in 1989.

Conclusion

Octopus fishery has a long history in Japan and some European countries whereas in India exploitation has just been initiated and they are landed as bycatch in shrimp trawlers from southwest coast and east coast.

The present study indicates that octopus landings are showing an increasing trend along the southwest coast of India. There is good demand for frozen octopus for export in recent years. 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 resource. Detailed studies on the distribution, biology and population dynamics is essential to evolve effective fishery management measures for judicious exploitation of this resource.