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Editors

V.K. Pillai
S.A.H. Abidi
V. Ravindran
K.K. Balachandran
Vikram V. Agadi

Department of Ocean Development
Government of India
New Delhi
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Cephalopod resources in southeast and northeast coasts of India and Andaman - Nicobar waters

V. Kripa, K. P. Nair, Kuber Vidyasagar, G. Syda Rao, A.P. Lipton, K.K. Appukuttan, P.V. Srinivasan, M.E. Rajapandian, P. Natarajan, K. Ramadoss, N. Burayya, K.T. Thomas, P. Achayya, M.M. Bhaskaran & Mathew Joseph

Central Marine Fisheries Research Institute, Post Box No. 1603, Cochin - 682 014

ABSTRACT

During 1988-'90, *FORV Sagar Sampada* has made 28 exclusive cruises to three regions in the Bay of Bengal covering different seasons of the year. Cephalopods formed one of the components of the demersal fishery resources of these regions, with the pelagic resources remaining insignificant. The commercially important neritic species of squids (*Loligo duvauceli, Doryteuthis sibogae* and *Doryteuthis singhalensis*), and cuttlefish (*Sepia aculeata*) were comparatively more in number and quantity than the species of oceanic squid *Symplectoteuthis oualaniensis* and other less important oceanic squids. The former groups of cephalopods were taken in demersal trawl and the latter in pelagic trawl. The distribution and relative abundance of various neritic and oceanic group of cephalopods by area and depth is given in the paper.

INTRODUCTION

Cephalopods form an important marine resource, the exploitation of which has recorded a phenominal increase in the recent years. The major fishing areas for this resource are the traditional fishing grounds, close to the shore. Information on the resource potential of cephalopods in the EEZ is available from the works of Joseph (1966); Silas (1986); Silas *et al.* (1986); Sudarsan *et al.* (1988, 1990); Philip & Somvanshi (1991). However, only very limited information is available on the cephalopod resources of the Andaman and Nicobar area (Sreenivasan & Sarvesan, 1990). In the present study the cephalopod resource in the waters off the northeast and southeast coasts of India and Andaman and Nicobar area as revealed by surveys made by *FORV Sagar Sampada* during 1988-90 is presented.

MATERIALS AND METHODS

During the period 1988-90 *FORV Sagar Sampada* has made exclusive cruises to the three regions in the Bay of Bengal covering the areas in the southeast region lat. 10°40'- 15°06'N and long 79°57'- 81°25'E, northeast region lat. 15°'-20°10'N and long. 81°22'-87°25'E and in the waters around Andaman and Nicobar islands lat. 6°30'- 14°30'N and long 91°35'- 94°55'E. The data presented in the paper pertain to the catch obtained in the pelagic and demersal trawls operated in these areas. Details of the cruises including the number of stations where cephalopods contributed to the catch is given in Tables 1,2. The catch data from all the cruises is pooled and analysed for the distribution and relative abundance of various neritic and oceanic groups of cephalopods by area and depth.

RESULTS

Northeast region

In the northeast region nine cruises (Tables 1, 2) were performed. The total cephalopod catch was only 315 kg, accounting for about 1% of the total catch of 31 tonne obtained from this region. Almost the entire catch was by bottom trawl. The pelagic trawl was operated within 40-120m depth from the surface in the oceanic waters where the bottom depth ranged between 250 to 3100 m. Bottom trawl was operated within 30-146 m depth. The catch per hour of trawling in NE region was very low, less than 5 kg in pelagic trawl operation. (Fig. 1) Cephalopods were trawled from six depth ranges within 20-40 m to 140-160 m. The catch rates obtained from these depth ranges are shown in Fig. 2. The highest catch of 203 kg which formed 42% of the total catch was obtained from 89 m depth, off Kakinada.

The entire catch of cephalopods taken in pelagic trawl was made up of the purple back flying squid *Symplectoteuthis oualaniensis* (Ommastrephidae). This is a widely distributed Indo-Pacific species, but in the Indian Ocean it is restricted to the northern and central parts. At present this species is not exploited from Indian water because of its restricted distribution in the oceanic regions far away from the coasts. In the cephalopod catch obtained from bottom trawl operation 47% (146 kg) was of squids and 53% (164 kg) cuttlefish. *Loligo duvacelii* was the single squid species while *Sepia pharaonis* and *S. aculeata* were the main cuttlefish components.

Southeast region

In the southeast coast seven cruises (Tables 1, 2) were performed during the period from June 1989 to April 1990. The total cephalopod catch was 141 kg accounting for 3.2% of the total catch of 5.4 tonne. Almost the entire catch was taken in the bottom trawl, while the share of pelagic trawl was insignificantly small in terms of quantity (1.4%). Pelagic trawling was done in the oceanic region and the depth of operation of the gear was 150 m from the surface, while bottom trawling was carried out within 48-101 m depth from the coastline. The duration of operation of the trawl varied from

Table 1 — Details of stations positive for cephalopod occurrence based on bottom trawl operations in the northeast, southeast and Andaman & Nicobar regions of Bay of Bengal

Cruise no.	Month/year	Position	Depth (m)	No. of stations	Cephalopod catch (kg)
Northeast coast of India					
44	March '88	19°40'-86°12'E	44	5	39
45	April '88	16°04'- 20°00'N;81°32'- 86°35'E;	40-60	5	6
47	May-June '88	16°14'- 17°05'N;82°01'- 83°02'E;	89-146	3	231
49	July '88	15°58'- 20°00'N;81°30'- 84°12'E;	75-87	2	2
51	Sept. '88	18°03'- 20°10'N;84°12'- 87°00'E;	46-65	4	13
53	Oct. '88	18°02'- 18°53'N;84°14'- 84°49'E;	64-120	3	3
54	Nov. '88	16°00'- 19°43'N;81°22'- 86°20'E;	52-100	4	12
57	Jan. '89	17°12'- 19°55'N;82°50'- 86°31'E;	30-35	2	2
58	Feb. '89	19°30'N; 85°39'E	65	1	2.5
Southeast coast of India					
59	June '89	10°30'- 14°11'N;80°09'- 80°22'E;	55-101	3	52
61	Aug. '89	10°45';80°12'E	80	1	52
63	Sept. '89	13°25'- 15°33'N;80°28'- 80°44'E;	65-80	1	24
67	Dec. '89	11°18'- 12°50'N;79°57'- 80°28'E;	50-85	2	4
70	Feb. '90	14°05'N;80°23'E	48	1	4
72	April '90	10°30'- 15°00'N;80°14'- 80°30'E;	48-98	4	5
Andaman & Nicobar region					
46	May '88	12°18'- 13°26'N;92°43'- 93°09'E;	65-73	2	3
48	June '88	12°55'-93°03'E	142	1	1
56	Jan. '89	12°32'- 12°42'N;92°05'- 93°05'E;	78-107	2	5
62	Aug.'89 Sept.	10°37' - 11°51'N;92°15' - 92°54'E;	90-92	2	1
66	Nov. '89	10°49'N;92°16'E	70	1	1
69	Feb. '90	11°45'- 12°49'N;92°35'- 92°47'E;	73-83	2	5
73	May '90	13°22'N;92°43'E	76	1	5

Table 2 — Details of stations positive for cephalopod occurrence based on pelagic trawl operations in the northeast, southeast and Andaman & Nicobar regions of Bay of Bengal

Cruise no.	Month/year	Position	Depth (m)	No. of stations	Cephalopod catch (kg)
Northeast coast of India					
44	March '88	15°00'- 19°00'N;82°40'- 87°25'E;	50-120	6	4.5
Southeast coast of India					
67	Dec. '89	12°00'- 15°06'N;80°24'- 81°15'E;	150	2	2
Andaman & Nicobar region					
48	June '89	12°40'N;91°45'E	65	1	1
50	Aug. '89	7°59'- 12°40'N;91°45'- 93°45'E;	65-100	4	1
60	July '89	10°30'N;92°45'E	65	1	1
64	Oct. '89	10°30'-13° 13' N; 92° 45' - 93°20'E;	100	2	1

20 minutes to 75 minutes. The maximum catch rate of 75 kg/hr was recorded at lat. 13°25'N, long. 80°28'E.

The cephalopod catch in the pelagic trawl composed of only squids while in the bottom trawl catch 53% (74 kg) was squids and 47% (65 kg) cuttlefish. The squid catch composed of mainly of *Loligo duvaucelii*. Other squids observed were *Doryteuthis sibogae* and *Doryteuthis singhalensis*. Among cuttlefish the dominant species was *Sepia pharaonis*. Besides, this, *Sepia aculeata* was also obtained in few numbers.

Andaman & Nicobar region

The total cephalopods catch from the twelve cruise (Tables 1, 2) in the Andaman-Nicobar waters was just 25 kg in the total catch of 4939 kg. The pelagic trawl was operated at a depth of 65-100 mm depth from the surface where the bottom depth was within 210- 3000 mm. Bottom trawl was also operated off Andaman- Nicobar islands where the bottom depth ranged from 70 m to 92 m. The catch per hour was less than 1 kg in most of the stations with a maximum of 8 kg at lat. 10°37'N; long. 92°15'E. The maximum catch was only 4 kg taken at lat. 13°22'N, long 92°15'E. The maximum catch was only 4 kg taken at lat 13°22'N, long 92°43'E from a depth of 76 m. Cephalopods were obtained mostly at two depth zones 60-80 m and 80-100 m. The

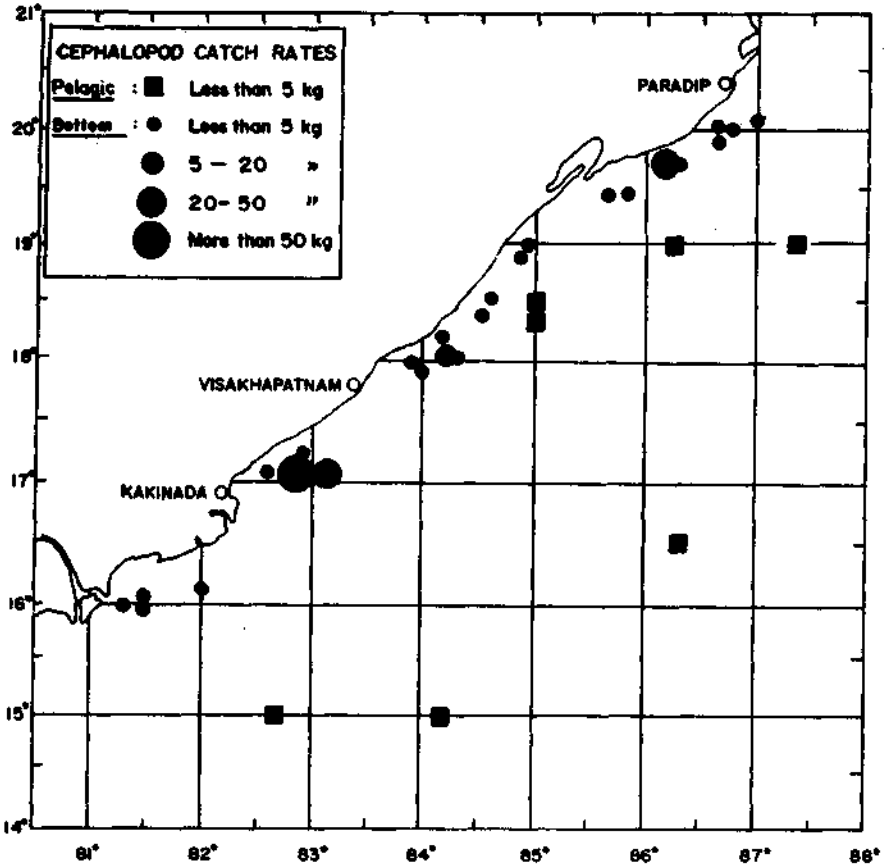

Fig.1 — Catch per hour (kg) of cephalopods taken in the pelagic and bottom trawl operated off the northeast coast of India

depth zone 80-100 m gave slightly better catch rate of 3.4 kg/hr, than the 60-80 m zone giving 2.2 kg/hr.

The most important component of the cephalopod catch was the purple black flying squid *Symplectoteuthis oualaniensis* in the size range of 14-132 mm. All squids were juveniles with the modal sizes of 25 mm and 65 mm. Apart from this squid, a few numbers of the small-sized oceanic squid *Abralia andamanica* were also obtained from stations at lat. 9°21'N, long. 93°03'E and lat. 7°59'N; long. 93°45'E.

DISCUSSION

The cephalopod resource as revealed by the catches, obtained by *Sagar Sampada* cruises is very low in the three regions surveyed. This does not mean that resources do not exist but evidently the catching technique is imperfect. Instead of using the pelagic

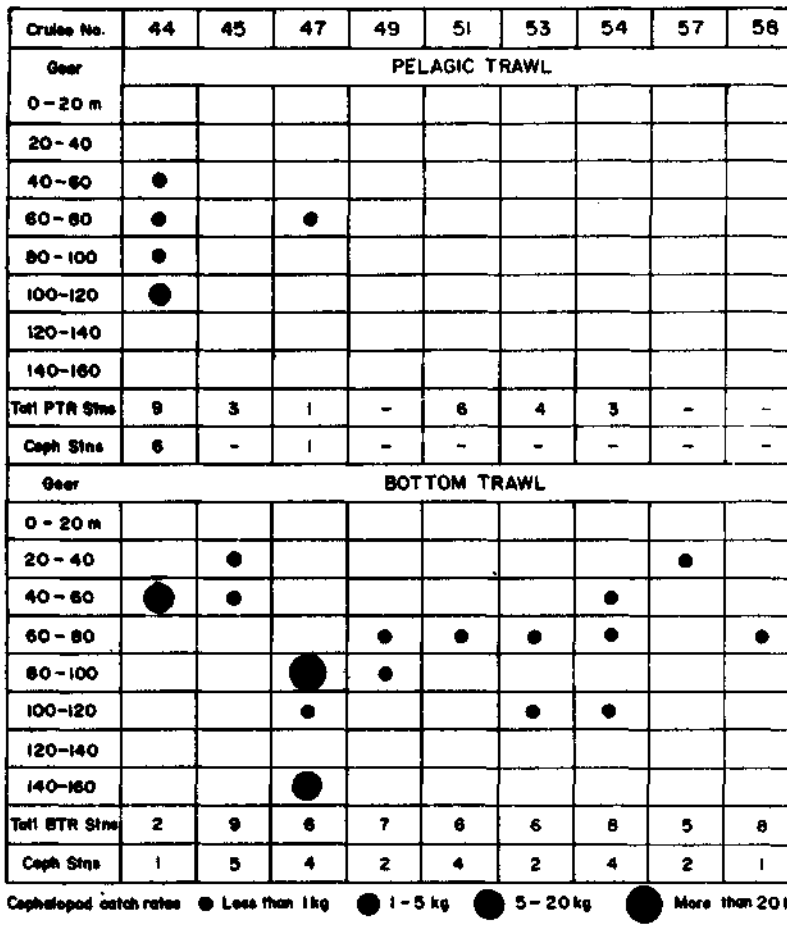

Fig.2 — Catch per hour (kg) of cephalopods taken from different depth ranges during different cruises of *FORV Sagar Sampada* off the northeast coast of India

and demersal trawls meant for finfishes and shrimps, the squid jigging method meant exclusively for squids must be tried. The data is quite insufficient to give any indication of the resources position of cephalopods in the area except providing some information on the qualitative distribution of different species of squids and cuttlefish by area and depth. In the Andaman-Nicobar waters the grounds were quite unsuitable for bottom trawling and this may be a reason for the negligible quantity of cephalopods obtained rather than their absence in the area.

The importance of the oceanic species as a resource in the Arabian Sea and Bay of Bengal has been highlighted by Nair *et al.* (1990). The surveys carried out by *FORV Sagar Sampada* during 1988-90, add more information on the distributional range of this species off the east coast. This squid is known for its positive phototaxic behaviour

(Chikuni, 1983). In the recent surveys it was noted that more number of squids were collected at night than during day which supports the earlier finding that this species exhibits vertical migration towards surface at night.

Earlier reports on the results of the exploratory surveys in the Andaman-Nicobar waters, by Sreenivasan & Sarvesan (1990) indicate the occurrence of 26 species belonging to 22 genera. Based on the occurrence of 3537 numbers juveniles of *Symplectoteuthis oualaniensis* in catch, it was suggested that this area may be nursery ground for *Symplectoteuthis oualaniensis*. Presence of juveniles of this species in the pelagic trawl in the recent survey substantiates this view.

The data on cephalopods collected by *FORV Sagar Sampada* during the course of three years add more information to the temporal and spatial distribution of oceanic cephalopods.

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