

Management of Scombroid Fisheries

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Status of exploitation of tuna, mackerel and seerfish in Andaman and Nicobar Islands

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ABSTRACT

Annual fish landing of Andaman and Nicobar Islands during 1989-'99 and the contribution of scombroids viz., tuna, mackerel and seerfishes are described. During the period the exploitation of tuna ranged between 321 to 3,823 t, the average contribution being about 5% of the total fish landings. Among the tuna species, yellowfin tuna *Thunnus albacares* is the major contributor followed by skipjack tuna *Katsuwonus pelamis* and bigeye tuna *Thunnus obesus* all of which are best caught during March to August. The mackerel fishery is supported by *Rastrelliger brachysoma* followed by *R. kanagurta*. The total mackerel landings ranged between 806 to 1,955 t, the major fishing season being from March to June and September to October and is best caught in the gill nets and boat seines. Seerfishes are dominantly represented by two genera and three species viz. *Scomberomorus commerson*, *S. guttatus* and *Acanthocybium solandri*. Their major fishing season is from March to August and November to February, being generally caught by gill nets, troll lines and hand lines. During the period of 1989 -'99, the total exploitation of seerfishes ranged between 293 to 1,172 t and showed a gradual increase in their production. Though Andaman and Nicobar Islands are endowed with rich resources of scombroids the catch data analysis revealed that most of the resources are remaining under exploited. Apart from these, a general account of the Andaman fishery, fishing crafts and gears, region and gear-wise fish landings, marine fishery potential assessment, efficiency of longlining for exploitation of tuna and allied resources, exploitation of tuna resources by foreign countries in Andaman sea are also dealt along with recommendations for augmenting the exploitation of scombroids in Andaman and Nicobar islands.

INTRODUCTION

The Union Territory of Andaman and Nicobar is situated between 6° 45'N and 13° 30', N latitude and 90° 20' and 93° 56' E longitude in the south east Bay of Bengal comprising more than 572 islands with a total area of 8,249 sq.km. The islands are spread over a length of about 700 km and breadth of about 250 km. The coastline of about 1,962 km has an Exclusive Economic Zone (EEZ) of 0.6 million sq.km., which is about 30% of the EEZ of India. These islands are oceanic in nature with an estimated continental shelf area of 35,000 sq.km which is about 7.7% of the total Indian continental shelf area.

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Fishing as a commercial activity is of a relatively recent origin in these islands. Fishermen from West Bengal, Andhra Pradesh, Kerala and Tamilnadu have come to these islands either through settlement scheme of the government or voluntarily. At present, marine fishery activities are carried out more or less exclusively by the fishermen from Andhra Pradesh while the fishermen from West Bengal are mostly engaged in inland fisheries. There are about 45 fishing villages and 57 fish landing centres. Altogether there are about 11,000 persons engaged in fishing activities, with about 2,500 persons being active and full time fishermen.

The Andaman and Nicobar islands are endowed with rich marine, brackish and freshwater resources. The most important marine resources in the islands are sardines, mackerels, perches, anchovies, seerfishes, carangids, tunas, mullets, silver bellies, elasmobranchs, prawns and crabs. The major gears in operation are gill net, cast net, hooks and line, shore seine and anchor net while the major crafts are mechanized boats, motorized boats and non mechanized country crafts. An assessment of the marine fishery resource of these islands is very scanty. Though these islands are reported to be rich for scombroids their current exploitation is less compared to other groups. This paper deals with the current status of scombroid fishery of the Andaman and Nicobar islands.

Species contributing to the scombroid fishery

The commercial scombroid species are yellowfin tuna *Thunnus albacares*, skipjack tuna *Katsuwonus pelamis*, bigeye tuna *T. obesus* and albacore *T. alalunga*. These are found in oceanic habitats and are mainly exploited by commercial fisheries. The smaller tunas such as kawakawa *Euthynnus affinis*, long tail tuna *Thunnus tonggol*, oriental bonito *Sarda orientalis* and dog tooth tuna *Gymnosarda unicolor* usually found nearer the coast, are exploited by artisanal fishermen. Their abundance in these waters has been reported by Talwar (1990). In addition to these, the abundance of blue fin tuna *Thunnus maccoyii* and frigate tuna *Auxis thazard* were also reported by Thailand fisheries in the Andaman sea (IPTP, 1985). The species of mackerel contributing to the fishery are *Rastrelliger brachysoma* and *R. kanagurta*, while the seerfish fishery is supported by species like *Scomberomorus commerson*, *S. guttatus* and *Acanthocybium solandri*.

Assessment of fish landings

The Department of Fisheries (Andaman administration), is collecting data on the fishery resources landed in and around Andaman and Nicobar islands. Regionwise fish landing data of various islands during 1989 to 1999 revealed that South Andaman contributed an average of 72.4% of total fish landings of the island followed by Rangat (10.3%), Diglipur (5.1%), Mayabunder (3.6%), Little Andaman (3.4%), Campbell bay (2.3%),

Nancowry (2.1%) and Car Nicobar (0.8%). The higher fish landing in south Andaman was due to the increased fishing activity as well as better infrastructure facilities and greater market demand. The average percentage composition of major categories of fishes landed in Andaman and Nicobar islands during 1989 to 1999 showed that sardines accounted for 14% and perches 9% of total fish production. The contribution of mackerel was 6%, tunas 5% and seerfishes 3%. Though Andaman and Nicobar islands cover some of the best tuna grounds in the Indian Ocean (Anon., 1989) their contribution to the Andaman and Nicobar fishery is comparatively low.

Fishing crafts and gears

The major types of fishing crafts in operation are plank-built boats ranging from 25 ft to 35 ft fitted with inboard engine (IBMs) of 8 to 15 HP and dug-out canoes of 10 ft to 22 ft size. The boat fitted with IBMs are reported to land about 150 to 200 kg per trip while the catch per day of dug-out canoes range between 20 to 30 kg per trip. During 1998-'99, about 7 mechanized fishing vessels, 247 motorized boats and 1,262 country crafts have undertaken fishing operations in these island waters. The total number of fishing gears in operation during 1998-'99 was 2,732, which includes 1,044 gill nets, 930 hooks and line, 615 cast nets, 49 shore seines and 38 anchor nets. Apart from these, longline and disco nets are also used in middle and north Andaman. The major contribution to the overall fish catch is through the gill net followed by shore seines. The total marine fish production and scombroid landings of Andaman and Nicobar islands during 1989 - '99 are given in Table 1. During the year the total fish landing was 26,673 t whereas the estimated marine potential of these islands are 2.435 lakh t (Anon., 1990) indicating that most of the resources are under-utilized.

Table 1. Total fish landings of Andaman and Nicobar Islands and contribution of scombroids during the period 1989 - '99

Year	Total Landings (t)	Tuna landings (t)	% composition	Mackerel landings (t)	% composition	Seerfish landings (t)	% composition
1989	14807	339	2.49	806	5.95	293	2.16
1990	13530	417	2.82	918	6.20	844	5.70
1991	22339	321	1.44	1615	7.23	456	2.04
1992	25404	488	1.92	1955	7.70	517	2.03
1993	23339	869	3.72	1393	5.97	626	2.68
1994	26695	1011	3.79	1664	6.23	748	2.80
1995	26120	972	3.72	1559	5.57	700	2.68
1996	26551	981	3.69	1589	5.99	799	3.01
1997	24974	970	3.88	1430	5.73	729	2.92
1998	28983	3823	13.19	1087	3.75	882	3.05
1999	26673	1362	5.11	1213	4.55	1172	4.39

Assessment of potential of scombroids

George *et al.* (1977) reported a potential yield of one lakh t of tuna and tuna-like fishes while Sudarsan *et al.* (1989), through longline survey, has reported a potential yield of 49,000 t of oceanic tunas and allied species in these islands. A stock of 50,000 t of skipjack tuna and 25,000 t of yellow fin and bigeye tuna have been projected for this region (Anon., 1990) whereas Fishery Survey of India has estimated potential of 82,000 to 94,000 t of tuna and tuna-like fishes in Andaman and Nicobar waters. Kumaran (1973) reported a total potential yield of 50,000 t from an area of 3,00,000 sq. miles around Andaman and Nicobar islands of which 12,000 t is from depth zone up to 200 m. But the tuna and other large pelagic resources from oceanic waters and perch resources in deeper waters and from the invisible banks around the islands are not being exploited.

Tuna fishery

The present production of tuna and tuna - like fishes is 1,362 t contributing 5.1% of the total marine fish landing of 26,673 t during 1999 in these islands (Anon., 1999 a). The peak season of tuna fishing of these islands is from March to August. The major species contributing to the catches are yellowfin tuna followed by skipjack tuna and bigeye tuna. The data collected during 1989 - '99 revealed that the exploitation of tuna and allied species ranged between 321 to 3,823 t. Though the coastal tuna are reported to have a potential of one lakh tonnes, the present exploitation of tuna in Andaman and Nicobar islands is poor.

Kikawa (1966) has given the distribution of yellowfin tuna and bigeye tuna in the Indian Ocean . The hooking rate of 1 to 1.9% for yellowfin tuna and 0.5 to 1 % for bigeye tuna from the Japanese longlining data is reported to be the same as in Lakshadweep and Maldives regions. The study also suggests that around the Andamans, specially in the eastern region of upwelling, the hooking rate are more than 1.1% for bigeye tuna and more than 2% for yellowfin tuna during December to January. A stock of 15,000t of yellowfin and bigeye tuna has been estimated for the Andaman and Nicobar region based on their hooking rate and yield rate. Sivaprakasam (1976) estimated a catch of 270 t of tuna per year from these waters and also reported that these regions are very rich and important for skipjack tuna but very little of this is caught in the gill net and seines. Ueyanagi (1969) estimated about 5,00,000 to 7,00,000 t as standing stock of skipjack for the whole Indian Ocean region and on the basis of proportionate yield of yellowfin, bigeye and skipjack tuna, about 50,000 t of skipjack has been estimated by him for Andaman and Nicobar islands. Majority of the stock is reported to be concentrated south of Car Nicobar region where salinity of about 33 ppt or above and temperature 28°C is observed.

A survey of oceanic tuna and allied resources by longlining around Andaman and Nicobar islands by FSI during 1991 to 1995 in the vessel *M.V. Blue marlin* recorded an average hooking rate of 2.73% in of which 1.02% was constituted by tuna and 1.31% by sharks. Tuna hooking rate was found more in Andaman waters (area south of Lat. 10° N). Analysis of sector-wise catch by longline survey in Andaman waters recorded a hooking rate of 2.48%. Among these, tuna formed 45.35% of catch, followed by shark 39.92%, billfishes 6.05% and others 8.68%. In the Nicobar waters, the hooking rate was 2.99% and shark formed 67.56% followed by tuna (20.74%), billfishes (6.35%) and others (5.35%) of the total catch (Anon., 1999 b).

Mackerel fishery

The present production of mackerel is 1,213 t contributing 4.55% of the total marine fish landings of 1999 (Table 1). The mackerel resources in these islands consist of *R. brachysoma* and *R. kanagurta*. The peak-fishing season is from March to June and September to December and they are best caught in gill nets and boat seines. The production of mackerel ranged between 806 to 1,955 t during 1989 - '99. The maximum catch of 1,955 t was in 1992 forming about 7.7% of the total fish landings (Table 1).

Seerfish fishery

Seerfishes in these islands are represented by *S. guttatus*, *S. commerson* and *A. solandri*. The major fishing seasons are from March to August and November to February. Generally they are caught by gill nets, troll lines and hand lines and the dominating species is *S. commerson*. In 1999, the seerfish landing was 1,172 t which accounted for 4.39% of the total marine fish landings. During the period 1989 - '99, the seerfish landings ranged between 293 to 1,172 t and the trend showed a gradual increase in the catch (Table 1). Though the seer fishery is reported to have an estimated potential of 5,000 t, the exploitation has reached only 1,172 t which indicates that the resource is remaining underexploited.

Exploitation of tuna resources by foreign country in the Andaman seas

The exploitation of tuna resources by Thai fishermen in the Andaman seas during 1971 to 1983 (Table 2) using seines and gill nets showed that there is a good resource of tuna species in the Andaman and Nicobar waters and adjoining areas. Report on the Thai fishery in the Andaman seas (IPTP, 1985) recorded the dominant occurrence of *T. tonggol* followed by *E. affinis* and *A. thazard* in the Andaman sea. The smaller species less than 40 cm are found round the year in coastal areas and are landed by artisanal seine fisheries. The larger individuals (more than 40 cm) occur offshore and are caught by large purse seine fisheries. *E. affinis* and *A. thazard* caught throughout the year from the shelf area generally measured 50-60 cm and 30-40 cm respectively.

Table 2. Annual tuna catches (in tonnes) by Thailand in Andaman seas during 1971 - '83.

Year	Seines	Gill nets	Total
1971	1887	-	1887
1972	1671	20	1691
1973	1611	94	1705
1974	1156	54	1210
1975	2769	147	2916
1976	1757	76	1833
1977	1510	115	1625
1978	1999	96	2095
1979	1963	150	2113
1980	625	141	766
1981	1164	897	2061
1982	9248	324	9572
1983	3790	24	3814

These results showed that Andaman and Nicobar islands harbour rich resources of scombroids and therefore an accelerated effort to exploit these resources from these waters through the introduction of efficient gears is very essential.

RECOMMENDATIONS

- Biological aspects including length frequency, length-weight, food and feeding, sex ratio, maturation and spawning in respect of scombroids of Andaman and Nicobar islands are lacking. Studies in these lines will throw more light on the prediction of fishery of these groups and their better management.
- Species wise data collection of tuna, mackerel and seerfish fishery.
- The measure of relative abundance of different year classes in the catch should be carried out to understand the natural fishing mortality taking place.
- Extensive survey of the offshore areas and spawning grounds in Andaman and Nicobar islands has to be carried out.
- The environmental factors may affect the general availability of the fishing grounds or they may affect spawning and subsequent survival of the larval fish thereby causing fluctuations in the recruitment class. It is thus necessary to collect environmental data in the fishing, offshore and spawning grounds and correlate them with abundance of scombroids to identify the factors which directly influence the abundance or availability.

- Live-bait resource assessment studies are needed to enhance the production of tunas in these waters.
- Efficient methods like pole and line fishing with live baits, purse seining and longlining should be promoted to exploit tuna resources of these islands.

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