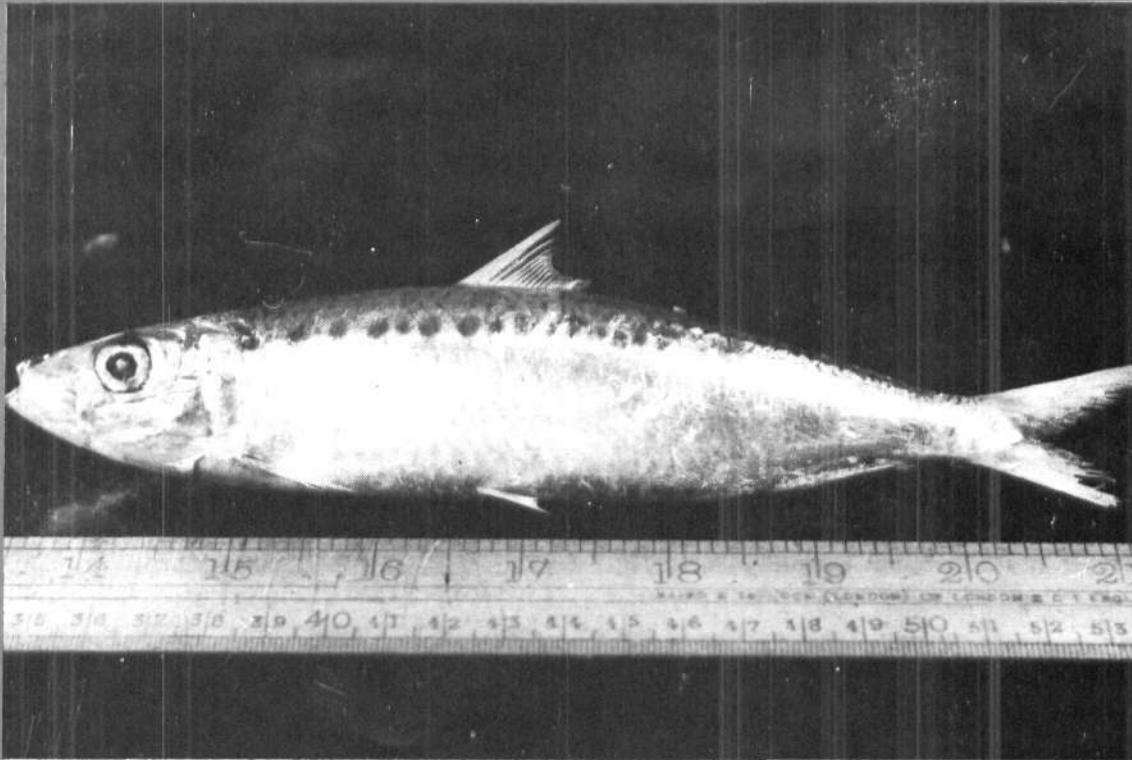




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भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

THE CEPHALOPOD FISHERY AT COCHIN, KERALA

V. Kripa, K. Prabhakaran Nair and Mathew Joseph

Central Marine Fisheries Research Institute, Cochin - 682 014

The fishery of cephalopods consisting of cuttlefishes, squids and octopuses has been gaining importance recently. The commercial exploitation of this resource started in India 25 years ago. In the sixties it was considered as trash and thrown overboard, but later in seventies and eighties it was identified as a valuable exportable item and this led the fishermen to save the cephalopod catch. The fishery status of the cephalopods improved tremendously with the fishermen preferring cephalopods to many fin fishes but next only to prawn. This trend is also reflected in the annual cephalopod landings of Kerala which from just about 100 t in 1961 increased to 500 t in 1971, 9,500 t in 1981, 19,500 t in 1991 and an all-time high of 30,600 t in 1992. In 1993, however, there was a slight decline to 28,471 t accounting for 29.6% of the all-India production of 96,052 t. Kerala has ranked first among all the maritime states of India in cephalopod production except in a few years.

The Cochin Fisheries Harbour is a major fish landing centre in Kerala. Cephalopod landings at this centre contribute about 11-23% of Kerala's annual cephalopod catch. They are landed as by-catch by shrimp trawlers which operate off Cochin upto 60 m depth. On an average, about 200 trawlers of 8-13m length range operate every day from Cochin base. The main fishing grounds are situated off Alleppey, Cochin, Beypore, Chavakkad and Chetuva.

Annual cephalopod production

During the 5-year period from 1989 to 1993 the estimated annual cephalopod landings at Cochin Fisheries Harbour varied from 2,597 to 7,230 t with an average of about 5,000 t accounting for about 14% of the total trawl catches landed here. The landings which stood at 4,109 t in 1989 declined to 2,597 t in 1990 but in the subsequent three years there was steady increase with the catch reaching the maximum in 1993 (Fig.1). During the 5-year period there was about 76% increase in the landings. The total trawl catch also increased steadily but in the case of effort (which number of trawl units) it increased till 1991 and then came down during the subsequent two years (Table 1). The annual catch-per-unit-effort (CPUE) varied from 35 kg to the maximum

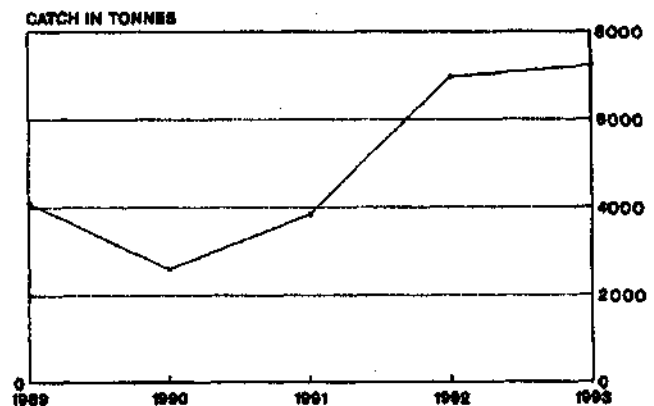


Fig. 1 Cephalopod landings in Cochin Fisheries Harbour during 1989-'93

TABLE 1. Particulars of the cephalopod landings during 1989 - '93 at Cochin Fisheries Harbour

	1989	1990	1991	1992	1993	Average
Cephalopod (t)	4,109	2,597	3,839	6,971	7,230	4,949
Total marine fish landed (t)	24,566	27,978	38,580	40,197	46,608	35,585
Share of cephalopod (%)	16.7	9.2	9.9	17.3	15.5	13.9
Trawl units (No.)	63,762	70,546	1,09,011	90,570	92,152	85,208
CPUE (kg)	64.4	36.2	35.2	77	78.4	58

of 78 kg, the average for the entire period being 58 kg. The share of cephalopods in the total fish landings ranged from about 9% to nearly 17%, the average contribution being 14%.

Monthly variation in catch and effort

The cephalopod landings showed wide variations from month to month in the same year, and in the same months in different years (Fig. 2). The highest average monthly catch was in September, the next highest catch being in May, followed by October, March and April. The lowest catch was in July. In general, the major peak season for cephalopods was during September-October and a minor peak of longer duration in March-June. The highest monthly catch of 2,050 t was obtained in September 1989, followed by 1,272 t in the same month in 1991 while the catches in September during the other years were between 191 t and 756 t. In 1992 the highest catch was in February and October, whereas in 1993 it was in May followed by March, with September coming

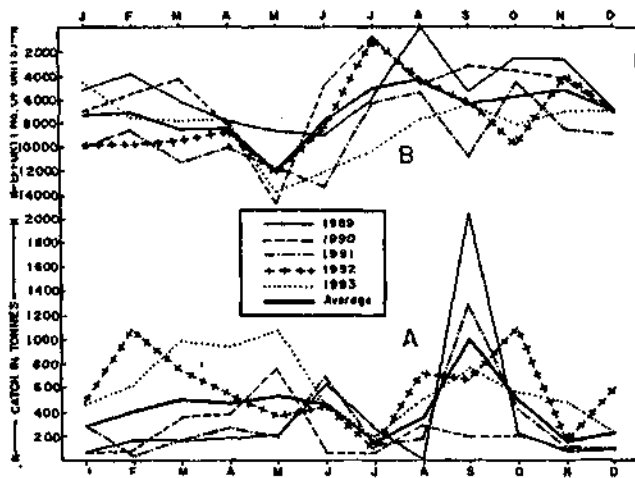


Fig. 2 Monthly cephalopod landings at Cochin Fisheries Harbour (A) and fishing effort (B) for the years 1989-'93. The average monthly values are also shown.

third. In all the years the catches in July were uniformly low, ranging between 55 t and 271 t.

The effort in terms of trawl units also showed wide variation (Fig. 2). Trawl units numbering between 5,000 and 10,000 operated in January have increased to between 8,600 and 14,800 in May in which the maximum average effort expended was 12,146 units. The effort came down to an average of 4,900 units in July and 4,400 in August. The unfavourable fishing conditions due to the southwest monsoon to-

gether with the ban on trawling during some part of this period are the reasons for the reduction in effort in these two monsoon months.

Cuttlefish, squid and octopus

The cephalopod catch was composed mainly of cuttlefishes and squids (Fig. 3) with very small quantities of octopuses. The annual cuttlefish catch ranged from 1,075 to 3,782 t accounting for 41 to 84% of the total cephalopod catch. The

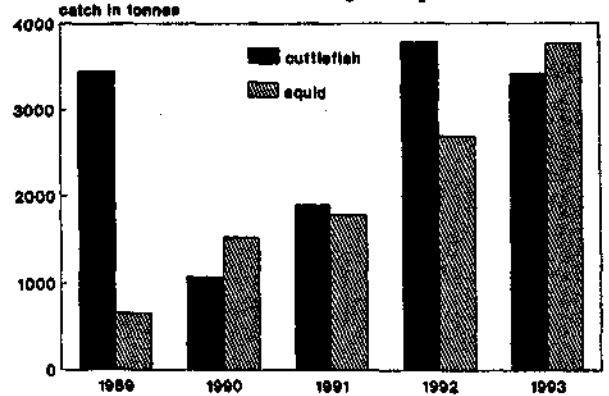


Fig. 3 Cuttlefish and squid landings at Cochin Fisheries Harbour during 1989-'93. Small octopus landings are not shown in the figure.

annual catch came down in 1990 but started increasing in subsequent years and reached the maximum of 3,782 t in 1992 and the annual average catch was 2,723 t; forming 55% of the total cephalopods. Squid catch was only 663 t in 1989 but increased steadily over the years and reached the maximum of 3,769 t in 1993 accounting for 52% of the total cephalopods. The annual average squid catch was 2,087 t (42%). There was no octopus catch in 1989 and 1990 and in the succeeding years the annual catch ranged from 41 t to 498 t (Table 2). The annual average octopus catch was only 139 t, accounting for as little as 3% of the total catch of cephalopods.

Species composition

Five species of cuttlefishes, three species of squids and four species of octopus in varying quantities contributed to the fishery. The average monthly catch of important species of squids, cuttlefishes and octopuses is shown in Fig. 4.

A. Cuttle fishes

(1) *Sepia pharaonis*: Known as the pharaoh cuttlefish, this species has the distinction of being the largest cuttlefish in the Indian seas growing to a maximum length of 430 mm in dorsal mantle

TABLE 2. Annual landings of different species of cephalopods at Cochin Fisheries Harbour during 1989-93

	1989	1990	1991	1992	1993
A. Cuttle fishes					
<i>Sepia pharaonis</i>	2,900	778	1,589	3,231	2,729
<i>S. aculeata</i>	471	271	183	317	322
<i>S. elliptica</i>	33	2	2	95	37
<i>Septella inermis</i>	42	24	121	139	316
<i>Sepia prashadi</i>	-	-	-	-	16
B. Squids					
<i>Loligo duvauceli</i>	443	1,450	1,696	2,173	3,129
<i>Doryteuthis sibogae</i>	179	53	-	476	639
<i>D. singhalensis</i>	41	19	94	42	1
C. Octopuses					
<i>Octopus membranaceus</i>	-	-	107	430	27
<i>O. dofusii</i>	-	-	23	13	-
<i>O. lobensis</i>	-	-	16	26	14
<i>Cistopus indicus</i>	-	-	9	29	-
Total	4,109	2,597	3,840	6,971	7,230

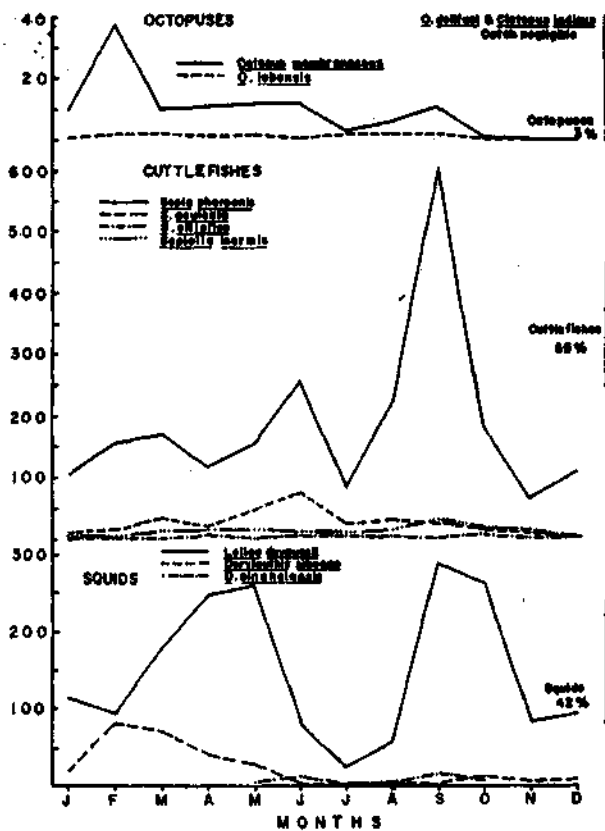


Fig. 4 Average monthly catch of important species of squids, cuttlefishes and octopuses at Cochin Fisheries Harbour during 1989-93.

length, and commercially the most important. The species has characteristic dark transverse stripes on the mantle, head and oral arms. The annual catch of this cuttlefish varied from 778 t to 3,231 t accounting for 45% on an average of the total cephalopods landed at Cochin Fisheries Harbour (Fig. 5) obtained throughout the year and comparatively better catches were recorded during June - October except July, with peak in September. Heavy catch to the tune of 1,839 t was brought in by 5,332 trawl units at a CPUE of 345 kg in September 1989. The length of this cuttlefish contributing to the fishery ranged from

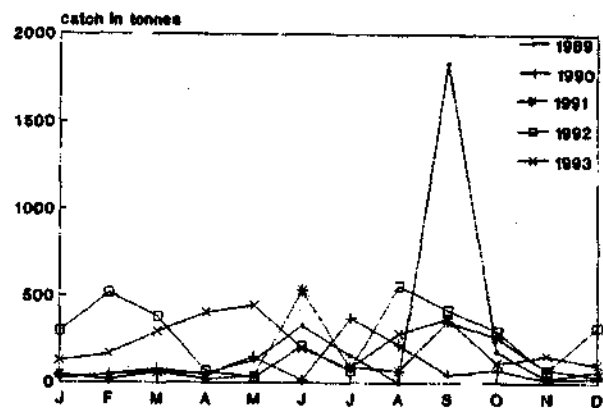


Fig. 5 Monthly landings of *Sepia pharaonis* at Cochin Fisheries Harbour during 1989-93.

70 mm to 320 mm. Large specimens above 270 mm, weighing two to two and a half kilograms is a common sight at Cochin Fisheries Harbour. During this period the price of *S. pharaonis* ranged between Rs. 35 and Rs. 145 per kilogram.

(2) *Sepia aculeata*: With an estimated annual average catch of 312 t forming 6% of the total cephalopods, this species is the second dominant cuttlefish landed at Cochin. It occurs in the trawl catch almost throughout the year with peaks during May-June and August-September (Fig. 6). The maximum monthly catch of 223 t was taken in June 1989, with a total catch of 471 t, next only

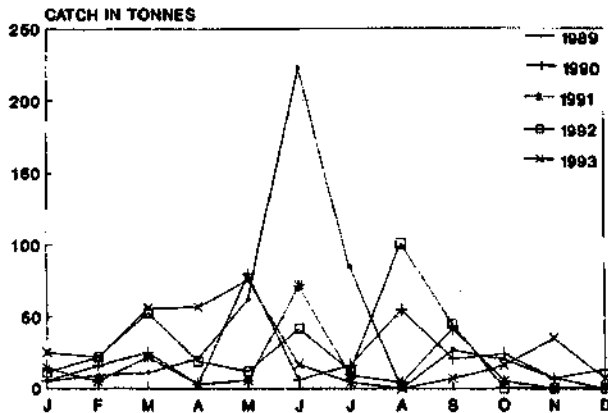


Fig. 6 Monthly landings of *Sepia aculeata* at Cochin Fisheries Harbour during 1989-'93.

to *Sepia pharaonis*. Cuttlefish of size 24 to 198 mm contributed to the fishery during this period.

(3) *Sepia elliptica*: This is a small-sized cuttlefish which formed less than 1% of the total cephalopods during the period 1989-'93. The maximum annual catch was only 95 t, and the highest monthly catch 42 t. The fishery was not regular, the small catches coming occasionally along with other species. During this period cuttlefish of size 33 to 121 mm contributed to the fishery.

(4) *Sepia prashadi*: A smaller species which resembles *S. pharaonis* and rare on the west coast, appeared in the fishery only in September 1993 when 16 t were landed by the trawlers. During the rest of the period this species occurred in stray numbers.

(5) *Septella inermis*: After *Sepia aculeata*, this cuttlefish was next in importance quantity wise, with an average catch of 128 t forming 2.6% of the total cephalopods, within the annual range of 24 t and 316 t. This occurred in the fishery almost

in all months, with peaks during March-May and August-November. The highest monthly catch was 83 t in September 1991.

B. Squids

(1) *Loligo duvauceli*: Known as the Indian squid, this is the most common squid throughout the Indian coast. Among the cephalopods landed at Cochin Fisheries Harbour, *Loligo duvauceli* is next only to *Sepia pharaonis* in quantity, the annual catch ranging between 443 t and 3,129 t (Fig. 7), at an average of 1,797 t forming 36% of the total cephalopods. There was a continuous increase in the annual landings of this squid. The maximum monthly catch was 680 t in September 1991 as well as in October 1992. In general there were two peaks in the landings, a larger peak in September-October and a smaller one during March - May. The catch was generally poor in July and August in all the years. Females of 40 to 220 mm length and males of 60 to 320 mm contributed to the fishery. The squids are sorted into 3 main groups based on their dorsal mantle length (DVM) and priced accordingly. Squids above 200 mm fetch Rs. 65-120/kg, while those between 150 and 200 mm cost Rs. 30 - 80/kg, and those below 150 mm are priced at Rs. 10 - 35/kg. This method of grouping the squids based on size was started only in 1991. The entire

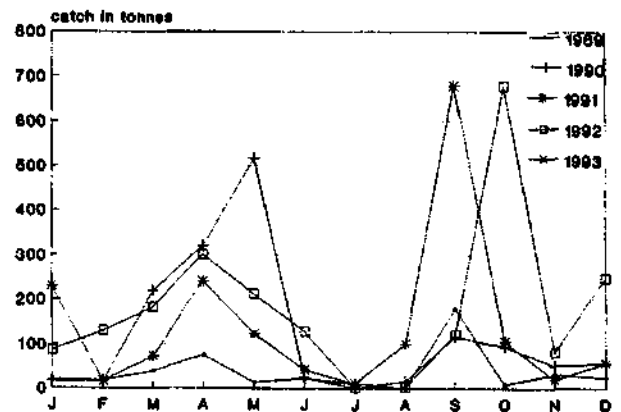


Fig. 7 Monthly landings of *Loligo duvauceli* at Cochin Fisheries Harbour during 1989-'93.

quantity of large sized squids are purchased by exporters, while a part of the small squids are bought by local vendors and sold in the nearby markets.

(2) *Doryteuthis sibogae*: Commonly known as the Siboga squid or Arrow squid is not in demand

by the exporters because of its smaller size and comparatively slender body than *L. duvauceli*. The species has shown seasonality and its fishery was mostly during the premonsoon period from January to May with peak during February - March (Fig. 8). With an estimated annual average catch of 270 t contributing to 5% of the total

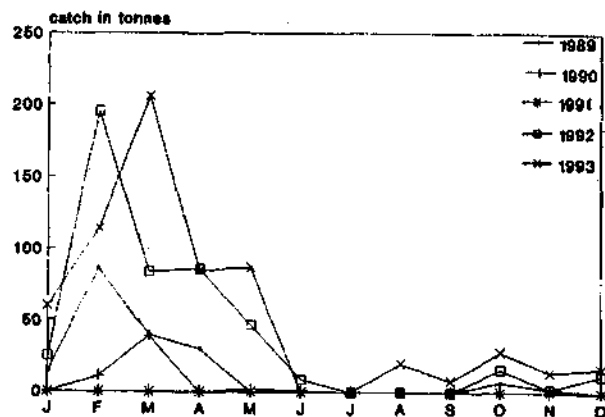


fig. 8 Monthly landings of *Doryteuthis sibogae* at Cochin Fisheries Harbour during 1989-'93.

cephalopods, the catch of this squid was poor in 1989 and 1990. There was no catch in 1991 while the annual catch was 476 t in 1992 and 639 t in 1993. Squids of 70 - 250 mm length contributed to the fishery.

(3) *Doryteuthis singhalensis*: This squid, which is larger in size contributed only less than 1% to the total cephalopod landings. The annual landings ranged from one to 92 t, with the average of 38 t.

C. Octopuses

Four species of octopuses together contributed to about 3% of the cephalopod fishery. They were (1) *Octopus dollfusi*, (2) *Octopus lobensis* (3) *Octopus membranaceus* and (4) *Cistopus indicus*. Of these, *O. membranaceus* was the dominant species accounting for 81% of the total octopus catch. The octopus landings showed good improvement in the first half of 1992, after which the fishery declined. The catch was sold at Rs. 5/- 10/kg. The entire catch was salted in the harbour itself. Apart from the above mentioned species, stray numbers of *Lololus investigatoris* a very small sized squid, occur in the fishery, especially during July-September. This has never been observed in fishable quantities.

Remarks

The cephalopod fishery at Cochin Fisheries Harbour, has improved remarkably during the last five years. Perceivable changes have taken place in the duration of fishing and the area of fishing. The actual fishing period has changed from overnight fishing to fishing for 2 to 3 days. During the peak season, trawl operations are done farther upto Beypore. The depth of operation also has extended from the nearshore areas upto 65 m, with the result that larger cuttlefishes are obtained. The onboard facilities for storage have also improved simultaneously. Apart from cuttlefish and squid, octopus is also landed now in view of its export demand.