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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. **82**: 1988

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Front cover photo:

Perches of species *Pristipomoides types* caught by hooks and line from the Kalava grounds off Cochin being landed at Cochin Fisheries Harbour.

Back cover photo:

Trawl catches being packed for transporting to local and distant markets — a common scene at Cochin Fisheries Harbour.

MARINE FISH CALENDAR

IV. COCHIN*

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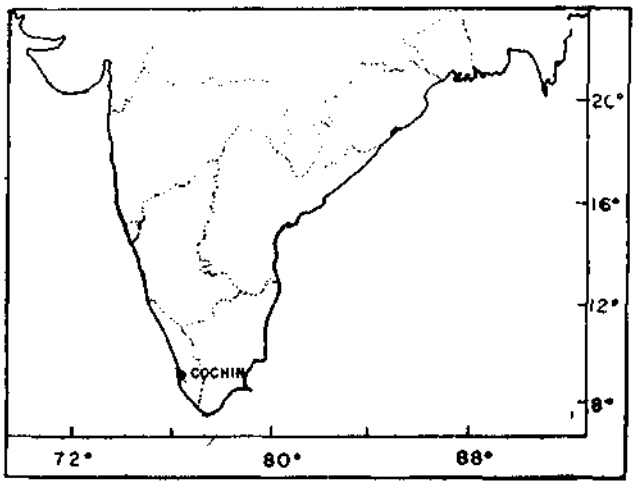
Introduction

Cochin Fisheries Harbour, one of the major fisheries harbours of Kerala, accounted for an average annual landing of 25,700 t (1981–'85) of fish caught from the coastal waters by all gears operated by both non-mechanised and mechanised vessels which formed about 8% of the total fish landings of Kerala. The pelagic fish resources formed almost 64% and demersal fish 36% of the total yield. Prior to the commissioning of this fishery port in 1978, the landings were made mostly at Kannamali, Manassery, Soudhi beach and Fort Cochin. The principal gears then employed were shrimp trawls, boat seines ('thangu vala'), gill nets and hooks and lines. In the late seventies, the purse seines were introduced to the fishing fleet of Cochin Fisheries Harbour, which altogether changed the fishing strategy of this region. During the period 1981–'85 purse seines accounted for almost 52% of the total fish catch of this centre, followed by trawlers (38%) and the rest by drift gill nets, boat seines, hooks and lines *etc.*

Among the pelagic fishes landed, oil sardine ranked first, forming about 44% of the total fish catch of Cochin. The next important component in the pelagic realm was mackerel (11%) followed by tunas (3%), carangids (2.5%) *etc.* The demersal group was dominated by threadfin breams (12%) followed by cat fishes (3%), lizard fishes, flat fishes and sharks and rays.

Fishing activities are restricted upto a maximum depth of 80 m, between Alleppey in the south and Chawghat in the north. The bottom in the region is mostly of grey and black mud deposit upto about 40 m and beyond this depth upto 160 m, the bottom is predominently sandy with lesser percentage of mud and shell fragments. Trawlers generally operate in depth range of 25–50 m and drift gill nets in 25–80 m; whereas purse seine operates beyond 30 m, eventhough very often this gear encircles shoals of fishes in shallow depths (10 - 15 m) also depending on the seasonal availability of shoals, disregarding the restrictions.

Gearwise, purse seines made the bulk of the landings, and the most dominant fishes were oil sardine (74%), mackerel (15%), other sardines (3%), carangids (3%), cat fishes (1.2%), pomfrets (1.1%) *etc.* The peak fishing season for purse seine was postmonsoon (42%) followed by summer (32%), premonsoon (14%) and monsoon (12%). The important fish groups in the trawlers were threadfin breams (33.7%), cat fishes (5.2%), sciaenids (4%), soles (4.6%), anchovies (3%), clupeids (2.3%), lizard fishes (2.9%) *etc.* In addition to different fish groups, penaeid prawns and crabs contributed a substantial percentage (12.5%) in the trawl catches. The fishing season for the gear commences in monsoon period and almost 40% of the landings was during this period. The premonsoon period contributed 30%, summer 20% and the postmonsoon 10%. In the drift gill net, tunas were the most abun-



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

dant fish (31%) followed by elasmobranchs (18%), cat fishes (15%), seer fishes (16%) carangids (7%), pomfrets (5%) *etc.* Monsoon months contributed the maximum landings (41%) followed by premonsoon (29%), postmonsoon (18%) and summer (1.2%).

The annual average catch of pelagic groups at Cochin showed that oil sardine ranked first (11,315 t), with 98% caught by purse seine, the peak months of landings being November and December. Mackerel was the next abundant fish forming 2,743 t, with 98% contributed by purse seine and the peak months of landings from September to November. Tunas and carangids formed about 770 t and 644 t respectively with the major landings during April to December. Seer fishes contributed 427 t and major fishing season was from August to December which was followed by whitebait (354 t) in October and November and pomfrets (271 t) in August to November.

Among the demersal resources, threadfin breams formed the bulk of the landings with an annual average catch of 3,118 t. The peak months of their landings were June to October. Cat fishes were the next dominant resource with the annual average catch at 696 t and the maximum harvest from June to February. Lizard fishes and flat fishes formed 430 and 381 t respectively with peak landings from June to September. Sharks and rays together contributed 378 t in almost equal proportions, the major season being April to December for sharks and November to March for rays. Perches were predominantly caught by hooks and line and were highly seasonal in their occurrence (January and February) with an annual average catch of 28 t.

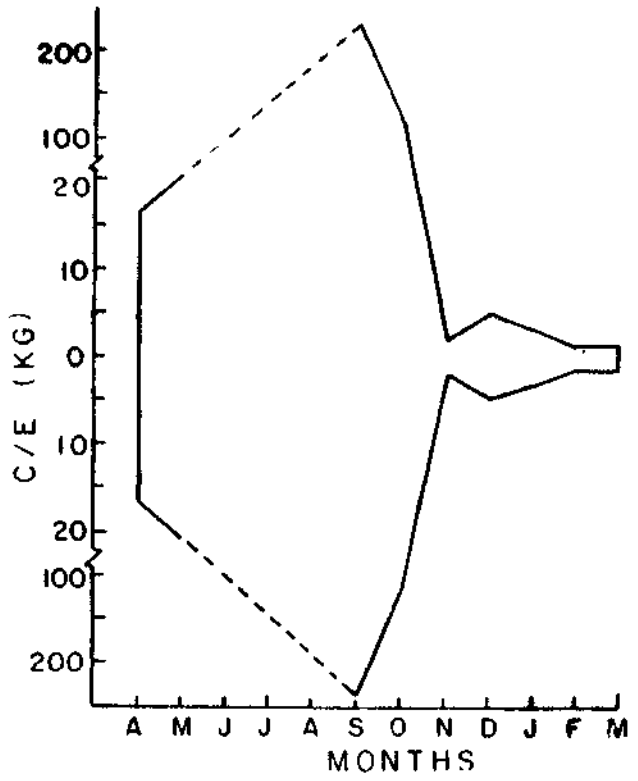


Fig. 1. Seasonal abundance of carangids. (Purse seine catch).

CARANGIDAE

Popular English Name	:	Trevallies/Scads
Vernacular Name (Malayalam)	:	'Para'/'Vatta'
Annual average catch	:	245.3 t
Percentage in total catch	:	1.0
Fishing methods and their contribution	:	Purse seine : 66.5%
		Drift net : 22.4%
		Trawl net : 11.1%

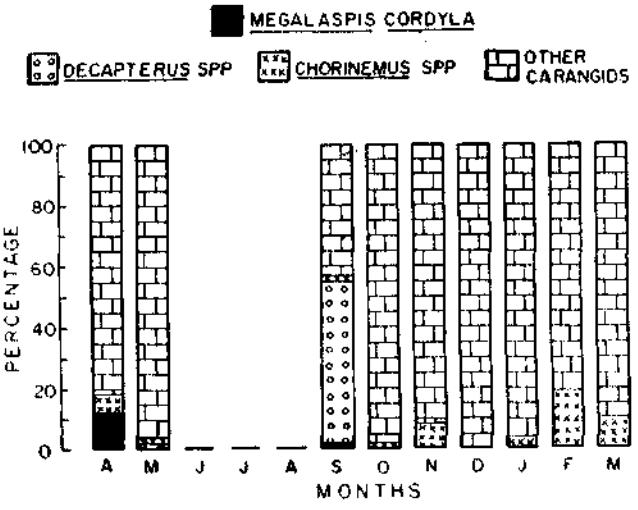


Fig. 2. Monthwise species composition of carangids in the purse seine catch.

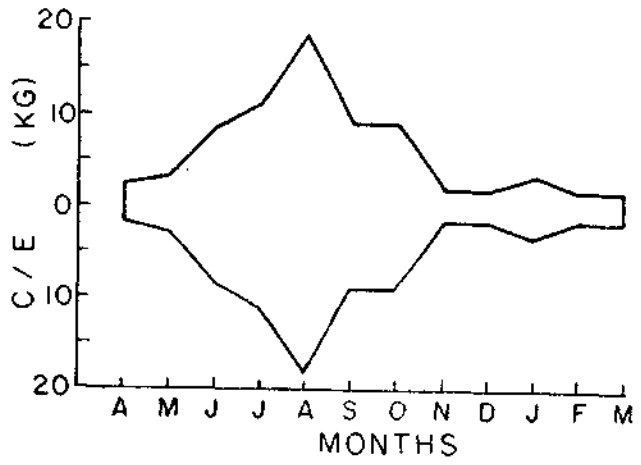


Fig. 3. Seasonal abundance of carangids (Drift net).

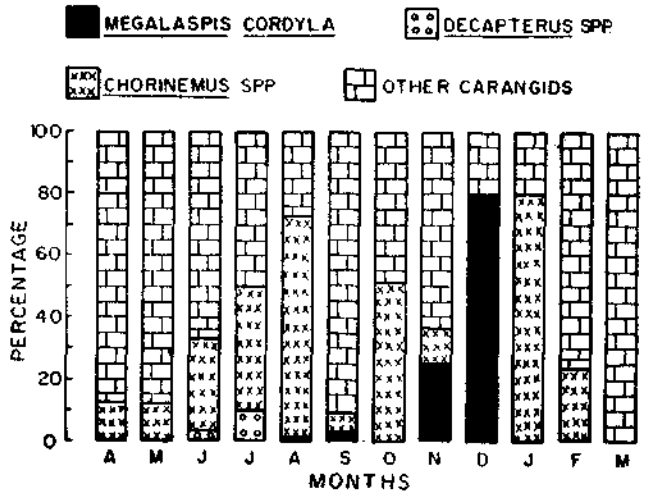


Fig. 4. Monthwise species composition of carangids in the drift net catch.

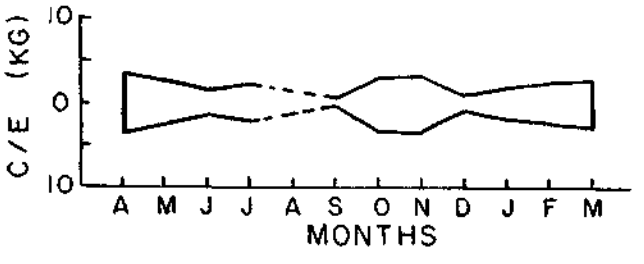


Fig. 5. Seasonal abundance of carangids (Trawl net).

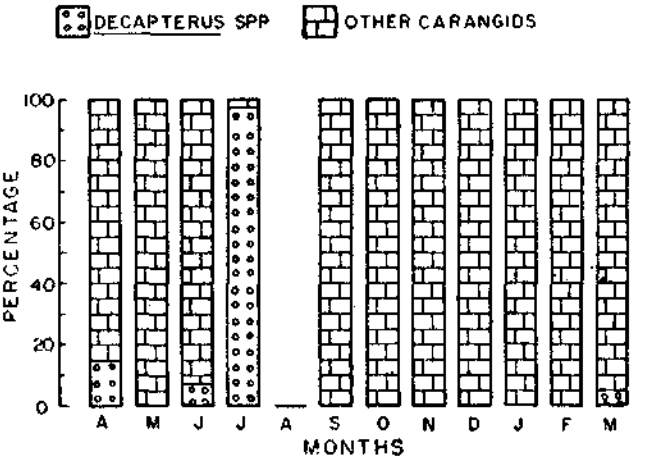


Fig. 6. Monthwise species composition of carangids in the trawl catch.

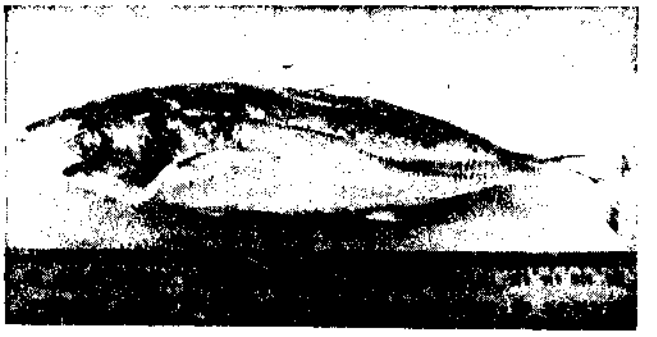


Fig. 7. *Decapterus russelli.*

Scientific Name	:	*Decapterus russelli*
Vernacular Name	:	'Thiriyan'
Gear	:	Purse seine/Trawl net
Percentage contribution by each gear	:	- -
Peak period of occurrence	:	Jan.–Feb. and Jul.–Sep.
Depth of occurrence	:	20–50 m
Length range in commercial fishery	:	70–220 mm
Size at first maturity	:	130 mm
Spawning season	:	May–July

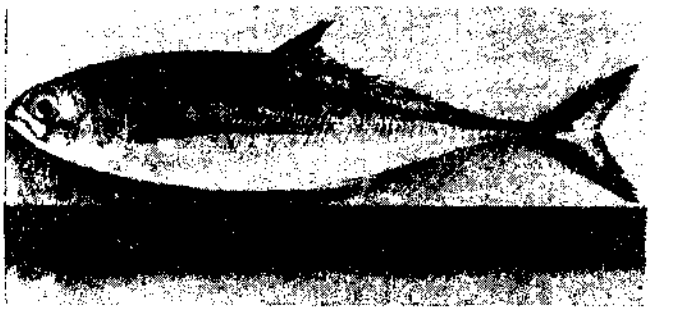


Fig. 8. *Megalaspis cordyla.*

Scientific Name	:	*Megalaspis cordyla*
Vernacular Name	:	'Vangada'
Gear	:	Trawl net/Purse seine
Percentage contribution by each gear	:	—
Peak period of occurrence	:	Nov. – Dec.
Depth of occurrence	:	20 – 80 m
Length range in commercial fishery	:	150 – 390 mm
Size at first maturity	:	270 mm
Spawning season	:	May – July

CLUPEIDAE

Popular English Name	:	Oil sardine
Vernacular Name (Malayalam)	:	'Mathi'/'Chala'
Annual average catch	:	11,314.8 t
Percentage in total catch	:	45.72
Fishing methods and their contribution	:	Purse seine : 97.8% Trawl net : 2.2%

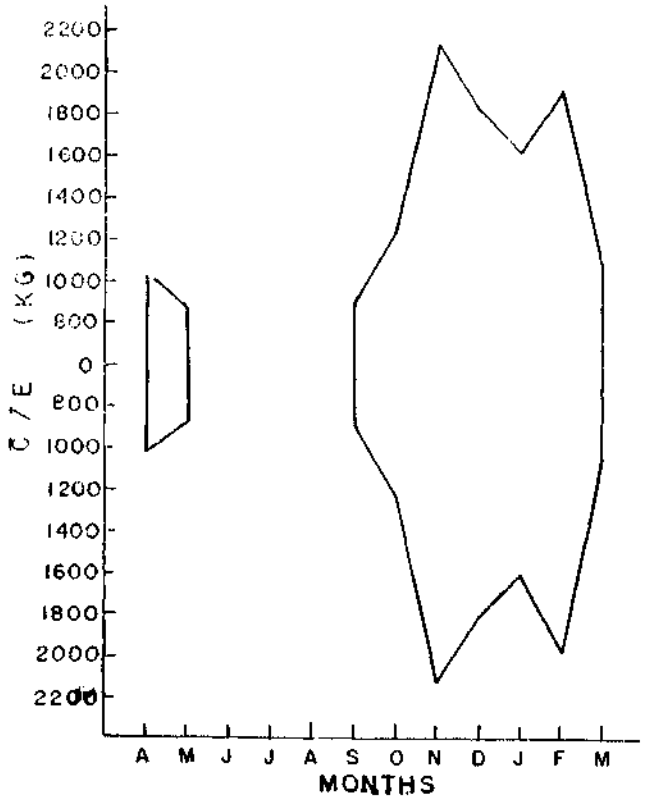


Fig. 9. Seasonal abundance of clupeids (Purse seine catch).

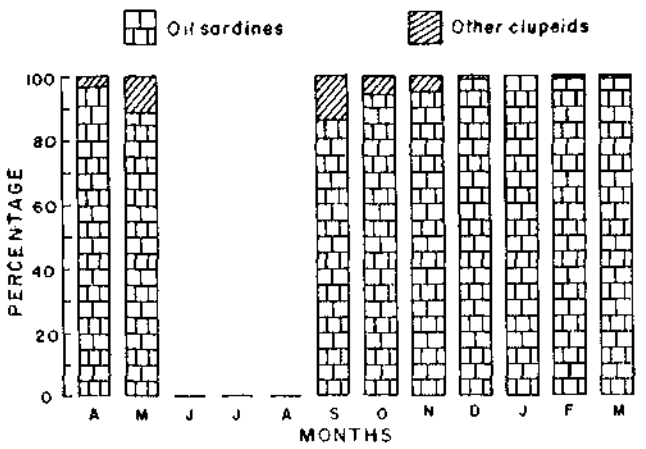


Fig. 10. Monthwise species composition of clupeids in the purse seine catch.

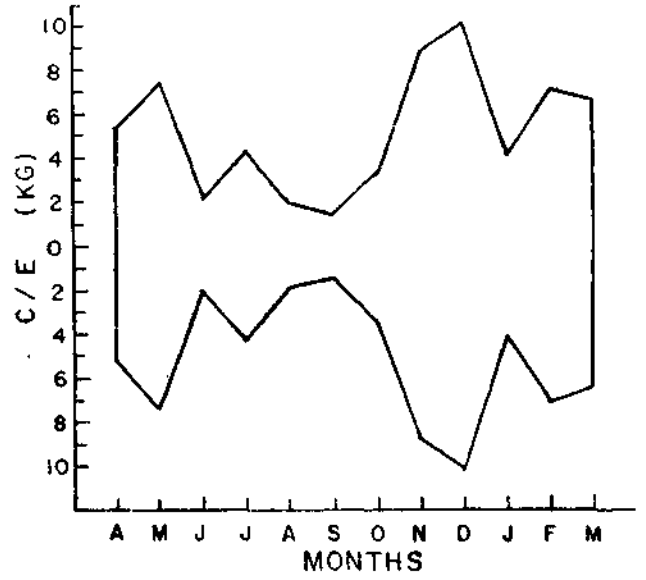


Fig. 11. Seasonal abundance of clupeids (Trawl net).

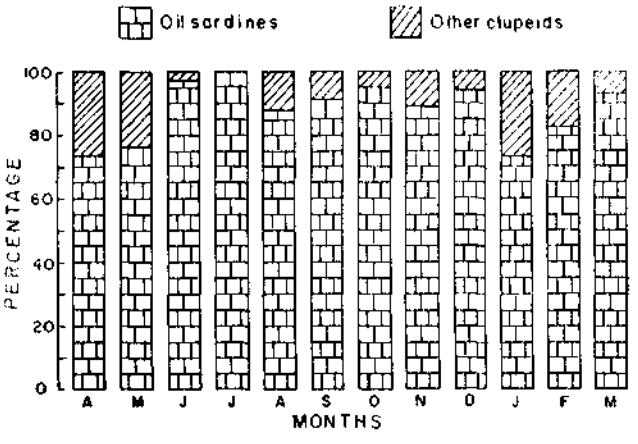


Fig. 12. Monthwise species composition of clupeids in trawl catch.

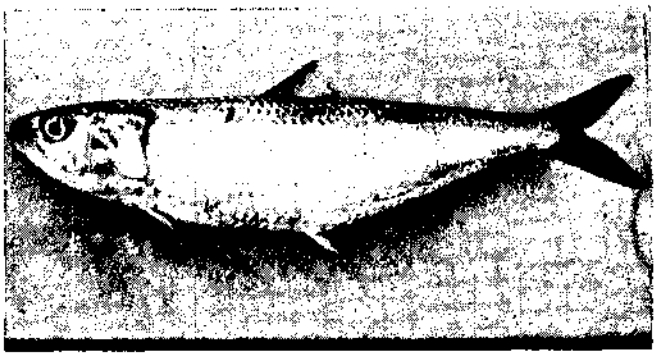


Fig. 13. *Sardinella longiceps.*

Scientific Name	:	*Sardinella longiceps*
Vernacular Name	:	'Nalla mathi'/'Neichala'
Gear	:	Purse seine/Trawl net
Percentage contribution by each gear	:	Purse seine : 97.8 Trawl net : 2.2
Peak period of occurrence	:	Nov. – Dec.
Depth of occurrence	:	Upto 50 m
Length range in commercial fishery	:	145 – 185 mm
Size at first maturity	:	150 mm
Spawning season	:	June – July

CYNOGLOSSIDAE

Popular English Name	:	Soles
Vernacular Name (Malayalam)	:	'Manthal'/'Nangu'
Annual average catch	:	375 t
Percentage in total catch	:	1.6
Fishing methods and their contribution	:	Trawl net : 100%

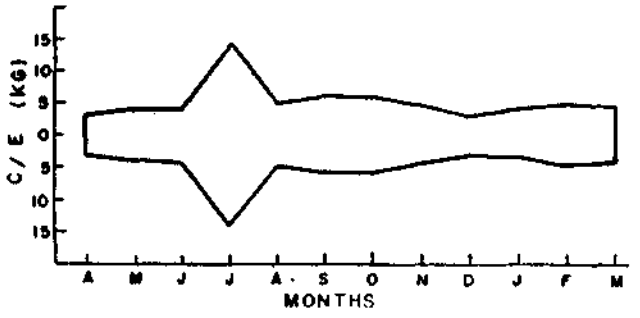


Fig. 14. Seasonal abundance of Cynoglossidae (Trawl net).

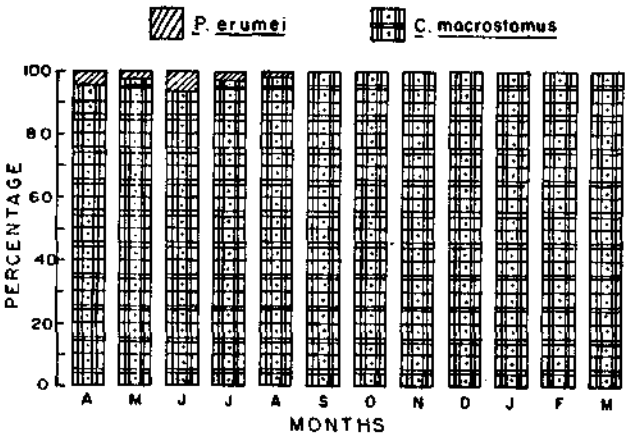


Fig. 15. Monthwise species composition of Cynoglossidae in trawl catch.

Fig. 16. *Cynoglossus macrostomus.*

Scientific Name	:	*Cynoglossus macrostomus*
Vernacular Name	:	'Manthal'/'Nangu'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jun. - Aug.
Depth of occurrence	:	Upto 40 m
Length range in commercial fishery	:	87 - 150 mm
Size at first maturity	:	—
Spawning season	:	—

ELASMOBRANCHS

Popular English Name	:	Sharks
Vernacular Name (Malayalam)	:	'Sravu'
Annual average catch	:	163 t
Percentage in total catch	:	0.86
Fishing methods and their contribution	:	Drift net : 76% Trawl net : 24%

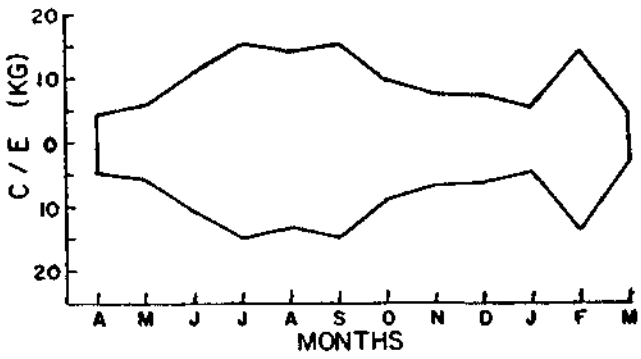


Fig. 17. Seasonal abundance of elasmobranchs (Drift net).

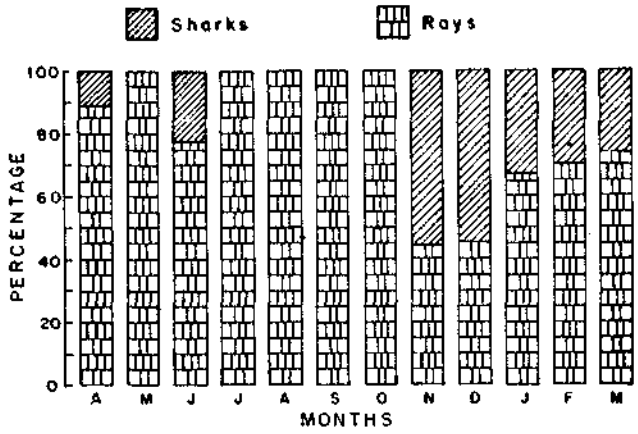


Fig. 20. Monthwise composition of shark and rays in trawl net.

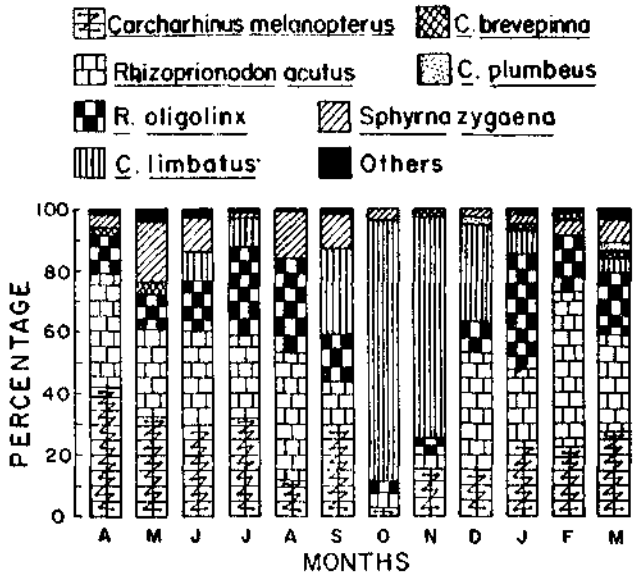


Fig. 18. Monthwise species composition of sharks in drift net catch.

Fig. 21. *Rhizoprionodon acutus.*

Scientific Name	:	*Rhizoprionodon acutus*
Vernacular Name	:	'Sravu'
Gear	:	Drift net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Feb. – May
Depth of occurrence	:	50 m
Length range in commercial fishery	:	485 – 780 mm
Size at first maturity	:	--
Spawning season	:	—

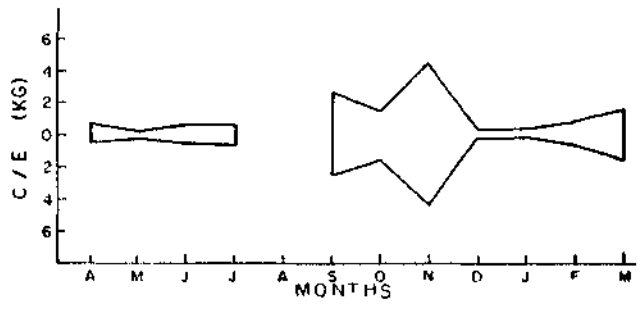


Fig. 19. Seasonal abundance of elasmobranchs (Trawl net).

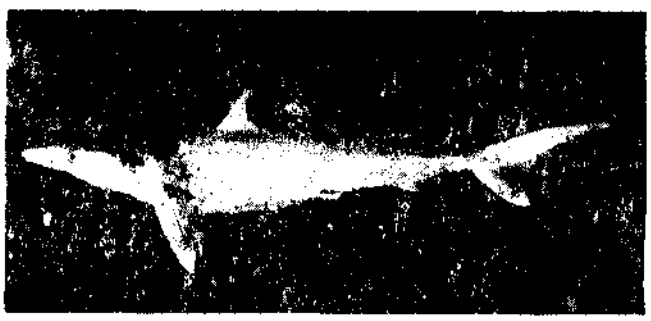


Fig. 22. *Rhizoprionodon oligolinx*

Scientific Name	:	*Rhizoprionodon oligolinx*
Vernacular Name	:	'Sravu'
Gear	:	Drift net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jan. and Jul. - Aug.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	370 - 800 mm
Size at first maturity	:	—
Spawning season	:	—

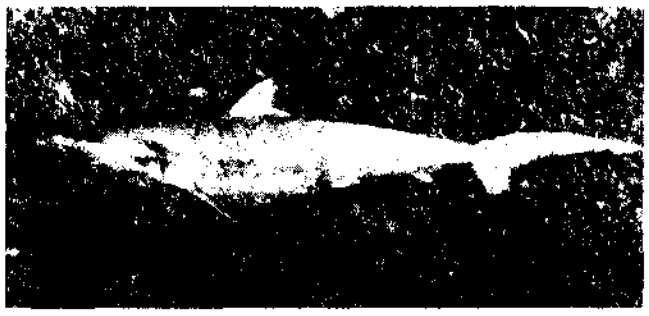


Fig. 23. *Carcharhinus limbatus.*

Scientific Name	:	*Carcharhinus limbatus*
Vernacular Name	:	'Sravu'
Gear	:	Drift net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Oct. - Nov.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	620 - 1,080 mm
Size at first maturity	:	—
Spawning season	:	—

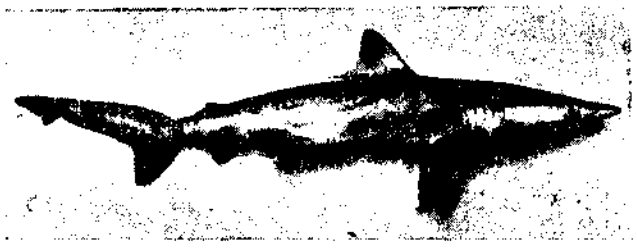


Fig. 24. *Carcharhinus melanopterus.*

Scientific Name	:	*Carcharhinus melanopterus*
Vernacular Name	:	'Sravu'
Gear	:	Drift net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Apr. - Jul.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	530 - 2,120 mm
Size at first maturity	:	—
Spawning season	:	—

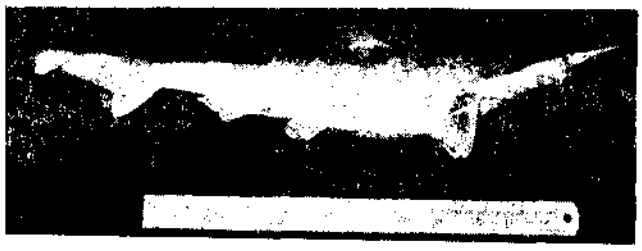


Fig. 25. *Scoliodon laticaudus*

Scientific Name	:	*Scoliodon laticaudus*
Vernacular Name	:	'Sravu'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Nov. - Dec.
Depth of occurrence	:	40 m
Length range in commercial fishery	:	290 - 565 mm
Size at first maturity	:	—
Spawning season	:	—

SPHYRNIDAE
HAMMER HEAD SHARK

Popular English Name	:	Hammer-head shark
Vernacular Name (Malayalam)	:	'Komban Sravu'
Annual average catch	:	12.3 t
Percentage in total catch	:	0.05
Fishing methods and their contribution	:	Drift net : 100%

Fig. 26. *Sphyrna zygaena*

Scientific Name	:	*Sphyrna zygaena*
Vernacular Name	:	'Komban Sravu'
Gear	:	Drift net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jun. - Sep.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	700 - 1,640 mm
Size at first maturity	:	—
Spawning season	:	—

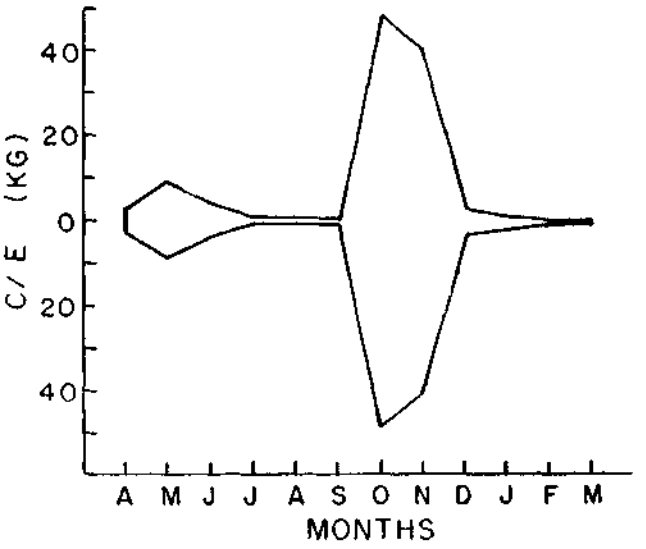


Fig. 28. Seasonal abundance of engraulids (Trawl net).

ENGRAULIDAE

Popular English Name	:	White baits/Anchovies
Vernacular Name (Malayalam)	:	'Kozhuva'/'Netholi'
Annual average catch	:	353.8 t
Percentage in total catch	:	1.4
Fishing methods and their contribution	:	Purse seine : 46.9% Trawl net : 53.1%

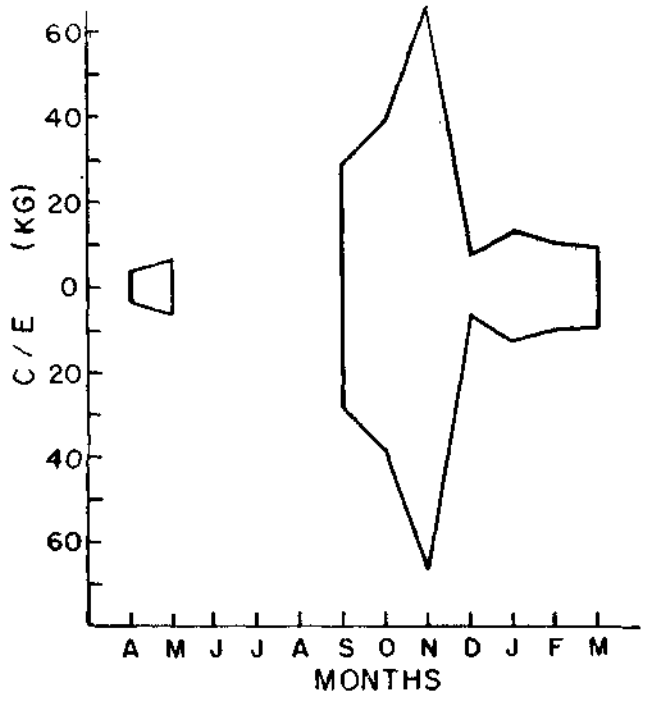


Fig. 27. Seasonal abundance of engraulids (Purse seine).

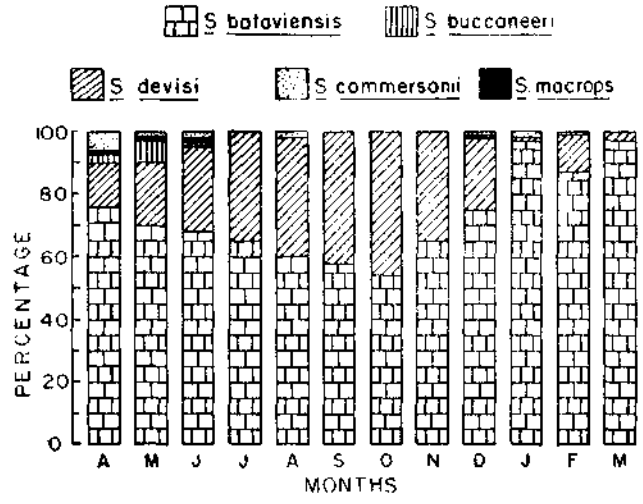


Fig. 29. Monthwise species composition of engraulids in trawl net.

Fig. 30. *Stolephorus bataviensis*.

Scientific Name : *Stolephorus bataviensis*
Vernacular Name : 'Kozhuva'
Gear : Purse seine/Trawl net
Percentage contribution
by each gear : Purse seine : 27.6
Trawl net : 72.4
Peak period of occurrence : Jan. – Feb.
Depth of occurrence : Upto 50 m
Length range in
commercial fishery : 45 – 105 mm
Size at first maturity : 67 mm (male)
77 mm (female)
Spawning season : Dec. – Mar.

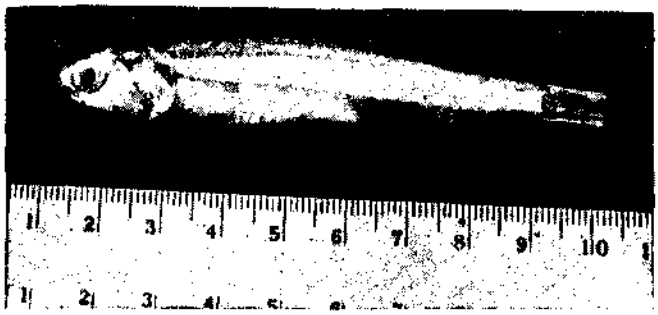


Fig. 31. *Stolephorus devisi.*

Scientific Name : *Stolephorus devisi*
Vernacular Name : 'Kozhuva'/'Netholi'
Gear : Purse seine/Trawl net
Percentage contribution
by each gear : Purse seine : 75
Trawl net : 25
Peak period of occurrence : Oct. – Nov.
Depth of occurrence : Upto 50 m
Length range in
commercial fishery : 40 – 100 mm
Size at first maturity : 57 mm (male)
61 mm (female)
Spawning season : Dec. – Mar.

Fig. 32. *Stolephorus buccaneeri*

Scientific Name : *Stolephorus buccaneeri*
Vernacular Name : 'Kozhuva'
Gear : Purse seine/Trawl net
Percentage contribution
by each gear : Purse seine : 99.1
Trawl net : 0.9
Peak period of occurrence : Apr. – Jun.
Depth of occurrence : Upto 50 m
Length range in
commercial fishery : 50 – 90 mm
Size at first maturity : —
Spawning season : Dec. – Mar.

Fig. 33. *Stolephorus commersonii.*

Scientific Name : *Stolephorus commersonii*
Vernacular Name : 'Kozhuva'
Gear : Purse seine/Trawl net
Percentage contribution
by each gear : Purse seine : 98.7
Trawl net : 1.3
Peak period of occurrence : Apr. – May
Depth of occurrence : upto 50 m
Length range in
commercial fishery : 75 – 125 mm
Size at first maturity : 110 mm
Spawning season : Dec. – Mar.

Fig. 34. *Stolephorus macrops.*

Scientific Name : *Stolephorus macrops*
Vernacular Name : 'Kozhuva'
Gear : Purse seine/Trawl net
Percentage contribution
by each gear : Purse seine : 99.7
Trawl net : 0.3

Peak period of occurrence	:	Apr. - Jun.
Depth of occurrence	:	Upto 50 m
Length range in commercial fishery	:	45 - 85 mm
Size at first maturity	:	67 mm
Spawning season	:	Dec. - Mar.

NEMIPTERIDAE

Popular English Name	:	Threadfin bream
Vernacular Name (Malayalam)	:	'Kilimeen'/ 'Puthiapla kora'
Annual average catch	:	3,118 t
Percentage in total catch	:	37.6
Fishing methods and their contribution	:	Trawl net : 100%

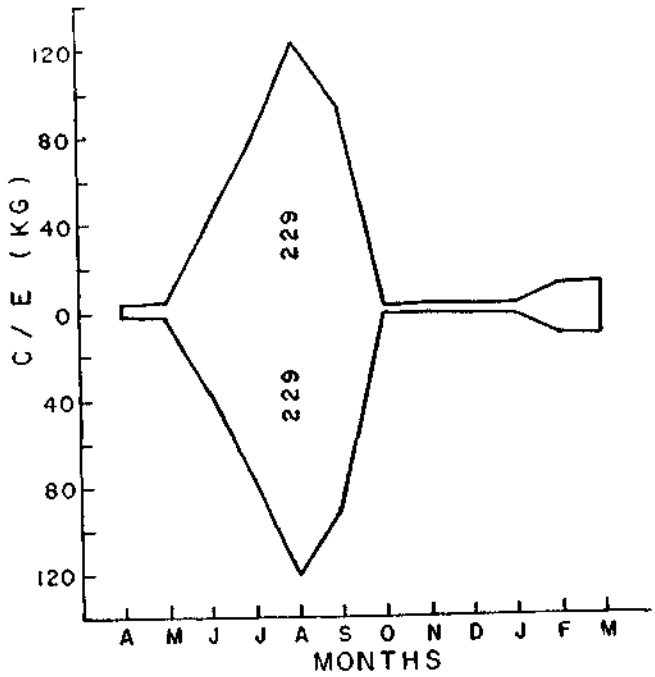


Fig. 35. Seasonal abundance of nemipterids (Trawl net).

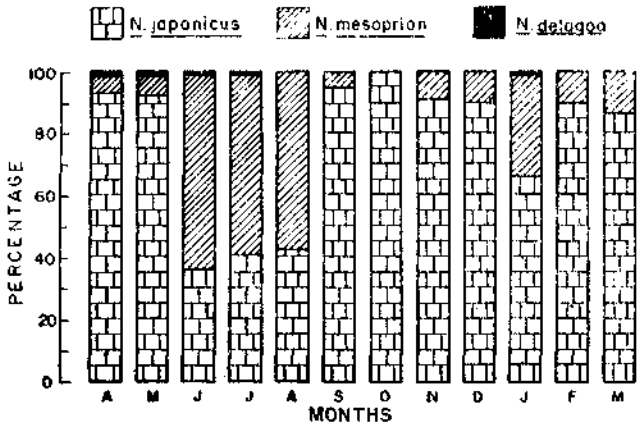


Fig. 36. Monthwise species composition of nemipterids (Trawl net).

Fig. 37. *Nemipterus japonicus*.

Scientific Name	:	*Nemipterus japonicus*
Vernacular Name	:	'Kilimeen'/ 'Puthiapla kora'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jul. - Sept.
Depth of occurrence	:	upto 75 m
Length range in commercial fishery	:	70 - 300 mm
Size at first maturity	:	180 mm
Spawning season	:	Jul. - Nov.

Fig. 38. *Nemipterus mesoprion*

Scientific Name	:	*Nemipterus mesoprion*
Vernacular Name	:	'Kilimeen'/ 'Puthiapla kora'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jun. - Oct.
Depth of occurrence	:	Upto 75 m
Length range in commercial fishery	:	70 - 260 mm
Size at first maturity	:	155 mm
Spawning season	:	Jul. - Nov.

Fig. 39. *Nemipterus delagoae*.

Scientific Name	:	*Nemipterus delagoae*
Vernacular Name	:	'Kilimeen' 'Puthiapla kora'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	—
Depth of occurrence	:	Upto 15 m
Length range in commercial fishery	:	—
Size at first maturity	:	—
Spawning season	:	—

PLATYCEPHALIDAE

Popular English Name	:	Flat head
Vernacular Name (Malayalam)	:	'Prathal'/'Eriyan'
Annual average catch	:	43.8 t
Percentage in total catch	:	0.18
Fishing methods and their contribution	:	Trawl net : 100%

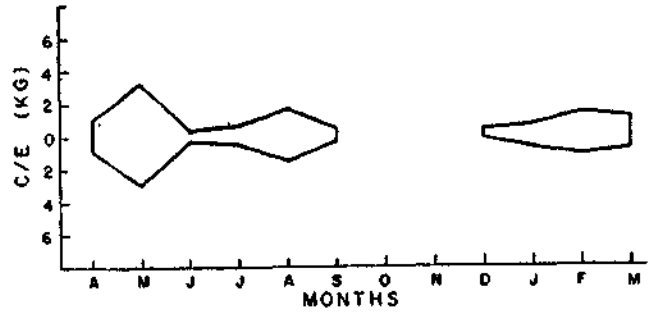


Fig. 40. Seasonal abundance of platycephalids (Trawl net).

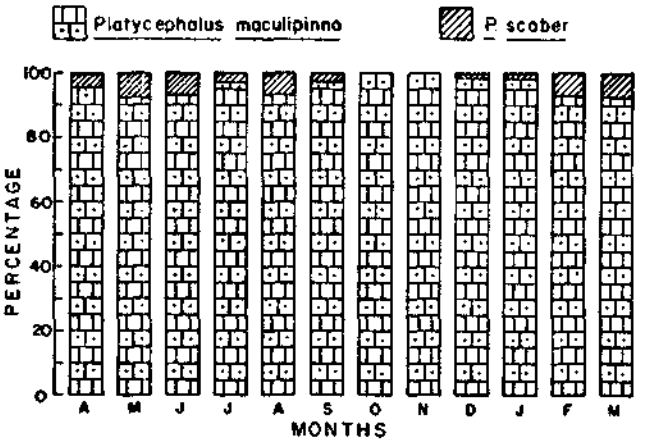


Fig. 41. Monthwise species composition of platycephalids in trawl net.

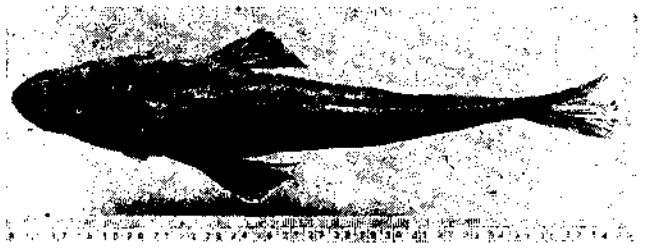


Fig. 42. *Platycephalus maculipinna*.

Scientific Name	:	*Platycephalus maculipinna*
Vernacular Name	:	'Prathal'/'Eriyan'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Feb.–Mar. and Jul.–Aug.
Depth of occurrence	:	Upto 40 m
Length range in commercial fishery	:	160–290 mm
Size at first maturity	:	—
Spawning season	:	—

SCIAENIDAE

Popular English Name	:	Croaker/Jew fish
Vernacular Name (Malayalam)	:	'Kora'/'Kuttan'/ 'Pallikora'
Annual average catch	:	505 t
Percentage in total catch	:	2.1
Fishing methods and their contribution	:	Trawl net : 100%

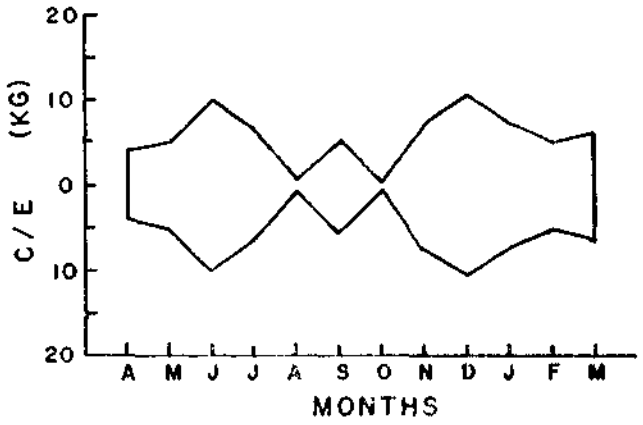


Fig. 43. Seasonal abundance of sciaenids (Trawl net).

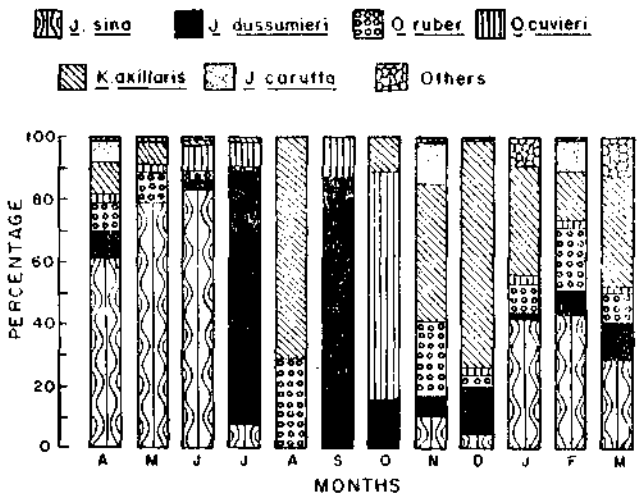


Fig. 44. Monthwise species composition of sciaenids in trawl net

Fig. 45. *Johnieops sina.*

Scientific Name	:	*Johnieops sina*
Vernacular Name	:	'Kora'/'Kuttan'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jan. – May
Depth of occurrence	:	Upto 40 m
Length range in commercial fishery	:	90 – 170 mm
Size at first maturity	:	125 mm
Spawning season	:	Feb. – May

Fig. 46. *Johnieops dussumieri.*

Scientific Name	:	*Johnieops dussumieri*
Vernacular Name	:	'Kuttan'/'Kora'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jun. and Sept. – Dec.
Depth of occurrence	:	Upto 40 m
Length range in commercial fishery	:	85 – 170 mm
Size at first maturity	:	125 mm
Spawning season	:	Nov. – Feb.

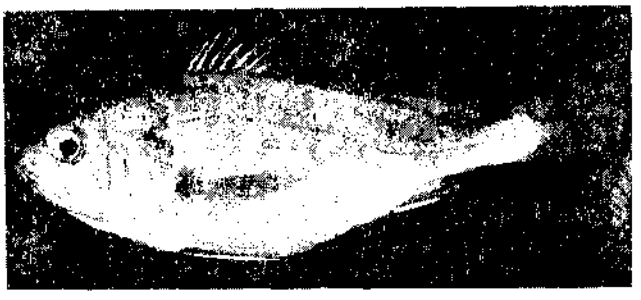


Fig. 47. *Kathala axillaris.*

Scientific Name	:	*Kathala axillaris*
Vernacular Name	:	'Kora'/'Kuttan'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Nov. – Feb.
Depth of occurrence	:	Upto 40 m

Length range in commercial fishery : 95 – 175 mm
Size at first maturity : —
Spawning season : Jun. – Sep.

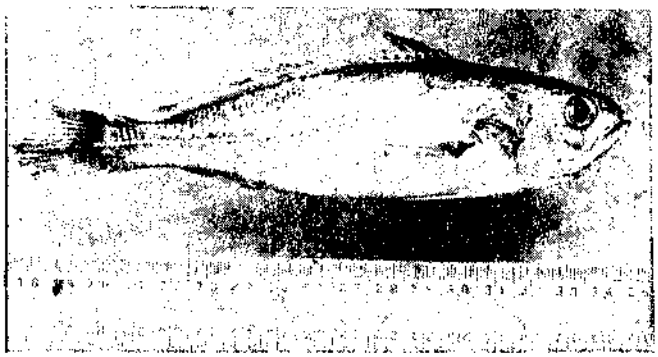


Fig. 48. *Otolithes ruber*.

Scientific Name : *Otolithes ruber*
Vernacular Name : 'Pallikkora'/Kuttan'
Gear : Trawl net
Percentage contribution by the gear : 100
Peak period of occurrence : Jan. – Apr.
Depth of occurrence : Upto 40 m
Length range in commercial fishery : 85 – 250 mm
Size at first maturity : —
Spawning season : Jun. – Oct.

Fig. 49. *Otolithes cuvieri*.

Scientific Name : *Otolithes cuvieri*
Vernacular Name : 'Pallikkora'/Kuttan'
Gear : Trawl net
Percentage contribution by the gear : 100
Peak period of occurrence : Apr. – Mar.
Depth of occurrence : Upto 40 m
Length range in commercial fishery : 80 – 240 mm
Size at first maturity : —
Spawning season : Jun. – Oct.

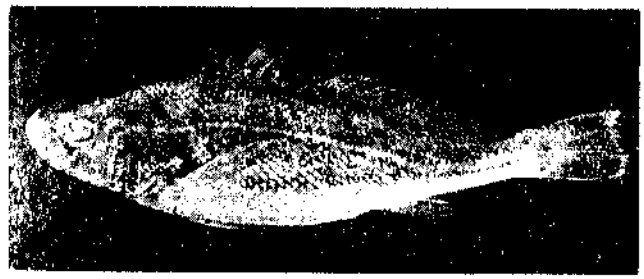


Fig. 50. *Johnius carutta*.

Scientific Name : *Johnius carutta*
Vernacular Name : 'Kora'/'Kuttan'
Gear : Trawl net
Percentage contribution by the gear : 100
Peak period of occurrence : Nov. – Dec. and Feb.
Depth of occurrence : Upto 40 m
Length range in commercial fishery : 90 – 170 mm
Size at first maturity : —
Spawning season : —

SCOMBRIDAE

Popular English Name : Mackerel/Tunas/ Seer fishes
Vernacular Name (Malayalam) : 'Ayila'/'Choora'/ 'Neimeen'/'Arkiah'
Annual average catch : 3,985 t
Percentage in total catch : 16.2
Fishing methods and their contribution : Purse seine : 58.2%
Drift net : 41.0%
Trawl net : 0.8%

MACKEREL

Popular English Name : Indian mackerel
Vernacular Name (Malayalam) : 'Ayila'
Annual average catch : 2,743 t
Percentage in total catch : 11.6
Fishing methods and their contribution : Purse seine : 97.9%
Drift net : 1.7%
Trawl net : 0.4%

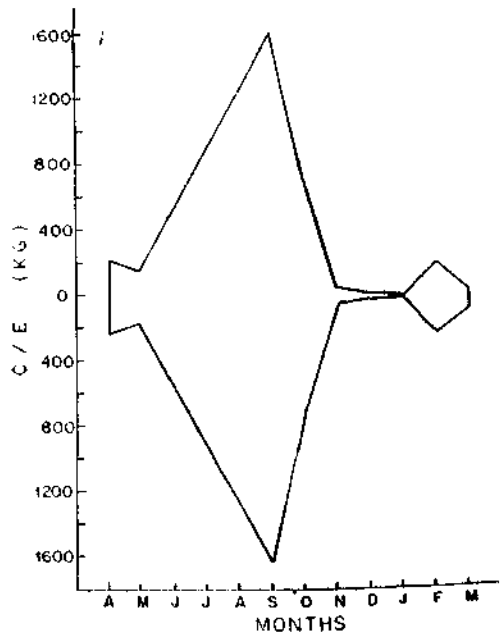


Fig. 51. Seasonal abundance of mackerel (Purse seine).

Scientific Name	:	*Rastrelliger kanagurta*
Vernacular Name	:	'Ayila'
Gear	:	Purse seine/Drift net/ Trawl net
Percentage contribution by each gear	:	Purse seine : 97.9 Drift net : 1.7 Trawl net : 0.4
Peak period of occurrence	:	Sep. – Nov.
Depth of occurrence	:	Upto 50 m
Length range in commercial fishery	:	160 – 240 mm
Size at first maturity	:	220 mm
Spawning season	:	Jun. – Aug.

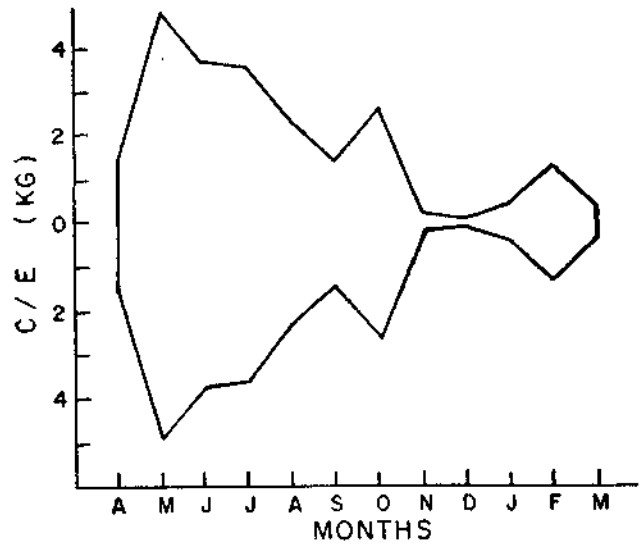


Fig. 52. Seasonal abundance of mackerel (Drift net).

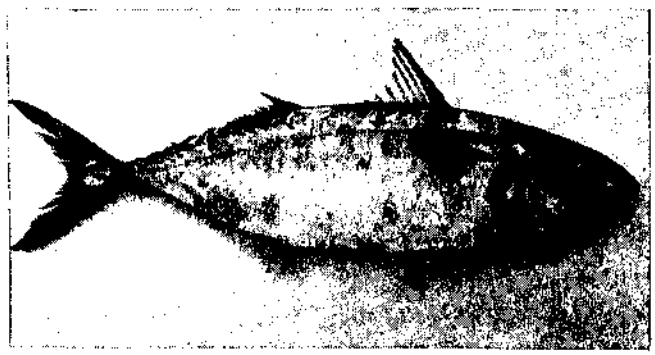


Fig. 53. *Rastrelliger kanagurta.*

TUNAS

Popular English Name	:	Tunas
Vernacular Name (Malayalam)	:	'Choora'
Annual average catch	:	770 t
Percentage in total catch	:	3.3
Fishing methods and their contribution	:	Drift net : 97.6% Purse seine : 2.4%

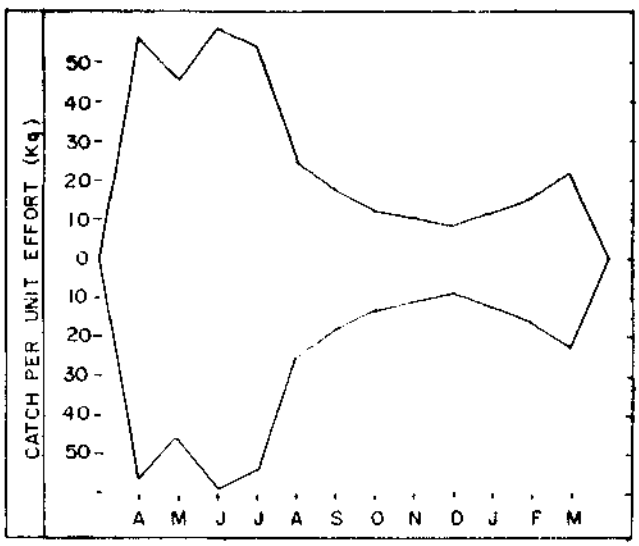


Fig. 54. Seasonal abundance of tunas (Drift net).

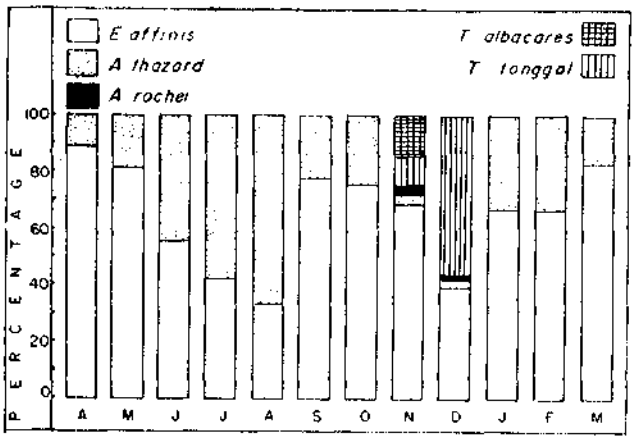


Fig. 55. Monthly species composition of tunas in drift net.

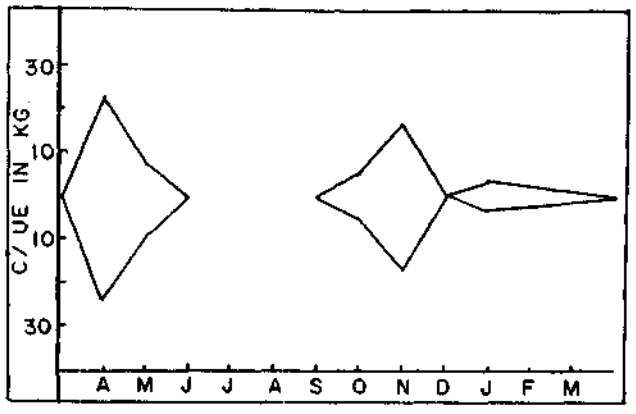


Fig. 56. Seasonal abundance of tunas (Purse seine).

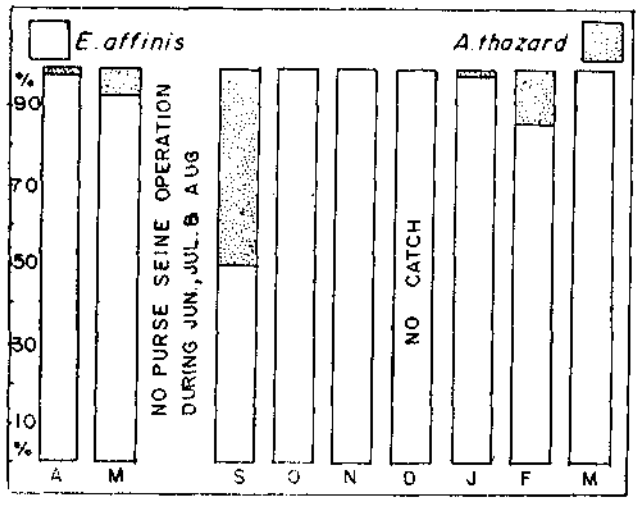


Fig. 57. Monthly species composition of tunas in purse seine.

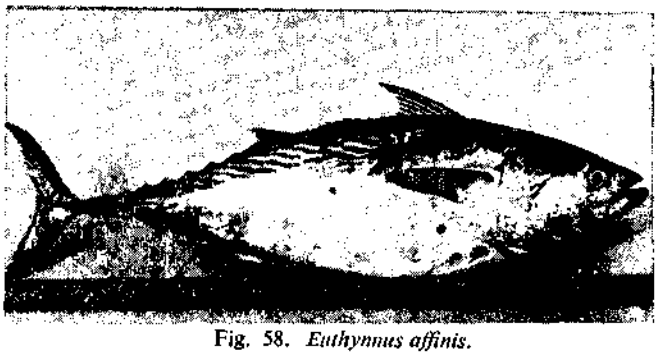


Fig. 58. *Euthynnus affinis.*

Scientific Name	:	*Euthynnus affinis*
Vernacular Name	:	'Choora'
Gear	:	Drift net/Purse seine
Percentage contribution by each gear	:	Drift net : 99.6 Purse seine : 0.4
Peak period of occurrence	:	Apr. – Nov.
Depth of occurrence	:	20 - 40 m
Length range in commercial fishery	:	220 - 720 mm
Size at first maturity	:	420 - 430 mm
Spawning season	:	Oct. – Mar.

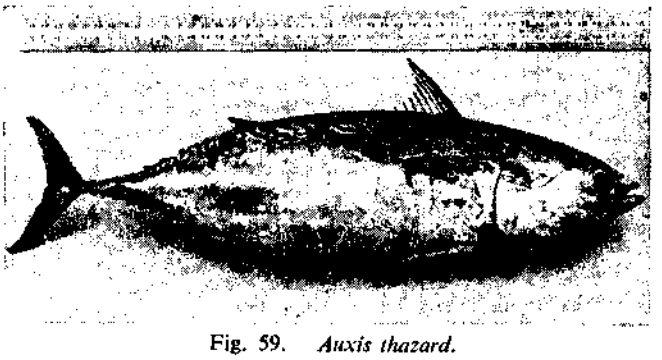


Fig. 59. *Auxis thazard.*

Scientific Name	:	*Auxis thazard*
Vernacular Name	:	'Kudutha'
Gear	:	Drift net/Purse seine
Percentage contribution by each gear	:	Drift net : 98.6 Purse seine : 1.4
Peak period of occurrence	:	Apr.– Nov.
Depth of occurrence	:	20 - 40 m
Length range in commercial fishery	:	200 – 480 mm
Size at first maturity	:	300 mm
Spawning season	:	Oct. – Dec.

Fig. 60. *Auxis rochei.*

Scientific Name	:	*Auxis rochei*
Vernacular Name	:	'Elichoora'
Gear	:	Drift net/Purse seine
Percentage contribution by each gear	:	Drift net : 90.9 Purse seine : 9.1
Peak period of occurrence	:	Jul. - Nov.
Depth of occurrence	:	30 – 40 m
Length range in commercial fishery	:	200 – 320 mm
Size at first maturity	:	240 mm
Spawning season	:	September

Fig. 61. *Thunnus albacares.*

Scientific Name	:	*Thunnus albacares*
Vernacular Name	:	'Manja choora'
Gear	:	Drift net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Feb. - Aug.
Depth of occurrence	:	30 - 40 m
Length range in commercial fishery	:	500 - 1,200 mm
Size at first maturity	:	—
Spawning season	:	—

SEER FISHES

Popular English Name	:	Seer fishes
Vernacular Name (Malayalam)	:	'Neimeen'/'Arkiah'
Annual average catch	:	472 t
Percentage in total catch	:	2.0
Fishing methods and their contribution	:	Trawl net : 0.2% Drift net : 99.8%

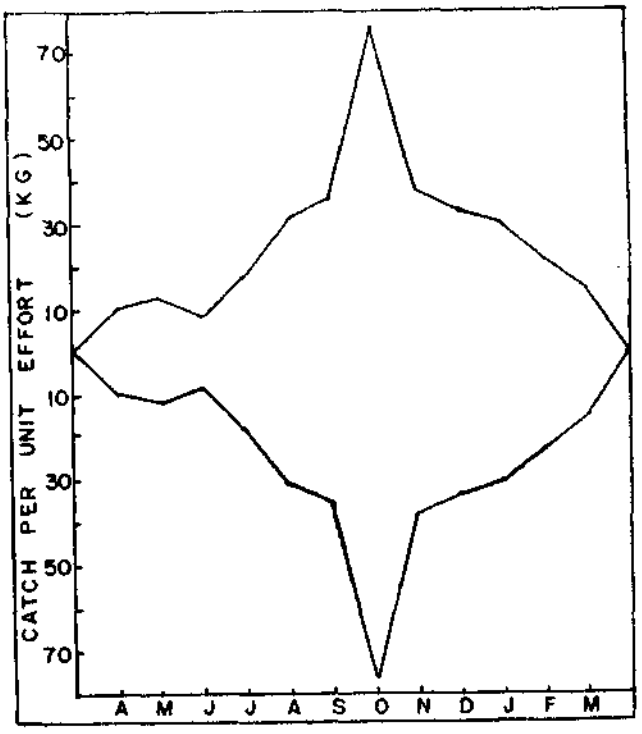


Fig. 62. Seasonal abundance of seer fishes (Drift net).

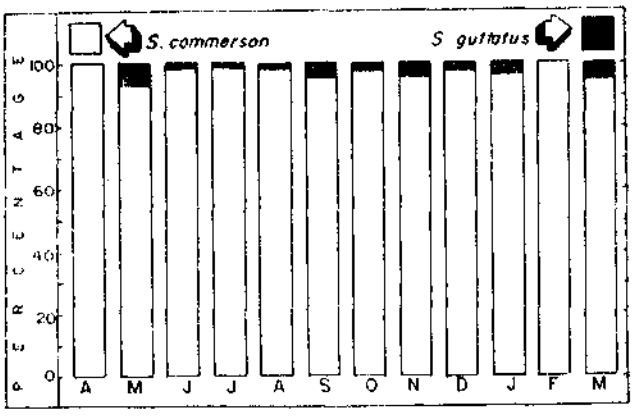


Fig. 63. Monthly species composition of seer fishes in drift net catch.

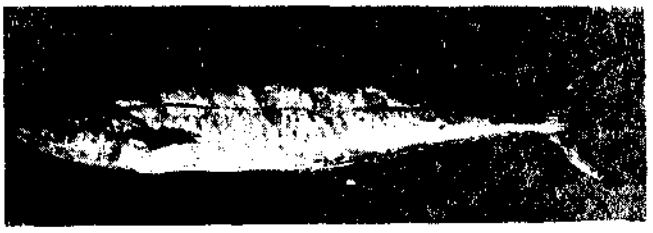


Fig. 64. *Scomberomorus commerson.*

Scientific Name	:	*Scomberomorus commerson*
Vernacular Name	:	'Neimeen'/'Arkiah'
Gear	:	Drift net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Aug. – Sep.
Depth of occurrence	:	30 – 40 m
Length range in commercial fishery	:	350 – 1,250 mm
Size at first maturity	:	750 mm
Spawning season	:	Jan. – Sep.

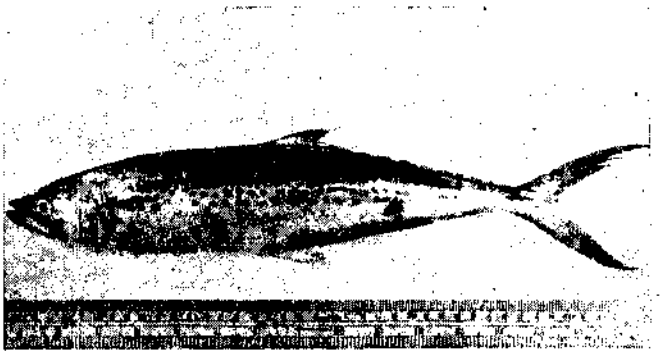


Fig. 65. *Scomberomorus guttatus.*

Scientific Name	:	*Scomberomorus guttatus*
Vernacular Name	:	'Neimeen'/'Arkiah'
Gear	:	Drift net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Sept. – Nov.
Depth of occurrence	:	30 – 40 m
Length range in commercial fishery	:	300 – 500 mm
Size at first maturity	:	—
Spawning season	:	—

SERRANIDAE

Popular English Name	:	Reef cod/Grouper
Vernacular Name (Malayalam)	:	'Kalava'
Annual average catch	:	19.8 t
Percentage in total catch	:	0.1
Fishing methods and their contribution	:	Hooks & line : 100%

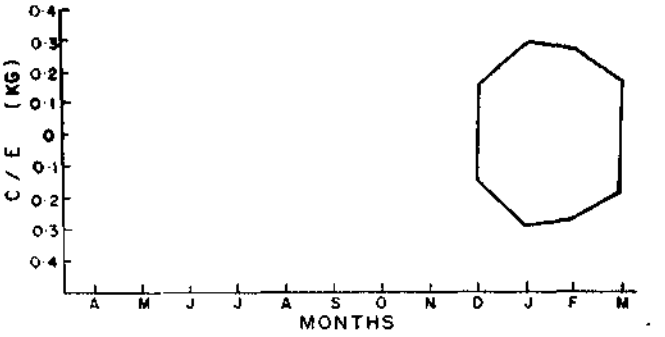


Fig. 66. Seasonal abundance of perches (Hooks and line).

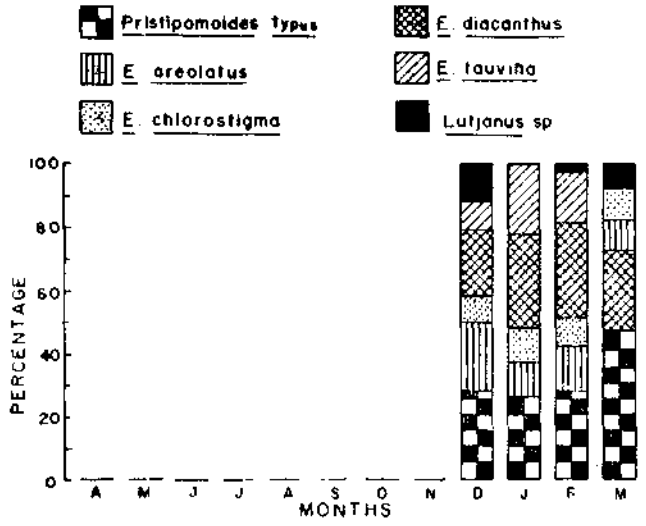


Fig. 67. Monthwise species composition of perches in hooks and line.

Fig. 68. *Epinephelus areolatus.*

Scientific Name	:	*Epinephelus areolatus*
Vernacular Name	:	'Kalava'
Gear	:	Hooks and line
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jan. – Feb.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	290 – 650 mm

Size at first maturity : —
Spawning season : —

Fig. 69. *Epinephelus chlorostigma.*

Scientific Name	:	*Epinephelus chlorostigma*
Vernacular Name	:	'Kalava'
Gear	:	Hooks and line
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jan. – Feb.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	270 – 580 mm
Size at first maturity	:	—
Spawning season	:	—

Fig. 70. *Epinephelus diacanthus.*

Scientific Name	:	*Epinephelus diacanthus*
Vernacular Name	:	'Kalava'
Gear	:	Hooks and line
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jan. - Feb.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	190 – 620 mm
Size at first maturity	:	—
Spawning season	:	—

Fig. 71. *Epinephelus tauvina.*

Scientific Name	:	*Epinephelus tauvina*
Vernacular Name	:	'Kalava'
Gear	:	Hooks and line
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jan. - Feb.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	300 – 970 mm
Size at first maturity	:	—
Spawning season	:	—

LUTJANIDAE

Popular English Name	:	Bass
Vernacular Name (Malayalam)	:	'Chemballi'/'Kalava'
Annual average catch	:	7.8 t
Percentage in total catch	:	0.03
Fishing methods and their contribution	:	Hooks and line

Fig. 72. *Pristiponoides typus.*

Scientific Name	:	*Pristiponoides typus*
Vernacular Name	:	'Chemballi'/'Kalava'
Gear	:	Hooks and line
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jan. - Feb.
Depth of occurrence	:	50 m
Length range in commercial fishery	:	210 – 590 mm
Size at first maturity	:	—
Spawning season	:	—

Popular English Name : Pomfrets
Vernacular Name : 'Machan'/'Avoli'
(Malayalam)
Annual average catch : 271 t
Percentage in total catch : 1.01
Fishing methods and
their contribution : Purse seine : 56.9%
Drift net : 38.6%
Trawl net : 4.5%

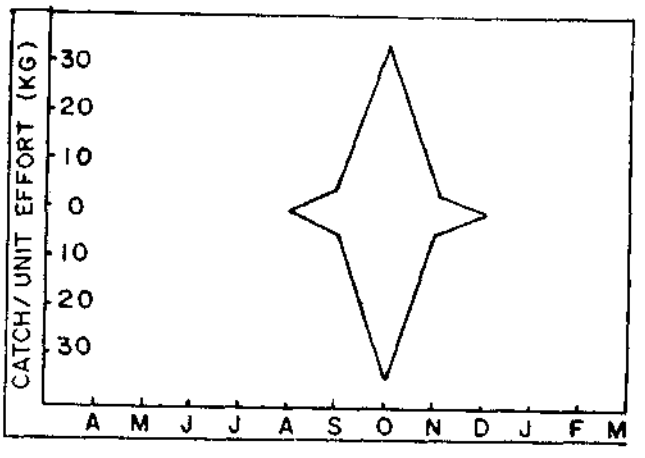


Fig. 73. Seasonal abundance of pomfrets (Purse seine).

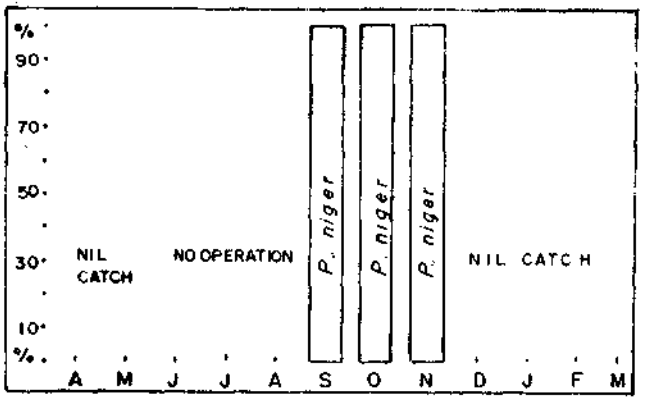


Fig. 74. Monthwise species composition of pomfrets in purse seine catch.

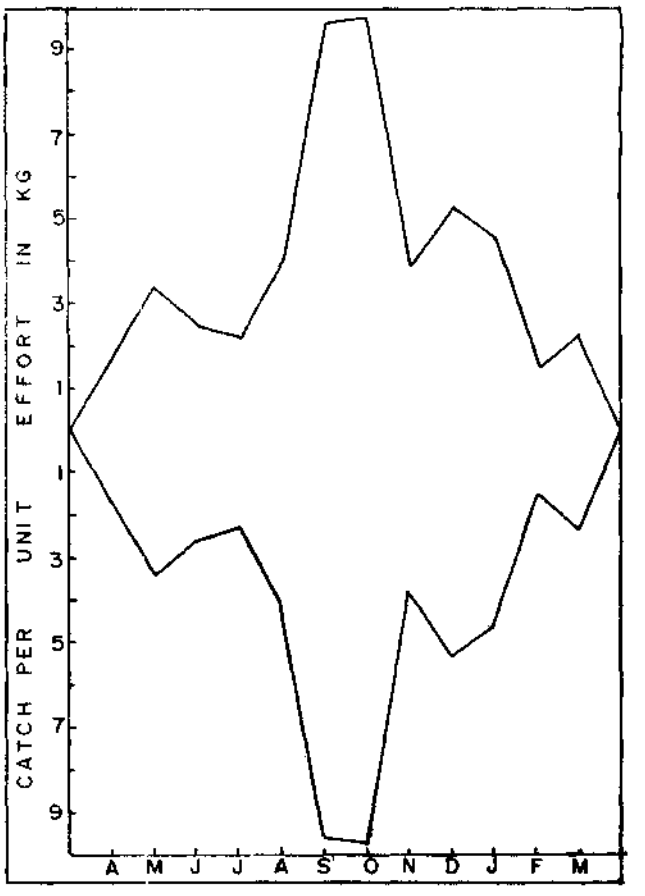


Fig. 75. Seasonal abundance of pomfrets (Drift net).

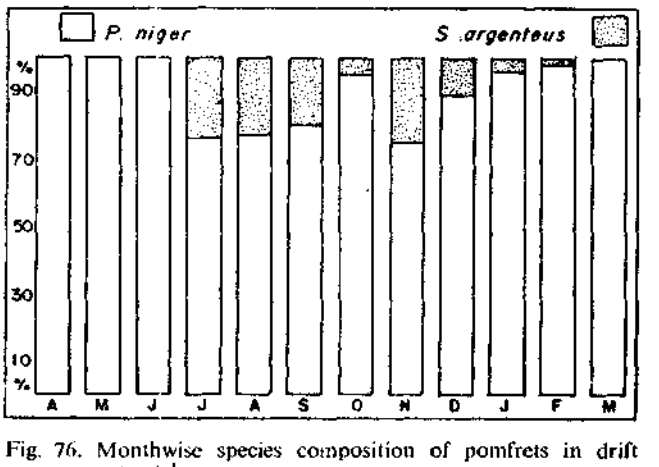


Fig. 76. Monthwise species composition of pomfrets in drift net catch.

Scientific Name : *Parastromateus niger*
Vernacular Name : 'Machan'/'Avoli'
Gear : Drift net/Purse seine
Percentage contribution
by each gear : Drift net : 77
Purse seine : 23

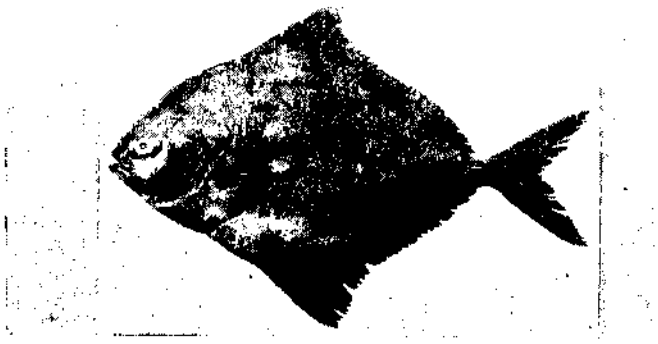


Fig. 77. *Parastromateus niger.*

Peak period of occurrence	:	Aug. – Nov.
Depth of occurrence	:	30 – 40 m
Length range in commercial fishery	:	180 – 520 mm
Size at first maturity	:	280 mm
Spawning season	:	Sep. – Dec. & Feb.

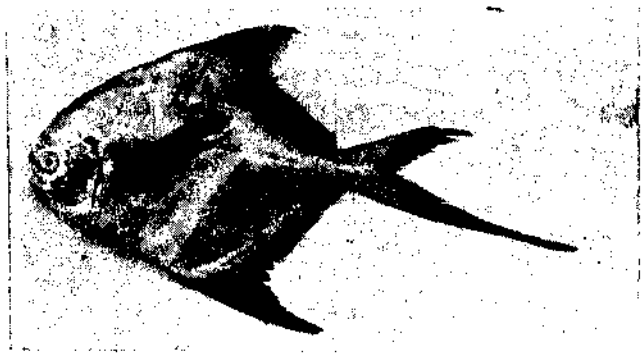


Fig. 78. *Pampus argenteus.*

Scientific Name	:	*Pampus argenteus*
Vernacular Name	:	'Vella avoli'
Gear	:	Trawl/Drift net
Percentage contribution by each gear	:	Trawl net : 83.3 Drift net : 16.7
Peak period of occurrence	:	Aug. – Oct.
Depth of occurrence	:	25 – 40 m
Length range in commercial fishery	:	100 – 350 mm
Size at first maturity	:	---
Spawning season	:	---

SYNODONTIDAE

Popular English Name	:	Lizard fishes
Vernacular Name (Malayalam)	:	'Arana meen'
Annual average catch	:	430 t
Percentage in total catch	:	1.8
Fishing methods and their contribution	:	Trawl net : 100%

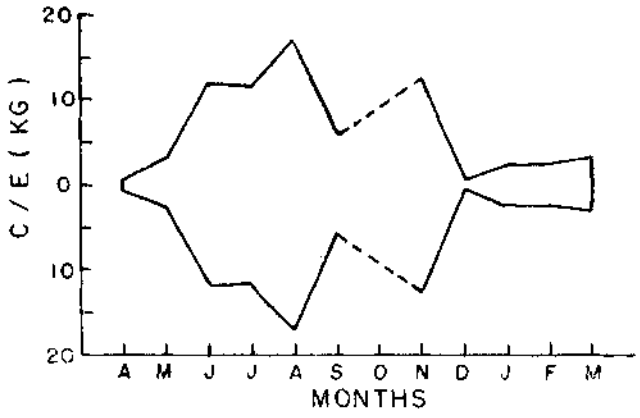


Fig. 79. Seasonal abundance of lizard fishes (Trawl net).

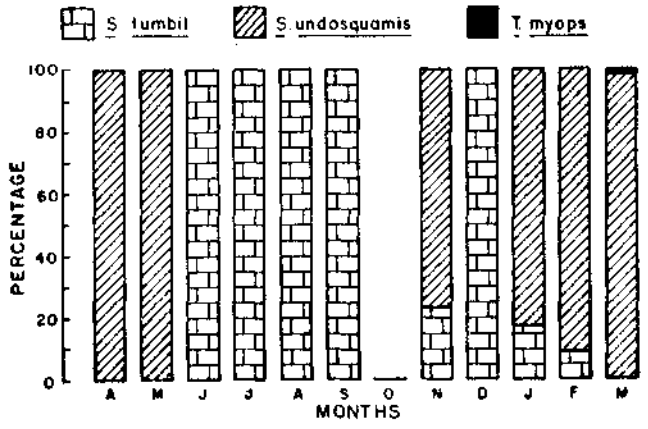


Fig. 80. Monthwise species composition of lizard fishes in trawl catches.

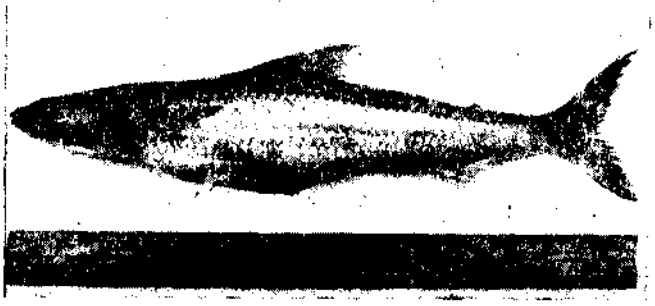


Fig. 81. *Saurida tumbil.*

Scientific Name	:	*Saurida tumbil*
Vernacular Name	:	'Arana meen'
Gear	:	Trawl net

Percentage contribution by the gear	:	100
Peak period of occurrence	:	Jan. – Sep.
Depth of occurrence	:	Upto 70 m
Length range in commercial fishery	:	160 – 420 mm
Size at first maturity	:	—
Spawning season	:	May – Sep.

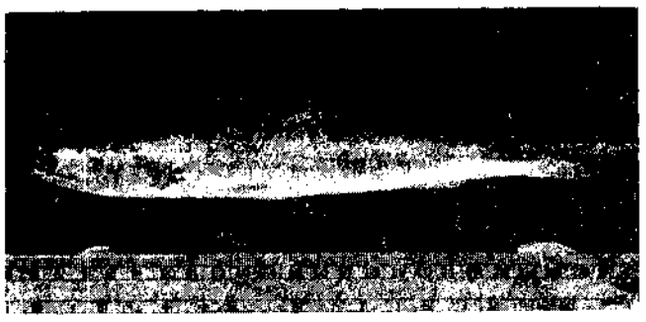


Fig. 82. *Saurida undosquamis*.

Scientific Name	:	*Saurida undosquamis*
Vernacular Name	:	'Arana meen'
Gear	:	Trawl net
Percentage contribution by the gear	:	100
Peak period of occurrence	:	Apr. – May; Nov. and Jan. – Feb.
Depth of occurrence	:	Upto 70 m
Length range in commercial fishery	:	90 – 200 mm
Size at first maturity	:	—
Spawning season	:	Nov. and Jan. – Feb.

TACHYSURIDAE

Popular English Name	:	Cat fishes
Vernacular Name (Malayalam)	:	'Aetta'/'Koori'
Annual average catch	:	695.5 t
Percentage in total catch	:	0.03
Fishing methods and their contribution	:	Drift net : 55.8%
		Trawl net : 41.4%
		Purse seine : 2.8%

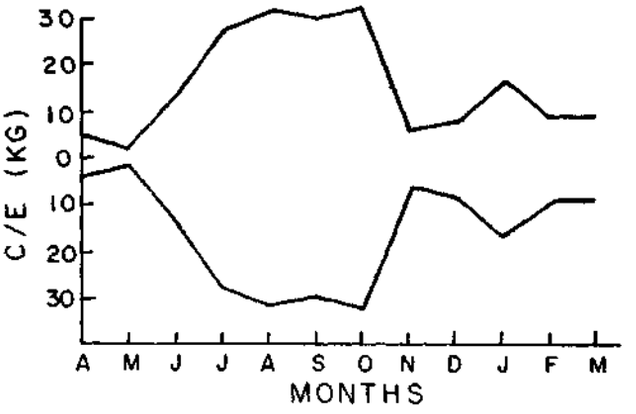


Fig. 83. Seasonal abundance of cat fishes (Drift net).

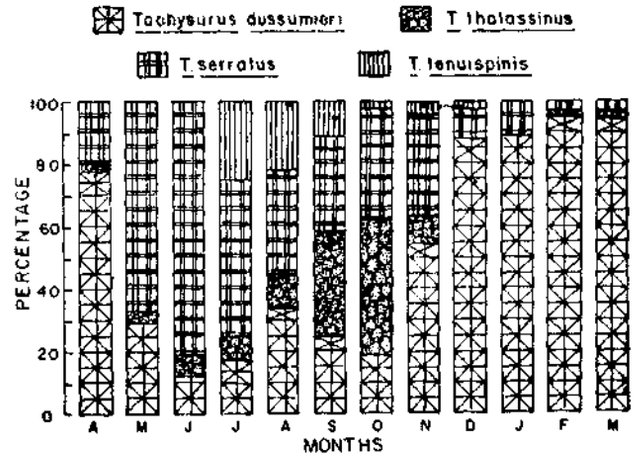


Fig. 84. Monthwise species composition of cat fishes in drift net.

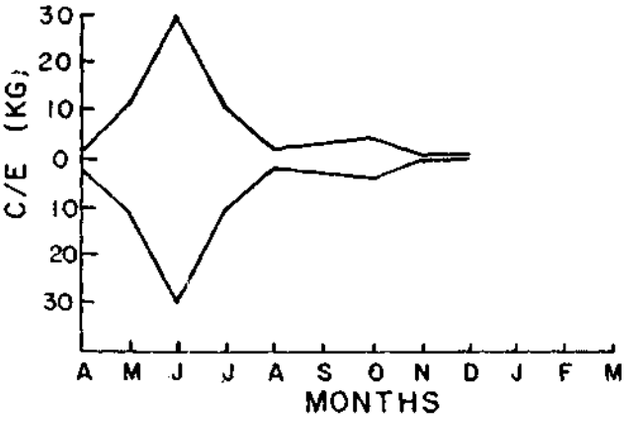


Fig. 85. Seasonal abundance of cat fishes (Trawl net).

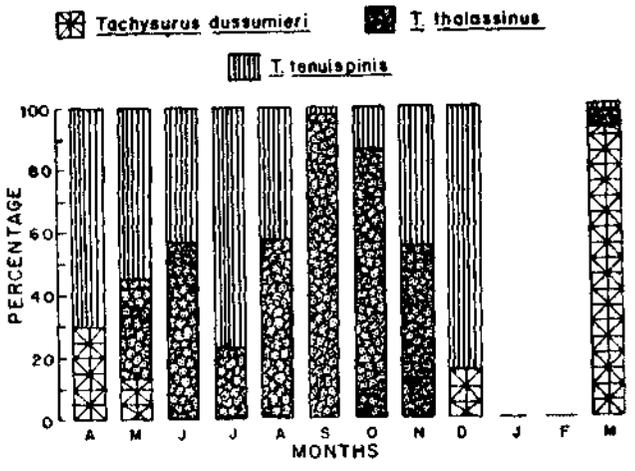


Fig. 86. Monthwise species composition of cat fishes in trawl net.

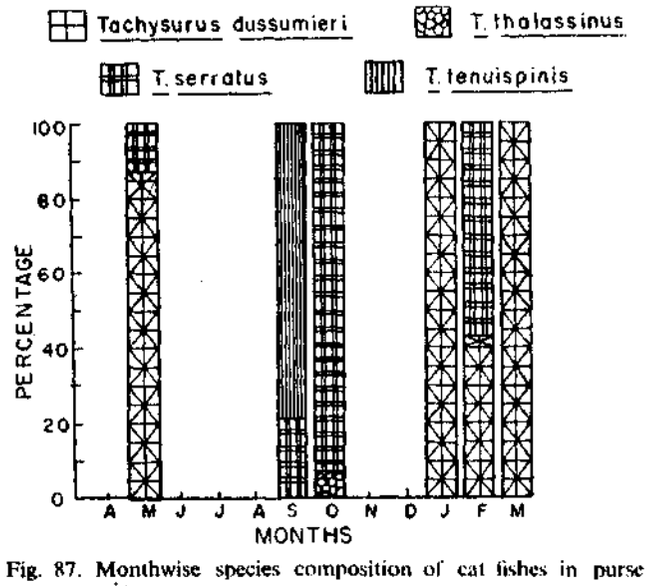


Fig. 87. Monthwise species composition of cat fishes in purse seine.

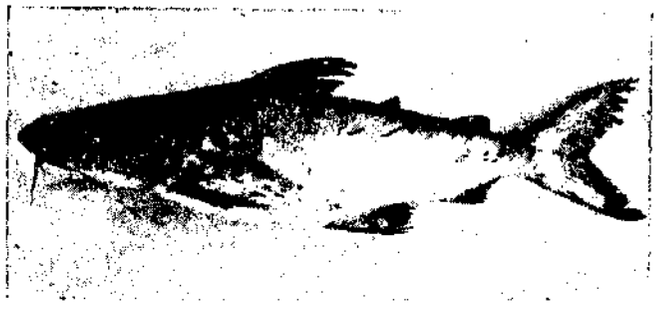


Fig. 88. *Tachysurus dussumieri.*

Scientific Name	:	*Tachysurus dussumieri*
Vernacular Name	:	'Valiaetta'
Gear	:	Drift net/Trawl net/ Purse seine
Percentage contribution by each gear	:	Drift net : 79.2 Trawl net : 11.8 Purse seine : 9.0
Peak period of occurrence	:	Jul. – Feb.
Depth of occurrence	:	Upto 70 m -
Length range in commercial fishery	:	500 – 800 mm
Size at first maturity	:	520 mm
Spawning season	:	Sep. – Jan.

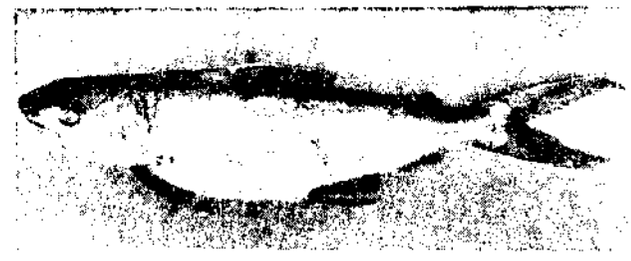


Fig. 89. *Tachysurus thalassinus.*

Scientific Name	:	*Tachysurus thalassinus*
Vernacular Name	:	'Valiaetta'
Gear	:	Drift net/Trawl net/ Purse seine
Percentage contribution by each gear	:	Trawl net : 63.1 Drift net : 36.8 Purse seine : 0.1
Peak period of occurrence	:	May – Oct.
Depth of occurrence	:	Upto 70 m
Length range in commercial fishery	:	300 – 600 mm
Size at first maturity	:	370 mm
Spawning season	:	Aug. – Oct.

Fig. 90. *Tachysurus serratus.*

Scientific Name	:	*Tachysurus serratus*
Vernacular Name	:	'Navetta'
Gear	:	Drift net/Trawl net/ Purse seine

Percentage contribution by each gear	:	Drift net	: 96.0
		Purse seine	: 3.0
		Trawl net	: 1.0
Peak period of occurrence	:	June – Oct.	
Depth of occurrence	:	Upto 70 m	
Length range in commercial fishery	:	600 – 900 mm	
Size at first maturity	:	600 mm	
Spawning season	:	Sep. – Oct.	

Fig. 91. *Tachysurus tenuispinis.*

Scientific Name	:	*Tachysurus tenuispinis*
Vernacular Name	:	'Urianetta'
Gear	:	Drift net/Trawl net/ Purse seine
Percentage contribution by each gear	:	Trawl net : 74.4
		Drift net : 24.7
		Purse seine : 0.9
Peak period of occurrence	:	May – Oct.
Depth of occurrence	:	Upto 80 m
Length range in commercial fishery	:	300 – 450 mm
Size at first maturity	:	320 mm
Spawning season	:	Apr. – Sep.

MONSOON PRAWN FISHERY BY 'MATABALA' ALONG THE MANGALORE COAST—A CRITICAL STUDY*

The mechanisation of fishing by the introduction of trawlers for prawns and ground fishes in the early 1960s and purse seines for pelagic resources in the late 1970s has revolutionised the fishing industry in Karnataka. However, when all these mechanised fishing operations remain suspended along this coast during the southwest monsoon period (June – August), traditional gears are operated mainly to catch large sized prawns. The introduction of 'matabala' in the 1984 season along the Mangalore coast and the subsequent additions in the following seasons, boosted the prawn landings during the monsoon season. These 'matabala' units, despite the weather conditions, could operate their nets without any difficulty since they are powered by outboard engines. It has created unprecedented rivalry between fishermen of the 'matabala' and the mechanised fishing boats which led to clashes resulting in law and order problem in this area. With this background information, a critical study of the 'matabala' prawn fishery during 1986 season was made and the results are given in the present account.

*Prepared by K. K. Sukumaran, Alli C. Gupta, Uma S. Bhat, D. Nagaraja, H. Ramachandra, O.Thippeswamy and Y. Munyappa, Mangalore Research Centre of CMFRI, Mangalore.

'Matabala'—A miniature purse seine

'Matabala' also known as 'Disco net' is a small version of purse seine net made of nylon, measuring about 240 m in length and 10 - 12 m in width with a mesh size of 10 – 18 mm. These nets are coloured orange, blue, pink, dark brown or green to ward off puffer fish which otherwise cause considerable damage to these nets.

A 'matabala' fishing unit may be owned by a group of 30 – 35 fishermen. A unit consisting of one net, three plank built canoes and three outboard engines may altogether cost Rs. 1.85 to 2.0 lakhs. Out of the total cost, 50–75% of the amount is loaned by private

agencies and the rest contributed by members of the 'matabala' unit. A good number of units are also financed by South Kanara Co-operative Fish Marketing Federation, Mangalore.

Mode of operation

This net is operated from two plank-built canoes, each measuring 6–7 m in length, fitted with outboard engines. Most of them use either 'Yamaha' or 'Suzuki' engines. A few are found to use 'Johnson' eventhough it is run by petrol. Generally, 8 or 15 HP engines are used.

Each canoe carries a part of 'matabala' net (120 m in length, each part consisting of 11 net pieces of 10–11 m length). At the time of operation, 2 such parts are joined together so as to make a net of 240 m length. After citing a shoal, the net is released. One end of the net will be kept with one canoe which will remain stationary, while the other end of the net is taken round by another canoe encircling the shoal.

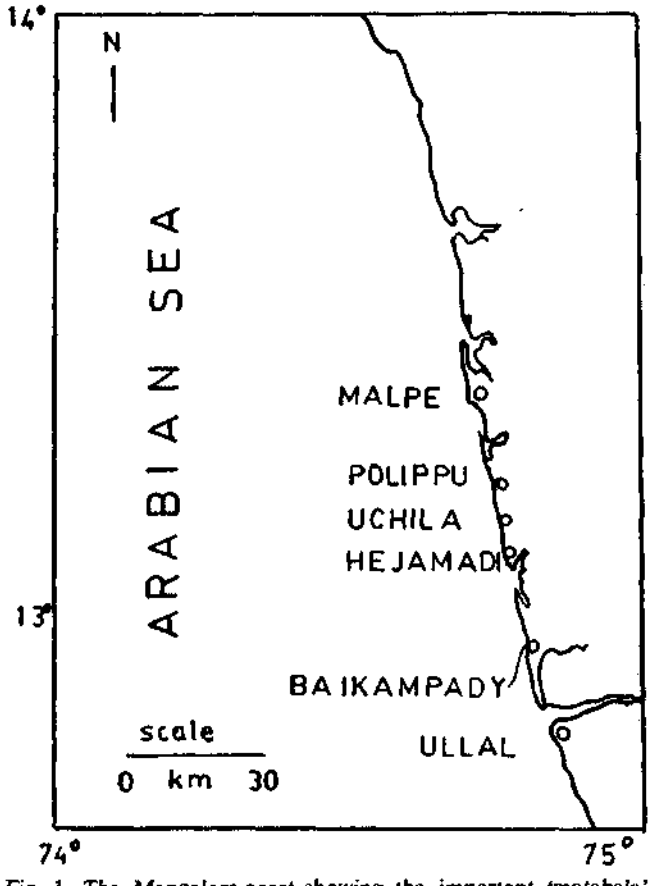


Fig. 1. The Mangalore coast showing the important 'matabala' fish landing centres.

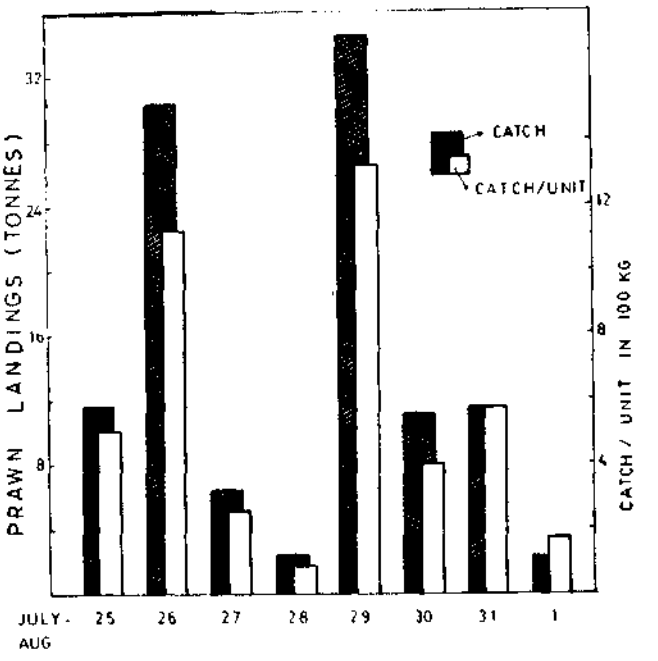


Fig. 2. Prawn landings by 'matabala' at Ullal during July-Aug. 1986.

After bringing both ends of the net together the bottom rope is pulled and the net is hauled slowly. To prevent the fishprawns jumping out of the net, the upper edge of the net is slightly lifted above the water level by one of the canoes while hauling it. Depending on the size of the shoal, the time taken for a haul varies from half-an-hour to one hour. The number of hauls vary from 1–4 per day. When the catches are high, each unit may employ one or two canoes (with or without outboard engines) as carrier boats for transporting a part of their catch as it is done by purse seines.

Area and period of operation

The 'matabala' units are operated all along the Mangalore coast when there is lull in monsoon and sea conditions permitted these fishermen to venture into the sea. However, most of these units are centred around Ullal, Baikampady (Panambur Harbour), Uchila, Hejamadi, Polippu and Malpe (Fig. 1). Fishing operations are generally confined to nearshore waters within 15 m depth.

It is seen that monsoon fishery along this coast largely depends on the weather conditions as well as the availability of shoals. Due to this, there has not been any consistency in the fishing operations. Regular catch statistics and other biological data were collected

only from Ullal and Baikampady. Information regarding the prawn landings at other centres were collected by enquiry.

'Matabala' fishery at Ullal and Baikampady

Ullal: It is estimated that 110.6 t of prawns landed during 1986 with a catch rate per boat-day of 384 kg as against 61.6 t and 517 kg obtained in the 1985 season. The catch per boat-day ranged widely from a minimum of 167 kg on 1st August 1986 to a maximum of 1,332 kg on 29th July '86 (Fig. 2). All the prawn catch was obtained between 25th July and 1st August '86. Of this, 97.9% was landed in July and the rest in August.

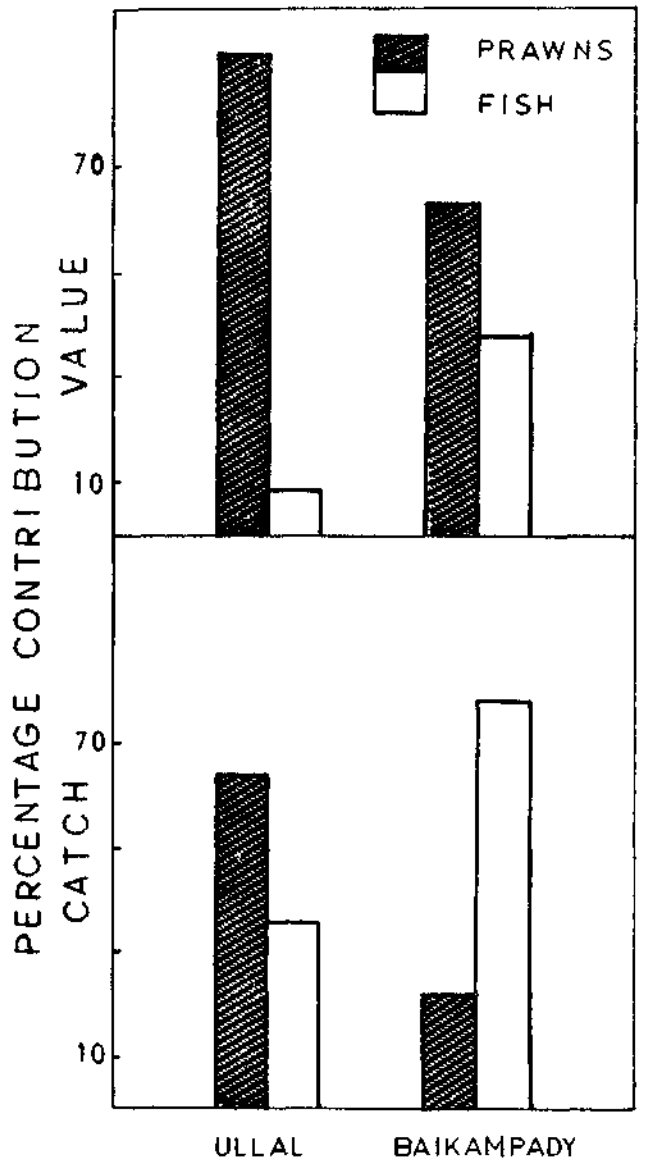


Fig. 3. Percentage contribution of prawns and fishes in 'matabala' catch at Ullal and Baikampady in respect of catch and value during July - August, 1986.

The prawns alone formed 63.5% of the 'matabala' catch at this centre (Fig. 3). Among the species, *Metapenaeus dobsoni* contributed 96.8% of the prawn landings, while *Penaeus indicus* and *Parapenaeopsis stylifera* together formed the rest (Table 1).

In the 'matabala' catch, fishes formed 36.5% at this centre. Bulk of the catch was obtained in July '86. The important species were *Thrissa* sp., silver bellies, *Kowala koval,* mackerel, *Caranx* sp., *Ambassis* sp., *Lactarius lactarius* and anchovies. It is interesting to note that oil sardine which used to be a major component in the traditional gears in the monsoon season, was completely absent during the 1986 season*.

Baikampady (Panambur Harbour): The prawn catch amounted to 6.0 t with a catch rate per boat-day of 27.3 kg during this period. All the catch was obtained in July 1986 itself. Prawns formed only 22.1% of the 'matabala' catch at this centre (Fig. 2). *M. dobsoni* was the principal species contributing to 95.0% of the prawn landings, and *P. indicus* formed the rest (Table 1).

Fishes contributed 77.9% of the catch. Silver bellies, *Lactarius lactarius, Ambassis* spp., *Kowala koval,* carangids, anchovies, soles and mackerel were the major components in the fish catch. Like Ullal,

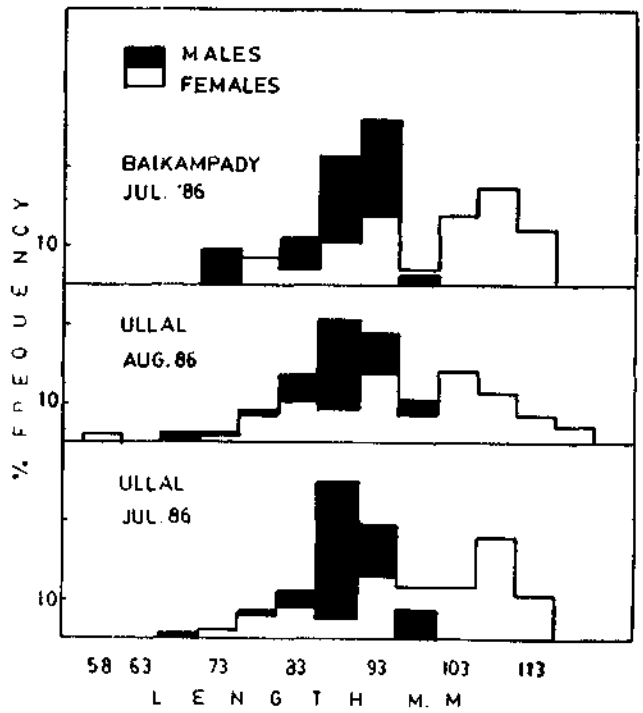


Fig. 4. Size distribution of *M. dobsoni* in the 'matabala' catch at Ullal and Baikampady during July - August 1986.

Table 1. *Catch (kg) and effort (nos.) at Ullal and Baikampady during July - August 1986 (catch values in Rupees in respect of prawns are given in parentheses)*

	ULLAL			BAIKAMPADY
	July	August	Total	July
'Matabala' units	214	74	288	220
M. dobsoni	1,04,840	2,273	1,07,113	5,714
	(17,29,860)	(37,505)	(17,67,365)	(94,281)
P. indicus	3,447	48	3,495	300
	(1,75,797)	(2,448)	(1,78,245)	(15,300)
P. stylifera	30	19	49	—
	(480)	(304)	(784)	
Total prawns	1,08,317	2,340	1,10,657	6,014
	(19,06,137)	(40,257)	(19,46,394)	1,09,581

Table 2. *Prawn landings by 'matabala' (in kg) along with the catch value in Rupees at other centres during Jul. - Aug.* 1986

Month	POLIPPU		UCHILA		HEJAMADI		MALPE	
	Catch	Value	Catch	Value	Catch	Value	Catch	Value
July	11,040	1,91,826	29,120	4,98,450	29,961	6,29,188	32,626	6,64,324
August	6,896	1,62,824	15,584	26,694	—	—	—	—
Total	17,936	3,54,650	44,704	7,65,392	29,961	6,29,188	32,626	6,64,324

there was no oil sardine in the catches at Baikampady during this period*.

'Matabala' prawn landings at other centres

Uchila: The prawn catch amounted to 44.7 t with a catch rate per boat-day of 827.8 kg. Of this, 65.1 kg was caught in July and the rest in August '86 (Table 2). *M. dobsoni* contributed 100% of the prawn catch.

Polippu: It is estimated that 17.9 t of the prawns with a catch per boat-day of 498.1 kg was landed at this centre (Table 2). Out of this, 61.5% was landed in July and the rest in August '86. *M. dobsoni* formed 92.1% and the rest by *P. indicus.*

Hejamadi: The prawn catch amounted to 30.0 t (Table 2). *M. dobsoni* formed 100% of the prawn landings.

Malpe: About 33.0 t of prawns with a catch per boat-day of 1,359.4 kg were landed at this centre (Table 2). All the catches were obtained in July '86. *M. dobsoni* formed 100% of the prawn catch.

Catch value

Altogether around 242.0 t of prawns were landed between Ullal in the south and Malpe in the north by 'matabala' during this season, worth Rs. 4.4 millions (Tables 1 and 2).

At Ullal, the catch value was estimated at Rs. 2.14 million of which prawns alone contributed 91.0% and the rest by fishes (Fig. 3).

At Baikampady, Rs. 0.17 million was realised, of which 63.3% was obtained through the sale of prawns (Fig. 3).

Size composition of *M. dobsoni*

It is interesting to note that the fishery was mainly supported by large sized prawns. In the 'matabala' fishery at Ullal, this species was represented by sizes ranging from 68 to 98 mm (mode at 88 mm) in males, and from 58 to 118 mm (mode at 93 and 108 mm in July '86 and 98 and 108 mm in August '86) in females (Fig. 4).

*However, during the 1987 season, oil sardine was caught in small quantities in this gear at both the centres. Other indigenous gears did not operate.

Table 3. *Age structure (%) in respect of* M. dobsoni *at Ullal and Baikampady during July - August,* 1986

Age	ULLAL				BAIKAMPADY	
	July		August		July	
	Males	Females	Males	Females	Males	Females
0-year	3.1	21.7	3.7	32.7	2.7	21.6
1-year	96.9	78.3	96.3	66.3	97.7	78.4

Table 4. *Sex ratio (%) in* M. dobsoni *at Ullal and Baikampady during July - August,* 1986

Month	ULLAL		BAIKAMPADY	
	Males	Females	Males	Females
July	61.5	38.5	54.1	45.9
August	49.5	50.5	—	—

Table 5. *Maturity stages of* M. dobsoni *at Ullal and Baikampady during July - August,* 1986

Place	Month	Immature	Maturing	Mature	Spent/spent recovering	Impregnated
Ullal	July	45.2	16.1	32.2	6.5	17.7
	August	61.8	9.1	10.8	16.4	18.2
Baikampady	July	32.1	35.8	32.1	—	14.3

At Baikampady, prawns ranging in size from 73 to 98 mm (mode at 93 mm) in males and from 78 to 113 mm (mode at 93 and 108 mm) in females supported the fishery (Fig. 4).

Age structure

Among males, 0-year class formed only 3–4 % at Ullal and about 2% at Baikampady, whereas, 1-year group (above 80 mm size) contributed the bulk of the catch (96-97% at Ullal and 98% at Baikampady). Among females, 22–33% was in O-year class at Ullal and 22% at Baikampady, while 1-year class (above 95 mm size) formed 66–78% at the former centre and 78% at the latter.

Sex ratio and maturity

The overall sex ratio in *M. dobsoni* indicated that males outnumbered females at both centres. In July '86, males formed 61.5% and 54.1% at Ullal and Baikampady respectively (Table 4). However, in August '86, it was seen that males and females were distributed more or less equally.

During 1986 season, 32.2% and 32.1% of females were in mature condition at Ullal and Baikampady respectively (Table 5). Impregnated females formed 17.7% and 14.3% respectively at these centres. In August '86, 18.2% of females was in impregnated condition at Ullal. The occurrence of spent/spent recovering females at Ullal (6.5% in July and 16.4% in August '86) suggested peak spawning particularly in the latter month.

General remarks

Exceptionally heavy catches of *M. dobsoni* were obtained in 'matabala' on certain days in July and August '86 (Fig. 2). This species alone contributed upto 98% or even 100% of the prawn landings. It is estimated that around 242 t of prawns landed between Ullal and Malpe, within a range of 70 km, in a short period. Questions have been raised at various forums

whether catching of these prawns at a time when peak spawning recorded, has any adverse effect on the resource. It is seen that monsoon fishery is exclusively supported by large sized prawns with modal lengths at 88 mm in males and 103/108 mm in females. Since most of these prawns have already spawned 2–3 times and also reached their maximum size, it is desirable to catch them during that period, instead of leaving them to breed again (Sukumaran, 1985; *Mar. Fish. Infor. Serv., T & E Ser.*, **65**: 1-6). Moreover, these prawns with such a short life span (with maximum of 2 years) are available to the fishery for not more than a year or so. Hence it is possible that they may die of natural mortality if not caught at that size, which may be a heavy loss to the fishery. Although the catches are heavy on certain days in July '86, the total

Fig. 5. 'Matabala' unit is being landed after fishing at Ullal.

landings of *M. dobsoni* was only 106 t at Ullal and less than 250 t along the entire Mangalore coast and hence may not pose any conservatory problem in the near future.

Eventhough the introduction of 'matabala' along the Mangalore coast has revolutionised the monsoon fishery, it has also created unprecedented rivalry between fishermen of 'matabala' and the mechanised fishing boats. In the last two seasons since mechanised boats, particularly purse seiners, could not get any prawn catch when fishing started in September, they decided to start fishing in August itself as 'matabala' was getting plenty of prawns during July–August '86.

Fig. 6. Prawns are being filled in bamboo baskets for weighing before loading in to the trucks at Ullal.

It was reported in the news paper that fishing was banned along this coast till 22nd August following a clash on 17th August '86 between the traditional fishermen and those using mechanised fishing boats. In these clashes four boats were set on fire and 28 fishermen were injured at the sea off Hejamadi, about 30 km north of Mangalore. The loss was estimated to be Rs. 35 lakhs. Trouble started when the fishermen took the mechanised fishing boats to the sea despite the understanding that no fishing would be undertaken till 22nd August '86. Emotional traditional fishermen joined together in their country boats and chased the fishing boats and set them on fire. All efforts to bring the two fighting factions to a negotiating table met with little success. Due to this, ban on fishing was further extended till the end of August 1986.

So, unless a permanent solution is found, the rivalry between 'matabala' fishermen and other mechanised boat owners may lead to further clashes resulting in loss of life and property.

PRELIMINARY OBSERVATIONS ON THE EFFICIENCY OF SOME MICROALGAL FOODS ON THE GROWTH OF GREEN MUSSEL LARVAE*

For the mass production of seed of bivalves in hatchery system, production, maintenance and supply of suitable microalgal food are important part of the operation. A knowledge about the efficiency of different algal species on the growth of the bivalve larvae will be helpful in developing suitable food for achieving faster growth, early spat settlement, higher percentage of survival and healthy individuals. An attempt was made in this direction on the larvae of the green mussel *Perna viridis* (Linnaeus) at the Kovalam Field laboratory of Madras Research Centre of Central Marine Fisheries Research Institute.

The larvae of the green mussel, reared from the spawning on 18th July, 1987 in laboratory were utilised for conducting the experiment. Four sets of larvae were maintained in duplicate in the laboratory, feeding them separately with pure cultures of *Isochrysis* sp., *Chromulina* sp., *Dicrateria* sp. and *Pavlova* sp. Though spat settlement was completed in 24 days, growth data was maintained till 35th day. Water temperature ranged between 26.9 and 27.6°C and salinity between 36.6 and 37.8‰ during the period. The cell concentration of the microalgal food was maintained uniformly for all the sets of larvae at the rate of 3,000 cells/larva initially and was raised gradually to 6,000 cells at later stages.

The details regarding the initial stocking density, water level maintained, total number of spat settled and the percentage in the initial strength of the larvae are given in Table 1. Of the four algal species experimented with, maximum settlement was noticed for the larvae fed with *Isochrysis* sp. followed by *Dicrateria* sp. and *Chromulina* sp. and the minimum with *Pavlova* sp. However, when the growth and progress of metamorphosis were considered (Table 2), *Chromulina* sp. and *Dicrateria* sp. were observed to give better results than the other two species. Therefore, it is suggested that *Dicrateria* sp. and *Chromulina* sp. can be utilised as the microalgal food in the green mussel hatchery to get better results.

Table 1. *Details of larvae stocked, volume of water maintained, number of spats settled and their percentage with different microalgal food*

Microalgal food	Total larvae stocked	Volume of water maintained (l)	No. of spat settled (as on 24th day)	Density of spat settled (%)
Isochrysis sp.	1,98,000	150	23,000	11.6
Chromulina sp.	80,000	80	6,700	8.4
Dicrateria sp.	92,000	80	9,000	9.8
Pavlova sp.	40,000	40	2,200	5.5

Table 2. *Length and stages of development of green mussel larvae fed with different microalgal food*

Day after Spawning	Mean length (mm)				Stages of metamorphosis			
	Isochrysis	*Chromulina*	*Dicrateria*	*Pavlova*	*Isochrysis*	*Chromulina*	*Dicrateria*	*Pavlova*
5th	0.090	0.090	0.090	0.090	D-shaped	D-shaped	D-shaped	D-shaped
9th	0.141	0.136	0.133	0.136	D & umbo	D & umbo	D & umbo	D & umbo
12th	0.190	0.268	0.264	0.182	Umbo & eyed	Eyed	Eyed	Umbo
16th	0.210	0.362	0.378	0.246	Umbo, eyed & spat	Eyed & spat	Eyed & spat	Umbo, eyed & spat
20th	0.328	0.520	0.544	0.352	Eyed & spat	Spat	Spat	Eyed & spat
24th	0.692	0.792	0.880	0.828	Spat	Spat	Spat	Spat
30th	1.293	1.701	1.314	1.322	Spat	Spat	Spat	Spat
35th	1.765	2.508	2.209	2.101	Spat	Spat	Spat	Spat

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