Management
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Scombroid Fisheries

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Status of exploitation of tunas at Agatti Island, Lakshadweep

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ABSTRACT

Pole and line fishing for tunas is a vital component of the fishery of Lakshadweep forming about 80% of the total tuna caught in these islands. The northern island of Agatti is the largest tuna fishing area contributing 35-40%. During the period from 1994 -'97, the annual average catch was 1,280 t with CPUE of 347 kg and CPUB (catch per unit bait) of 22 kg. Fishing season commences from late November and continues up to May with peak catches during December to March. Skipjack (*Katsuwonus pelamis*) is the major species caught followed by *Auxis thazard*, *Thunnus albacares* and *Euthynnus affinis*. Fishing grounds near Agatti subscribed 54% of the catch followed by Perumal Par forming 43%. The size of *K.pelamis* caught ranged from 20 to 76 cm with modes at 48 and 54 cm. Of late, the tuna fishery of Lakshadweep is almost stagnant but there is scope for its expansion. In addition to the recommendations made by earlier workers to expand the fishery, there is an urgent need to obtain data on some major aspects like population dynamics, migratory behaviour, environmental factors influencing the distribution of various tuna species and their aggregation around logs, FADs and seamounts.

INTRODUCTION

Pole and line tuna fishery at Lakshadweep is concentrated in four areas: the southern island of Minicoy, the islands of Suheli, Agatti and nearby islands and at Cheriapani and Valiyapani in the north. Agatti is the major fishing area contributing about 35-40% of the total tuna caught. Previous studies on the tuna fishery at Agatti are those of Varghese and Shanmugham (1983) and Yohannan *et al.* (1993).

MATERIALS AND METHODS

The tuna fishermen at Agatti conduct only single day fishing trips and data on the fishery was collected for the period between 1994 and 1997. Number of units operating on the observation days were averaged and raised to the number of fishing days in a month. In the evening, when the pole and line units return back to the island, data were collected from a minimum of 5 units. The number and weight of each species of tuna was recorded while the areas of fishing, time spent in scouting, the behaviour of tuna and the time of maximum catch were noted based on enquiry.

RESULTS

The annual effort, catch, CPUE and CPUB (catch per unit bait) are summarized in Table 1. In 1995, a 58% increase in catch over 1994 was observed but indicated a declining trend in 1996–'97. Monthly landings showed that the catch was comparatively high during March and December with maximum catch of 785 t recorded in March 1995 (Fig. 1). Fishing is completely suspended by late May to end of October due to unfavourable weather conditions of the southwest monsoon.

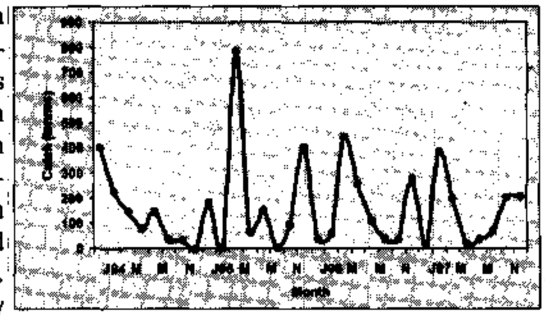

Fig. 1. Monthly catch of *K. pelamis* for the years 1994-'97

Species composition of tunas for the period 1994-'97 showed skipjack tuna to be the dominant species (95%), followed by yellowfin (2%), frigate tuna (2%) and little tunny (1%). Area wise production showed concentration in the seas around Agatti and Perumal Par (Fig. 2).

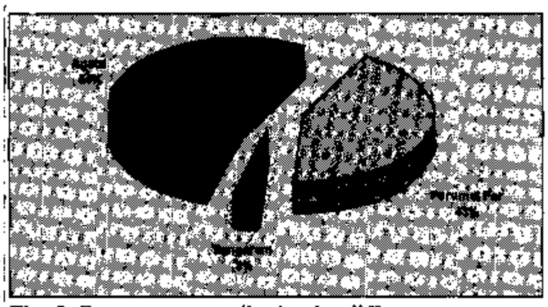

Fig. 2. Percentage contribution by different areas

Length frequency analysis showed that the fork length of skipjack tuna ranged from 20 to 76 cm. In 1994, three modes were noticed at 32-35, 48-51 and 60-63 cm groups but during 1995 and 1996, prominent mode was observed only in the 52-55 cm range (Table 2). This mode was considerably reduced in 1997, where the major mode was at 40-43 cm. Monthly size distribution for the entire period of study showed a major mode at 52-55 cm in January, 32-35 cm in April and 40-43 cm in November (Fig. 3).

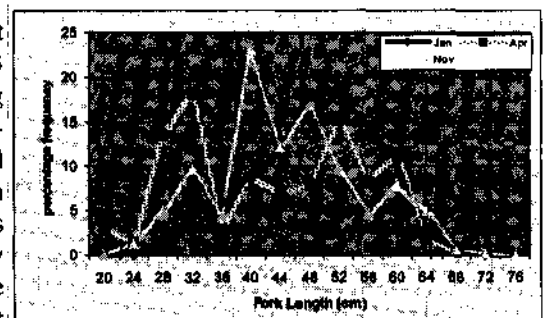

Fig. 3. Monthly size frequency distribution of skipjack in tuna catches at Agatti during 1994-'97

DISCUSSION

Comparison of the present catch with information available in the literature show that there has not been considerable increase in the catch. Tuna catch from Lakshadweep has stagnated around 6,000 t with minor annual fluctuations. This is low when compared to the catch of Maldives, which is around 73,000 t (Hafiz and Anderson, 1994) and about 27,000 t in Sri Lanka (Maldeniya and Dayaratne, 1994). Stock structure analysis of skipjack in Indian seas indicate that total mortality affected by pole and line fishing on the population is negligible and catch is below the maximum sustainable yield (Yohannan *et al.*, 1993). Increasing the effort in terms of fishing days and use of combination gear may help in increasing the catch.

Pole and line tuna fishing is completely suspended during the southwest monsoon period (May to late October) due to problems encountered in the navigation of boats through the channels on the reef because of rough weather and difficulty in deployment of nets for baitfishing. These problems can be overcome by anchoring the boats on the eastern or leeward side of the island in the monsoon months. Baitfish available on outer reefs such as caesionids, which can be caught more easily, may be exploited. In fact, the two monsoons namely the southwest and northeast are periods of active baitfish and tuna fishery in Maldives (Hafiz and Anderson, 1994; Anderson and Saleem, 1994). Presently the fishing boats are equipped with only pole and line gear, but provisions may be made to accommodate additional gears such as troll lines, longline and hand lines. These alternate gears can be used when the tuna are not effectively chummed to the boat or in the absence of surface shoals. Gill netting for tunas have been attempted in some areas with limited success. Experimental fishing by gill-netters and purse seiners to understand their feasibility and economic viability needs immediate attention.

Pole and line fishery of Lakshadweep can be termed as "passive" fishing since the area of operation is limited and success depends on the entry of tuna shoals to the fishing grounds. Fishing has not undergone any major changes and still involves the traditional methods. The boats can venture out to more distant areas if they are fitted with radios for communicating between vessels and the island and also by the use of GPS. Successful deployment of FADs and logs to improve the catch has shown encouraging results. Identification of PFZs using satellite remote sensing data needs to be streamlined and supplied to the fishermen on time.

In spite of increased research effort by various agencies on the tuna fishery and associated resources like plankton and livebaits of Lakshadweep, major lacunae in some areas still remain. They include the collection and analysis of catch statistics, understanding the behaviour and migrations of tunas, monitoring the oceanographic environment and inventory and location of seamounts. Catch and effort data are available only from limited areas and the extent of fishery in areas such as Suheli, Valiapani and

Cheriapani are not known. Training of personnel of staff of local fisheries department in collection of data need to be addressed at the earliest.

Only a few studies (Appukuttan *et al.*, 1977; Madan Mohan and Kunhikoya, 1985; Pillai and Gopakumar, 1989; Yohannan *et al.*, 1993; Yohannan and Pillai, 1994) have been carried out on the status of tuna stocks in Lakshadweep seas. Tagging of tuna coupled with monitoring of oceanographic parameters will help in understanding their behaviour and migration. Preliminary work as those attempted from pole and line fishery in Maldives (Waheed and Anderson, 1994) and collaboration in international tagging programmes may also be considered.

Studies on oceanographic and biological environment of tunas is considered important because it affects fishing efficiency like time spent scouting for fish. Parameters such as sea surface temperature and oceanic currents needs to be studied using drifting buoys. This information will enable the formation of a hydrographic database that can aid in analysing the environmental influences on the behaviour and availability of tuna schools. Seamounts have long been reputed to have significant attractive power on tunas. At Agatti, the tuna fishing is often concentrated around a seamount called '*mankunnu*' in the south of the island. Study of seamounts might improve the efficiency of fishery by reducing searching costs. A detailed inventory of seamounts in the Lakshadweep sea using radar satellite imagery is necessary. Analysis of catches in their vicinity, tuna behaviour and the hydrological discontinuities they generate need to be monitored. The fishery scenario reveals that it is time for us to think in terms of diversifying the fishery with more inputs and also focus on vital environmental influences on the fishery.

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Table 1: Effort, catch, catch per unit effort (CPUE) and catch per unit bait (CPUB) of *K.pelamis* at Agatti

Year	Effort (Units)	Catch (tonnes)	CPUE (kg)	CPUB (kg)
1994	3286	1068	325	27
1995	4192	1692	404	23
1996	3352	1225	365	19
1997	3887	1135	292	20
Average	3679	1280	347	22

Table 2: Length-frequency distribution of *K.pelamis* at Agatti

Size group (cm)	1994	1995	1996	1997
20-23	0.68	0.02	-	-
24-27	0.73	1.12	0.16	0.16
28-31	5.67	5.66	1.19	1.84
32-35	12.20	3.71	2.66	4.45
36-39	7.15	4.88	2.51	2.88
40-43	4.96	7.45	2.22	25.00
44-47	15.92	7.93	4.75	18.82
48-51	16.67	25.26	23.17	13.00
52-55	9.62	28.87	46.99	14.05
56-59	7.70	8.28	15.77	8.19
60-63	15.95	3.12	0.44	4.42
64-67	2.38	.50	0.11	5.23
68-71	0.35	0.06	0.03	1.95
72-75	0.01	-	-	-
76-79	0.01	-	-	-