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SOME OBSERAVATIONS ON SMALL MESHED GILLNET FISHERY IN NEGOMBO AND CHILAW

by

PAULINE DAYARATNE

National Aquatic Resources Agency.

ABSTRACT

This study is based on a survey carried out during the period March 1979 to October 1980.

Fishing operations were carried out by using 5-5.5 M FRP fibre glass boats. The mesh size of the gillnet range from 12-38 mm with 28 mm and 30 mm being the most common. Fishing operation were limited to the region within 16-19 Kilometres from the shore.

Monthly total catch, effort and catch per unit effort showed seasonal vatiations. Highest catch rates were recorded in July-August period. Monsoonal changes seemed to have some influence on this fishery.

Sardines spp. contribute up to about 80 % of the catches. Species composition changes seasonally and also with the fishing depth.

INTRODUCTION

Small pelagic fish species show very significant contribution to fish production in Sri Lanka. Fishing for these species is usually carried out in shallow coastal waters. In the past it was the beach seiens (madel) and the non mechanized log rafts (teppam) that were mainly responsible for these catches. However, since early sixtees the gillnet fishery became very popular as a result of the introduction of small, open decked, 5-5.5 M FRP fishing boats. Fishermen found this type of boats to be superior to the traditional wooden rafts and also with the ability to do fishing at a greater range of depths. Since then the, small mesh gillnet fishery became the most popular fishing method to catch small pelagic fishes especially on the west coast of Sri Lanka.

This report includes a preliminary study of the small meshed gillnet fishery, which is based on a survey carried out at two fish landing centres (Negombo and Chilaw) on the West coast of Sri Lanka, during the period March 1979 to December 1980. The total catches taken at the two fishing centres, their monthly variation, and the species composition were studied. The catch data, from the two areas as well as the two successive years, were compared. A description of the type of the fishing craft, gear, area and depth of operation is also included.

MATERIALS AND METHODS

1 Collection of data :

Catch data were collected by making regular weekly visits to the fish landing centres in Negombo and Chilaw. About 10% of the total number of boats operated were sampled randomly. The necessary information such as the size and type of the craft used, horse power of the engine, mesh size of the nets used were recorded for each boat sampled. The total catch and its species composition were also noted. The total number of boats operated on a particular day was taken into account to calculate the total catch for that day.

2 Analysis of data :

a. Fishing depth:

The data on fishing depth, collected from Negombo during the period January - December 1980, were analysed. Fishing depths were roughly categorized as 1.) less than 12 m 2.) between 12-20 m 3.) between 20-26 m 4.) deeper than 26 m, for convenience.

Although the depth measurement are not very accurate, these are used in the present study to get an idea about the composition of the catches at different depth, the distribution of different mesh sizes with depth and the seasonal variation of the depth ranges covered by fishermen. The number of boats operated within each depth range were calculated for each month.

b. Seasonal variation in the total effort, total catch and catch per unit effort :

The average number of boats operated per day was taken as the unit of measure of the monthly total effort. These values were derived for each month by averaging the total number of boats operated on sampling days.

The total catch for a day was calculated by multiplying the total number of boats operated, by the average catch per boat sampled. To get the monthly total catch, the estimated daily total catch was multiplied by the number of fishing days in each month (usually 23-25).

The catch per boat per day is considered as the catch per unit effort, for each month. The following observation justify this,

i. Every boat uses approximately the same number (usually 18-22, mean 19.7 S.D. 1.09) and size (1500 mesh in length and 330 mesh in width) of gillnets per fishing operations.

ii. The period for which the gear is in operation in almost the same ($\simeq$ 2 hr.) Even slight changes would not affect the efficiency of the operation due to the phemomenon of gear saturation.

iii. The number of persons involved in each fishing operation is always two.

iv. The fishermen usually have one fishing operation per day. Although a few do more than one fishing operation per day, these were not regular and were therefore not recorded. This would not have any serious effect on the index of catch per unit effort.

c. Species composition of the catches :

Species composition of catches was analysed for each month separately, to study the variation pattern. These values were tabulated as percentage of the total catch. Changes in the species composition of the catches taken at different depths were compared. For this purpose, the catch data collected from Negombo for the year 1980, were used.

RESULTS AND DISCUSSION

1. Fishing craft and gear

The type of fishing crafts used for small meshed gillnet operations are mainly 5-5.5M fibre glass boats. A very few traditional log rafts are still being used in the very shallow waters. These crafts are powered by outboard motor engines of H.P. varying from 6-18 (Table 1).

TABLE I.

SPECIFICATIONS OF THE FISHING CRAFTS AND GEAR USED IN SMALL MESHED GILLNETS OPERATIONS

Fishing craft	*No. of units used in one operation*			*Range of mesh size (streched mm)*	*H.P. of engine*	*Range of operation (Kilometres from the shore)*
	Range	*Mean*	*Variance*			
1. Traditional wooden crafts (with or without outboard motors)	4 - 6	5.5	0.59	12 - 28	6 - 8	3 - 6
2. Mechanized fibre-glass boats	18 - 22	19.7	1.09	12 - 38	8 - 18	16 - 19

The nets used are, surface gill nets made of a nylon PA multifilament twine. Each net consists of a number of equal sized units (each unit is 1500 mesh long and 330 mesh wide). The size of the gillnets are determined by the number of these units. The number of such units used for a single operation is limited to 4-6 in wooden rafts while the mechanized boats could use 18-22 units. Wide range of mesh sizes are used depending on the size and type of fish to be caught. Table 2 show the relative impotrance of these in different months.

TABLE 2.

PERCENTAGE NUMBER OF GILLNETS OF DIFFERENT MESH SIZES OPERATED IN EACH MONTH (BASED ON DATA COLLECTED FROM NEGOMBO IN 1980)

Mesh size (mm)	*Month*											
	J	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*O*	*N*	*D*
12	—	8	5	—	—	—	—	—	6	15	—	—
19	2	—	—	—	4	6	—	—	—	—	—	—
25	16	3	5	—	20	38	—	—	—	—	—	—
28	59	56	61	47	42	56	89	81	81	85	100	84
30	13	24	21	24	—	—	9	8	12	—	—	6
32	6	5	7	18	17	—	—	—	11	—	—	—
38	3	3	2	11	18	—	2	—	—	—	—	—

The smallest mesh size (12 mm) is commonly used for small fishes such as anchovies of 5-7 cm. length range.. Together with these species, juveniles of sardines (6-7 cm. length) are caught occasionally. The 25 mm nets are used in May-June period to catch mainly *Escualosa thoracata* (white Sardine) which is found in relatively shallow waters. The most commonly used mesh size in this fishery is the 28 mm. It is being used continuously throughout the year and as seen from Table 2 more than 50% of the boats are using this mesh in all the other months except in April and May. During these two months an increase in the use of larger mesh sizes (32 & 38 mm) is observed. These large mesh sizes are operated in relatively deeper water (Fig. 1) where the catches are composed mainly of *Amblygaster Sirm*. Among these catches are also caught juveniles of dther large pelagic species such as baraccuda, horse mackeral, frigate mackeral etc. in very small quantities.

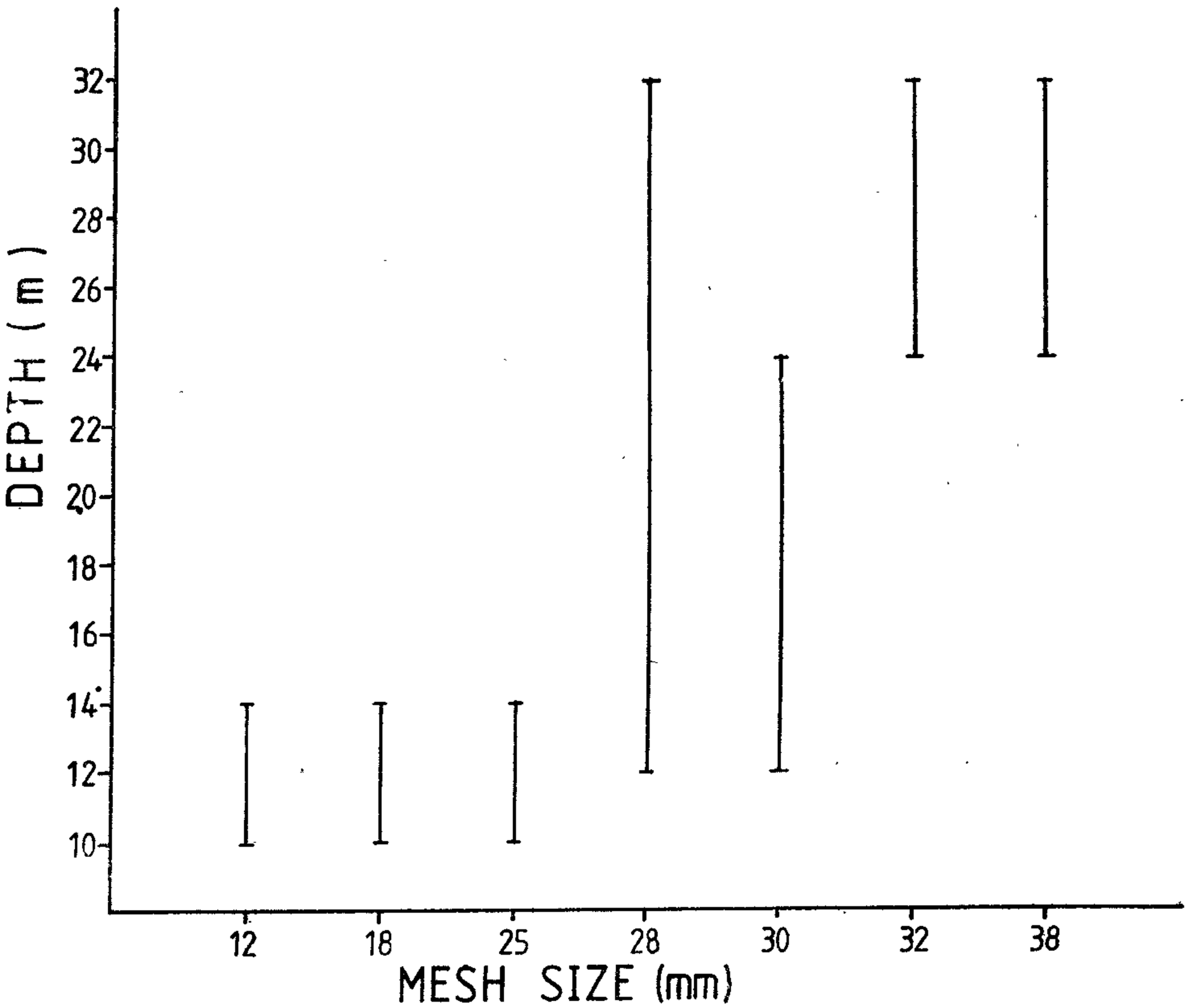

Fig. 1 : Variation of fishing depth with mesh size.

The relation between the mesh size used and the depth of fishing showed that the smallest meshes 12, 19 and 25 mm are restricted to shallow waters, the medium sizes 28 mm and 30 mm are operated within a wide range of depths, while the larger mesh sizes 32 mm and 38 mm are used only in deeper waters.

2. Fishing Depth :

The depth range covered by the gill netters vary much in the case of mechanized fibre-glass boats while the traditional rafts always fish in the shallow waters. mechanised fibre-glass boats could operate upto a depth of about 35 m. Fig. 2 shows the variation

in the percentage number of boats operated at different depth ranges. During the period July-October, which could be considered as the peak season for the small meshed gillnet fishery, the fishing is more concentrated at depths greater than 20 m. Fishing at these depths is carried out by some fishermen during the rest of the year too. However, these waters (> 20 m depth) are not reached by fishermen in November while in June a few do fishing at 20-24 m depth. The changing weather conditions due to the prevailing south west and north west monsoons probably restrict their fishing operations to shallow waters during these months.

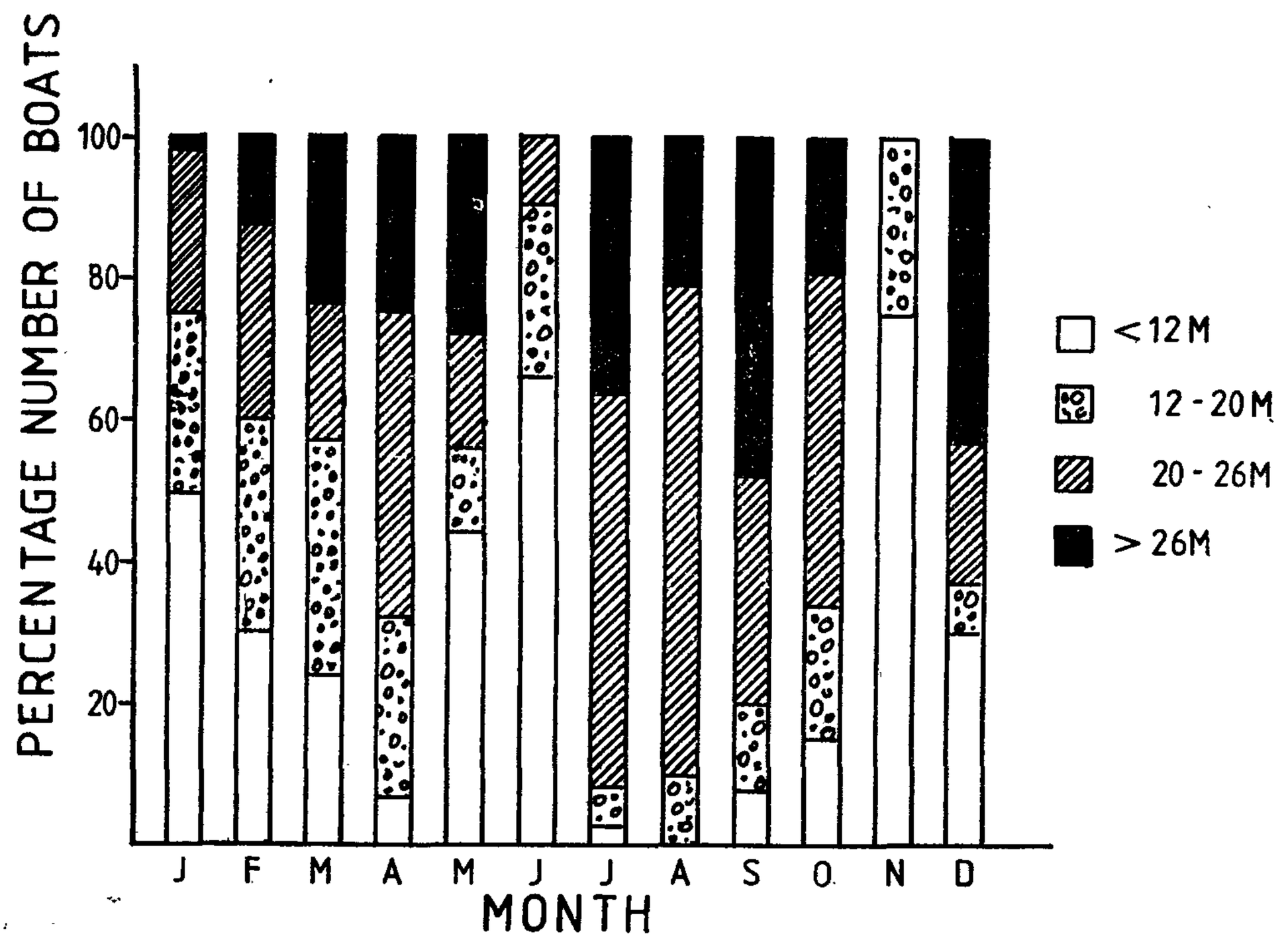

Fig. 2 : Monthly variation of the number of boats operated at different depths.

3. Variation in effort :

Fig. 3 shows the monthly variation of the average number of boats operated per day for each month. It was observed that there is a tendency for an increase in effort during the period July to October each year in the two areas Negombo and Chilaw. It was also revealed that the period of maximum effort coincided with the period when the highest catch rates were obtained (i.e. from July to October). Therefore, the reason for the increase in effort during this period could be the high catch rates. Likewise, the low catch rates during the period May-June explain the relatively low effort.

A remarkable increase in effort was observed from 1979 to 1980 (Fig. 3) in both areas. This increase is clearly seen during the peak period for this fishery i.e. July-October.

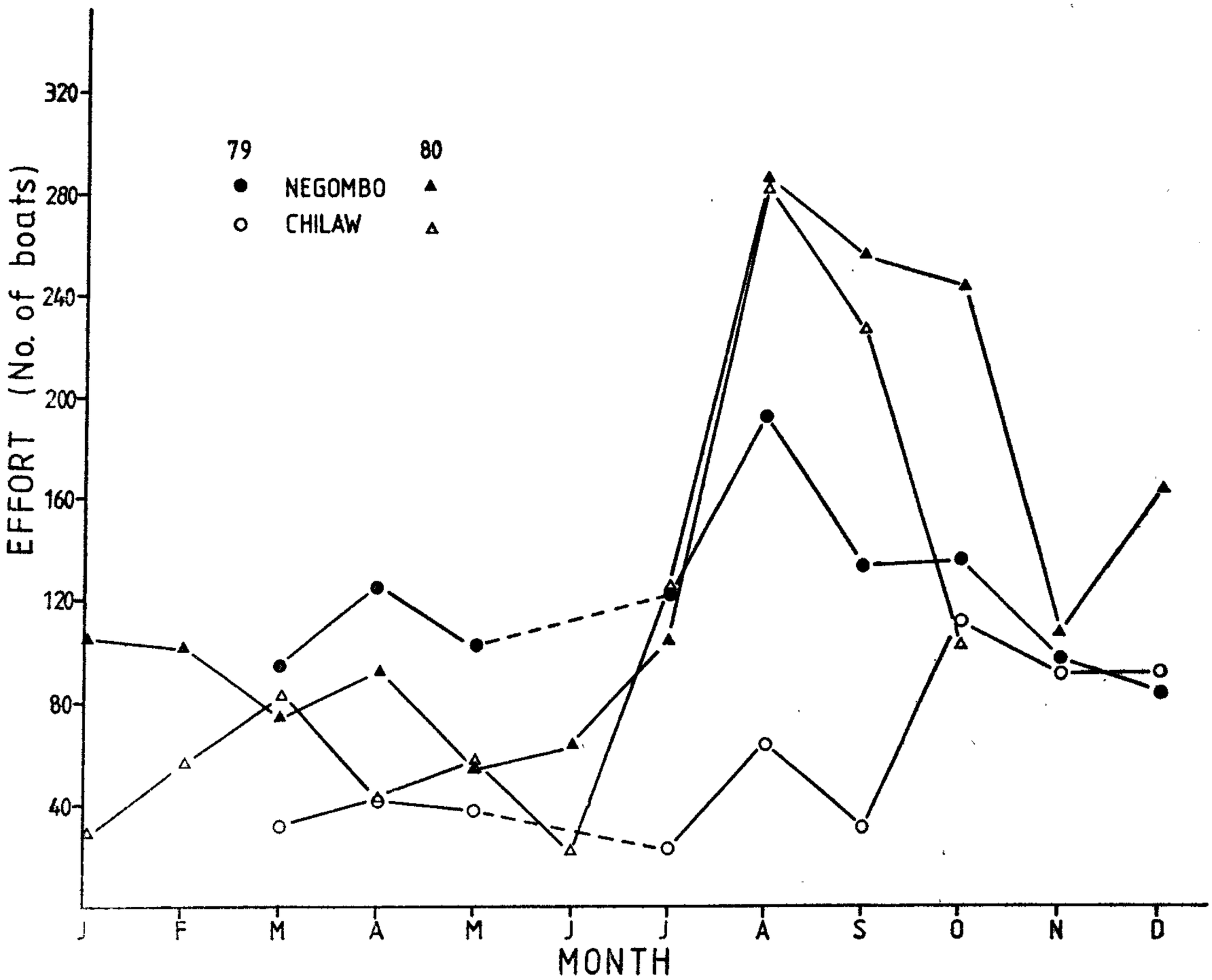

Fig. 3 : Monthly variation in total effort.

4. Total catch :

The monthly total catch of this fishery was calculated for the two areas Negombo and Chilaw separately (details given in appendieces I and II). During the survey period, the highest monthly catches were observed in Chilaw in August 1979 (513 tonnes). Fig. 4 shows the monthly variation of the total catch in the two areas. It is clear that the peak period is from Aug.-Oct. each year. In Chilaw the total catch taken during this period in 1980 was 2418 tonnes, which was comparatively higher than the catch in 1979 which was 910 tonnes. This could have been due to the increase in effort in 1980. However, even with a similar increase in effort, the total catch in Negombo during the same period did not show a significant difference between the two years (1498 tonnes in 1979 and 1494 tonnes in 1980).

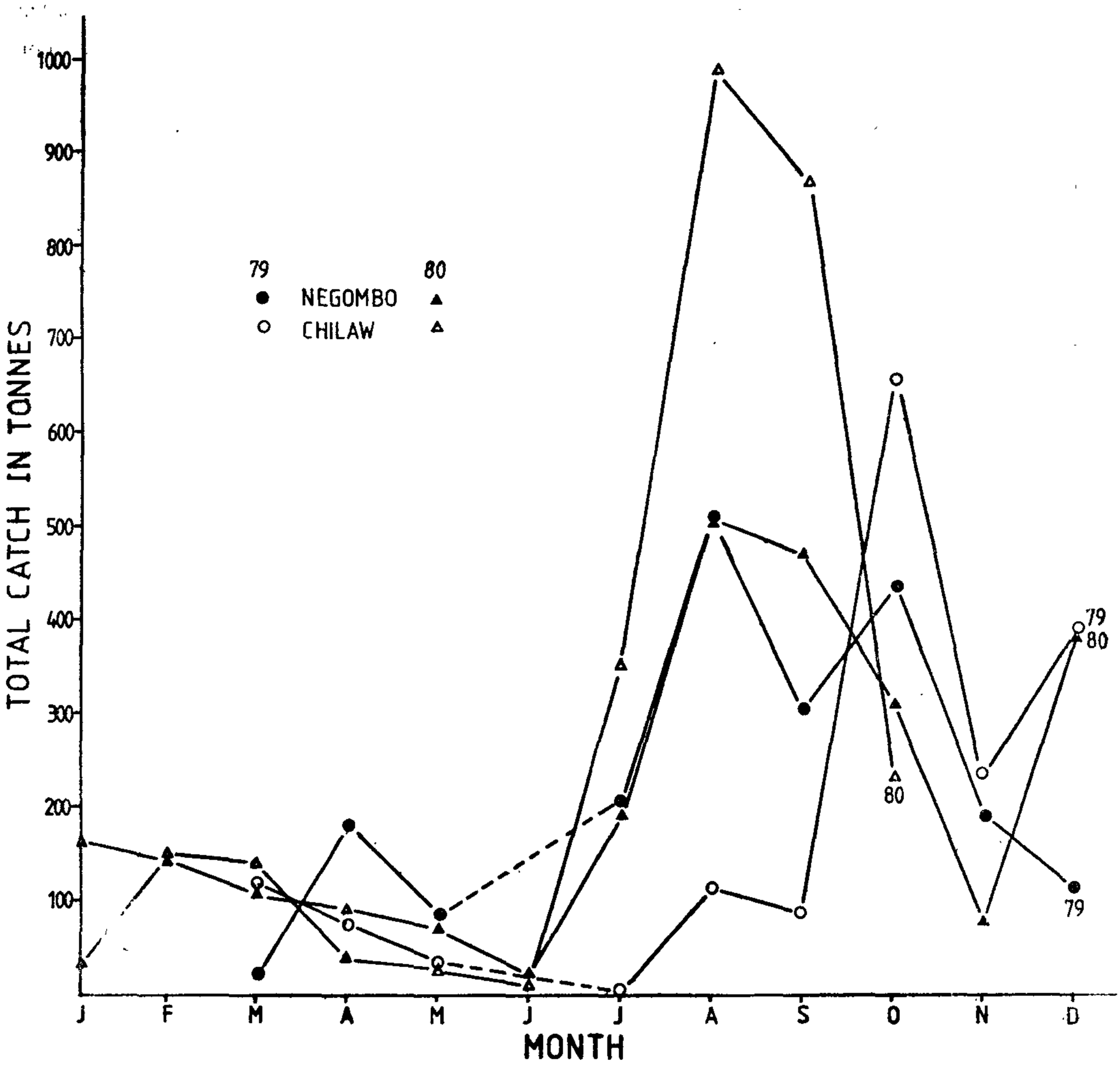

Fig. 4 : Monthly variation in total catch.

The total annual catch estimated for Negombo and Chilaw in 1980 were 2580 tonnes and 3080 tonnes respectively. These values too may have been an underestimate due to the following reasons.

i. A few number of boats occassionaly land their catches away from the main landing centres, which were not taken into account during the survey.

ii. In some occasions when the catches have already been sold before sampling one had to depend on the figures given by the fishermen to estimate the total catch. As the fishermen are usually reluctant to give the correct figures they normally come-out with lower values.

5. Seasonal variation in catch per unit effort (CPUE) :

Fig. 5 shows the monthly variation pattern of the CPUE values. The variation pattern was found to be similar in both areas as well as in the two years. There is a trend for the CPUE values to decrease during April-June and to increase again to reach a maximum in September-October, and decline again in Negombo. The period August-October is considered as the peak season for this fishery and this coincides with the tail end of the south west monsooon. The other period with considerable amount of catches coincides with the later part of the north east monsoon (i.e. February-March). Low catch per unit effc rt values were observed at the beginning of the two monsoons.

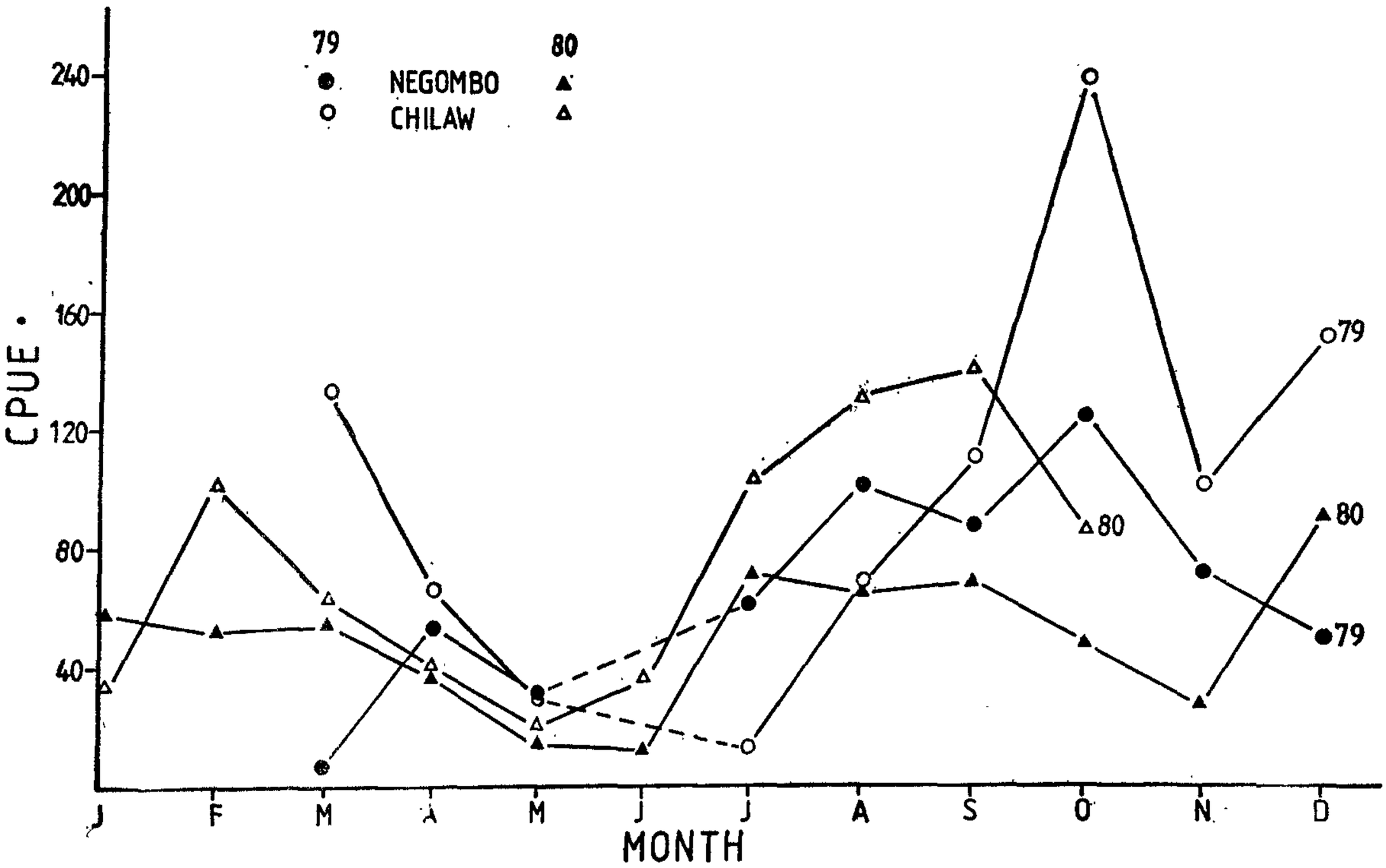

Fig. 5 : Monthly variation in catch per unit effort (CPUE)

Research surveys carried out by R/V "Dr. Fridtjof Nansen" has shown more complex fluctuations of small pelagic fish stocks. Highest catches were observed during August-September and the lowest in April-June (Blindheim and Fǿyn, 1980). A similar pattern has been observed in the *Sardinella* fishery (*S. aurita*) in Hongkong, with best catches made between July and October. Disappearance of fish schools during the transitional period between the two monsoons is frequently reported (Li Kwan Ming, 1960).

As the *A. sirm* and the two *Sardinella spp.* (*s. albella* and *S. gibbosa*) show a greater contribution to the catches (Appendices III and IV), their monthly variatoins were studied. Figs. 6-8 show the monthly variations of the CPUE of these species. Each year, peak catches cf *A. sirm* were obtained in Negombo in August-September months

and in Chilaw in October (Fig. 6). This could suggest a northward migration of *A. sirm*. The sudden increase in catches observed in October 1979 is not clearly understood. The lowest catch rates were observed in May-June and November-December months, owing to the fact that no fishing is carried out during these months at the fishing rounds where *A. sirm* is usually found.

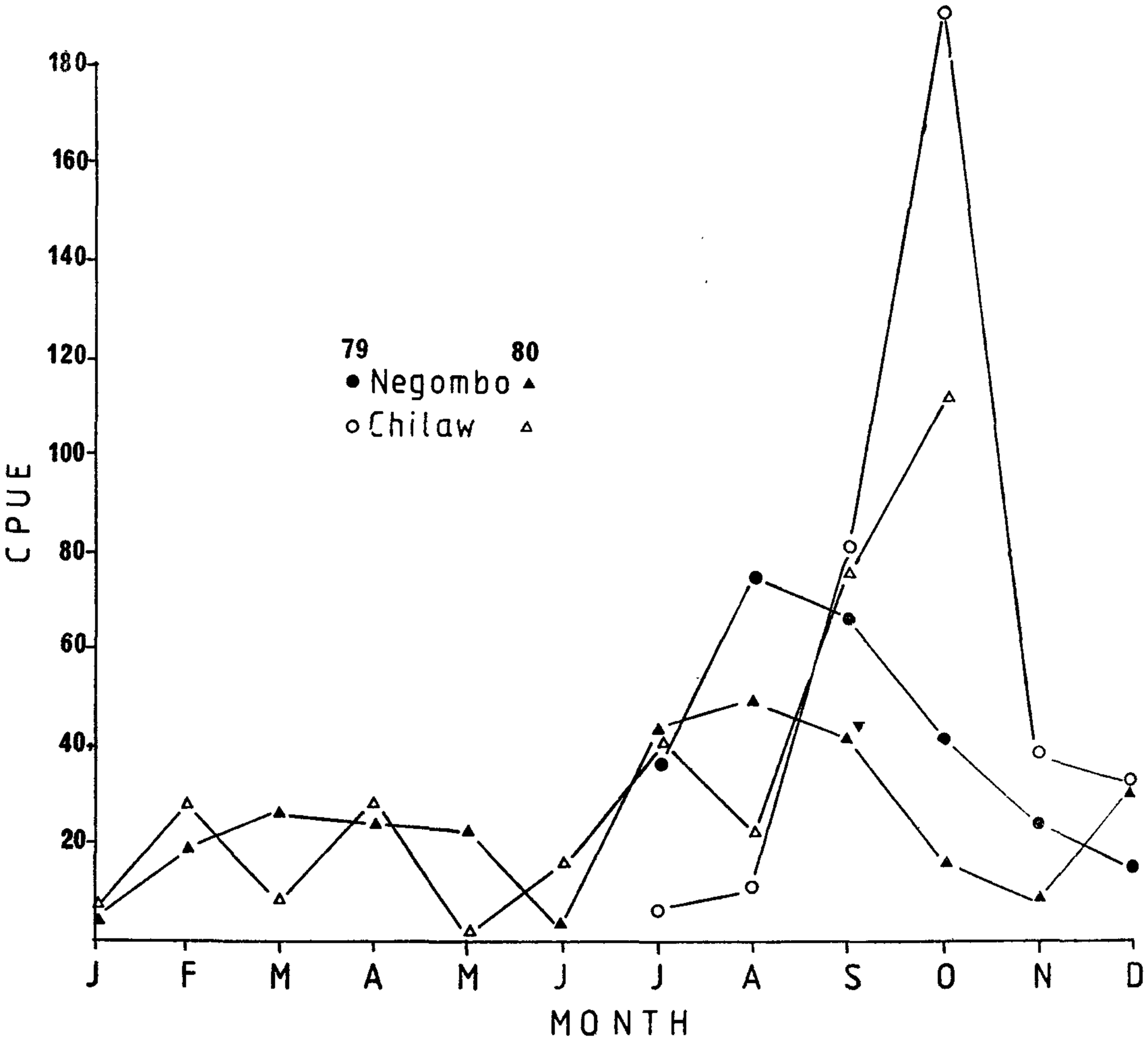

Fig. 6 : Monthly variation in CPUE of *Sardinella sirm*

However, the reason why the fishermen do not reach these fishing grounds is not clear. It may be due to the rough weather conditions or that they do not find these sardines during this period at the usual fishing grounds.

Disappearance of these sardines concides with the estimated spawning seasons (Dayaratne 1983). Therefore, this could be attributed to a reproductive behaviour. It is possible that these fish migrate away from the fishing grounds for an off-shore spawning or towards the sea bottom where they remain during the spawning period. The possibility of off-shore spawning migrations of *A. sirm* have been suggested by Chacko (1956).

Catches of *Sardinella gibbosa* also follow the same pattern as *A. sirm* (Fig. 7). Peak catches were observed in August-October period and the catches in May-June were

almost negligible. During May-June period about 30% of the boats were operated at the depth range where *S. gibbosa* is usually found;

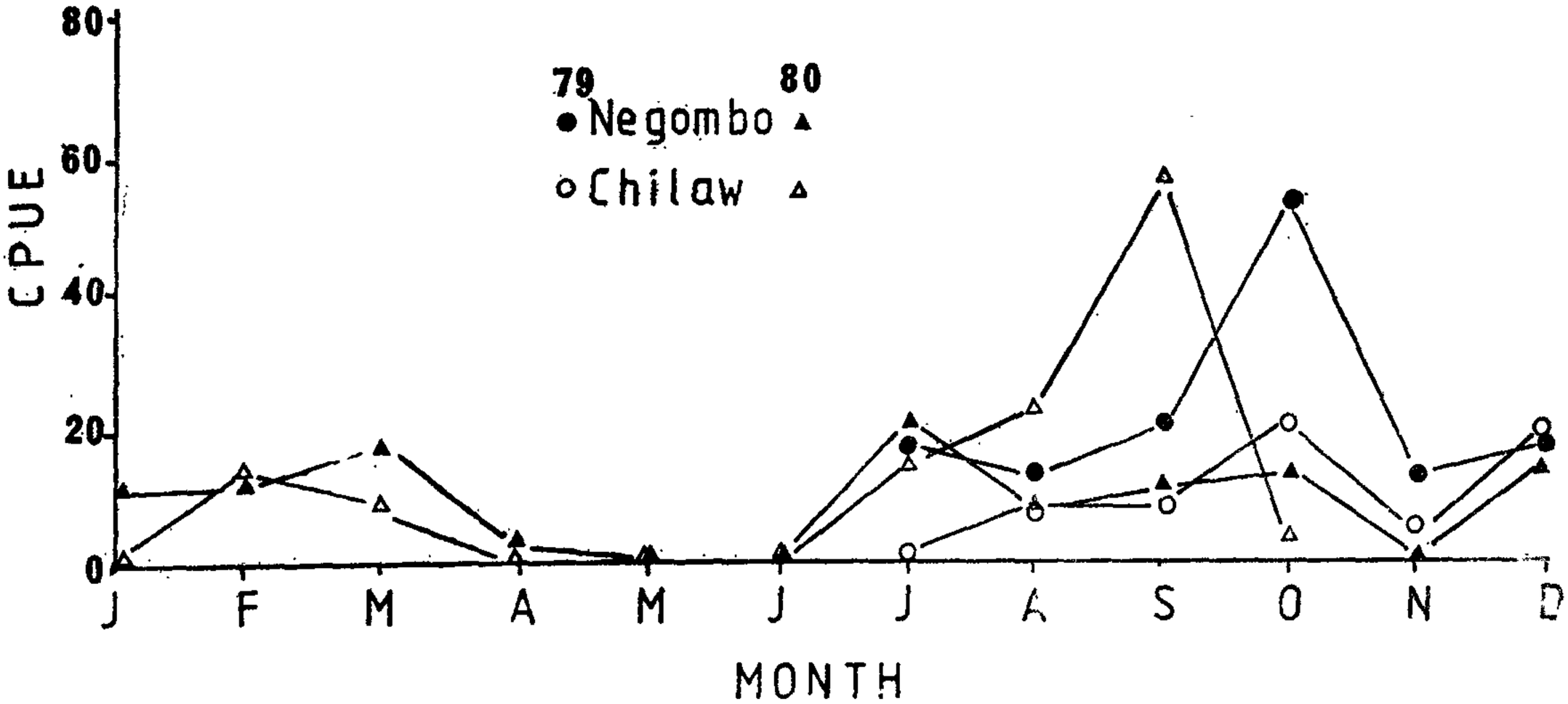

Fig. 7 : Monthly variation in CPUE of *Sardinella gibbosa.*

Therefore, the absence of these sardines in the catches during these months could be due to a spawning behaviour as the period of lower catches coincides with the estimated spawning season (Dayaratne, 1983). These sardines form a good fishery in Madras state of India. Two distinct peak seasons have been observed from March-April and in October (Nair, 1960).

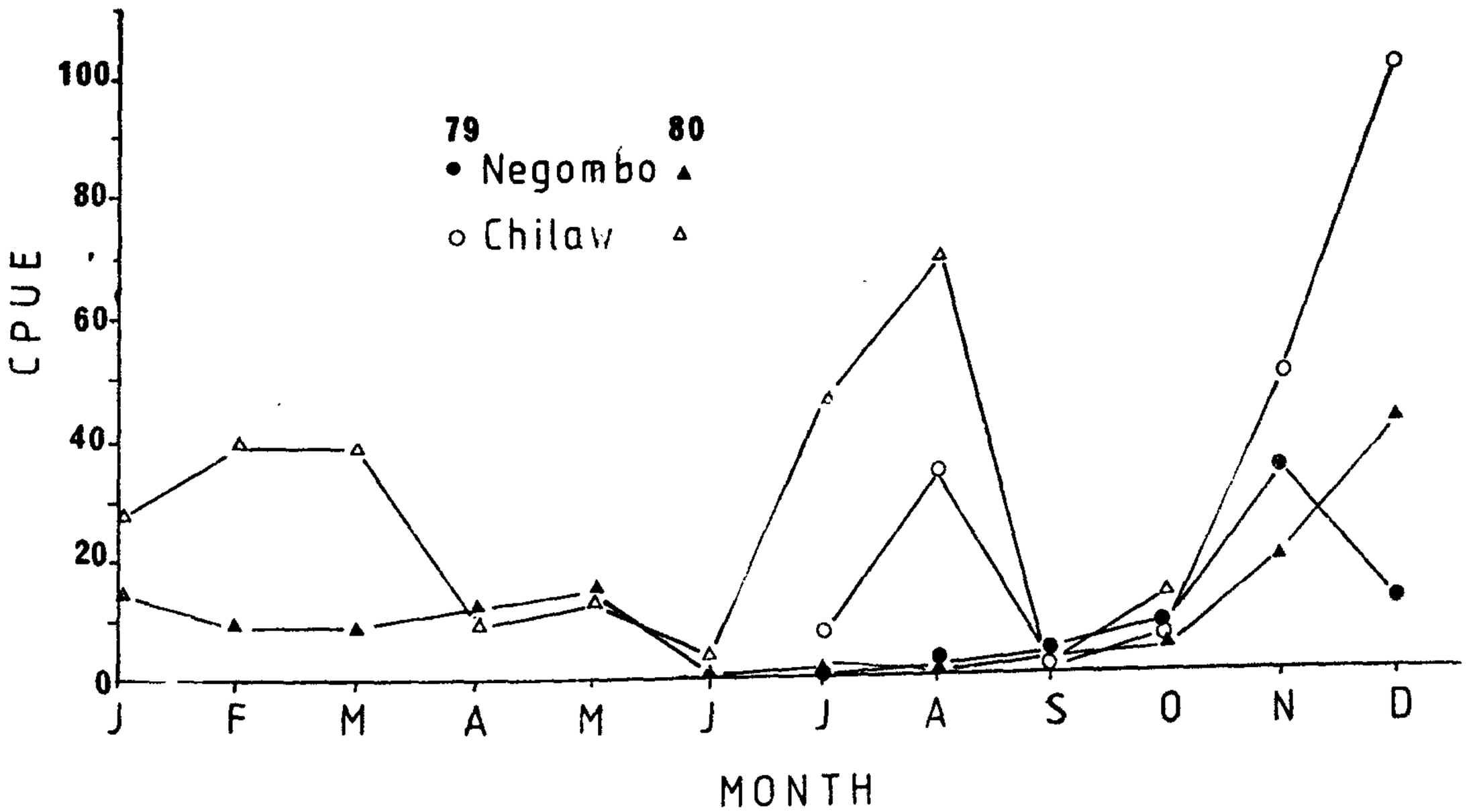

Fig. 8 : Monthly variation in CPUE of *Sardinella albella.*

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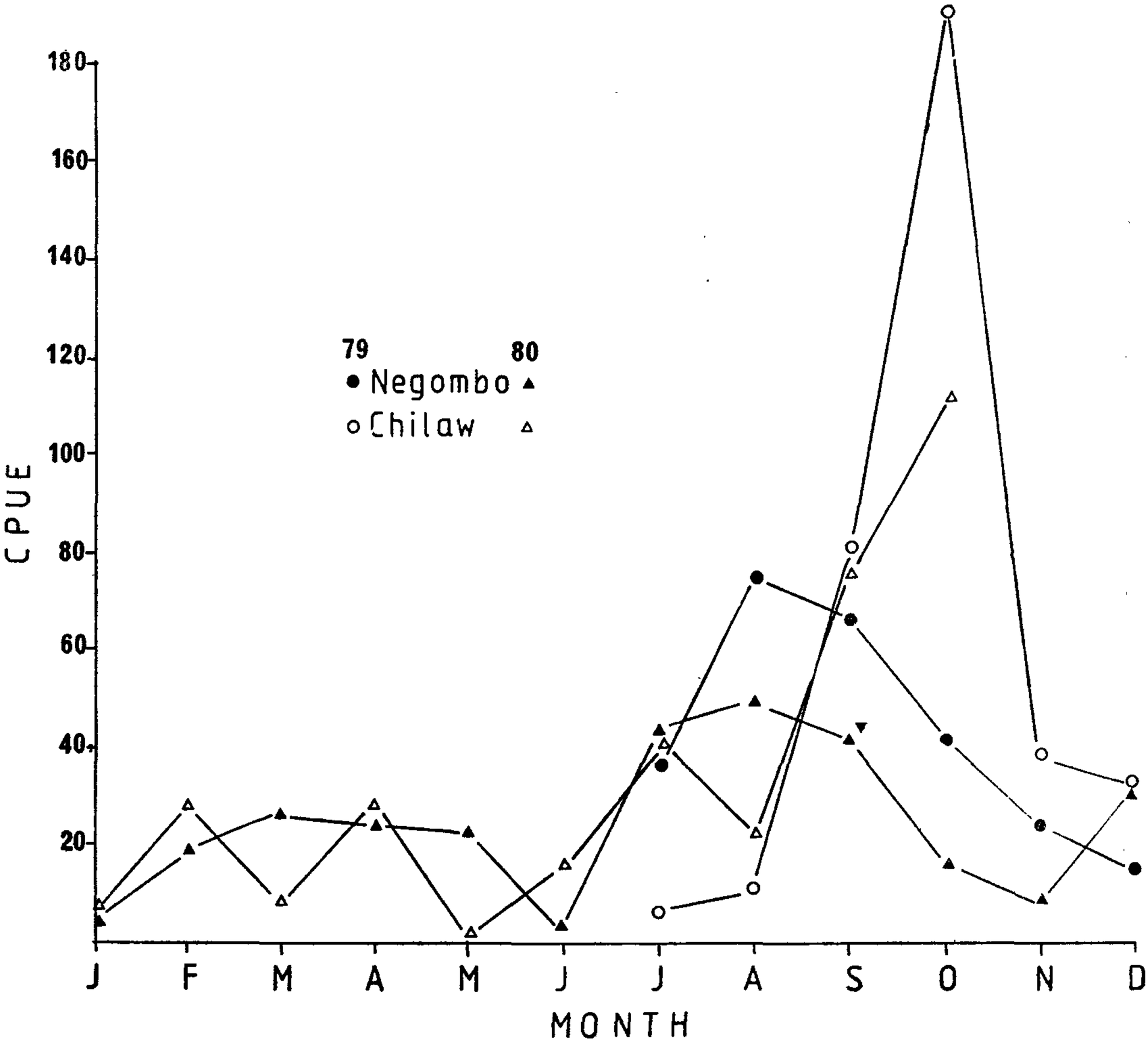

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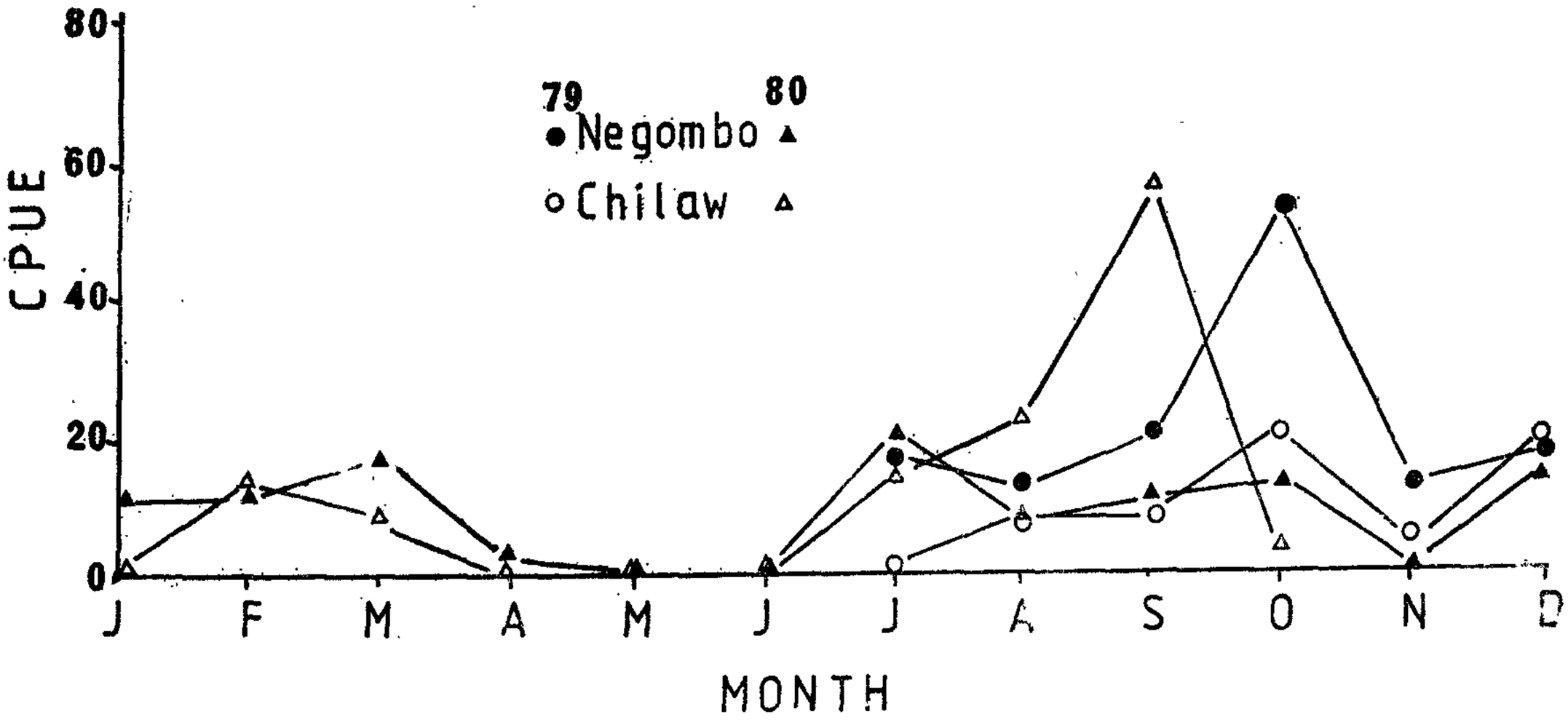

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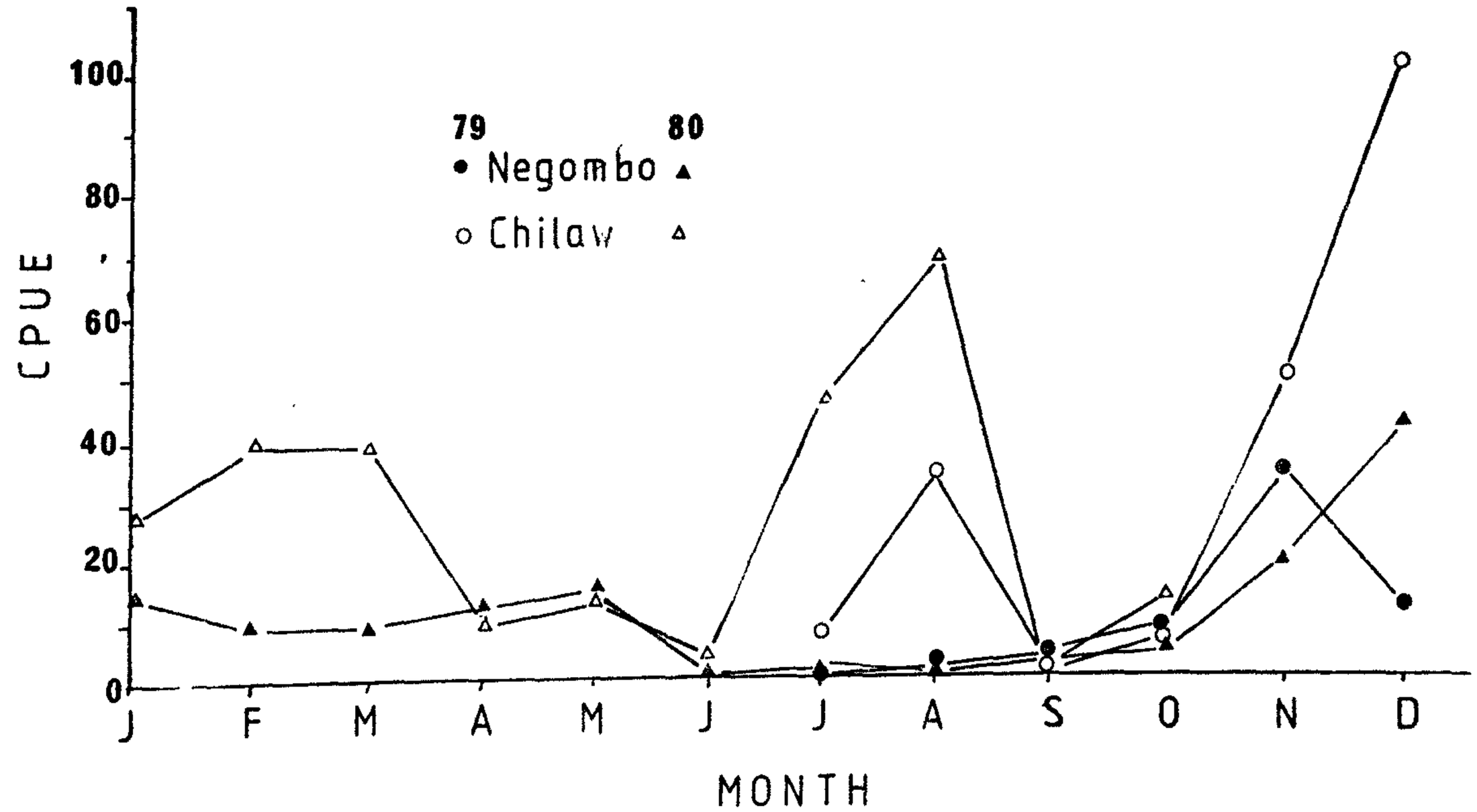

Fig. 8 : Monthly variation in CPUE of *Sardinella albella.*

The variation pattern of *S. albella* seemed to differ somewhat from the other two species (Fig. 8). Almost negligible catches were observed in September-October months which is the peak season for the other two species. It was also observed that fishing during these peak months was concentrated mainly at greater depths (> 20 m) and that *S. albella* was caught mainly in waters less than 20 m depth. This explains the lower catches obtained in September-October months and also the higher catches in November. However, the reason for low catches in June, even when fishing is carried out in relatively shallow waters, is not clearly understood.

Unlike in the other two species, the catches of *S. albella* showed a difference between the two areas. In Negombo, the highest CPUE values were obtained in November 1979 and in December 1980. However, in Chilaw almost three peaks were observed in February-March, July-August and November-December. Two of these seasons coincide with the estimated spawning season of this species (Dayarante, 1983).

6. Species composition of the catches

A total of 54 fish species belonging to 20 families were identified among the catches (see appendix V). of these, only 9 species are considered as important and their percentage compositions are given in Appendix III and IV for Negombo and Chilaw. Although a variety of species are caught by this year, sardines seem to constitute a major portion of the catches. Analysis of percentage composition has shown that the three species of *Sardines* (*A. sirm*, *S. albella* and *S. gibbosa*) together contribute to about 80% of the total catch.

Other *Sardinella* spp. such as *S. fimbriata*, *S. longiceps* and *S. melanura* although appear among the catches, their contribution to the fishery is not very remarkable. All these species are grouped together as other *Sardinella* spp. Among the others the *Stolephorus* spp. *Thrissocles* spp. and *Leiognathus* spp. contribute to the catches in considerable amounts.

Another interesting species that enters the fishery is the *Escualosa thoracata* (White sardine) which contribute heavily in May and June each year in Negombo.

7. Change in species composition with depth :

Species composition of the catches taken at different depths are given in Table 3. It

TABLE 3

PERCENTAGE SPECIES COMPOSITION OF THE CATCHES TAKEN AT DIFFERENT DEPTHS

Species	*Depth*			
	12*m*	12 - 29*m*	20 - 26*m*	26*m*
Amblygaster sirm	—	6.4	51.4	91.2
S. gibbosa	4.6	36.6	28.6	7.6
S. albella	27.5	38.1	3.8	—
Other *Sardinella* spp.	—	—	2.3	—
Kowala coval	20.8	3.0	—	—
Stolephorus spp.	21.9	1.2	—	—
Leiognathus spp.	4.5	3.6	—	—
Thrissocles spp.	18.9	5.6	—	—
Sphyreana spp.	—	3.0	1.7	—
Other spp.	2.1	2.6	12.4	1.2

was observed that most species are caught only at certain depths while few others are caught over the entire depth range fished by the small meshed gillneters. Of the three important *Sardine S. albella* is caught mainly at dpeths less than 20 m., *A. sirm* in deeper waters (> 20 M) while *S. gibbosa* is caught in consideratble amounts in mediam depths (12-26 M).

For *A. sirm* there is a graduation of size in that deeper the waters, larger the fish. This suggests some movement off-shore as the fish grows. In very shallow waters (> 12 m), catches are composed of a variety of other species. Of these, the *Stolephorus* spp., *Escualosa thoracata, Thrissocles* spp. and *Leognathus* spp. are of great importance. As seen from the monthly variation of the species composition of the catches (Appendices III & IV), the appearance of these species among the catches are highly seasonal. In relatively deeper waters (20-26 M), juveniles of other larger pelagic species such as tunas, mackeral and scad are caught occasionally. All these species are gouped together as other spp. in Table 3. At greater depths (> 26 m) a noticeable change in species composition is observed, where *A. sirm* contribute more than 90% of the catch.

CONCLUDING REMARKS

The small meshed gillnet fishery is mainly responsible for the small pelgaic fish catch in Negombo and Chilaw areas. The species composition indicates that the contribution to this fishery by sardines is significant.

The seasonal variation in catch rates of these sardines could probably be due to some reproductive behaviour. Therefore, it is important to study the reproductive biology of these species in detail. Age at maturity, spawning time and spawning areas seem to be most useful from fisheries point of view.

Distribution, migration and stock abundance should also be studied. It is also important to identify the sardine stocks in Negombo and Chilaw.

ACKNOWLEDGEMENTS

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APPENDIX 1.

Catch data collected from Negombo during the period March 1978 to December 1980

Month	*No. of sampling days*	*Mean No. boats sampled/day*	*Mean No. of boats operated per day*	*Catch/boat/day (kg.)*		*Total catch (Tonnes)*
				Mean	*Range*	
1979						
March	3	14	37	8.8	8-21	23
April	4	18	125	55.1	15-76	179
May	4	15	105	31.4	50-45	86
June	—	—	—	—	—	—
July	3	13	124	61.5	25-102	106
August	4	15	191	103.5	51-191	514
September	3	9	132	89.7	46-170	308
October	4	22	135	126.3	38-281	443
November	3	21	97	74.9	26-190	189
December	2	17	86	51.5	18-171	115
1980						
January	3	13	104	59.4	18-160	161
February	4	16	102	55.1	10-182	146
March	2	12	73	57.2	11-227	109
April	3	12	93	39.7	14-82	96
May	3	8	55	52.7	10-75	75
June	3	7	65	13.1	7-35	22
July	4	13	103	74.1	5-340	198
August	3	22	288	68.2	15-160	511
September	4	15	257	71.1	25-100	475
October	3	18	247	48.5	20-205	312
November	2	11	108	28.0	14-68	79
December	2	15	164	92.7	45-180	395

APPENDIX II.

Catch data collected from Chilaw during the period March 1979 to October 1980

Month	*No. of sampling days*	*Mean No. boats sampled/day*	*Mean No, of boats operated per day*	*Catch/boat/day (kg.)*		*Total catch (Tonnes)*
				Mean	*Range*	
1979						
March	3	5	31	138.2	51-290	111
April	3	9	42	68.2	32-112	75
May	4	3	38	31.1	8-51	31
June	—	—	—	—	—	—
July	3	11	23	15.3	5-32	9
August	3	13	64	64.9	18-101	108
September	3	13	31	107.1	37-297	86
October	4	15	113	241.3	100-520	709
November	4	13	91	100.1	28-180	237
December	3	18	95	154.9	25-310	383
1980						
January	2	5	30	35.1	8-90	27
February	2	4	56	102.8	45-160	150
March	3	11	83	66.8	34-114	144
April	4	8	42	41.2	32-57	45
May	2	9	57	22.5	10-45	33
June	3	4	21	37.3	12-125	21
July	4	14	128	105.7	35-340	352
August	4	21	283	134.9	45-227	993
September	3	18	226	142.3	20-385	836
October	4	10	106	86.8	23-170	239

APPENDIX III.

MONTHLY VARIATION IN PERCENTAGE SPECIES COMPOSITION OF THE CATCHES IN NEGOMBO

Species	*July* 1979	*Aug.*	*Sep.*	*Oct.*	*Nov.*	*Dec.* 1979	*Jan.* 1980	*Feb.*	*Mar.*	*Apr.*	*May*	*June* 1980
Amblygaster sirm	58.6	72.3	33.1	31.4	29.2	29.2	10.1	35.0	44.5	57.9	42.2	17.4
Sardinella gibbosa	29.1	14.1	22.3	43.8	18.7	33.2	19.5	23.6	31.4	8.5	2.5	2.6
Sardinella albella	2.4	1.8	3.9	8.3	45.1	21.2	26.9	16.8	13.3	30.5	27.9	3.2
Other *Sardinella* spp.	9.0	9.6	2.5	10.4	1.3	—	1.6	6.3	2.8	1.3	2.5	—
Escualosa thoracata	—	—	—	0.8	—	0.3	0.6	—	—	—	6.9	76.3
Stolephorus spp.	—	—	0.05	4.6	0.4	—	0.2	5.1	0.8	—	—	—
Leiognathus spp.	0.3	0.3	0.1	0.6	1.0	0.7	2.3	2.7	2.3	1.2	15.5	—
Thrissocles spp.	0.2	0.8	—	—	0.9	9.0	33.6	9.1	3.1	—	0.5	—
Sphyreana sp.	—	0.8	—	—	0.2	—	—	—	0.9	—	—	—
Other spp.	1.5	0.2	0.3	0.3	1.0	6.0	5.1	2.6	1.5	0.6	1.9	0.5

APPENDIX IV.

MONTHLY VARIATION IN PERCENTAGE SPECIES COMPOSITION OF THE CATCHES IN CHILAW

Species	*July* 1979	*Aug.*	*Sep.*	*Oct.*	*Nov.*	*Dec.* 1979	*Jan.* 1980	*Feb.*	*Mar.*	*Apr.*	*May*	*June* 1980
Amblygaster sirm	39.4	15.9	76.3	87.5	38.2	21.0	17.5	28.0	11.5	71.2	4.6	72.6
Sardinella gibbosa	14.5	17.4	9.0	8.8	5.3	13.8	4.5	14.1	14.4	2.4	2.2	2.5
Sardinella albella	44.0	52.9	1.7	2.7	48.9	64.8	76.2	38.2	59.4	23.1	61.7	12.5
Other *Sardinella* spp.	—	—	5.2	—	—	—	—	18.1	13.8	2.4	1.1	1.0
Escualosa thoracata	—	—	—	0.2	—	—	—	—	—	—	1.1	0.4
Stolephorus spp.	—	—	—	0.1	—	—	—	—	—	—	—	—
Leiognathus spp.	0.7	4.1	—	—	—	0.1	—	0.8	0.7	0.3	17.83	—
Thrissocles spp.	—	3.1	—	—	0.2	0.1	—	0.6	—	—	0.6	1.6
Sphyreana sp.	—	—	0.5	—	0.3	—	—	—	—	—	—	—
Other spp.	1.2	8.6	6.7	0.8	7.2	0.3	1.8	0.1	1.2	0.5	10.9	7.3

APPENDIX V.

LIST OF THE FISH SPECIES IDENTIFIED IN THE CATCHES OF SMALL - MESHED GILLNET FISHERY

Scientific name	*English name*
Clupeidae	
Sardinella albella	White sardinella
Sardinella gibbosa	Gold striped sardinella
Amblygaster sirm	Spotted sardinella
Sardinella fimbriata	Fringed scale sardine
Sardinella longiceps	Indian oil sardine
Sardinella melanura	Black tiped sardinella

Appendix V Contd.

Scientific Name	*English name*
Escualosa thoracata	White sardine
Amblygaster clupeoides	
Opisthopterus tardoore	Tardoore
Herklotsichthys punctatus	Spotted herring
Hilsa kelee	Kelee shad
Ilisha elongata	Elongate ilisha
Ilisha melanostoma	Indian ilisha
Nematolosa nasus	Bloch's gizzard shad
Dussumieriidae	
Dussumieria acuta	Rainbow sardine
Engrauljdae	
Stolephorus commersonii	Commersons anchovy
Stolephorus indicus	Indian anchovy
Stolephorus heterolobus	Short head anchovy
Stolephorus bataviensis	Spot faced anchovy
Thrissocles mystax	Mustached anchovy
Thrisssocles hamiltonii	Hamiltons anchovy
Thrisssocles malabaricus	Malabar anchovy
Thrissocles setirostris	Long jaw anchovy
Chirocentridae	
Chirocentrus dorab	Wolf herring
Hemirhamphidae	
Hyporhamphus gaimardi	Gaimardi half beak
Hyporhamphus unifaciatus	Silver lined half beak
Sphyraenidae	
Sphyraena jello	Giant sea pike
Atherimidae	
Allanetta forskali	Hardy head
Ambassidae	
Ambassis commersonii	Glassy perchlet
Lactaridae	
Lactarius lactarius	White fish
Sillaginidae	
Silago sishama	Silver whiting
Carangidae	
Decapterus rasselli	Russel's scad
Gnathanodon speciosus	Golden travelly
Alectis indica	Indian threadfin travelly
Selar mate	One finlet scad

Appendix V Contd.

Scientific name	*English name*
Sellar kalla	Golden scad
Carangoides malabaricus	Malabar travelly
Chorinemus toll	Slender queenfish
Selar crumenopthalmus	Round scad
Menidae	
Mene maculata	Moonfish
Gerridae	
Pertica filamentosa	Long rayed silver biddy
Leiognathidae	
Leiognathus splendens	Splendid pony fish
Leiognathus lineolatus	Lined pony fish
Secutor insidiator	Slender bared pony fish
Secutor ruconius	Deep bodied pony fish
Gazza minuta	Toothrd pony fish
Caesionidae	
Caesio chrysozonus	Golden banded fusilier
Trichuridae	
Trichurus savala	Ribbon fish
Scombridae	
Rastrelliger kanagurta	Indian mackeral
Auxis thazard	Frigate mackeral
Cybium commersonii	Bared spanish mackeral
Indocybium guttatum	Spotted spanish mackeral
Stromateidae	
Pampus argenteus	Silver pomfret
Tricanthidae	
Tricanthus brevirostris	
Diodontidae	
Diodon hystrix	Spotted porcupine fish