A PRELIMINARY STUDY ON THE BATOID FISHERY OF CUDDALORE WITH A NOTE ON THE BIOLOGY

P. DEVADOSS

Central Marine Fisheries Research Institute Centre, Calicut.

ABSTRACT

A study of the fishery of the economically important skates and rays of Cuddalore coast, based on the fishery for the period 1973-1974, is attempted. *Rhyncobatus djiddensis, Rhinobatos granulatus, Himantura uarnak H. bleekeri, D. sephen, Aetomylus nichofii, Aetobatus flagellum* are some of the common species fished along this coast, with a type of bottom-set gillnet, locally known as 'Thirukkai valai.' Females with nearly full-grown embryos are common during March-May.

INTRODUCTION

Investigations on the elasmobranchs of the Indian region received a fillip only in recent years. Evidence shows that ample scope exists for the exploitation of this important fishery. The nutritive values of the elosmobranch muscles are as good as any other meat. The available literature are by Chidambaram and Menon (1946) on the shark fishery of the Madras persidency, Devanesan and Chidambaram (1948) on the food fishes of Madras, Setna and Sarangdhar (19466, 1949) on the selachian fauna with their systematics, feeding and breeding habits in the Bombay waters, Misra and Menon (1955) on the distribution of the elasmobranchs of the Indian region. James (1962, '66 and '73) described the fishery and biology of some rays from Mandapam area and the fishery potential of the elasmobranchs on the east coast of India.

The present study is undertaken with a view to estimating the resources of the skates and rays of Cuddalore which is one of the major fishing centres for elasmobranchs in Tamilnadu. For estimating the total catches, weekly random sampling of catch data were taken from Devanampattinam fish landing centre at Cuddalore where the bottom-set gillnet, locally called 'Thirukkai valai' is operated.

TOPOGRAPHY OF CUDDALORE

Bordering the union teritory of Pondicherry on the southern side, Cuddalore has a coast line of 11 km with three estuaries viz., the Pennaiyar, Gadilam

and Paravanar; the latter two are interconnected. In between these three estuaries there are 5 landing centres viz., Thazhanguda, Devanampattinam, Sonankuppam, Singarathoppu and Akkaraigori. The latter three villages are surrounded by waters Gadilam and Paravanar on the north, west and south and the Bay of Bengal on the east (Fig 1). The mouth of Gadilam is closed with the formation of a temporary sand bar during summer months, while that of Paravanar is always open as the harbour is situated here. Tidal influence is always felt upto 5 km in Gadilam through the Paravanar channel. The entire sea shore is sandy.

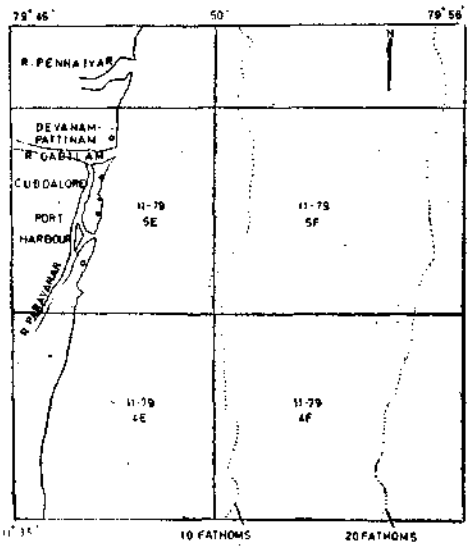

FIG. 1. Map of Cuddalore coast

COMPOSITION OF THE SPECIES IN THE FISHERY

There are 12 species occurring on this coast, of which *Rhynchobatus djiddensis* (Forskal), *Rhinobatos granulatus* (C), *Pristis microdon* Latham, *Himantura bleekeri* (Blyth), *H. uarnak* (Forskal), *Dasyatis* (*Pastinachus*) *sephen* (Forskal), *Actomylus nichofii* (Schn). *Aetobatus flagellum* (Schn.) and *Rhinaptera javanica* Muller and Hente contribute to the regular fishery, while *Rhinobatus obtusus* (M. & H.) occur very rarely. Although *Dasyatis* (*Amphotistius*) *imbricata* (Schn.) and *D.* (*A.*) *zugei* (M. & H.) occur in this coast commonly, they are not fished along with these skates and rays, due to their smaller size.

DESCRIPTION OF THE SPECIES

1. *Rhynchobatus djiddensis* (Forsk): This species occurs only in certain months and grows upto 9' in total length in the Indian waters (Misra, 1955). The maximum size recorded at Cuddalore is 2021 mm in total length. It feeds on fishes, mollusks and prawns. The flesh is considered very nourishing whether taken fresh or salted and, the fins are highly valued in the export market.

2. *Rhinobatus granulatus* (C): This skate is more frequently fished than *R. djiddensis* (Forsk). Maximum size measures upto 1475 mm in total length and, up to 12 embryos have been recovered from the uterus from a single specimen. Pregnant female specimens were observed from September-February.

3. *Pristis microdon* Latham: This saw-fish occurs seasonally during the south-west monsoon period from July to September. Specimens upto 3125 mm in total length were recorded from the commercial catches. They are abundant in the southern region of the east coast (of India) and good potential grounds for this fishery indicated along the north-east coast also (James 1973). They feed on large numbers of fishes like the seer fish, mackerels, Pomfrets, small sharks sciaenids, ribbon fishes, crustaceans and mollusks. They give birth to young ones from May to July, during which period they move close to the shore in the sheltered waters (Chidambaram and Menon 1946).

4. *Himantura uarnak* (Forskal): The fishing season extends roughly throughout the year. It has been recorded in the Indian waters ranging to 5' across the disk. Much havoc is caused to the fishery, through this fish by devouring large number of fishes, mollusks and crustaceans (Devadoss, in press).

5. *H. bleekeri* (Blyth): This ray locally called as 'Senthirukkai' occurs also throughout the year, and grows upto 85 cm across the disk on this coast. It feeds on the mollusks, crustaceans, polychaetes and ascidians. Up to 2 embryos have been found in the uterus during the winter months (December-February).

6. *Dasyatis* (*P.*) *Sephen* (Forsk): It is observed to occur in the commercial catches all the year round and grows upto 6' across the disk. The main items of its food are the fishes, prawns and crabs. The breeding season seem to be after the monsoon, as upto 2 embryos of nearly full-term have been recovered from its uterus during February to April.

7. *Aetobatus flagellum* (Schn): This ray contributes seasonally to the fishery. The maximum size across the disk varies from 1150-1580 mm. Nearly full-term 3 embryos have been obtained from the uterus during August/September.

8. *Aetomylus nichofii* (Schn): These ray, locally known as 'Kuruvi thirukkai' occasionally make their appearance in the catches. They are prized very much as table fish by the fish merchants and grow to a size of 690 mm across the disk. Fishes, mollusks and prawns form the food items these rays.

9. *Rhinoptera javanica* Muller & Henle: It is found to grow up to 150 cm across the disk and contributes occasionally to the fishery. James (1973) recorded this species in large shoals and bringing havoc to the pearl oyster beds. They mainly feed on the mollusks, and occasionally on the crabs, prawns and fishes.

FISHERY

It is estimated that the elasmobranchs contribute about 37,249 tons/year, forming 4.27% in the total of all India marine fisheries catches for the decade 1962-'71 (Ann. Rep. CMFRI). Tamilnadu's contribution was 30.77% of the total all India annual average elasmobranch catches. This works out roughly to 6% of the state's total annual fish landings (James 1973). Much of our present knowledge on the elasmobranch fishery potential resources of India are gleaned, as earlier stated, from the reports of Chidambaram and Menon (1946) John and Somayaji (1946) Krishnamurthi (1957) and James (1973). We need more detailed information.

Fishing Methods

Fishing of rays and skates along the Cuddalore coast is mostly done by a specialised type of gill net locally known as 'Thirukkai valai.' This gear is made from the nylon material and the mesh size varied from 6"-8" depending on the pieces placed in position in the net. The net is operated from the Catamaran at a depth range of 4 to 60 meters. While the net is lowered from the Catamaran the previous day, the catches are hauled up only on the succeeding day. After hauling the catch, the fishermen return to the shore leaving the net set up on the bottom of the sea. On the following day to bring home the catches they again sail to the place where they had left the net the previous day. The rays and skates are actually caught entangled in the net, and occasionally they are fished by hooks and line. Besides these methods, they are also caught using the small trawlers.

SEASONAL ABUNDANCE

The catches under the batoid fishery consist of 12 species belonging to 9 genera comprising 7 families. Of these, *Rhinobatus obtusus* (M. & H.), *D. (A). zugei* and *Mobula diabolus* (Shaw) are rarely fished. The annual catch is about 202 tons which forms about 2% of the total elasmobranch catches from Tamilnadu.

The number of fishing trips undertaken varied every month, the maximum trips being 279 made during July, and the minimum of 7 trips made during October 1974. The trips depended on the returns obtained from the fishing operations which in turn depended on the conditions prevailing at the sea. Hence the catches fluctuated monthly (Table 1). Maximum landings with corresponding increase in the catch per unit effort were observed during the 3rd quarter (of the year), although catches of higher magnitude were also noticed during some months. Catches were poor during the 4th quarter, probably due to the North East monsoon.

Some of the groups are mostly seasonal. Species of the family Dasyatidae are invariably dominant in the catches all the year round (Fig. 2). While the

TABLE 1. *Showing monthly catch data*

Month	No. fishing trips	No. Men engaged	Total catch	Catch/unit effort	Catch/Man power
March, 1973	124	341	17,763	143.3	52.1
April, 1973	160	480	13,580	84.9	28.3
May, 1973	124	372	12,551	101.2	27.3
June, 1973	230	290	30,060	130.8	43.6
Total for 2nd Qr.	514	1,542	56,191	109.3	36.4
July, 1973	186	589	43,307	233.0	73.3
August, 1973	217	868	41,106	189.5	60.3
Total for 3rd Qr.	523	1,859	1,01,663	194.4	54.6
September, 1973	120	390	17,250	143.8	44.2
October, 1973					
November, 1973			Data not available.		
December, 1973					
January, 1974					
February, 1974	196	616	26,460	135.0	43.4
March, 1974	186	589	23,354	125.7	39.7
Total for 1st Qr.	382	1,205	49,814	130.4	41.5
April, 1974	220	760	15,620	71.0	20.6
May, 1974	155	434	24,614	158.8	56.7
June, 1974	270	810	24,600	91.0	30.3
Total for 2nd Qr.	645	2,004	64,834	106.4	35.9
July, 1974	279	868	38,161	136.8	44.0
August, 1974	124	341	18,228	147.0	53.5
September, 1974	120	390	20,610	171.7	52.8
Total for 3rd Qr.	523	1,599	76,999	151.8	50.1
October, 1974	155	496	9,052	58.4	18.3
November, 1974	30	90	1,230	41.0	13.7
December, 1974			Data not available		
Total for 4th Qr.	185	586	10,282	33.1	10.7
Grand Total	2,903	8,960	3,77,712	130.1	42.7

saw-fishes are caught during July to September. They are conspicuous by their absence during the remainder of the year. *Rhynchobatus djiddensis* occur only sporadically without any noteworthy magnitude in the catches. *Aetobatus* and *Aetomylus* are common throughout the period of study. *Urogymnus* sp. and *Mabula* sp., which are rarely noticed during May-June period, are included under the miscellaneous groups.

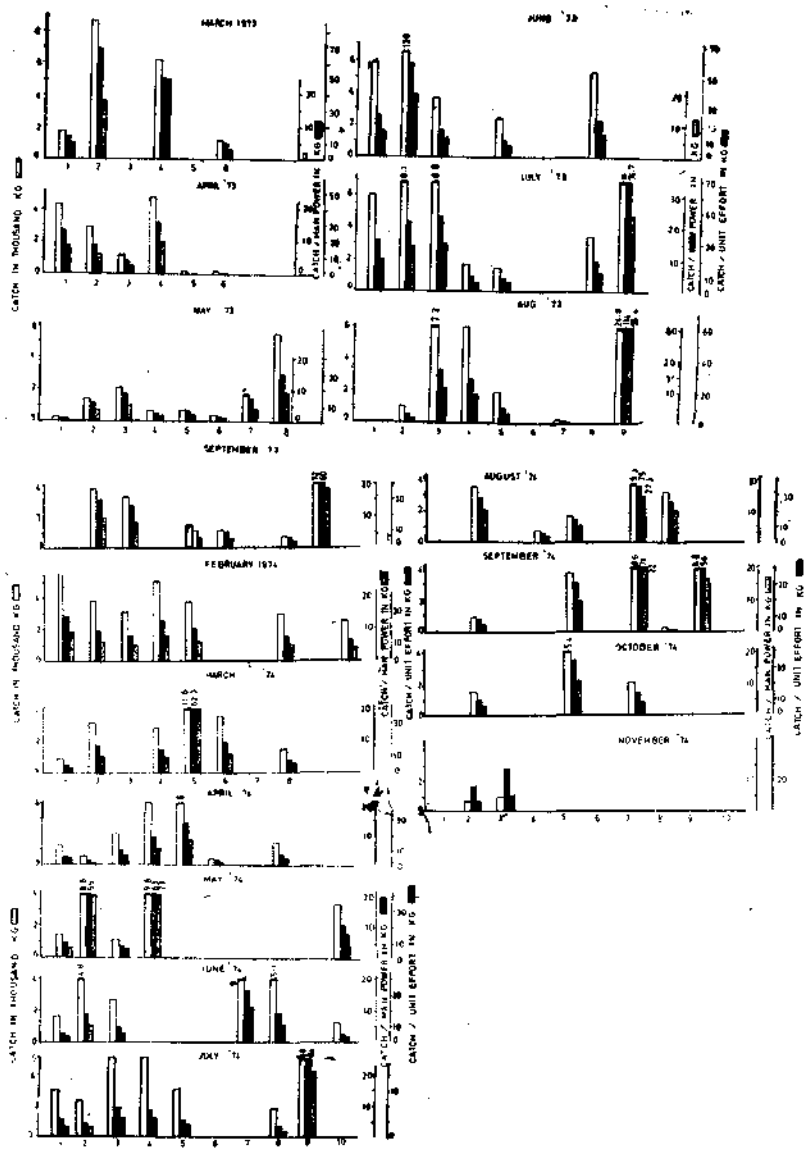

FIG. 2. Monthly fluctuations in the catches of skates and rays

1. *D. (P) Sephen*
2. *H. bleekeri*
3. *H. uarnak*
4. *A. nichofii*
5. *A. flagellum*
6. *R. javanica*
7. *R. djiddensis*
8. *R. granulatus*
9. *P. microdon*
10. *Miscellaneous group*

Remarks

Chidambaram and Devidas Menon (1946) observed that sharks concentrate near the mouths of the rivers. What is true of sharks, holds good for the skates and rays which are also carnivores and predators (It is worth recalling that there are three rivers, viz., Pennaiyar on the north, Paravanar on the south and Gadilam in between (Fig. 1) which drain into the Bay of Bengal at Cuddalore). They further stated that the fishing season for the saw fishes extended from July to March on the southern part of the East coast and from May to September on the northern part. From the present study, it is clear that saw fishes are caught from July - September at Cuddalore. Rao (1969) in his assessment of the marine resources of India, observed that in Tamilnadu, the elasmobranch catches were most abundant during the third quarter - the first and the second quarters catches were fairly high and the fourth quarter catches being the lowest. The present study also shows the same pattern of distribution (vide Table 1).

In view of the great scope for expansion of elasmobranchs fishery, the present catches can be further exploited on a much larger scale by a regular, sustained and organised fishing, pressing into use the tools of modern fishery technology. A systematic survey of the Bay of Bengal for potential and new grounds can be undertaken. Necessary facilities for deep sea fishing may be provided for.

Acknowledgements

The author wishes to thank Dr. K. Krishnamurthy, Reader, Centre of Advanced Study in Marine Biology, Porto Novo for the valuable suggestions and for critically going through the manuscript.

References

Chidambaram, K. and M. Devidas Menon. 1946. *Investigations on the shark fishery of Madras presidency.* Govt. of Madras, pp. 18.

Devanesan, D. W. and K. Chidambaram. 1948. *The Common Food fishes of Madras Presidency.* Govt. of Madras, pp. 79.

James, P. S. B. R. 1962. Observations on shoals of the Javanese Cownose ray, *Rhinoptera javanica* M. & H. from the Gulf of Mannar with additional notes on the species. *J. Mar. biol. Ass. India,* 4, 217-23.

James, P. S. B. R. 1966 Notes on the biology and fishery of the butterfly ray, *Gymnura poecilura* (Shaw) from the Palk Bay and Gulf of Mannar. *Indian J. Fish.* 13, 150-57.

James, P. S. B. R. 1973. Sharks, rays and skates as a potential fishery resource off the East coast of India. *Proc. Symp. Living resour. seas around India. Special publication,* CMFRI, Cochin.

John, V. and A. Somayaji. 1946. *A report on the Deepsea fishing Experiments conducted* in 1943-45. Govt. of Madras, pp. 24.

KRISHNAMURTHI, B. 1957. Fishery resources of the Rameswaram Island. *Indian J. Fish.*, 4: 229-253.

MISRA, K. S. AND M. A. S. MENON. 1955. On the distribution of the elasmobranchs and chimaeras of the Indian region to the mean annual isotherms. *Rec. Indian Mus.*, 53: 72-86.

MISRA, K. S. 1955. An aid to the identification of the common commercial fishes of India and Pakistan. *Ibid.*, 57: 97-111.

RAO, K. V. 1969. Distribution pattern of the Major Exploited Marine Fishery Resources of India. *Bull.* 6, *CMFRI.*, 5-8.

SETNA, S. B. AND P. N. SARANGADHAR. 1946. Selachian fauna of the Bombay waters - A classificatory representation with a key for their identification. *Proc. Nat. Inst., Sci. India* 12, 243-259.

SETNA, S. B. AND P. N. SARANGADHAR. 1949. The breeding habits of Bombay elasmobranchs. *Rec. Ind. Mus.* 47: 107-124.

SETNA, S. B. AND P. N. SARANGADHAR. 1949. A contribution to the systematics of *Scoliodon acutus* (Ruppell) *Hemipristis elongatus* (Klunzinger) and *Torpedo Zugmayeri Englehart Ibid.*, 47, 125-134.