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MARINE LIVING RESOURCES OF THE UNION TERRITORY OF LAKSHADWEEP —

**An Indicative Survey
With Suggestions For Development**

**CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
P. B. No. 2704, E. R. G. Road, Cochin-682 031, India**

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P. S. B. R. JAMES

Director

**Central Marine Fisheries Research Institute
Cochin 682031, India**

Edited by

C. SUSEELAN

Scientist

**Central Marine Fisheries Research Institute
Cochin 682031, India**

Limited Circulation

7. OTHER FIN-FISH RESOURCES

M. Kumaran, R. S. Lal Mohan and V. Sreeramachandra Murty

INTRODUCTION

Fishing is a profitable source of livelihood for the people of Lakshadweep where traditional methods of capture are still in vogue to a great extent. The traditional fishing methods and fishery of Lakshadweep consisting of 27 small islands of which only ten are inhabited have been briefly described by Hornell (1910), Ayyangar (1922), Ellis (1924), Mathew and Ramachandran (1956), Jones and Kumaran (1959), Verghese (1974), and Koya *et. al.* (1956). The exploited resources have been dealt with by Silas *et. al.* (1986) and Kumaran and Gopakumar (1986). Even though 603 species of fishes are known from the Lakshadweep (Jones and Kumaran, 1980), only about thirty species contribute to the commercial fishery. Fish landings in some of the islands were not even sufficient for local consumption before 1958. The efforts made during the past two and half decades to exploit the tuna resources by using pole and line has started paying good dividends. The remarkable increase in the landings of tunas especially skipjack is responsible for the present prosperity of some of the islands like Minicoy, Agatti, Kavaratti and Bitra. Though the islands have only an area of about 32 sq. km. the lagoons, reefs and submerged banks extending over an area of 42,000 sq. km. is endowed with several commercially important fishes. With the limited land area and a high density of population, the possibilities for developing other industries is limited, but the sea offers good scope for the progress of the islands. The vast difference in the estimates of fisheries potential of the Laccadive Sea which is reportedly of the order of 90,000 tonnes (Jones and Banerji, 1973) and the present annual landings (5,524 tonnes in 1986) indicates that further intensive exploitation is called for in the region.

The present account on the resources of fishes other than tunas is the result of a survey of the fisheries resources conducted for a period

of three months from January to the first week of April 1987. Fish collections were made from the lagoons, reef flats and also around the islands for the purpose. Fishes were collected by drag net, cast net, pole and line, hook and line and other indigenous methods during the course of the survey. Fish landings of commercial fishermen were also considered to have an idea of the magnitude of abundance.

CRAFT AND GEAR IN OPERATION

The traditional fishing methods of the islands have been described by earlier workers Ayyangar, (1922); Ellis, (1924); Mathew and Ramachandran, (1956); Jones and Kumaran, (1959) and Koya *et al.* (1986). All the fish landings in the islands before mechanisation were by primitive indigenous crafts and gears. The details of the number of crafts and gears available at the time of the survey in different islands are given in Table 1. There are in all 251 mechanised boats in operation in all the islands. However, all of them are not used for fishing even during the peak fishing season as some are required for transport purposes especially for transporting passengers and luggage from the ship. Mechanised boats are being increasingly used for pole and line fishing, but many are used for the capture of other fishes also. Trolling and drift long lining are mostly done by mechanised boats of 7.6 m OAL which are more popular with the fishermen. The number of boats in Agatti, Kavaratti and Minicoy exceeds the total number of boats in all other islands and the lowest number is in Kalpeni. The plank built country crafts vary from 5 to 7 m in length. There are altogether 691 country crafts of which 118 are in Agatti, 110 in Kavaratti and 108 in Kalpeni. Bitra and Kadmat have only a few country crafts, 27 and 28 respectively. In all 154 country crafts are provided with outboard engines. Kalpeni and Minicoy leads in the mechanisation of country crafts.

TABLE 1. Details of craft and gear available in different islands*

Island	Crafts			Gears			Remarks
	Mechanised boat	Country craft with outboard motor	Country craft	Shore seine/drag net	Gill net	Drift long line	
Agatti**	49	19	99	48	38	31	** Occasionally some mechanised boats go to Suheli and Bitra for a few days when there is good fishing in these areas @ Some of the boats are often engaged for transport purpose. *** The number of mechanised boats at Bitra varies greatly as boats from Chetlat and Agatti come here for short periods during peak fishing season.
Ameni@	19	—	38	6	—	16	
Androth	23	18	64	30	40	70	
Bitra***	17	14	13	4	—	6	
Chetlat@	19	20	30	5	—	47	
Kadmat@	14	16	12	20	4	16	
Kalpeni	9	28	80	20	100	60	
Kavaratti	45	5	105	6	80	90	
Kiltan@	24	10	52	8	—	62	
Minicoy	32	24	44	10	30	—	
Total	251	154	637	157	292	398	

*Number of troll lines and pole and line not included.

Drag nets, gill nets, drift long lines and troll lines are the most important gears for the capture of other fin-fishes. Drag nets operated mostly in the lagoons for the capture of fishes like goat-fishes, lutianids, lethrinids, balistids, mullets etc. There are 157 shore seines/drag nets of varying dimensions in the islands. The highest number is found in Agatti viz., 48 followed by Androth 30. Only very few drag nets are found in Bitra and Chetlat. Lutianids, lethrinids, carangids, rainbow runner, serranids etc. are caught by drift nets operated mostly in the lagoon. There are 292 gill nets in all the islands. Drift long lines locally known as 'Bayp' for the capture of sharks and other large fishes are found in all the islands except Minicoy. The total number of drift long line is about 400 and the highest number of 90 is in Kavaratti. Harpoons are used for the capture of devil rays (*Manta birostris*), *Aetobatus narineri*, *Dasyatis* spp., sharks etc. from the open sea around all the islands. Large carangids, bill fishes, wahoo, rainbow runner etc. are caught by surface trolling. Apart from the gears, varying number of cast nets, hand lines, iron spikes, 'Chilla' with spikes and fish traps are

operated depending on the abundance of suitable species and favourable seasons. It would only be appropriate to point out that the use of indigenous gears is decreasing year after year due to the popularity of pole and line fishing for tuna and this is becoming evident by the decline in the landings of other fishes.

STATUS OF OTHER FIN-FISH RESOURCES

The general abundance and distribution of different species other than tunas collected during the survey and contributing to the commercial fishery are given in Table 2. All the species listed in the table are present around all the islands, but their abundance may vary. Species belonging to seventeen families form the major share of other fin-fish landings. The important groups constituting the commercial fishery and widely distributed are sharks, rays, belonids, half-beaks, serranids, lutianids, lethrinids, wahoo, dolphin fish and rainbow runner. From the groups-wise fish landings at Lakshadweep for the years 1973-'86 given in Table 3, it is seen that the annual average landings of fishes including tunas is 3,707.2 tonnes of which only 1022.4

TABLE 2. Abundance of other fishes (other than tunas) in different islands

Species	Agatti	Ameni	Androth	Bengaram,	Bitra	Chetlat	Kadmat	Kalpeni.	Kavaratti	Kiltan	Minicoy
1. <i>Eulamia melanoptera</i>	XX	XX		XX	XX			XXX			
2. <i>Strongylura strongylura</i>	XXX	XX	XX	XXX	XXX	XXX			XX	XX	XX
3. <i>Befone platyura</i>	XXX	XX			XX		XX		XX		XX
4. <i>Hemirhamphus dussumieri</i>	XXX		XX	XXX	XX	XXX		XX		XX	
5. <i>Hemirhamphus marginatus</i>		XX	XX				XXX				
6. <i>Fistularia petimba</i>	XXX			XXX	XXX		XXX				
7. <i>Eleotheronema tetradactylum</i>	XXX	XX		XXX	XX	XX		XX			XX
8. <i>Eplnephelus merra</i>	XX	XXX		XX	XX	XXX	XXX		XXX	XXX	XX
9. <i>Eplnephelus merra</i>			XX		XX	XXX	XXX		XX	XX	XXX
10. <i>Cephalopholis argus</i>	XX				XX	XXX		XXX			XX
11. <i>Cephalopholis rogaa</i>	XXX		XX	XX	XX			XXX		XX	XX
12. <i>Caranx sexfasciatus</i>	XX	XX		XX		XX	XX		XXX		XX
13. <i>Caranx stellatus</i>	XX	XX						XX	XX		XXX
14. <i>Caranx lugubris</i>		XX		XX	XX	XX		XX			XXX
15. <i>Trachinotus bailloni</i>			XX	XX		XXX			XX	XXX	
16. <i>Trachinotus blochii</i>		XX			XX		XXX	XX			XX
17. <i>Lutianus gibbus</i>	XX		XXX	XX	XX	XX	XX			XX	XX
18. <i>Lutianus kasmira</i>	XX				XX	XX		XX	XX		XX
19. <i>Lutianus russelli</i>		XXX	XX	XX	XX		XX	XX		XX	
20. <i>Lutianus bohar</i>	XX	XX			XX					XX	
21. <i>Mulloidichthys auriflamma</i>	XXX	XX		XXX	XXX	XXX	XXX	XX	XXX	XX	XXX
22. <i>Mulloidichthys samoensis</i>	XX	XX		XX		XXX	XXX	XX	XX	XX	XX
23. <i>Parupeneus barberinus</i>		XX				XXX	XX	XX	XXX	XX	XX
24. <i>Parupeneus macronemus</i>	XX		XX	XXX		XXX			XXX	XX	XX
25. <i>Lethrinella xanchocheilus</i>	XX			XX	XX	XX		XXX	XX	XX	XX
26. <i>Acanthurus triostegus triostegus</i>	XXX	XXX		XXX	XX	XXX	XXX	XX	XX	XXX	XXX
27. <i>Elegatis bipinnuatus</i>	XXX	XX	XXX	XX	XX	XX		XXX	XXX	XX	XXX
28. <i>Coryphaena hippurus</i>	XX	XX	XX	XX	XX	XX	XX		XX		XX
29. <i>Acanthocybium solandri</i>	XX		XXX		XX			XXX	XXX		XXX
30. <i>Gerres oblongus</i>	XXX		XX	XX	XX	XX	XX				
31. <i>Gerres lucidus</i>		XX		XXX		XXX			XX	XX	
32. <i>Callyodan ghorbar</i>	XX			XX		XX		XXX	XX	XX	XX
33. <i>Aphareus furcatus</i>	XX	XX	XXX	XX	XX		XX	XX	XX	XX	XX

xxx Abundant
xx Common

tonnes (27.58%) consist of other fishes. The total landings in 1986 has reached 5,524 tonnes, but the landings of other fishes was only 717 tonnes (15.52%) which is the lowest during the 12-year period. The landings of other fishes has been gradually decreasing from 1983, whereas the tuna catch as well as the total catch generally showed an increasing trend for the past few years. Fishes other than tuna in the commercial landings in the order of abundance for the 12-year period are: sharks and rays (26.52%), perches (20.50%), carangids (8.39%),

belonids and half beaks (7.42%), wahoo (5.22%) and goat fishes (3.13%).

The island-wise production of other fishes for the period 1981-85 are given in Table 4. The average annual landings of other fishes for the period 1981-85 was 1049.4 tonnes which formed 24.02% of the total landings. The landings of other fishes was highest at Androth (25.77%), followed by Agatti (13.51%), Kadmat (10.50%), Ameni (10.02%) and Kavaratti (9.59%), and very low at Chetlat (4.73%) and Minicoy (4.10%). A declining trend in the

TABLE 3 *Marine fish Landings in Lakshadweep during 1973-'86 (in tonnes)*

Group	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average 73-'86	Percentage*
Elasmobranchs	325	354	296	198	364	284	211	240	332	287	228	134	271.1	26.52
Belonids & Half beaks	29	33	58	144	101	99	113	87	103	62	39	43	75.9	7.42
Flying fish	30	41	30	33	16	29	16	25	25	15	6	13	23.3	2.28
Perches	186	193	211	163	203	376	315	230	252	205	109	72	209.6	20.50
Goat fishes	34	58	29	27	27	27	25	27	32	24	28	46	32.0	3.13
Carangids	61	94	65	60	58	80	105	21	147	45	50	51	85.8	8.39
Wahoo	66	87	41	41	24	21	50	99	59	59	58	36	53.4	5.22
Barracuda	17	20	15	18	11	15	12	10	19	14	8	8	13.8	1.35
Miscellaneous	232	361	281	201	233	206	203	239	237	265	318	314	257.5	25.19
Total (excluding tuna)	980	1241	1026	885	1037	1136	1050	1171	1206	976	844	717	1022.4	(27.58)
Tuna	1932	1291	1166	1875	2794	1760	2236	2966	3303	4313	3775	4807	2684.8	(72.42)
Grand total	2912	2532	1192	2760	3831	2896	3286	4137	4509	5289	4619	5524	3707.2	

*Percentage to the total (excluding tuna)

Percentage indicated in brackets is percentage to the grand total.

TABLE 4. *Island-wise fish landings (excluding tuna) in Lakshadweep during 1981-85 (in tonnes)*

Island	1981	1982	1983	1984	1985	Average	Percentage
Agatti	137	180	186	123	83	141.8	13.51
Ameni	157	100	128	81	60	105.2	10.02
Androth	303	385	335	192	137	270.4	25.77
Bitra	56	47	66	58	28	51.0	4.86
Chetlat	50	51	56	61	30	49.6	4.73
Kadmat	100	116	80	76	179	110.2	10.50
Kalpeni	53	58	92	96	116	83.0	7.91
Kavaratti	111	110	105	112	65	100.6	9.59
Kiltan	38	79	94	150	112	94.6	9.01
Minicoy	45	45	64	27	34	43.0	4.10
Total (excluding tuna)	1050	1175	1206	976	844	1049.4	100
% of total catch	31.95	28.31	26.75	18.45	18.27	24.02	

other fish landings from 31.95% in 1981 to 15.52% in 1985 has been observed. This obviously is due to the deployment of more units for pole and line fishing which is more economical to the fishermen who neglect the exploitation of other fin-fish resources when tuna fishery is good. As tuna fishing by pole and line for skipjack is practised in Minicoy from very early times, the landings of other fish resources there has been low all along. According to Kumaran and Gopakumar (1986) the landings of other fishes is usually higher when the tuna catch is poor in a particular season.

Even though only ten islands are inhabited, fishermen from some islands go to the neighbouring uninhabited islands and reefs for fishing and return after fishing for a few days. The boats from Kavaratti visit Suheli par during peak fishing season there and other fish catches are salted and dried there itself. The fishermen from Agatti and Chetlat go to Bitra during good weather for catching tuna and other fishes. Occasionally boats from the northern islands go to Perumal par for catching large fishes, sharks and rays. Cheriya Kalpeni; a small coral bank near Androth is a good fishing ground for *Acanthocybium solandri*, *Elagatis bipinnulatus*, *Coryphaena hippurus* and flying fish. There is good potential for sharks, groupers and carangids around the islands, but these are exploited only on a very limited scale.

The main fishing season in the islands extend from November to May, the peak period being February-March. The month of March accounted for about 16% of the landings. Fishing is poor during June to September. The season for goat-fish, serranids, lutianids, lethrinids and sharks is generally from May to November. The season for *Acanthocybium solandri* and *Elagatis bipinnulatus* is November to April. Coral fishes which form about 19% of the catches at Kalpeni is caught almost in all the months. About 38% of the catches at Kalpeni is landed during November and December. In Androth fishing is good during October to February with the peak during November. In Minicoy the highest catch is in March with about 18.5% of the annual catch and the fishing was poor during June to October. In Kavaratti fishing was good during November and May with a peak landing during April-May. The fishery was poor during June to September. Fishing at Suheli par generally starts in November and comes to a close by April and the fishing is very good from December to March. There is no fishing at Suheli par from May to October as the fishermen have to come from Kavaratti for fishing after the south-west monsoon.

PROSPECTS FOR DEVELOPMENT

The widespread adoption of pole and line fishing for tunas has resulted in considerable increase in the tuna catch in the Lakshadweep

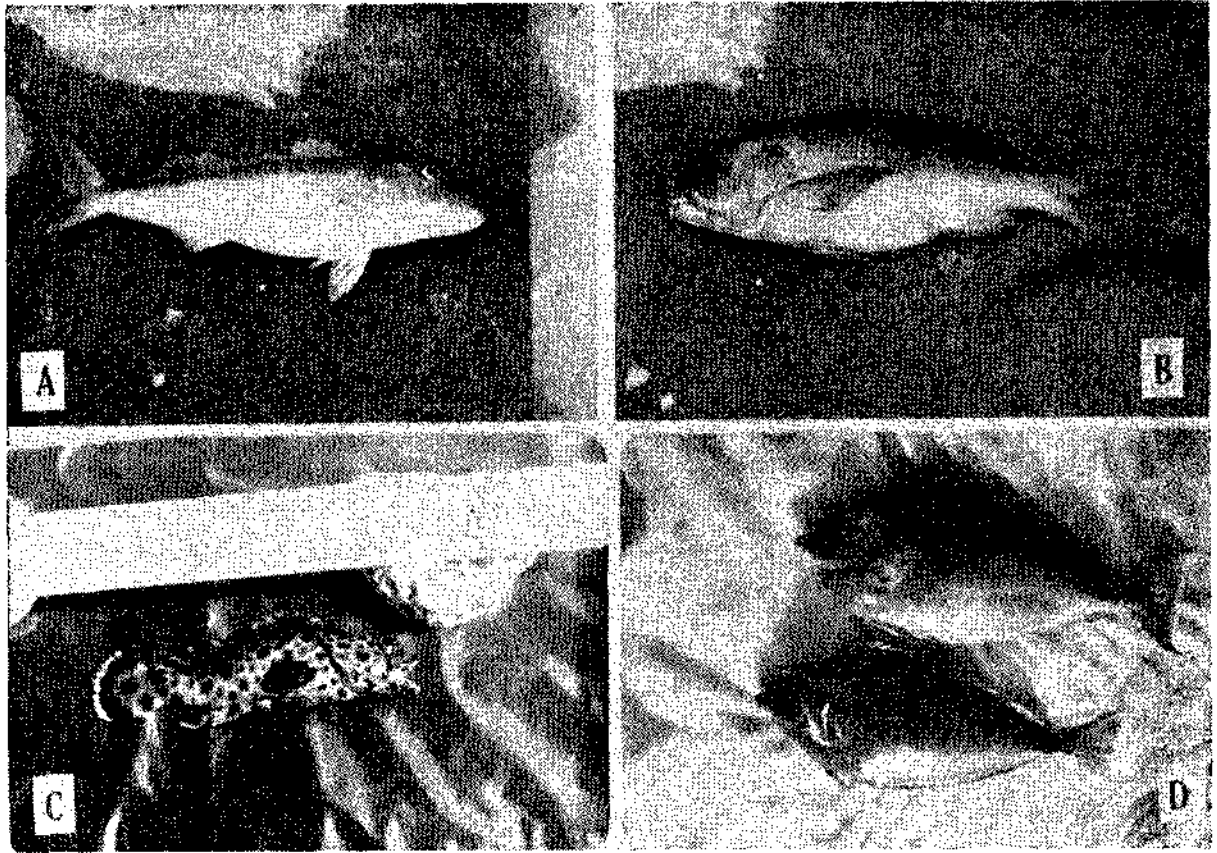


FIG. 1 A. *Abrion virescens* from Minicoy island. B. *Lutianus bohar* from Minicoy island. C. *Epinephelus merri* from Minicoy island. D. *Naso unicornis* from Kavaratti island.



FIG. 2 A. Fish collections of drag net, consisting mostly of *Mulloidichthys auriflamma*. B. Fishes being dried at Subeli par.

with a per capita availability of more than 120kg of fish per year which is the highest when compared to other States and Union Territories. At the same time the exploitation of other fish resources is rather neglected as evidenced by the decline in their landings during the past few years. The landings of traditional gears like drag nets, cast nets, trolling and harpooning etc. amounts to less than one fourth of the total fish landings. Nair *et al.* (1986) has opined that the presence of divergence and convergence zones in the open sea, the presence of upwelling, eddy systems and relatively low saline waters in the surface layers during November-December period contribute to the high productivity around Lakshadweep. Concentrations of oceanic zooplankton and micronecton have been observed by Silas (1972) in the Laccadive sea. These feature should be conducive for the concentrations of larger fishes like tunas, bill fishes, *Acanthocybium solandri*, *Elagatis bipinnulatus*, *Coryphaena hippurus* etc. in the open sea during first quarter of the year. The lagoons of the islands are ideal for a variety of fishes of commercial importance which could be easily exploited by hook and line and nets. Larger fishes in the deeper waters around the islands could be exploited by trolling, long lining and gill netting. Suheli par has been a good fishing centre for the past several years for the islanders, especially those of Kavaratti. Androth has no lagoon, but the resources of other fishes around the island is important when compared to that of other islands as the landings of other fin-fishes there is higher than in any other island. Bitra which is only less than 2 hectares in extent has the largest lagoon with various kinds of fishes. There is good possibility for the capture of sharks and billfishes by long lining and rays by harpooning in the Lakshadweep sea.

Diversification of fishing effort with improvement in gears to suit local conditions aimed at generating employment opportunities will naturally pave the way for increasing the production of other fishes. The area of fishing operations need to be simultaneously increased by adopting modern technology. Resource surveys by long lining and gill netting have to be carried out to locate productive areas for other fish resources and to evaluate the suitability of different gears. There is sufficient

manpower in the islands itself for the expansion of fishing activities as there are many unemployed youths who are now reluctant to take up fishing as a profession. Increasing the development activities in the fisheries sector will solve the problem of unemployment and lead the islands to prosperity. The chances of getting Government employment for all the educated youth of the Territory in the islands itself is meagre. The establishment of a Fisheries Development Corporation or Fisheries cooperatives with public participation for the exploitation of oceanic fishes will accelerate the progress of fisheries development and increase the per capita income which is at present probably the highest in India.

REFERENCES

- AYYANGAR, S. R. 1922. Notes on the fauna and fishing industries of the Laccadives. *Madras Fish. Bull.*, 15: 45-69.
- BALAN, V. 1958. Notes on a visit to certain islands of the Laccadive Archipelago with special reference to fisheries. *J. Bombay nat. Hist. Soc.*, 55 (2) : 297-306.
- ELLIS, R. H. 1924. *A short account of the Laccadive Islands and Minicoy*. Govt. Press, Madras ; iv+122 pp.
- HORNELL, J. 1910. Report on the results of the fishery cruise along the Malabar coast and the Laccadive Islands in 1908. *Madras Fish Bull.*, 4 : 71-126.
- JONES, S. AND S. K. BANERJI. 1973. A review of the living resources of the Central Indian Ocean. *Proc. Symp. Living resources of the seas around India*, Cent. Mar. Fish. Res. Inst., Cochin: 1-17.
- JONES, S. AND M. KUMARAN. 1959. The fishing industry of Minicoy island with special reference to the tuna fishing. *Indian J. Fish.*, 6 (1) : 30-54.
- JONES, S. AND M. KUMARAN. 1980. *Fishes of the Laccadive Archipelago*. Nature Conservation and Aquatic Sciences Service, Trivandrum : 760 pp.
- KOYA, P. P., K. P. SAID KOYA, V. RAVINDRANATHAN AND Y. SREEKRISHNA. 1986. Traditional fishing methods of Lakshadweep, *J Indian Fish Ass.*, 14 & 15 : 17-25.

- KUMARAN, M. AND G. GOPAKUMAR. 1986. Potential resources of fishes other than tuna in Lakshadweep. *Mar. Fish Infor. Serv. T & E Ser.*, 68 : 41-45.
- MATHEW, M. J. AND T. B. RAMACHANDRAN. 1956. Notes on a survey of the fishing industry of Laccadive and Amindivi Islands. *Fisheries Station Reports and year Book 1954-55. Govt. Press. Madras*: 121-137.
- NAIR, P. V. R., A. V. S. MURTY, C. P. RAMAMIRTHAM, D.S. RAO AND V.K.PILLAI. 1986. Environmental features in the sea around Lakshadweep. *Mar. Fish. Infor. Serv. T & E. Ser.*, 68 : 10-13.
- SILAS, E. G. 1972. Investigations on the deep scattering layers in the Laccadive Sea. In: *Proc. Symp Corals and Coral reefs.*, 1969. Mar. Biol. Ass India : 257-274.
- SILAS, E. G., K. V. N. RAO, P. P. PILLAI, MADAN MOHAN, G. GOPAKUMAR, P. LIVINGSTON AND M. SRINATH. 1986. Exploited and potential resources of tunas of Lakshadweep. *Mar. Fish. Infor. Serv. T & E Ser.*, 68 : 15-25.
- VARGHESE, T. J. 1974, Shark resources of the Laccadive waters. *Seafood Export Journal*, 6 (1) : 65-68.