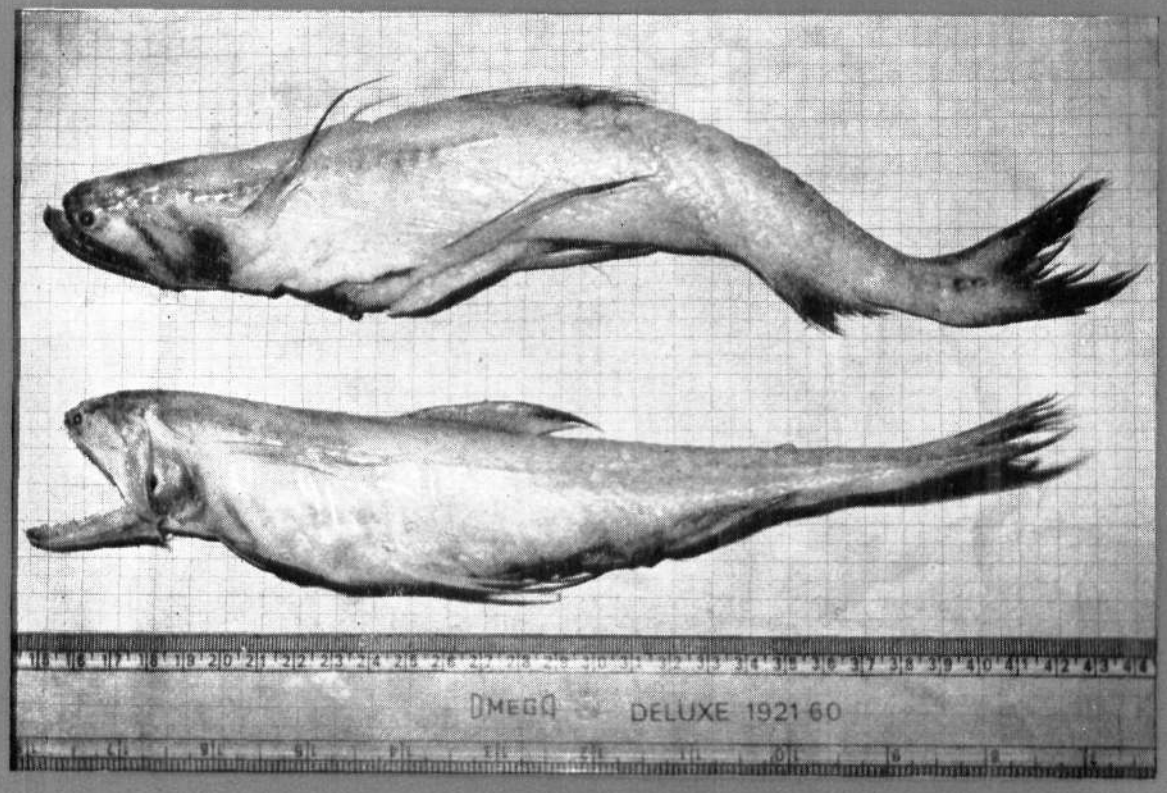
MARINE FISHERIES INFORMATION SERVICE



No. 89
NOVEMBER 1988

Technical and Extension Series

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

COCHIN, INDIA

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

THE MARINE FISHERIES INFORMATION SERVICE: Technical and Extension Series envisages the rapid dissemination of information on marine and brackish water fishery resources and allied data available with the National Marine Living Resources Data Centre (NMLRDC) and the Research Divisions of the Institute, results of proven researches for transfer of technology to the fish farmers and industry and of other relevant information needed for Research and Development efforts in the marine fisheries sector.

Abbreviation - *Mar. Fish. Infor. Serv., T & E Ser.*, No. 89: 1988

CONTENTS

Front cover photo:

Bombay duck *(Harpadon nehereus)* a common fish resource of the Maharashtra-Gujarat coasts.

Back cover photo:

Trawlers moored at Sassoon Dock fish landing centre in Bombay.

MARINE FISH CALENDAR

XI. BOMBAY*

P. V. Kagwade, S. K. Chakraborty, Mohamed Zafar Khan and J. D. Sarang

Bombay Research Centre of CMFRI, Bombay

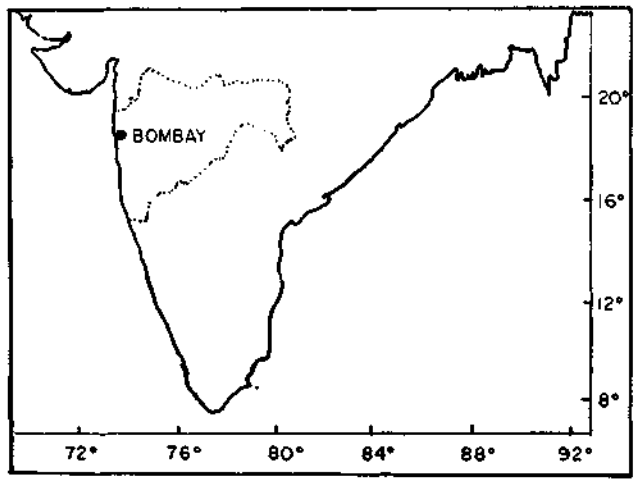
Introduction

There are three major fish landing centres in Bombay, namely Sassoon Dock, Versova and New Ferry Wharf. Of these, the former two are very old centres while the New Ferry Wharf is about a decade old. Sassoon Dock is a major centre where fishing activities are the maximum throughout the year, except during inclement weather. The fishing activities at Versova during monsoon are sporadic and limited to nearshore fishing by miniature bag net ('Bokshi'), cast net and shore seine. The boat owners and the crew at New Ferry Wharf are mostly from Gujarat and hence, they return to their native places during monsoon with the result that there is hardly any fishing worth drawing attention. Catch data from Sassoon Dock are made use of in the preparation of this marine fish calendar.

The crafts at Sassoon Dock are all mechanised and the gear used are mainly trawl net, bag net called 'dol' and gill net, their mesh sizes being 20-25, 15-20 and 80 to 120 mm respectively. All these gears operate all round the year, the trawl at 60-90 m, 'dol' at 10-30 m and gill net at 30-60 m depth zones. On an average daily 70 trawlers, 25-30 'dol' netters and 15-20 gill netters operate. In addition there are 30 units of hooks and line operating from September to April at a depth of about 30m. Their landings are very meagre and comprised of cat fish, shark and occasionally eel. Data used for this calendar are the annual and monthly averages of the catches of the three year period from 1983 to '85 for the three major gears.

The trawl catch has many groups of fishes occurring in different magnitude. The major groups are sciaenids, cat fishes and clupeids forming 5.01, 4.83 and 4.09% respectively in the catch. Sharks, ribbon fishes, thread-fin breams, lizard fishes and rays contribute 3.98, 3.43, 2.70, 2.11 and 1.24% respectively to the total catch. The remainings are minor groups forming less than 1% in the total catch.

Bombay duck is the predominant fish forming 25.65% in the 'dol' net catch. Other varieties like clupeids, sciaenids, pomfrets, eels and ribbon fishes form less than 4% each in the catch.



Pomfrets, both silver and black, forming 28.6% dominate the gill net catch. This is followed by clupeids, tunas and seer fishes constituting 20.2, 20.0 and 14.8% respectively. Sciaenids, sword fishes and horse mackerel form between 3.7 and 7.4%.

BOTHIDAE

Popular English Name	:	Indian halibut
Vernacular Name (Marathi)	:	'Bakus'
Annual average catch	:	—
Percentage in total catch	:	—
Fishing methods and their contribution	:	Trawl net: —

* Consolidated by N. Gopinatha Menon and K. Balachandran, CMFRI, Cochin.

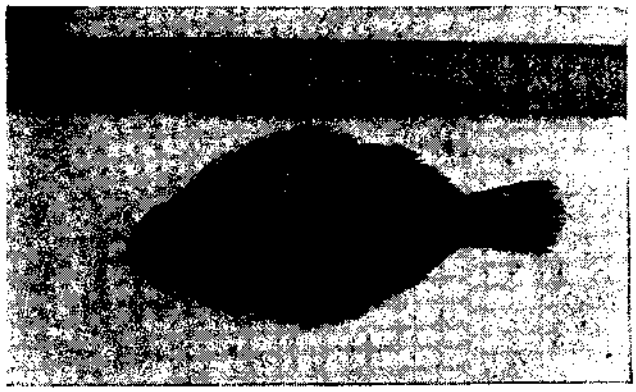


Fig. 1. *Psettodes erumei*

Scientific Name	:	*Psettodes erumei*
Vernacular Name	:	'Bakus'
Percentage in the catch of the group	:	—
Peak period of occurrence	:	Dec. – Jan.
Depth of occurrence	:	30 – 60 m
Length range in commercial fishery	:	140 – 620 mm
Size at first maturity	:	—
Spawning season	:	Sep. – Oct.

CARANGIDAE

Popular English Name	:	Horse mackerel
Vernacular Name (Marathi)	:	'Kati bangada'
Annual average catch	:	57 t
Percentage in total catch	:	0.4
Fishing methods and their contribution	:	Gill net: —

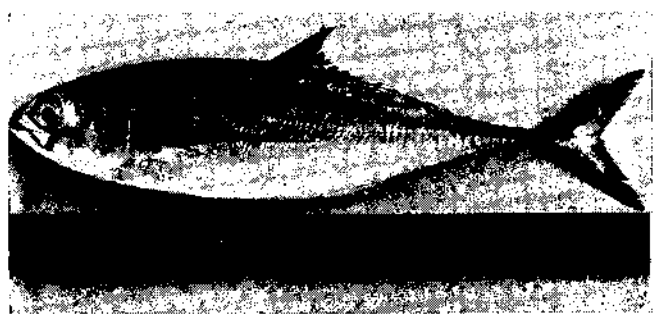


Fig. 2. *Megalaspis cordyla.*

Scientific Name	:	*Megalaspis cordyla*
Vernacular Name	:	'Kati bangada'
Gear	:	Gill net
Percentage in the catch of the group	:	—
Peak period of occurrence	:	Aug. – Dec.
Depth of occurrence	:	30 – 60 m
Length range in commercial fishery	:	110 – 350 mm
Size at first maturity	:	—
Spawning season	:	Dec. – Feb.

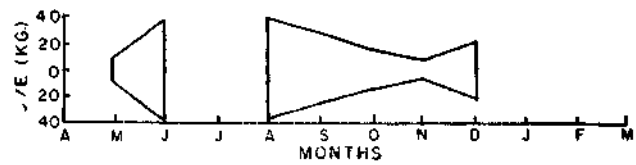


Fig. 3. Seasonal abundance of Horse mackerel *(Megalaspis cordyla)* in gill net catch

CLUPEIDAE AND CHIROCENTRIDAE

Popular English Name	:	Herring/Silverbar/ Golden anchovy
Vernacular Name (Marathi)	:	'Karli'/'Datali'/ 'Bhing'/'Kati'/ 'Mandeli'
Annual average catch	:	1,739 t
Percentage in total catch	:	13.6
Fishing methods and their contribution	:	Trawl net/Gill net/ Dol net: —

Fig. 4. Seasonal abundance of clupeids in trawl net catch.

Fig. 5. Seasonal abundance of clupeids in dol net catch.

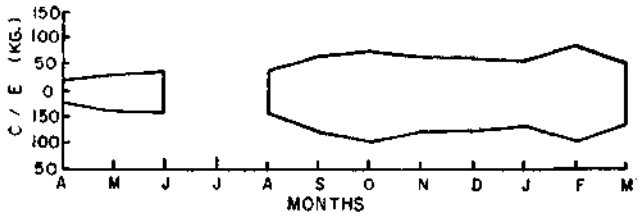


Fig. 6. Seasonal abundance of clupeids in gill net catch.

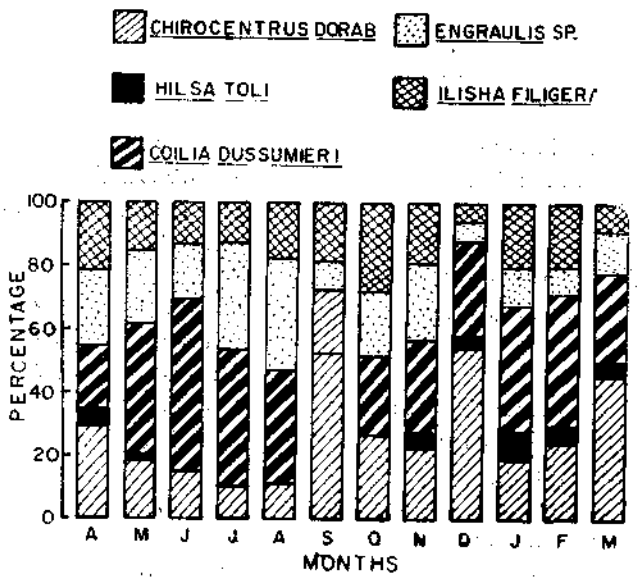


Fig. 7. Monthly species composition of clupeids in trawl net catch.

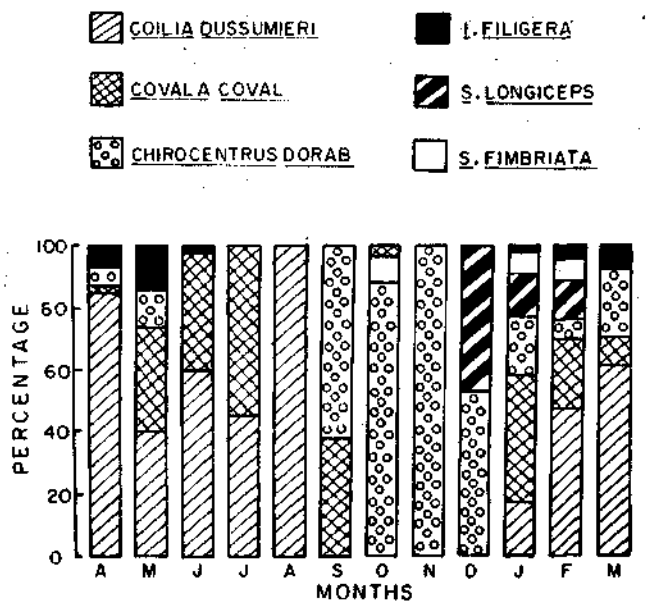


Fig. 8. Monthly species composition of clupeids in dol net catch.

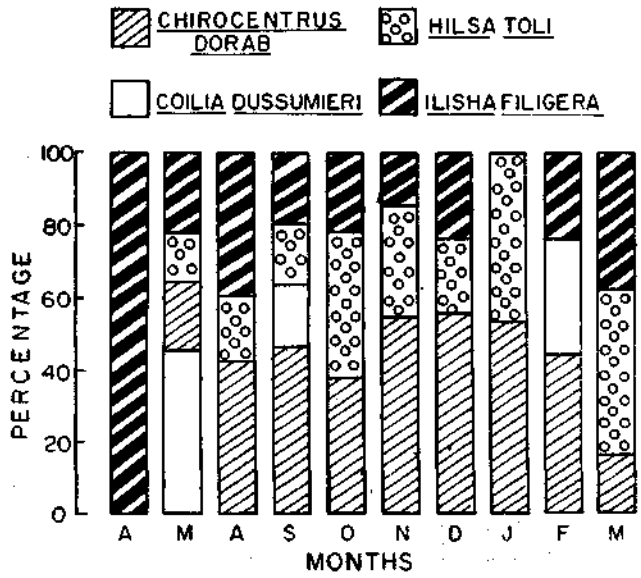


Fig. 9. Monthly species composition of clupeids in gill net catch.

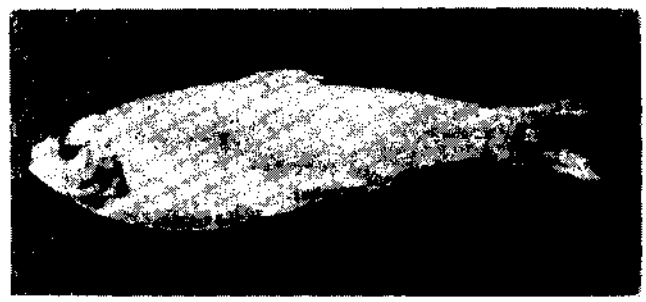


Fig. 10. *Escualosa thoracata.*

Scientihc Name	:	*Escualosa thoracata*
Vernacular Name	:	'Bhilgee'
Gear	:	Dol net
Percentage in the catch of the group	:	37.9
Peak period of occurrence	:	May – Jul.
Depth of occurrence	:	10 – 15 m
Length range in commercial fishery	:	60 – 80 mm
Size at first maturity	:	—
Spawning season	:	—
Scientific Name	:	*Tenualosa toli*
Vernacular Name	:	'Bhing'
Gear	:	Trawl net/Dol net
Percentage in the catch of the group	:	Trawl net : 3.4
	:	Dol net : 30.3
Peak period of occurrence	:	May – Jan.

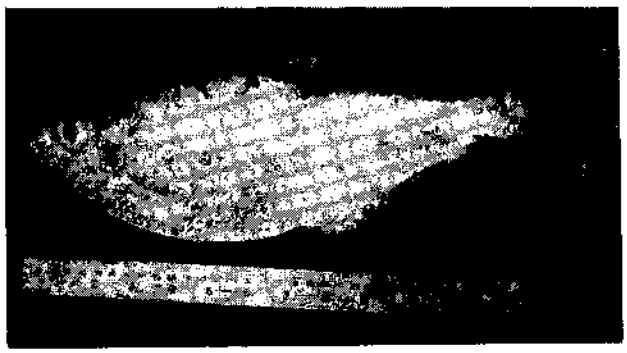


Fig. 11. *Tenualosa toli.*

Depth of occurrence	:	30 – 60 m
Length range in commercial fishery	:	320 – 400 mm
Size at first maturity	:	—
Spawning season	:	—

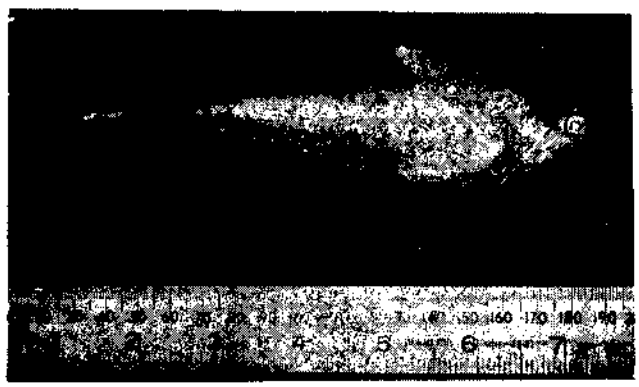


Fig. 12. *Coilia dussumieri.*

Scientific Name	:	*Coilia dussumieri*
Vernacular Name	:	'Mandeli'
Gear	:	Trawl net/Dol net
Percentage in the catch of the group	:	Trawl net : 33.6 Dol net : 31.8
Peak period of occurrence	:	Jun. – Aug. and Dec. – Feb.
Depth of occurrence	:	10 – 30 and 60 – 90 m
Length range in commercial fishery	:	80 – 180 mm
Size at first maturity	:	140 mm
Spawning season	:	Sep. – Mar.

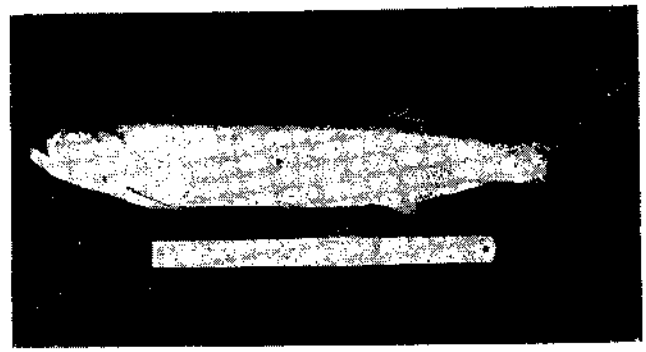


Fig. 13. *Chirocentrus dorab.*

Scientific Name	:	*Chirocentrus dorab*
Vernacular Name	:	'Karli'/'Datali'
Gear	:	Trawl net/Gill net/ Dol net
Percentage in the catch of the group	:	Trawl net : 38.9 Gill net : 46.7 Dol net : 22.7
Peak period of occurrence	:	Aug. – Apr.
Depth of occurrence	:	10 – 90 m
Length range in commercial fishery	:	420 – 860 mm
Size at first maturity	:	—
Spawning season	:	Jul. – Aug.

CYNOGLOSSIDAE

Popular English Name	:	Soles
Vernacular Name (Marathi)	:	'Lepti'
Annual average catch	:	—
Percentage in total catch	:	—
Fishing methods and their contribution	:	Trawl net: —

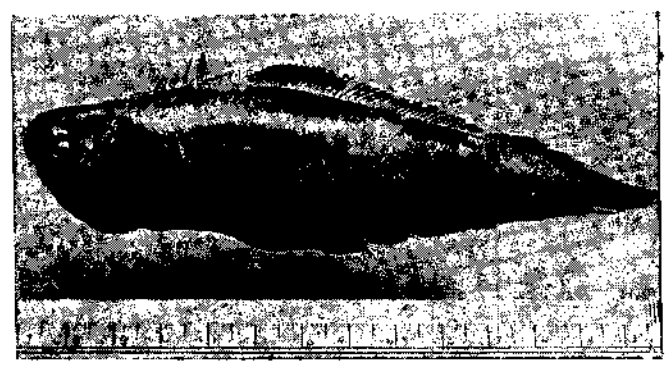


Fig. 14. *Cynoglossus macrostomus.*

Scientific Name	:	*Cynoglossus macrostomus*
Vernacular Name	:	'Lepti'
Gear	:	Trawl net
Percentage in the catch of the group	:	—
Peak period of occurrence	:	Aug. - Oct.
Depth of occurrence	:	30 - 60 m
Length range in commercial fishery	:	120 - 340 mm
Size at first maturity	:	—
Spawning season	:	—

ELASMOBRANCHS

Popular English Name	:	Sharks/Skates/Rays
Vernacular Name (Marathi)	:	'Mushi'/'Pakat'/ 'Ranja'/'Lani'/'Pok'
Annual average catch	:	2,198 t
Percentage in total catch	:	17.2
Fishing methods and their contribution	:	Trawl net: —

Fig. 15. Seasonal abundance of sharks in trawl net catch.

Fig. 16. Seasonal abundance of rays in trawl net catch.

Fig. 17. Seasonal abundance of skates in trawl net catch.

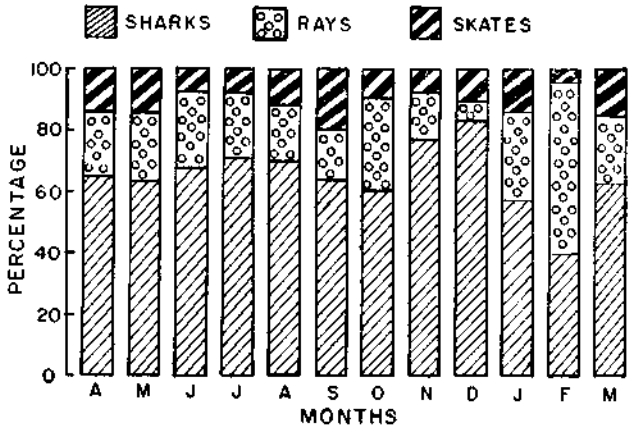


Fig. 18. Monthwise catch composition of elasmobranchs by trawl net catch.

HARPADONTIDAE

Popular English Name	:	Bombay duck
Vernacular Name (Marathi)	:	'Bombil'
Annual average catch	:	443 t
Percentage in total catch	:	3.5
Fishing methods and their contribution	:	Dol net: —

Fig. 19. Seasonal abundance of Bombay duck in dol net catch.

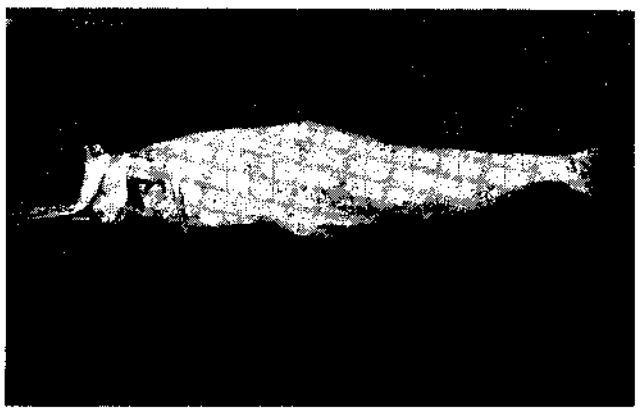


Fig. 20. *Harpadon nehereus.*

Scientific Name	:	*Harpadon nehereus*
Vernacular Name	:	'Bombil'
Gear	:	Dol net

Percentage in the catch of the group	:	100
Peak period of occurrence	:	Jun. – Oct.
Depth of occurrence	:	10 - 30 m
Length range in commercial fishery	:	40 – 350 mm
Size at first maturity	:	210 mm
Spawning season	:	Nov. – Dec.

MULLIDAE

Popular English Name	:	Goat fish
Vernacular Name (Marathi)	:	'Raja'
Annual average catch	:	272 t
Percentage in total catch	:	2.1
Fishing methods and their contribution	:	Trawl net: —

MURAENESOCIDAE

Popular English Name	:	Eel
Vernacular Name (Marathi)	:	'Wam'
Annual average catch	:	49 t
Percentage in total catch	:	0.4
Fishing methods and their contribution	:	Trawl net: — Dol net : —

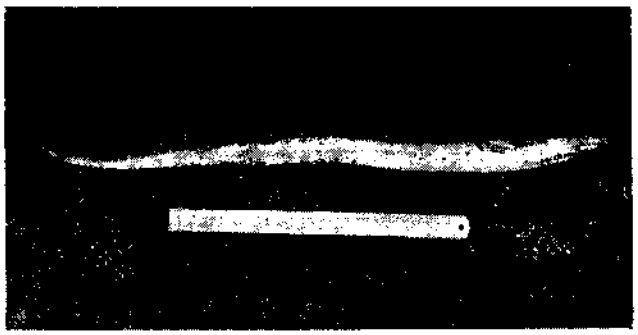


Fig. 21. *Muraenesox talabonoides.*

Scientific Name	:	*Muraenesox talabonoides*
Vernacular Name	:	'Wam'
Gear	:	Trawl net/Dol net
Peak period of occurrence	:	Jan. – May and Oct. – Dec.
Depth of occurrence	:	10 – 60 m
Length range in commercial fishery	:	400 - 2,000 mm
Size at first maturity	:	1,200 mm
Spawning season	:	Apr. – May and Sep. – Oct.

NEMIPTERIDAE

Popular English Name	:	Threadfin bream
Vernacular Name (Marathi)	:	'Rani'
Annual average catch	:	1,002 t
Percentage in total catch	:	7.9
Fishing methods and their contribution	:	Trawl net: —

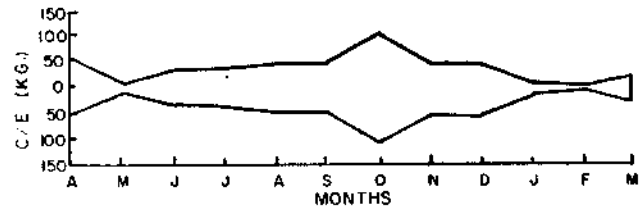


Fig. 22. Seasonal abundance of threadfin breams in trawl net catch.

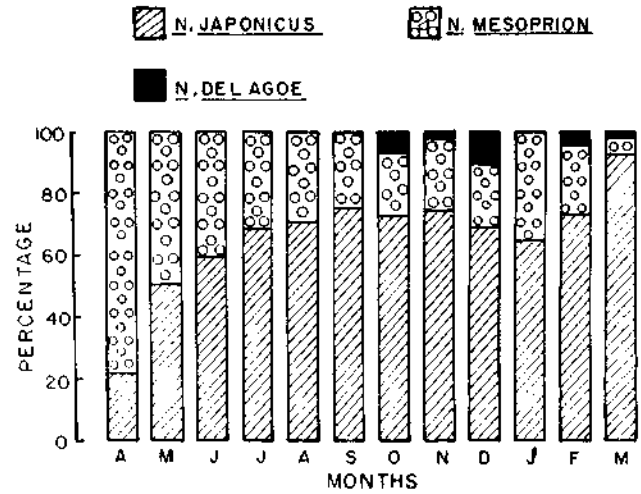


Fig. 23. Monthly species composition of threadfin breams in trawl net catch.

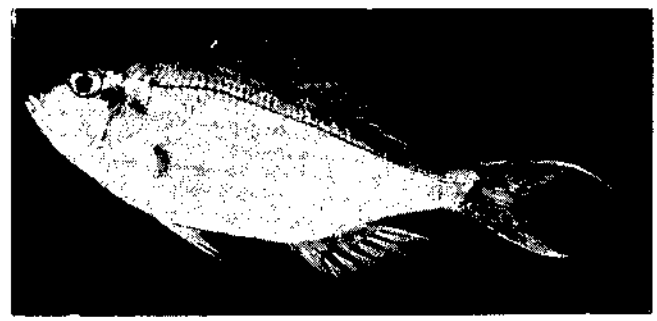


Fig. 24. *Nemipterus japonicus.*

Scientific Name	:	*Nemipterus japonicus*
Vernacular Name	:	'Rani'
Gear	:	Trawl net

Percentage in the catch of the group	:	Trawl net	: 65.2
Peak period of occurrence	:	Nov. - Jan.	
Depth of occurrence	:	60 - 90 m	
Length range in commercial fishery	:	130 - 290 mm	
Size at first maturity	:	—	
Spawning season	:	—	

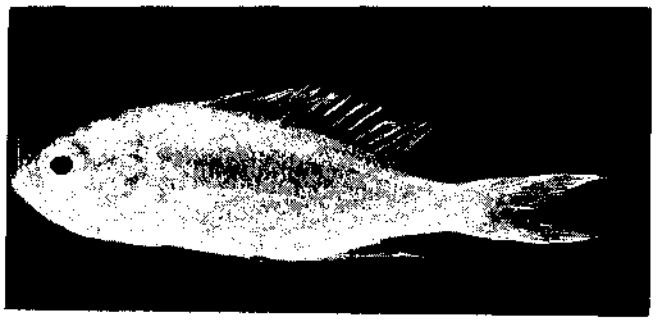


Fig. 25. *Nemipterus mesoprion.*

Scientific Name	:	*Nemipterus mesoprion*
Vernacular Name	:	'Rani'
Gear	:	Trawl net
Percentage in the catch of the group	:	Trawl net: 32.2
Peak period of occurrence	:	Nov. - Jan.
Depth of occurrence	:	60 - 90 m
Length range in commercial fishery	:	140 - 320 mm
Size at first maturity	:	—
Spawning season	:	—

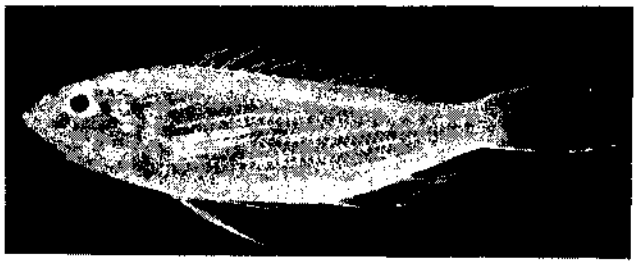


Fig. 26. *Nemipterus delagoae.*

Scientific Name	:	*Nemipterus delagoae*
Vernacular Name	:	'Rani'
Gear	:	Trawl net
Percentage in the catch of the group	:	Trawl net : 2.7
Peak period of occurrence	:	Dec.
Depth of occurrence	:	60 - 90 m
Length range in commercial fishery	:	—
Size at first maturity	:	—
Spawning season	:	—

SCIAENIDAE

Popular English Name	:	Croakers/Jew fish/ Drummers
Vernacular Name (Marathi)	:	'Dhoma'
Annual average catch	:	1,898 t
Percentage in total catch	:	14.9
Fishing methods and their contribution	:	Trawl net/Gill net/ Dol net: —

Fig. 27. Seasonal abundance of sciaenids in trawl net catch.

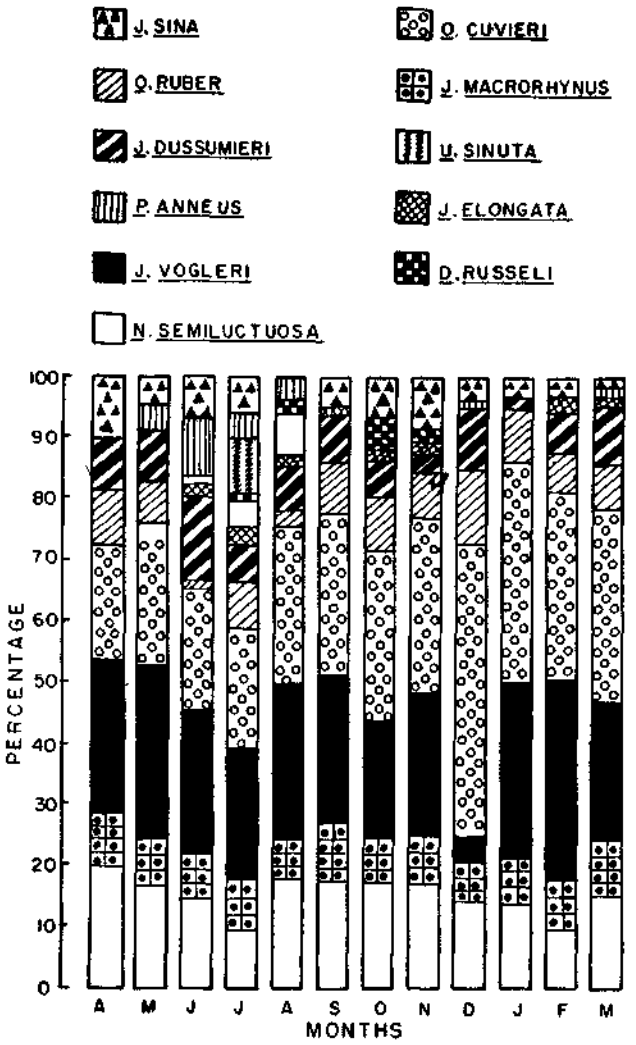


Fig. 28. Monthly species composition of sciaenids in trawl net catch.

Fig. 29. Seasonal abundance of Ghol *(P. diacanthus)* in gill net catch.

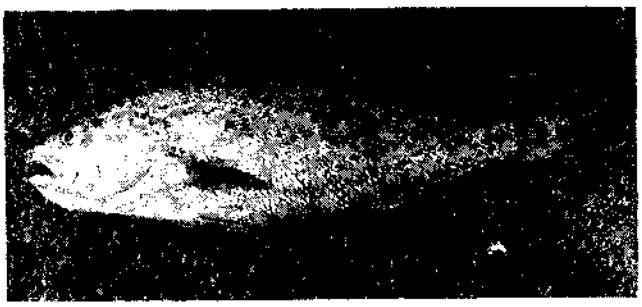


Fig. 30. *Protonibea diacanthus.*

Scientific Name	:	*Protonibea diacanthus*
Vernacular Name	:	'Ghol'
Gear	:	Trawl net/Gill net/ Dol net
Percentage in the catch of the group	:	Trawl net : 8.7
Peak period of occurrence	:	Aug. - May
Depth of occurrence	:	10 - 90 m
Length range in commercial fishery	:	200 - 1,200 mm
Size at first maturity	:	850 mm
Spawning season	:	Jun. - Sep.

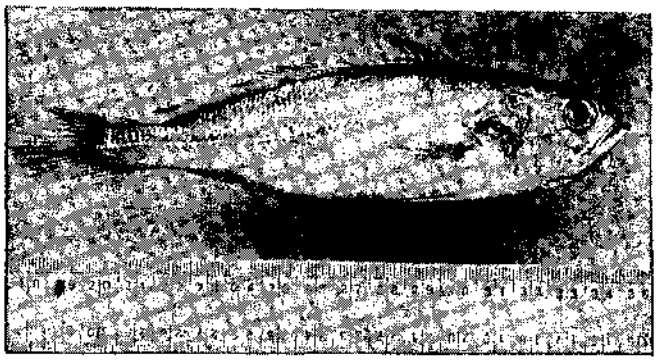


Fig. 31. *Otolithes ruber.*

Scientific Name	:	*Otolithes ruber*
Vernacular Name	:	'Dhoma'
Gear	:	Trawl net
Percentage in the catch of the group	:	Trawl net : 6.0
Peak period of occurrence	:	Occasional
Depth of occurrence	:	60 - 90 m
Length range in commercial fishery	:	—
Size at first maturity	:	—
Spawning season	:	Jul. - Oct.

Fig. 32. *Otolithes cuvieri.*

Scientific Name	:	*Otolithes cuvieri*
Vernacular Name	:	'Dhoma'
Gear	:	Trawl net
Percentage in the catch of the group	:	Trawl net : 26.2
Peak period of occurrence	:	Oct. - Dec.
Depth of occurrence	:	60 - 90 m
Length range in commercial fishery	:	140 - 310 mm
Size at first maturity	:	170 mm
Spawning season	:	Jul. - Sep.

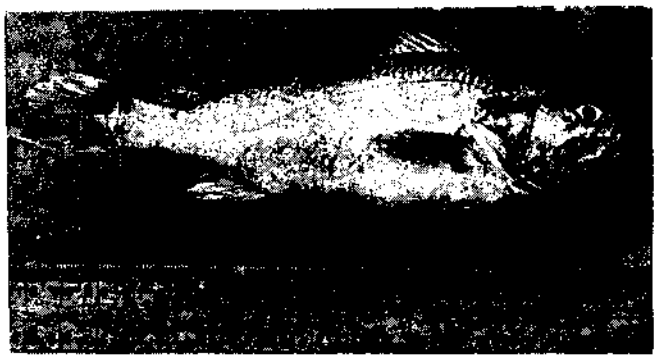


Fig. 33. *Johnius dussumieri.*

Scientific Name	:	*Johnius dussumieri*
Vernacular Name	:	'Dhoma'
Gear	:	Trawl net
Percentage in the catch of the group	:	Trawl net : 6.2
Peak period of occurrence	:	Mar. - Apr.

Depth of occurrence	:	60 - 90 m
Length range in commercial fishery	:	—
Size at first maturity	:	—
Spawning season	:	—

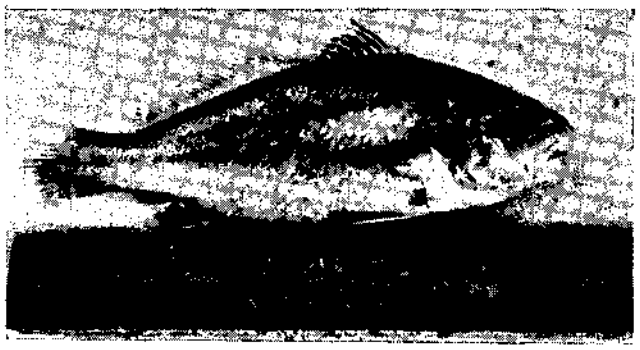


Fig. 34. *Johnieops sina.*

Scientific Name	:	*Johnieops sina*
Vernacular Name	:	'Dhoma'
Gear	:	Trawl net
Percentage in the catch of the group	:	Trawl net : 4.2
Peak period of occurrence	:	Jan. - May
Depth of occurrence	:	60 - 90 m
Length range in commercial fishery	:	—
Size at first maturity	:	—
Spawning season	:	—

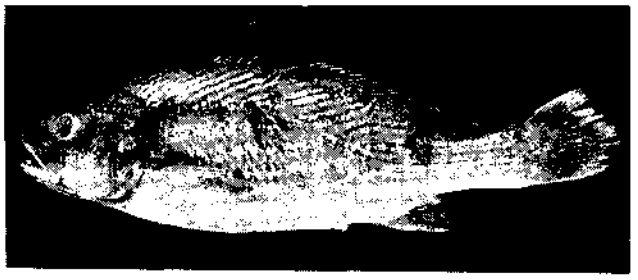


Fig. 35. *Johnieops vogleri.*

Scientific Name	:	*Johnieops vogleri*
Vernacular Name	:	'Dhoma'
Gear	:	Trawl net
Percentage in the catch of the group	:	Trawl net : 23.8
Peak period of occurrence	:	Jan. - Mar.
Depth of occurrence	:	60 - 90 m
Length range in commercial fishery	:	120 - 290 mm
Size at first maturity	:	150 mm
Spawning season	:	Jul. - Sep

SCOMBRIDAE

Popular English Name	:	Mackerel/Seer fish/ Tuna
Vernacular Name (Marathi)	:	'Surmai'/'Kuppa'/ 'Gedra'
Annual average catch	:	540 t
Percentage in total catch	:	4.2
Fishing methods and their contribution	:	Gill net: —

Fig. 36. *Scomberomorus commerson.*

Scientific Name	:	*Scomberomorus commerson*
Vernacular Name	:	'Surmai'
Gear	:	Gill net
Percentage in the catch of the group	:	—
Peak period of occurrence	:	Oct. - Dec.
Depth of occurrence	:	30 - 60 m
Length range in commercial fishery	:	550 - 1,200 mm
Size at first maturity	:	—
Spawning season	:	—

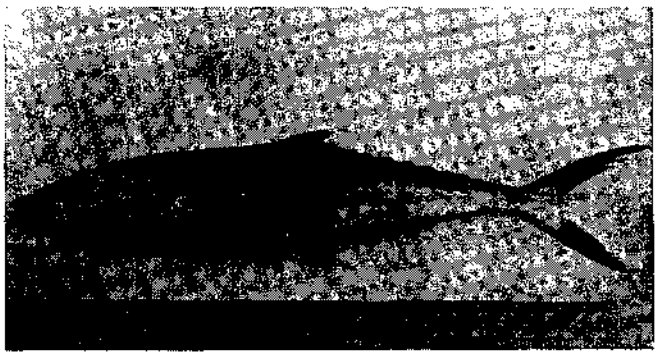


Fig. 37. *Scomberomorus guttatus.*

Scientific Name	:	*Scomberomorus guttatus*
Vernacular Name	:	'Surmai'
Gear	:	Gill net
Percentage in the catch of the group	:	—
Peak period of occurrence	:	Oct. – Dec.
Depth of occurrence	:	30 – 60 m
Length range in commercial fishery	:	350 – 550 mm
Size at first maturity	:	—
Spawning season	:	Apr. – Jun.

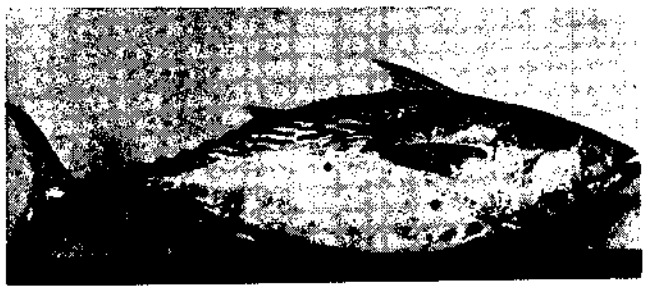


Fig. 38. *Euthynnus affinis.*

Scientific Name	:	*Euthynnus affinis*
Vernacular Name	:	'Kuppa'/'Gedra'
Gear	:	Gill net
Percentage in the catch of the group	:	—
Peak period of occurrence	:	Oct. - Dec.
Depth of occurrence	:	30 - 60 m
Length range in commercial fishery	:	300 - 700 mm
Size at first maturity	:	—
Spawning season	:	Apr. - Sep.

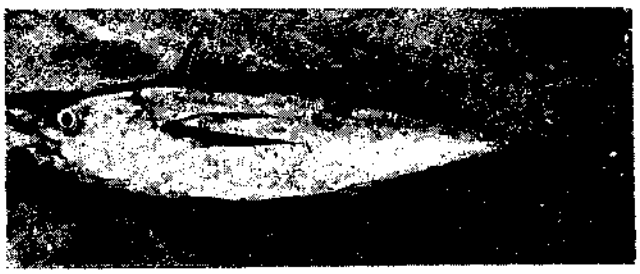


Fig. 39. *Thunnus tonggol.*

Scientific Name	:	*Thunnus tonggol*
Vernacular Name	:	'Kuppa'/'Gedra'
Gear	:	Gill net
Percentage in the catch of the group	:	—
Peak period of occurrence	:	Oct. – Dec.
Depth of occurrence	:	30 - 60 m
Length range in commercial fishery	:	350 - 750 mm
Size at first maturity	:	—
Spawning season	:	—

STROMATIDAE

Popular English Name	:	Pomfrets
Vernacular Name (Marathi)	:	'Paplet'/'Sarga'/ 'Saranga'/'Halwa'
Annual average catch	:	845 t
Percentage in total catch	:	6.6
Fishing methods and their contribution	:	Trawl net/Gill net/ Dol net: —

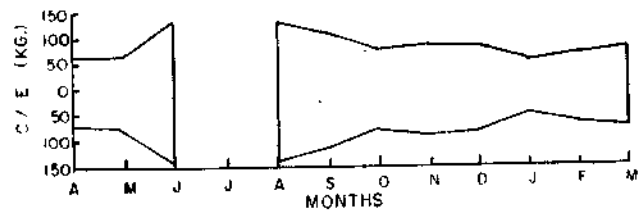


Fig. 40. Seasonal abundance of pomfrets in gill net catch.

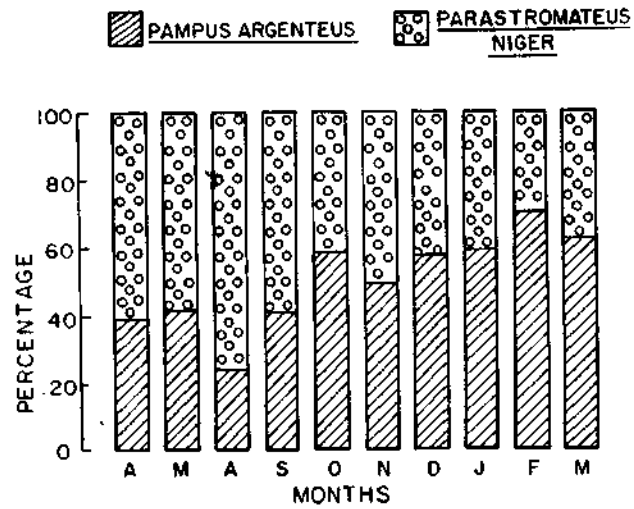


Fig. 41. Month-wise species composition of pomfrets in gill net catch.

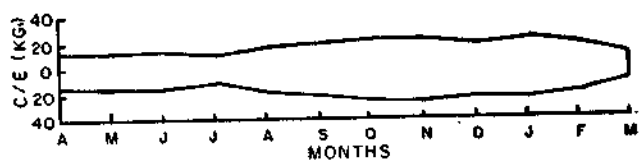


Fig. 42. Seasonal abundance of pomfrets in trawl net catch.

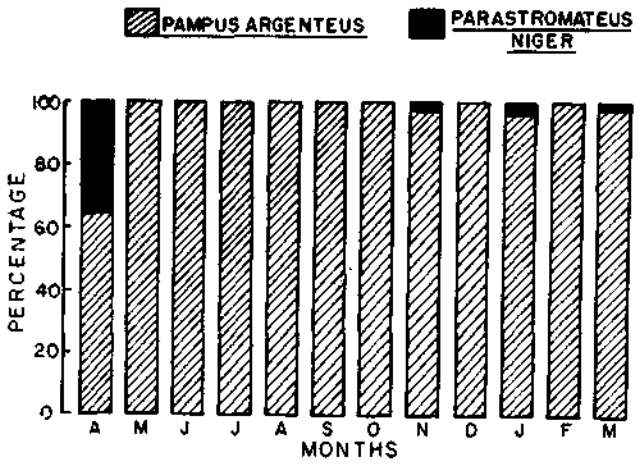


Fig. 43. Month-wise species composition of pomfrets in trawl net catch.

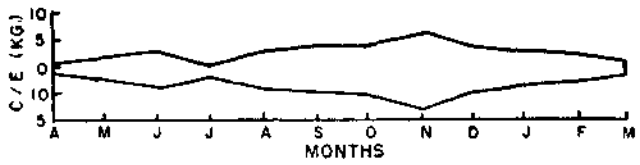


Fig. 44. Seasonal abundance of black pomfret *(P. argenteus)* in dol net catch.

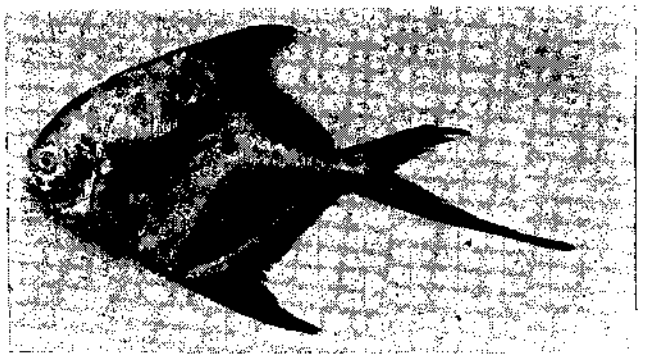


Fig. 45. *Pampus argenteus.*

Scientific Name	:	*Pampus argenteus*
Vernacular Name	:	'Saranga'/'Paplet'
Gear	:	Trawl net/Gill net/ Dol net
Percentage in the catch of the group	:	Trawl net : 97.4 Gill net : 49.7
Peak period of occurrence	:	Aug. – May
Depth of occurrence	:	10 – 90 m
Length range in commercial fishery	:	40 – 320 mm
Size at first maturity	:	220 – 240 mm
Spawning season	:	Aug. – Sep. and Jan. – Mar.

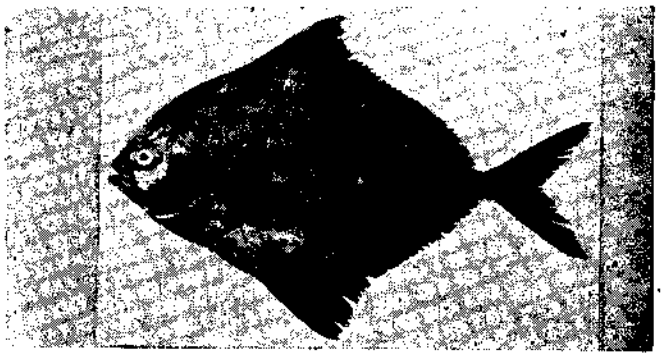


Fig. 46. *Parastromateus niger.*

Scientific Name	:	*Parastromateus niger*
Vernacular Name	:	'Halwa'
Gear	:	Trawl net/Gill net
Percentage in the catch of the group	:	Trawl net : 2.6 Gill net : 50.3
Peak period of occurrence	:	Aug. – May
Depth of occurrence	:	30 – 90 m
Length range in commercial fishery	:	150 – 500 mm
Size at first maturity	:	—
Spawning season	:	—

SYNODONTIDAE

Popular English Name	:	Lizard fish
Vernacular Name (Marathi)	:	'Chor bombil'
Annual average catch	:	668 t
Percentage in total catch	:	5.3
Fishing methods and their contribution	:	Trawl net: —

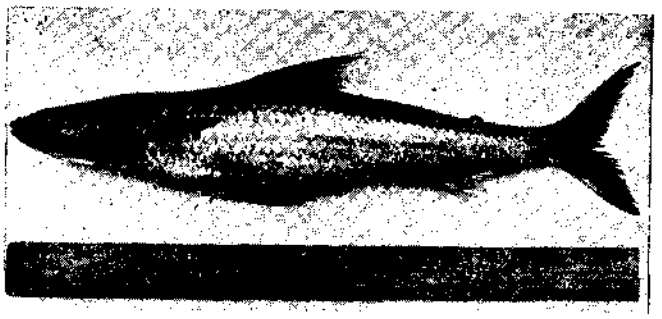


Fig. 47. *Saurida tumbil.*

Scientific Name	.	*Saurida tumbil*
Vernacular Name	:	'Chor bombil'
Gear	:	Trawl net
Percentage in the catch of the group	:	—

Peak period of occurrence : Oct. – Nov.
Depth of occurrence : 60 – 90 m
Length range in commercial fishery : 210 – 540 mm
Size at first maturity : —
Spawning season : —

TACHYSURIDAE

Popular English Name : Cat fish
Vernacular Name (Marathi) : 'Singhala'
Annual average catch : 1,530 t
Percentage in total catch : 12.0
Fishing methods and their contribution : Trawl net : —

TRICHIURIDAE

Popular English Name : Ribbon fish
Vernacular Name (Marathi) : 'Wakti'/'Wagti'
Annual average catch : 1,087 t
Percentage in total catch : 8.5
Fishing methods and their contribution : Trawl net/ Dol net: —

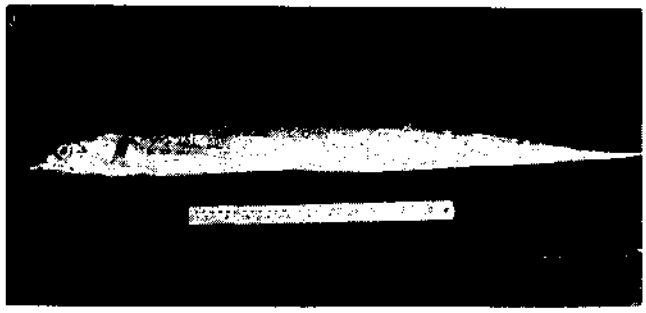


Fig. 48. *Trichiurus lepturus.*

Scientific Name : *Trichiurus lepturus*
Vernacular Name : 'Wakti'
Gear : Trawl net/Dol net
Percentage in the catch of the group : —
Peak period of occurrence : Oct. – Dec.
Depth of occurrence : 60 – 90 m
Length range in commercial fishery : 410 – 950 mm
Size at first maturity : —
Spawning season : Jun. – Jul.

Fig. 49. *Eupleurogrammus muticus.*

Scientific Name : *Eupleurogrammus muticus*
Vernacular Name : 'Wagti'
Gear : Dol net
Percentage in the catch of the group : —
Peak period of occurrence : Jul. – Sep.
Depth of occurrence : 10 – 30 m
Length range in commercial fishery : 250 – 400 mm
Size at first maturity : —
Spawning season : Feb. – May

XIPHIDAE

Popular English Name : Sword fish
Vernacular Name (Marathi) : 'Ghoda'
Annual average catch : 115 t
Percentage in total catch : 0.9
Fishing methods and their contribution : Gill net: —

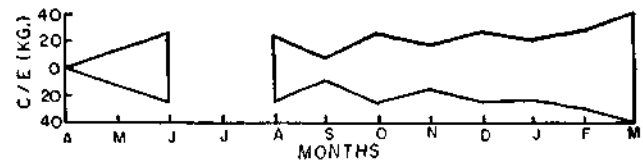


Fig. 50. Seasonal abundance of sword fish (Xiphiidae) in gill net catch.

PSYCHO-SOCIAL ASPECTS OF FISHERMEN WITH RESPECT TO MOTORIZATION

Krishna Srinath

Central Marine Fisheries Research Institute, Cochin

In India the motorization of country crafts has, to a certain extent, helped the fishermen to increase their fish catch as a result of the increased mobility and the access to the fishing grounds. It has been reported that in Kanyakumari, due to motorization the employment opportunity had doubled as more number of fishermen were required to go in the craft. An increase by six times in the gross returns of fishermen after motorization has also been reported. Though the economic benefits of this innovation was quite perceivable its popularization has not been quite even. For example in Kerala, while fishermen of Alleppey and Quilon adopted motorization prior to 1980, the fishermen of Kannamali and Saudi areas in Cochin took up the same during 1981–'83. The innovation caught up in Vypeenkara during 1984–'85 only. The number of motorized units in Vypeenkara during 1982 was only one or two and in 1985 it was about 115. Though the causative factor for adoption of this innovation is primarily better returns in economic terms, its continuance and sustenance as well as adoption of more improved fishing methods will, to a great extent, depend on the impact of this innovation on the social well-being of the fishermen. This report examines the efficiency of the technology based on the perception of fishermen of their present and future status in relation to their living conditions prior to motorization. The study was conducted in Vypeenkara during August-October, 1985.

Out of about 115 motorized country crafts, the owners/shareholders of 50 units were subjected to the study. Data were collected using an interview schedule involving projective and non projective techniques. Information on personal variables, impact of motorization and the living standards and projection for future, aspirations and facility satisfaction as assessed qualitatively by fishermen themselves were collected.

Age and education of the respondents

The respondents were in the age range of 18–58. About 35% was in the age group of 18–30, 37% in the age group of 31–45 and 28% in the age group of 46–58. The educational status of the respondents was between II–IX standard. Twenty per cent of the respondents had educational status between I & IV standard. The age-wise and education-wise distribution of respondents is given in Table 1.

Table 1. *Age and education of the respondents*

Age (years)	Education (figures indicate % respondents)			
	Below primary	Primary	Primary–secondary	Secondary
18–30	—	5.8	21.5	7.8
31–45	—	7.8	27.4	1.9
46–50	5.0	5.4	1.9	1.9
> 50	1.9	9.8	1.9	—
Total	6.9	28.8	52.7	11.6

Family structure

Eighty per cent of the respondents was having nuclear families and the rest had one or more numbers living with them, the average family size being 6.5.

Table 2. *Details of crafts & gears used by the motorized units*

Type	Crafts (% respondents)	Type	Gear (% respondents)
Small	—	Drift gillnet	29.4
Medium	50.9	Boat seine (combination)	31.4
Big	49.1	Hooks & line	19.6
		Boat seine, Drift gillnet & Hooks & line	19.6
		Drift gillnet & Boat seine	—

Occupation

Ninety per cent of the respondents was engaged in traditional fishing before taking up motorized fishing and 10% had occupations not related to fisheries.

Details of crafts and gears owned

The details of crafts and gears belonging to the motorized units are given in Table 2. Among motorised units percentage of the canoes crewed by 16 and 5 was about 50% each.

Source of inspiration for motorization

Eighty per cent of the respondents indicated their source of inspiration for taking up motorization as the demonstration effect of fishermen of Kannamali, Saudi and Alleppey. Fifteen per cent indicated that availability of credit under IRDP was the factor which prompted them to go in for motorization and the rest of them have followed their fellow fishermen in the adoption of the innovations.

Source of finance

About 59% of the respondents had availed individual loan facilities available for purchase of country crafts under IRDP and pooled them together to purchase the motorized units. About 12% had availed credit scheme by Latin Catholic Church and 29% had made use of their own resources. The time lag between their desire to have motorized units and actual possession ranged between 4 months to 4 years. Regarding the difficulties encountered in realizing the goal, loss of fishing days and travelling and miscellaneous expenditure were indicated as most important (Table 3).

Table 3. *Source of credit, time taken and difficulties in realising the goal (in %)*

Source of credit	Respondents (%)	Time taken (years)	Respondents (%)	Difficulties encountered (Multi-responses)	Respondents (%)
IRDP	58.8	About 1	25.0	Loss of fishing days	74.5
Latin Catholic Church	11.8	2-3	70.8	Extra expenditure including travel	50.0
Own resources	29.4	3-4	4.2	—	—

Impact of motorization as perceived by the respondents

All respondents in this study agreed that there was some increase in their income as the result of motorization. The number of fishing days have gone down as Sundays had become compulsory holidays. Ninety per cent had already registered definite increase in the quantity of fish caught. No change was seen in the role of women in the post harvest operations or their income. Eighty per cent of the respondents reported improvement in their food consumption and 70% said that the clothing had improved. No change was immediately perceivable in education and housing, but many of them hoped that there would be improvement in these aspects in the next five years. The saving habit of 8% of the respondents already indicated improvement. Seven items pertaining to socio-economic conditions were presented to the respondents on a five point scale and the mean score obtained indicated improvement in the overall socio-economic conditions. The details are presented in Table 4.

Table 4. *Socio-economic changes after motorization as perceived by respondents*

Parameters administered (Multi-responses)	Respondents (%)	Mean score (maximum score = 5)
Increase in mobility	100	4.53
Increase in catch	100	4.64
Improvement in food	80	4.82
Improvement in clothing	70*	3.22
Improvement in housing	43*	3.87
Improvement in education of children	96*	3.90
Improvement in savings	8	2.55
		pooled 3.93

* Hope to improve soon.

Facility satisfaction

Six aspects of facilities related to the operation and maintenance of motorized units and disposal of catch namely landing facilities, market, availability of inputs like kerosene, petrol and engine oil, facilities for storing and repair of engine and finance were presented to the respondents on a five-point scale. The scores are presented in Table 5. The mean facility satisfaction score was 2.2 which was below satisfactory. It was reported that the 600 litres of kerosene available to them through government outlets for a period of one month

was sufficient only for 20 days and the rest of the quantity had to be bought from the open market at prices prevailing at that time. Regarding marketing of the catch the time of landing was reported to determine the trade. If agents could get sufficient quantity of fish from Cochin Fisheries Harbour, the price of fish landed at Vypeen was reported to go down. The landing facilities at Vypeen was felt to be unsatisfactory. The facilities for storing the engines were also not satisfactory. For repairing engines no facility was available in the Island and the fishermen had to go out of the Island even for every small repair, paying exhorbitant charges for private conveyance.

Table 5. *Facility satisfaction mean score*

Facilities considered	Mean score (maximum score = 5)
Landing facility	2
Marketing	3
Inputs for operating the engine	2
Storage facility for engine	2
Repair	1
Finance	2
	pooled 2.20

Aspirations

Aspiration was measured for education and occupation for children, food, clothing, housing and ownership of fishing implements and the rank order is presented in Table 6. Eighty two per cent considered better living in terms of food, shelter and clothing as most important while 63% considered ownership of fishing implements and more number of crafts and gears and 63% better education for their children.

Table 6. *Aspirations and ratings for self*

Aspirations	Rank order (%) (multiresponse)	Rating for time dimensions	Self mean rating
Better living in terms of food, shelter & clothing	82	Past	1.0980[a] (0.3003)
Education for children	63	Present	2.8627[b] (0.6331)
Possession of implements	63	Future	6.2941[c] (0.9848)

Note: Means with different superscripts differ significantly among themselves at 1% level of significance.

Rating for self and village

A ten point ladder scale (0–10) indicating progress in life was administered to the respondents. Their assessment of general conditions and extent of progress as subjectively perceived for self for three time dimensions namely past, present and future at the interval of five years was rated. The mean rating is given in Table 6. The rating for past, present and future aspirations showed significant difference which indicated that the change brought about by motorization was significant. As regards rating for village, an open question was put asking whether the respondent thought that motorization had brought about any improvement in the life of the villagers or whether they perceived any change in future. Seventy per cent felt that the villagers can progress if they go in for motorization at large as some progress has been indicated in the first year of motorization.

Conclusion

During 1982–'83, though fishermen of Vypeen Island were aware of motorization the factor which hindered the adoption was lack of financial resources. Though schemes were available under IRDP for motorization of fishing crafts the initial investment of Rs. 9,000/- was beyond the reach of small fishermen. As they realised the benefits of motorization from the successful experience of the fishermen elsewhere they had availed the credit available under different agencies for purchase of motorised units. They felt that the motorization has already proved its worth and if it continues to accrue more benefits they may switch over to mechanised fishing by raising pooled capital. When they were asked to react to the banning of mechanised fishing like trawling and purse-seining the general feeling was that mechanization was not totally harmful to them. This was mainly due to the increased mobility of motorized units and the resultant increase in catch.

From the above findings it may be concluded that motorization can be instrumental in bringing about significant changes in the living conditions of fishermen and their outlook and inculcating the spirit of unity and co-operation among them. The fishermen in general felt that their status has improved as a result of motorization and were more optimistic about their future. It is hoped that proper motivation and facilities with adequate supporting services will lead to quicker adoption of better fishing methods.

REPORT ON A DIAMOND-BACK SQUID CAUGHT OFF VERAVAL, GUJARAT*

During the course of survey, a male specimen of 'Diamond-back squid' *Thysanotenthis rhombus* weighing 1.65 kg was recorded from trawl landings at Veraval on 28-2-1987 (Fig. 1). The squid was caught by a trawler off Veraval at a depth of about 80 metres. The stomach was found to be empty. The body measurements (in mm) are as follows:

1.	Dorsal mantle length (DML)	327
2.	Ventral mantle length	323
3.	Mantle width	303
4.	Mantle width Index	92.6 %of DML
5.	Head length	67
6.	Head width index	23.32 %of DML
7.	Arm length	195
8.	Arm length index	59.63 % of DML
9.	Eye diameter	4.8
10.	Hetrocotylus length index	29.23 % of DML
11.	Sucker index (sessile)	1.83 % of DML
12.	Suckers	prominent 16 in left arm and prominent 23 in right arm.

Fig. 1. Dorsal view of the Diamond-back squid.

* Reported by A. P. Lipton, Veraval Research Centre of CMFRI, Veraval.

BUMPER CATCH OF 'KALARU' FROM DHANUSHKODI AND MOONDRURAYARCHATHIRAM (PALK BAY), RAMESWARAM ISLAND*

Five-spotted herring *Hilsa kelee* locally known as 'Kalaru' in Tamil occurs in small quantities in shore-seines ('Kara valai'), drift net ('Paru valai') and in bottom set gill net ('Disco valai') at Mandapam – Rameswaram region. In this area, the fishing season for the species extends from April to October in the Palk Bay and from November to March in the Gulf of Mannar. In the latter region the catch rate ranges from 5 to 30 kg per drift net unit. At Dhanushkodi, where relatively more intense fishing is observed, a catch rate of 380 kg per unit is obtained by the 'Kara valai'. In the bottom set gill net operated from this

Table 1. *Details showing the bumper catch of* Hilsa kelee

Date	Name of landing centre	No. of 'Kara-valai' units	Total catch in tonnes	Length range in (mm)	Dominant size in (mm)
7-4-'87	Moondrurayarchathiram	4	10.9	150–209	180–189
19-4-'87	-do-	1	36.0		
21-4-'87	-do-	1	5.0		
8-4-'87	Dhanushkodi	1	8.2	150–199	160–189
27-4-'87	-do-	1	1.5		
28-4-'87	-do-	3	4.75		

* Reported by C. Kasinathan, Regional Centre of CMFRI, Mandapam Camp.

region, the catch rate of *Hilsa kelee* ranges from 1 to 5 kg per unit.

A bumper catch of *Hilsa kelee* was observed in the shore seines operated at the Palk Bay side at Dhanushkodi and Moondrurayarchathiram in the Rameswaram Island in April, 1987 and the details are presented in Table 1.

Mode of disposal of the catch

The offtake of fresh fish was found to be limited. The major portion of the catch was spread on the sandy beach and dried in the sun for 5 days, packed in gunny bags and sent to Nammakkal, Hyderabad and other places for preparing poultry feed. The price of fresh fish ranged from Rs. 1.50 to Rs. 2 per kg, and of the dried fish from Rs. 2.50 to Rs. 3 per kg.

UNUSUAL LANDING OF CAT FISH *TACHYSURUS DUSSUMIERI* AT MADRAS*

About 2,000 numbers of cat fish *Tachysurus dussumieri* weighing approximately five tonnes were landed on 25-11-1987 by shore seine operation at Nochikuppam landing centre in Madras. The entire catch was realised from a single operation which is an unusual phenomenon along Madras coast. The catch was sold for Rs. 30,000 at the landing centre itself.

A sample of 69 specimens of the fish was collected from the catch for biometric and biological observations. The total length ranged from 611-710 mm. The maximum frequency of 18.8% was observed in the length group of 651-660 mm. Of the 69 specimens, 46 were males (66.7%) and 23 were females (33.3%). All the females were in stage V of gonadial development.

Large shoals of cat fish are usually reported from the west coast. Recently, heavy landings of cat fish have been reported from the east coast also, especially at Pondicherry (bag net) and Mandapam (trawl net).

Spawning migration of *T. thalassinus* and *T. tenuispinis* towards shallow waters of less than 10 m depth has been reported during southwest monsoon (May - July) from the west coast. Considering the fact that all the female specimens analysed were in advanced stage of gonadial maturity, it appears that *T. dussumieri* also tends to migrate towards shallow waters during northeast monsoon (October - December) along the east coast.

Cat fish do not form a major fishery along the Madras coast. The annual average landing is about 2.9 tonnes from trawlers, 0.6 tonne from mechanised gill netters and 0.5 tonne from non-mechanised gill netters during 1980-'86. The present unusual heavy landing was observed for only one day and it was confirmed from the fishermen that the shoal was moving from south to north and that they could get only about 25% of the haul while the rest escaped.

* Prepared by S. Srinivasarengan, Madras Research Centre of CMFRI, Madras.

The author names of Fish Calendar VI for Tuticorin (MFIS No. 84, June, 1988) may be read in the order S. Mahadevan, P. Sam Bennet, K. M. S. Ameer Hamsa, Pon. Siraimeetan and H. Mohamed Kasim. The name of Shri Pon. Siraimeetan was left out inadvertently during consolidation of the article.

—EDITORS

Edited by Dr. K. J. Mathew, Mr. I. David Raj and Mr. G. S. D. Selvaraj. Published by Dr. K. J. Mathew on behalf of the Director, Central Marine Fisheries Research Institute, Cochin-682 031. Printed at PAICO, Cochin-31.