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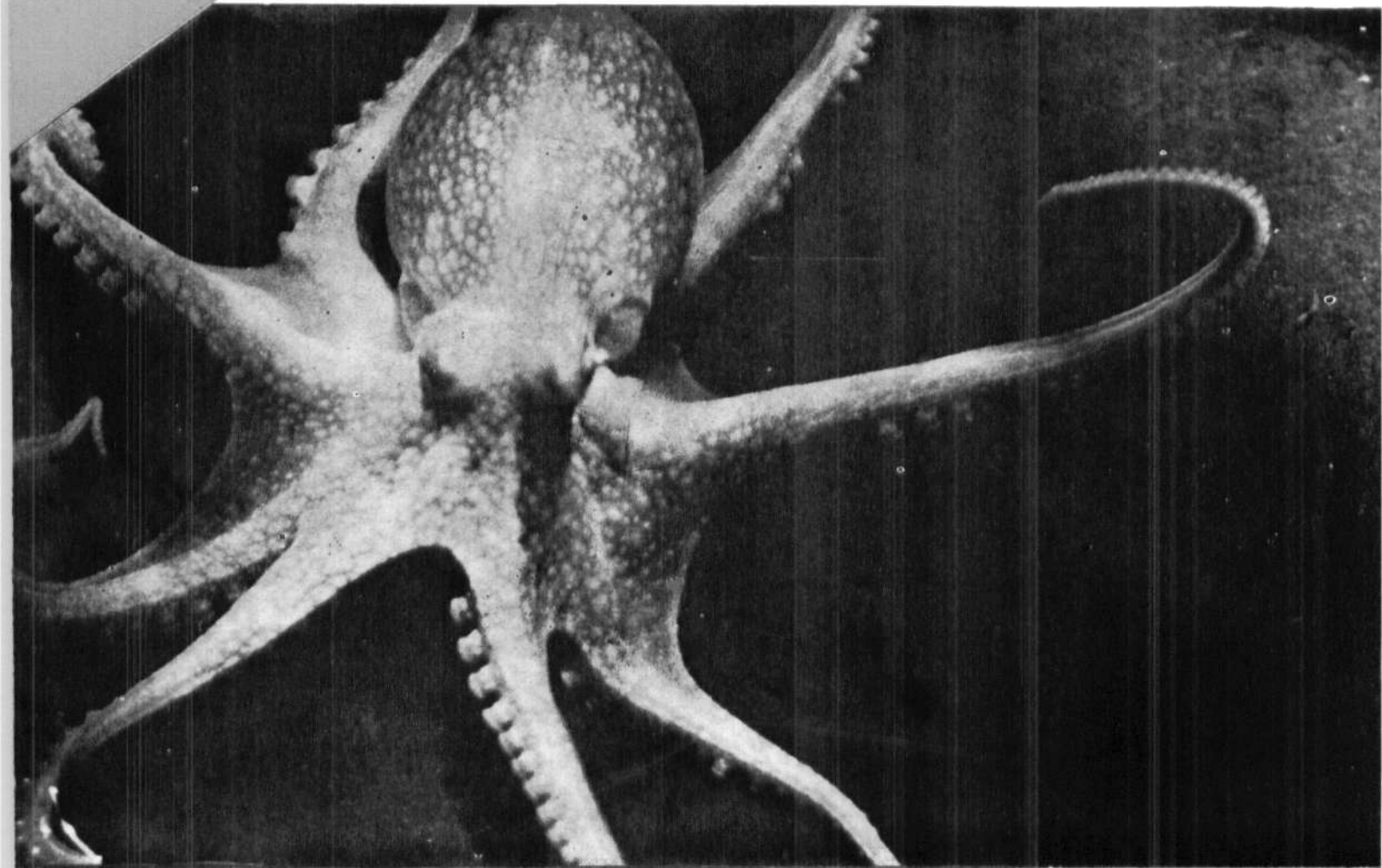
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CEPHALOPOD BIONOMICS, FISHERIES AND RESOURCES OF THE EXCLUSIVE ECONOMIC ZONE OF INDIA

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AREAWISE AND GEARWISE PRODUCTION OF CEPHALOPODS

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ABSTRACT

The coasts of the maritime states of India have been divided into subareas and the annual and seasonal trends of the areawise and gearwise landings of cephalopods and CPUE have been studied in detail.

WEST BENGAL

West Bengal which has a coastline of 600 km is treated as a single area. In this state cephalopods amounting to 82 t have been landed only in 1971 and there was no production in the other years during 1968-77 (Fig. 1). The entire landings of 82 t of cephalopods were obtained in the shore seine *Sarini jal* in November, 1971 and formed 1.9% in that month's total catch and 0.9% in the annual catch.

ORISSA

The State which has a coastline of 480 km has been divided into two areas viz., A-extending from Gadhadharpur to Chandnipal (288 km) and B-from Pentakota to Kavitysonapur (192 km). In the period 1968-72 as well as in 1973-77, there were no cephalopod landings from area A (Fig. 1). In area B, small quantities of cephalopods were obtained in the months January to May and November. Annual landings of 1.6-18.5 t were caught in the period 1968-72 and the landings varied between 0.2 t and 27 t in 1973-77. The cephalopods formed 0.1% of the total production during 1968-72 and 0.6% during 1973-77.

In area B cephalopods were caught in two types of gear, shore seines (*Pedda vala*) and boat seines (*Iraga*

vala). Boat seines were employed throughout the year but cephalopods were obtained only in March and April. Shore seines were also operated all round the year but cephalopods were caught only in six months, January-May and November. In the cephalopod catches during 1973-77 boat seines accounted for 67.5% and shore seines 32.5%. The boat seine landings were obtained in March and April in 1973 and 1976, when they amounted to 3.3 t and 21.3 t (Figs. 1 and 2). The CPUE in 1976 was higher (0.8 kg) compared to that (0.1 kg) in 1973 although the effort was only 42% of that in 1973. In boat seine all fish catches, cephalopods formed 0.2% and 4.4% in 1973 and 1976 respectively. The annual shore seine cephalopod catches fluctuated between 0.2 t to 6.2 t and CPUE between 0.01 kg and 0.5 kg, the landings showing no distinct changes in relation to variations in effort. The catch rates were better in March and April than in other months. In the total shore seine catches cephalopods represented only 0.03 to 1.0%.

Hooks and lines had been employed from January to April in all the five years in area B, but there were no cephalopod landings. Trawls nets were operated in several months in 1973 and 1975 in area A but cephalopods were not obtained in this gear also.

CEPHALOPOD LANDINGS IN WEST BENGAL AND ORISSA (IN TONNES).

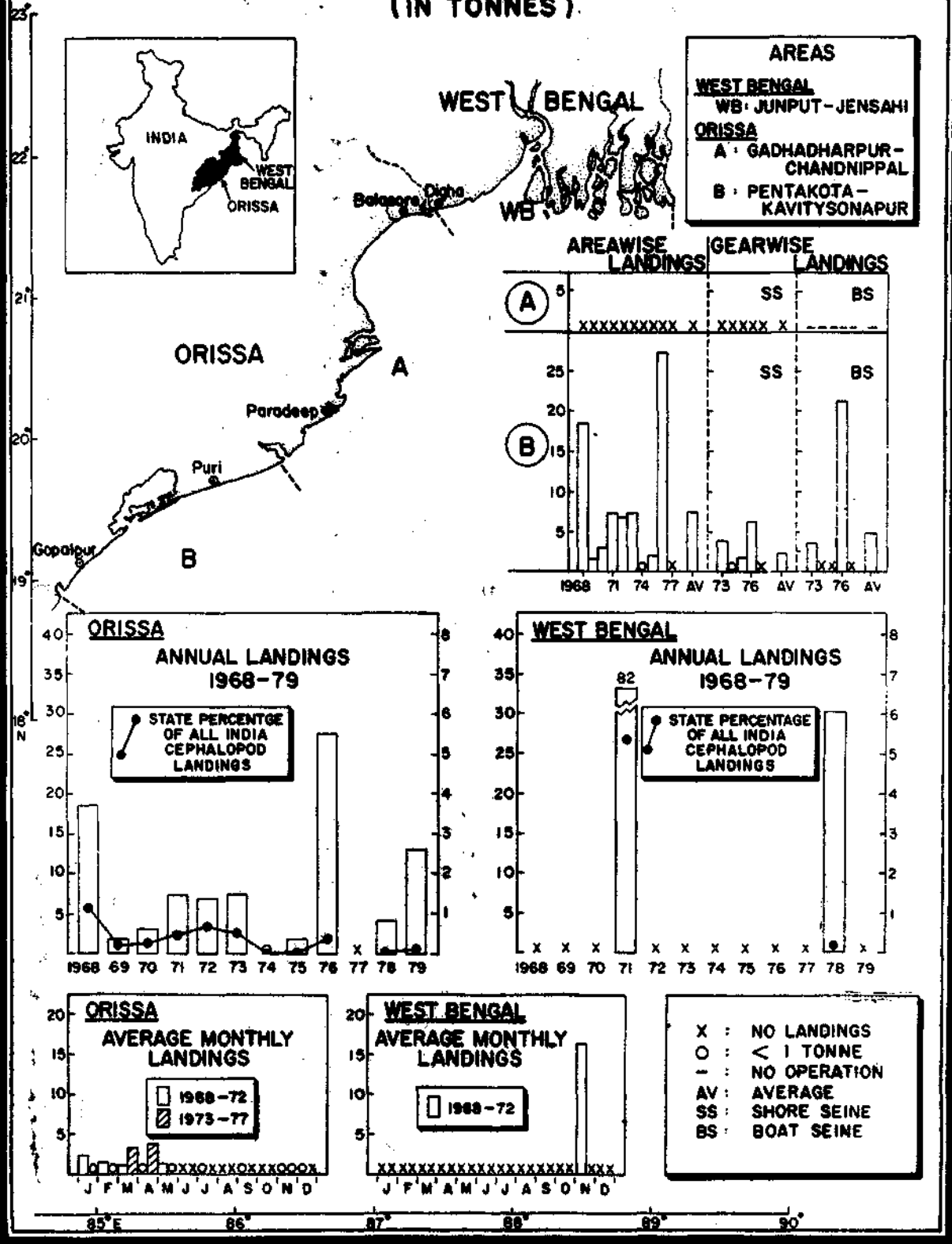


FIG. 1. Annual landings, state percentage in all India cephalopod landings (1968-'79) and average monthly landings (1968-'72) in West Bengal, and annual landings, State percentage in all India cephalopod landings (1968-'79) areawise (1968-'77) and gearwise (1973-'77) landings and average monthly landings (1968-'77) in Orissa.

ANDHRA PRADESH

The coast of Andhra Pradesh extending over 982 km has been divided into five areas viz., A-extending from Donkuru to Geddalapadu (83 km), B-Kumuduvanipeta to Dhonipeta (71 km), C-Chintapalli to Kothapatnam (119 km), D-Bangarammapalem to Bhairavanipalem (161 km) and E-Pandi to Pulinjerikuppam (548 km) (Fig. 3).

During the period 1968-72 the best catches were obtained in area A with average annual landings of

fluctuated between 2 t and 14 t. In this area moderately good catches were got in February, August and September. Cephalopods formed less than 1% of the total marine production in the area. The annual cephalopod landings from area D amounted to 7.9 t in 1969 and formed 2.8 t and 0.1 t in 1968 and 1971 respectively. The catches were obtained only in a few months February, April, August and November and they were better in the earlier two months.

During 1973-77 period, the cephalopod production was highest in area D with average landings of 92.7 t

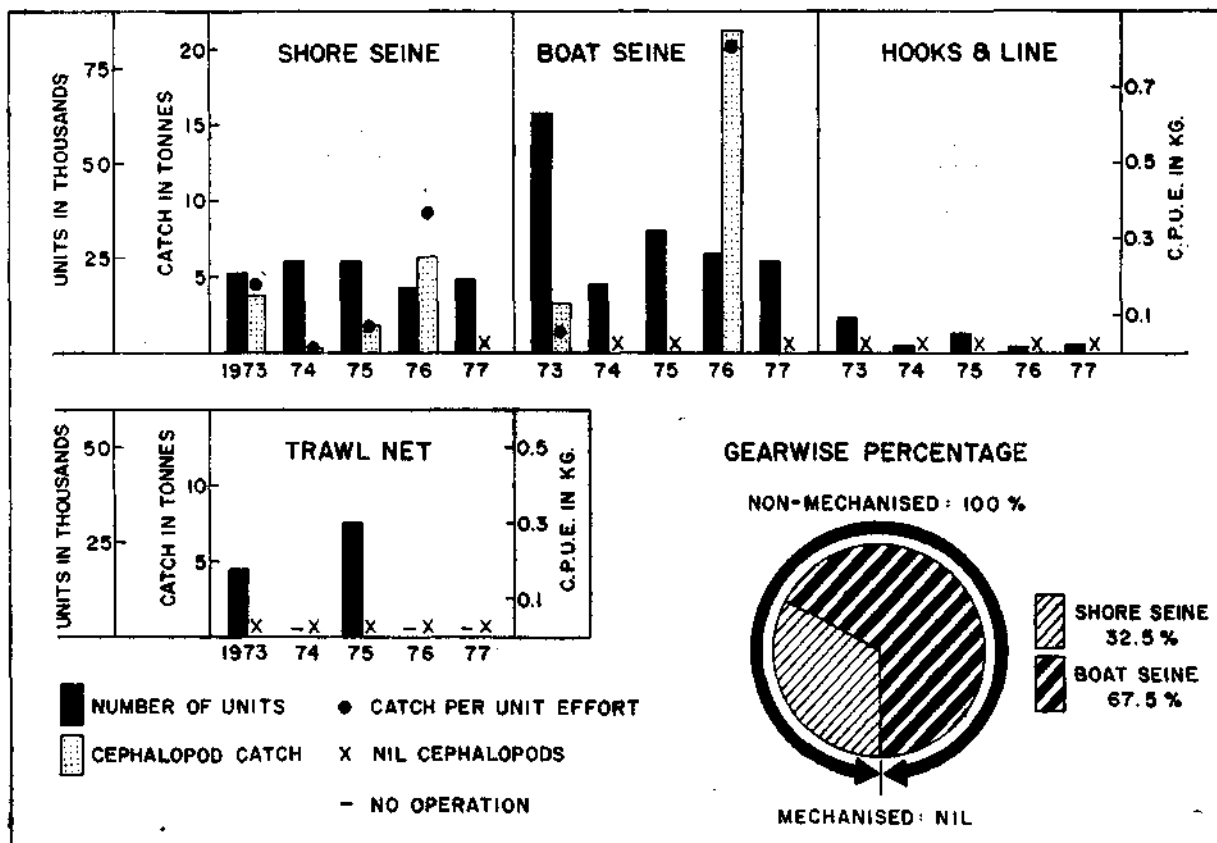


FIG. 2. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Orissa, 1973-77.

165.3 t. Areas C and D were next in importance but the average production was comparatively much less viz., 13.9 t and 2.1 t respectively. In areas B and E there were no cephalopod landings (Fig. 3). In area A the cephalopod landings showed a sharp increase from 58 t in 1968 to 642 t in 1970 but underwent a steep fall to 9.6 t in 1972. The average monthly landings in 1968-72 varied from less than 1 t to 100.4 t and the best catches were obtained from February to April. In this area cephalopods formed up to a maximum of 7% (February) with average annual percentage of 1.4% in total marine landings. In area C the annual production was 40.3 t in 1968 and in other years it,

The other areas in the order of abundance of landings were area C (30.5 t), area B (14.9 t), area A (10.7 t) and area E (1 t).

In Andhra Pradesh during 1973-77 period, 62.9% of the cephalopod landings were obtained in trawl nets and the rest in three non-mechanised gears viz., boat seines (*Iraga vala*) 21.6%, shore seines (*Pedda vala*) 15.2% and 0.3% in hooks and lines (*Galamu*) (Fig. 4). Among the various gears, the average monthly CPUEs of trawl nets were highest (0.5-3.2 kg) and shore seines were next in importance. The best cephalopod catches were obtained in trawl nets in March, May, September

CEPHALOPOD LANDINGS IN ANDHRA (IN TONNES)

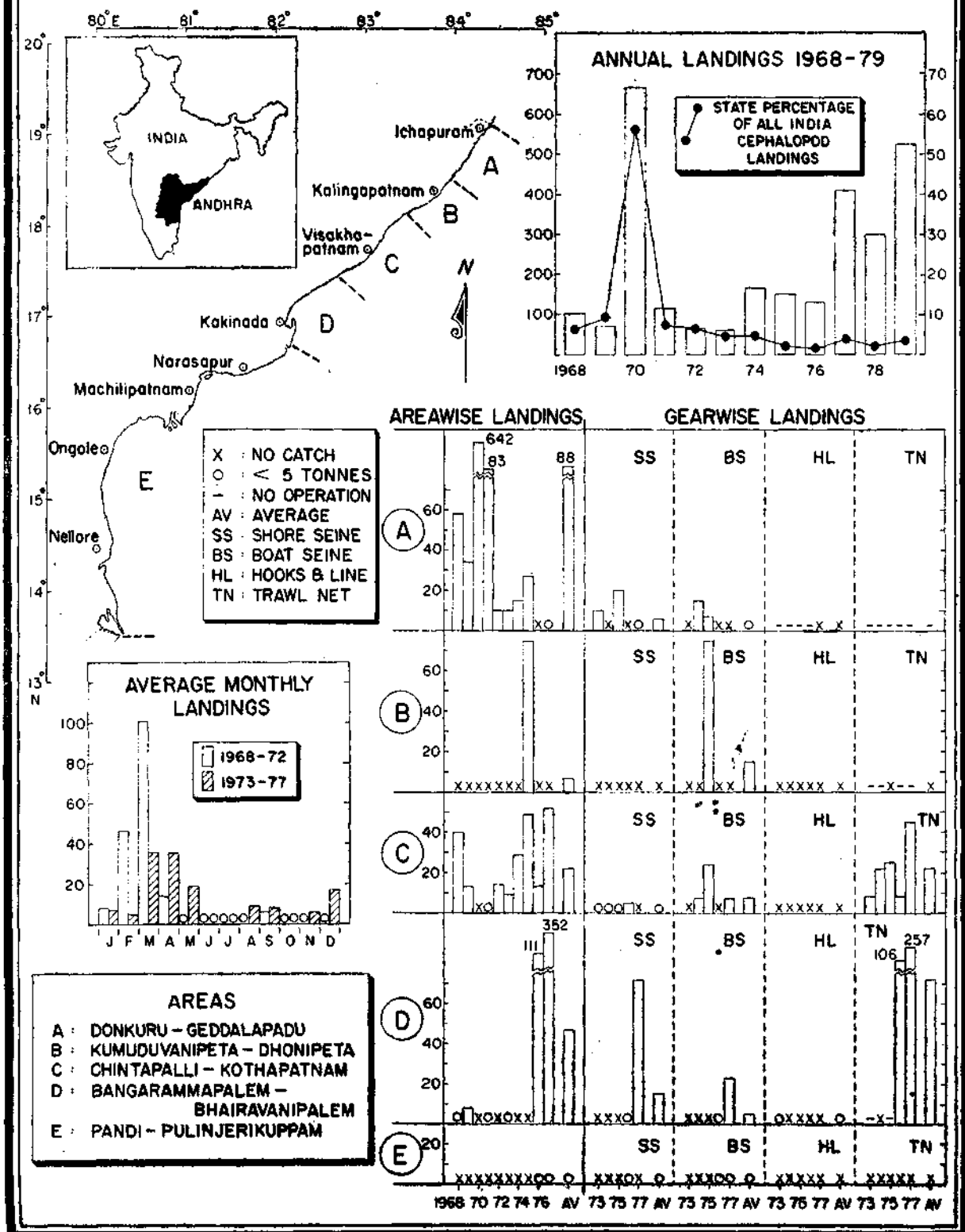


FIG. 3. Annual landings, state percentage in all India cephalopod landings (1968-'79), areawise (1968-'77) and gearwise (1973-'77) landings and average monthly landings (1968-'77) in Andhra Pradesh.

and December and in shore seines and boat seines in March-April.

In area D the landings were negligible (1 t) in 1973 and increased sharply to 110.6 t in 1976 and 351.8 t in 1977. The best catches were obtained in March-May and December. In this area cephalopods formed 0.1 to 1.3% in total marine landings. Trawl nets were operated in this area in 1974, 1976 and 1977. The landings amounted to 105.7 t in 1976 and increased by nearly two and half times in 1977 to 256.8 t as a result of a rise in effort by 76%. The CPUE showed a

Only in 1973 hooks and lines landed small quantities of cephalopods with the annual landings amounting to 1 t.

The cephalopod production in area C showed a rise from 8.8 t in 1973 to 49.1 t in 1975, a fall in 1976 to 13.4 t followed again by a rise to 51.7 t in the next year. Good catches were obtained in this area from March to May and in all the other months the catches were much less. In this area cephalopods accounted for less than 1% in the total marine production. The landings of trawlers in the area showed a rise from 8.3 t in 1973 to 45 t in 1977 following an increase in

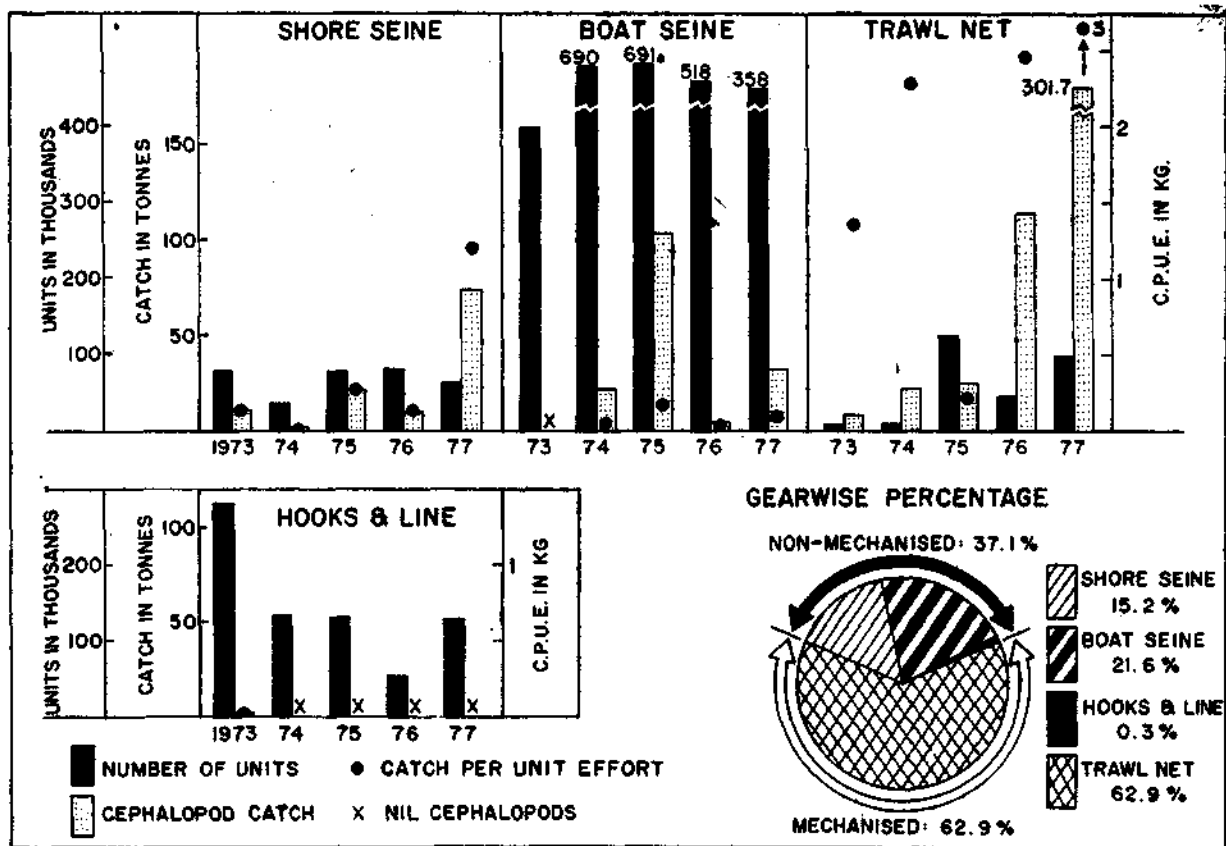


FIG. 4. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Andhra Pradesh, 1973-'77.

rise from 3.2 kg in 1976 to 4.5 kg in 1977. In the total fish production of trawlers in this area, cephalopods formed 1-1.1%. Cephalopods were not landed in 1974. The cephalopod landings of shore seines amounted to only 1.8 t in 1976 but increased sharply to 71.7 t in 1977 although the rise in effort was only 13.4%. The CPUE was only 0.1 kg in 1976 and increased to 4.2 kg in 1977. The boat seine cephalopod landings also increased from 3.1 t in 1976 to 23.3 t in 1977 though there was not much change in the effort.

effort by seven times. The CPUE increased from 1.5 kg in 1973 to 3.6 kg in 1974 and decreased to 1.1 kg in 1977. The cephalopods contributed less than 1% to 1.9% of the total trawl landings. The boat seines landed 6.6 t to 24.2 t during 1974-'75 and 1977 with CPUEs varying between 0.4 kg and 0.1 kg. The annual landings by shore seines amounted to 0.2 t to 5.3 t and the CPUE fluctuated over a narrow range of 0.02 kg and 0.3 kg. Though hooks and lines were operated on a large scale no yield of cephalopods was noticed.

In area B cephalopods were landed only in one year, 1975 during the period 1973-'77. 99% of these landings were obtained in a single month April and the rest in September in boat seines. Cephalopods were not got from this area in shore seines, hooks and lines and trawl nets.

The annual cephalopod landings in area A ranged between 9.6 t and 27.1 t during 1973-75 and decreased to 2.1 t in 1977. Good landings were obtained in this area only in one month, March. The shore seine landings increased from 9.6 t in 1973 to 20.5 t in 1975 although there was a fall in effort by about 39%. There was a steep fall in the landings to 2.1 t in 1977 although there was an increase in effort by about 22% compared to that in 1975. Boat seines were operated in this area in all the five years, 1973-'77 but cephalopod catches were obtained only in 1974 and 1975 when they amounted to 14.8 t and 6.6 t respectively. Hooks and lines were employed only in 1977 and there were no cephalopod catches. Trawlers were not at all operated in this area.

Very small quantities of cephalopods were landed by shore seines and boat seines in area E during 1976 and 1977 with the annual production amounting to 2.6 t and 2.5 t respectively. The catches were obtained in the months January, July and September.

TAMIL NADU

The Tamil Nadu coast which extends over 1,000 km is divided into eight areas viz., area A-extending from Arangamkuppam to Alamharikuppam (11 km), B-from Thiruvattiyurkuppam to Thiruvanniyurkuppam (35 km), C- from Muthukkudukuppam to Pudupettai (79 km), D-from Porto novo to Arasanagiri (254 km), E-from Sundarapandianpattinam to Rochema Nagar (235 km), F- Rameswaram Island (69 km), G- from Vembar to Chinnamuttom (151 km) and area H-from Kanyakumari to Neerodi (66 km) (Fig. 5).

During 1968-72 the average annual cephalopod production was highest in area H with average annual landings of 254.8 t and areas B and E ranked second and third with average landings of 68.6 t and 40.8 t respectively. Areas D (25.5 t) and C (24.6 t) were next in importance. The landings were very low in areas F (9.3 t), G (2.9 t) and A (2.3 t).

In area H the cephalopod landings were highest 195.2 t in 1971 and decreased to 55.5 t in 1972 and good catches were obtained in February, April, November and December. In area B the landings were high, 143.9 t and 121.1 t in 1969 and 1972 and the

catches were good in July and August. In area E the annual landings varied from 28.8 t to 88.2 t during 1968-71 and declined to 7.1 t in 1972. In this area the best catches were obtained in April-May. During 1968-70 the annual landings in area D varied between 3.7 t (1970) and 25.2 t (1969) and the production was higher during 1971 and 1972 being 43.1 t and 40.7 t respectively. The catches were better during July-September and November. The landings from area C amounted to 46.2 t and 41 t in 1968 and 1971 and were less viz., 22.5 t and 13.3 t in 1969 and 1972 respectively with higher catches in July, August and October than in other months. The cephalopod catches from area F increased from 11.2 t in 1968 to 19.8 t in 1969 and there was a distinct fall in the catches during 1970-72. Good catches were obtained in the months March-May. The production in area G was low, the annual landings amounting to 12 t and 2.5 t in 1968 and 1971 respectively with catches during the last quarter of the year only. The landings from area A were also low with annual catches varying from less than 1 t to 5.3 t.

During 1973-77 the cephalopod production was maximum in area H with an average annual landings of 564.6 t followed by area D (318.8 t) and area B (265.6 t). The other areas in the order of importance were area E (197.8 t), area C (50.1 t) area F (21.1 t), area A (9.5 t) and area G (4.3 t).

In the period 1973-77, trawl nets accounted for 35.1%, hooks and lines (*Choondai*) 28.5%, shore seines (*Kara valai*, *Peria valai*, *Ola valai*) 20.6% and boat seines (*Thuri valai*, *Thattumadi*, *Kacha valai*) 15.8% (Fig. 6). The CPUE of shore seines was highest 3.1 kg, of trawl nets 1.9 kg, of hooks and lines 0.8 kg and of boat seines 0.5 kg. The highest cephalopod landings were obtained in shore seines in January-April and June, in boat seines in May, July-September and November-December, in hooks and lines in January-February and September-December and in trawl nets in a number of months viz., February-March, June-September and November.

The average annual landings of 564.6 t obtained from area H during 1973-77 were over seven times that in 1968-72. The total production in this area rose steeply from 16.8 t in 1973 to 927.9 t in 1977 though there was not much change in the effort put in. The highest yields were obtained in September-October and fairly good catches in November-February. In this area the cephalopod catches of hooks and lines amounted to as much as 66.3% and the landings from this gear increased sharply from 88.7 t in 1974 to 813.6 t in 1975 although the increase in effort was only 22.2%

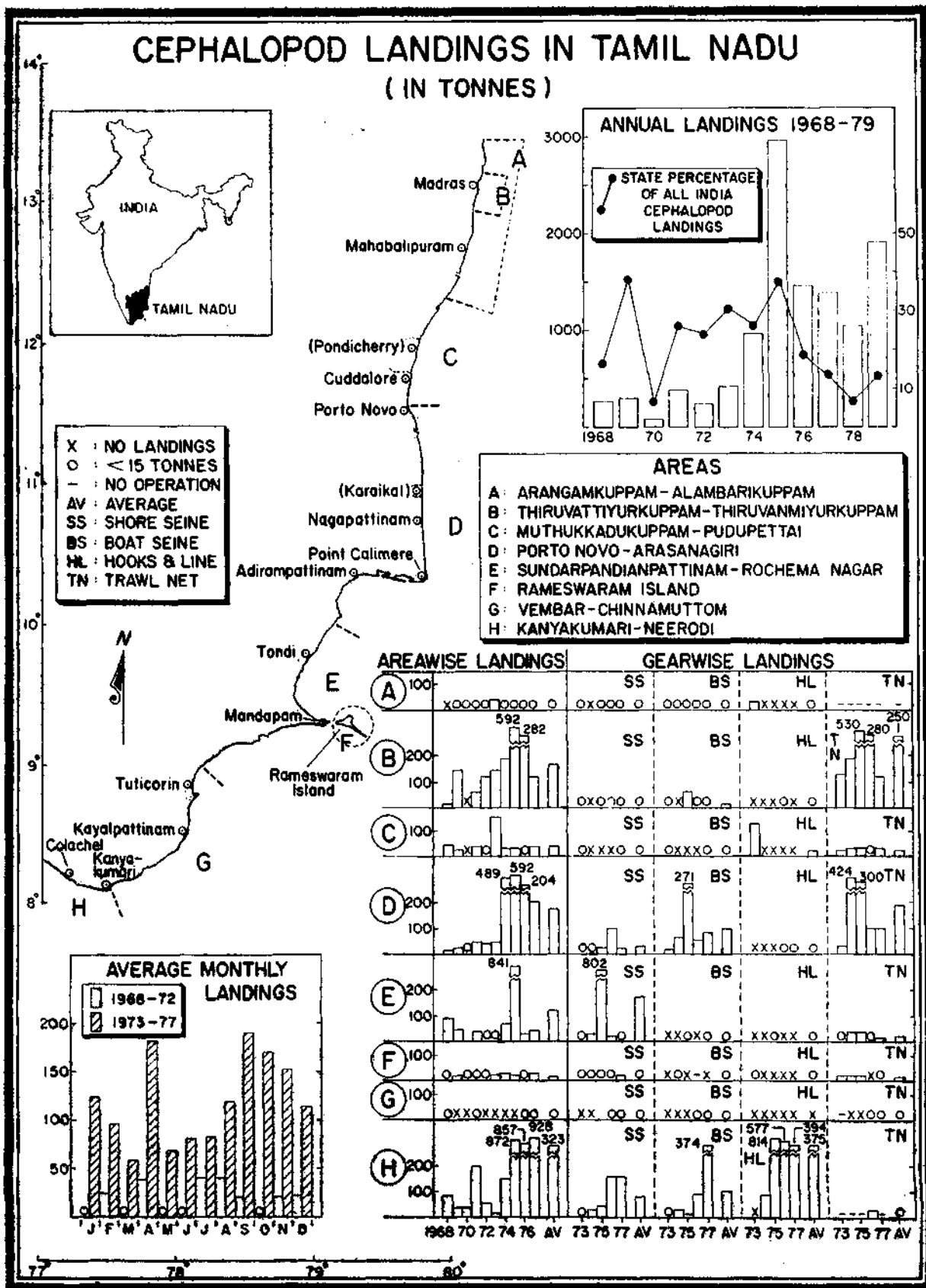


Fig. 5. Annual landings, State percentage in all India cephalopod landings (1968-'77), areawise (1968-'77) and gearwise (1973-'77) landings and average monthly landings (1968-'77) of Tamil Nadu.

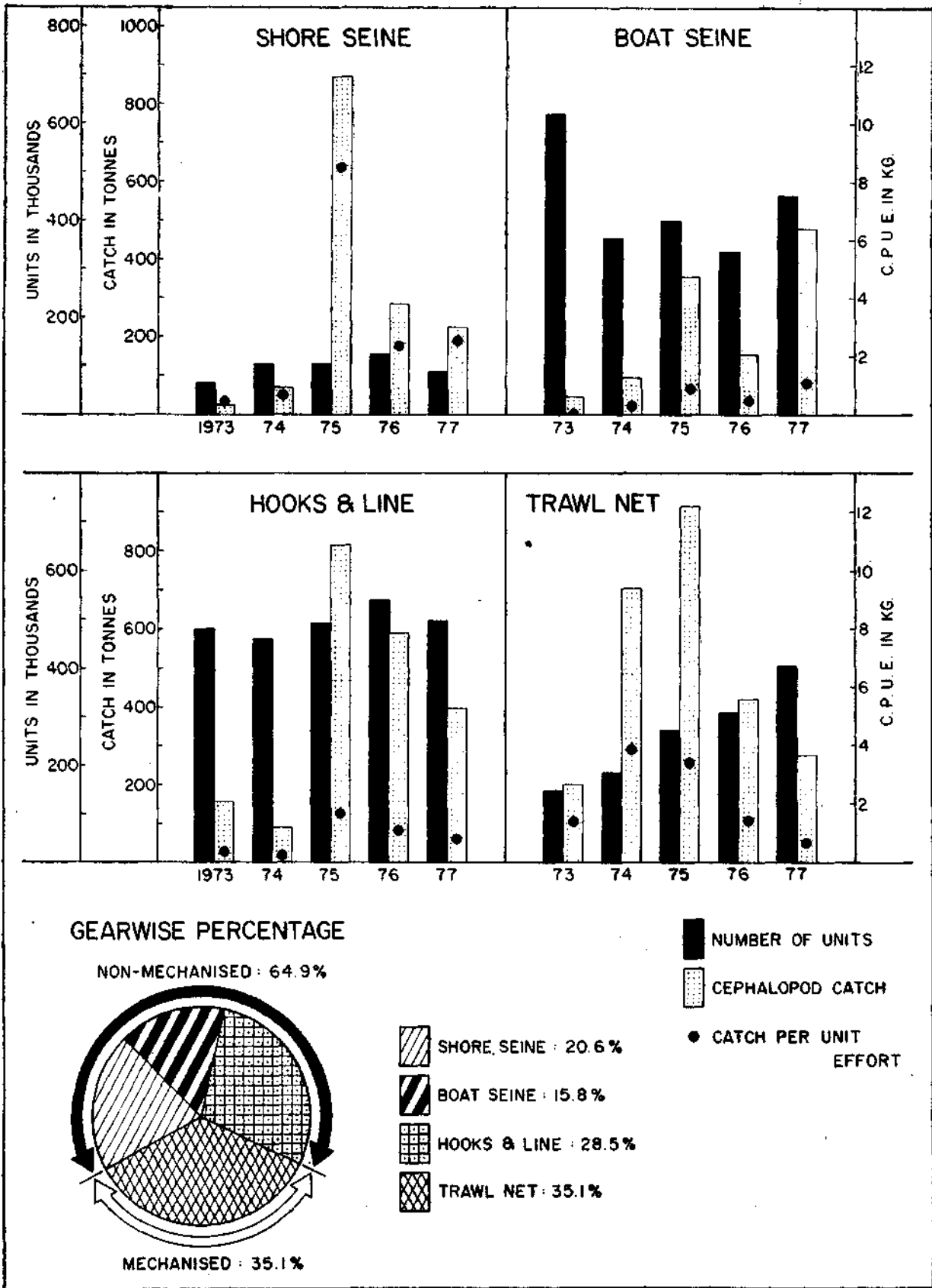


FIG. 6. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Tamil Nadu, 1973-'77.

Later there was a fall in landings to 576.5 t and 394.1 t in 1976 and 1977 when there was not much change in the effort put in. The CPUE showed a trend similar to that of the landings with highest value of 12.4 kg in 1975. Cephalopods were an important item of hooks and lines catches forming 6 to 12% during 1975-77. Boat seines accounted for 18.6% of the cephalopod landings in this area. Though the effort decreased by 17.9%, the cephalopod landings by boat seines increased from 6.9 t in 1973 to 373.9 t in 1977 and the CPUE showed an increase from less than 1 kg to 2.5 kg. In the boat seine landings cephalopods formed from less than 1% to 1.8%. The shore seines landed 14.1% of the cephalopods in the area and the catches exhibited a large increase of over fifteen times from 9.9 t in 1973 to 160 t in 1977 when the effort rose by about 100%. During the same period the CPUE increased from 0.6 kg to 4.9 kg, the cephalopods forming 1.2-5.6% of the shore seine landings. Trawl nets were operated in this area only in 1976 and 1977 and in the former year 28.4 t of cephalopods with a high CPUE of 26.2 kg were obtained, accounting for about 1.0% of the trawl landings.

In area D, the cephalopod landings exhibited a large increase from 46 t in 1973 to 591.7 t in 1975 although the total effort put in decreased by 28%. In 1977 the landings decreased to as much as 204.4 t in spite of a rise in effort by as much as 59%. In this area the best catches were obtained in May and November and moderately good catches in March, June and December. 59.4% of the cephalopod production in this area was landed by trawlers. The annual landings were high viz., 423.7 t and 300.1 t in 1974 and 1975 respectively. In 1976 although the effort increased by as much as 46.8% the landings steeply declined to 98.1 t and in 1977 with a fall in effort by 40%. The production was similar (98.5 t) to that in the previous year. The CPUEs closely followed the trend of catches with higher values of 6.9 kg and 3.7 kg in 1974 and 1975 and lower values of 0.8-1.4 kg in other years. Cephalopods formed 1.7 to 3.1% in the trawl landings in 1974-75 and in other years they formed less than 1%. The boat seine catches of cephalopods formed 30.1% of the total landings in this area and rose from 18.3 t in 1973 to 271 t in 1975 in spite of a fall in effort by 63.7%. The landings showed a steep decline to 80.6 t in 1977 though the effort spent in that year was more than double that in 1975. The CPUE of boat seines was 4.1 kg in 1975 and varied between 0.1 kg and 0.6 kg in the other years. In boat seine catches cephalopods formed less than 1% in 1973 to 14.1% in 1975. The cephalopod landings of shore seines which accounted for 9.5% of the total

production in this area increased from negligible quantities in 1973 to 98.6 t in 1976 when the effort more than doubled and declined to 23.7 t in 1977 with a fall in effort by 60%. The average CPUE was 3.5 kg in 1976 and decreased to 2.1 kg in 1977. Hooks and lines were operated throughout 1973-77 but only in 1976 and 1977 small catches of cephalopods of 13.1 t and 1.6 t were landed with CPUEs of 0.3 kg and 0.2 kg respectively.

A high cephalopod production of 591.7 t was observed in 1975 in area B but in other years the production was much less and fluctuated between 122.9 t and 282.1 t. The best catches were obtained in this area from June to August. The predominant cephalopod catches amounting to 93.8% were obtained in this area in trawl nets. The landings increased by more than four times from 129.8 t in 1973 to 529.9 t in 1975 although there was a decrease in effort by 15.7%. The production declined to 118.4 t in 1977 in spite of rise in effort by about 16%. The CPUE was high, 13.2 kg in 1975 and decreased to 2.6 kg in 1977. Cephalopods formed 6.6% of the total trawl landings in 1975 but accounted for only 2.1% in 1977. The catch of boat seines amounted to 5.7% of the total production in this area. The landings were moderately good in 1975 with an annual production of 61.6 t but in the other years they amounted to only 0.4-9.5 t. The cephalopod landings of shore seines in this area were very low and only in 1973 they amounted to 3.3 t with a CPUE of 1.4 kg. Hooks and lines were operated in this area in good numbers in all the years but only in 1976 a meagre catch of 0.7 t was obtained.

As in areas B, D and H, in area E also the annual cephalopod production was very high, 841.5 t in 1975. However, in the other four years of the period 1973-77, the landings were low, 10.1 t (1973) to 68 t (1974). The highest catches were obtained in two months, April and May. 88.5% of the production from this area was obtained in shore seines. The shore seine landings in 1975 were very high, 801.6 t but in the other years they were very low, 10 t (1973)—30.4 t (1974) with no well defined variations in the catches in relation to the effort put in. The CPUE and percentage contribution of cephalopods were very high in 1975 being 30.7 kg and 14.8% respectively and the values were very low in other years. 9.9% of the cephalopod landings in the area were obtained in trawl nets and the rest by boat seines and hooks and lines. The trawl net production was 37.6 t and 34.9 t in 1974 and 1975 but amounted to only 6.6 t and 18.6 t in the next two years, 1976 and 1977 in spite of increase in effort by 4% and 23%. Annual landings of 3.3 t and 10.9 t

were obtained in boat seines in the area only in two years 1975 and 1977 and hooks and lines landed 1.7 t in 1975.

In area C, the cephalopod landings were highest, 150.4 t in 1973 and declined very much in subsequent years with catches varying between 7.3 t (1976) and 34.1 t (1977). The catches were better in January, June and July than other months. Hooks and lines and trawl nets accounted for bulk of the landings of 49.8% and 45.3% and shore seines and boat seines 4.3% and 0.6% respectively. Hooks and lines formed 82.9% of the entire cephalopod production in 1973 with a catch of 124.7 t with a CPUE of 9.9 kg and percentage contribution of 54.2. There were no landings from this gear during 1974-77. The annual trawl landings varied between 6 t and 28.9 t and showed no correlation with the effort put in. The CPUE of the trawlers varied from less than 1 kg to 3.4 kg and cephalopods formed 0.6-3.0% of total trawl landings. Shore seines and boat seines were employed during all the years but cephalopod yields were very poor.

In area F, the annual cephalopod production varied between 2.2 t (1976) and 30.8 t (1974). The landings were better in February and from May to August. Most of the catches were obtained in trawl nets (71.8%) and shore seines (28%). The cephalopod production of trawlers varied between 8 t (1977) and 25.5 t (1974). The CPUE was less than 1 kg. The annual cephalopod landings of shore seines formed 5.2 t and 21.7 t in 1974 and 1977 and were still lower in the other years. The average CPUEs in 1974 and 1977 were 2.4 kg and 5.3 kg. Boat seines and hooks and lines operated in small numbers landed very meagre quantities of cephalopods.

The annual cephalopod catches from area A amounted to 39.1 t 1973 but in latter years they were extremely low (0.1-3.6 t). 73% of the cephalopod landings in 1973 (28.6 t) were obtained in hooks and lines but in the other years no cephalopods were landed by this gear although they were operated in large numbers. The annual boat seine cephalopod production amounted to 9.8 t in 1973 and decreased very much in subsequent years. Although cephalopods were obtained in shore seines the annual landings were very less (0.02-3.3 t).

In area G there were no cephalopod landings during 1973-75 but the production amounted to 8.8 t and 12.8 t in 1976 and 1977. About 81.5% of the cephalopod landings in this area came from boat seines and the rest was accounted for by trawl nets (11.9%) and shore seines (6.6%).

PONDICHERRY

Pondicherry is divided into two areas viz., A-Kanagachettikulam to Murthikuppam (22 km) and B-Mandapathoor to Thirumalarayanpattinam (13 km) (Fig. 7).

Areawise figures on cephalopod production in Pondicherry were available only from 1972. The annual landings of area A amounted to 14.7 t and those of area B were less, 7.7 t in 1972. During this year the highest catches were obtained in area A in three months, May, June and August and in area B in September.

During 1973-77 the average annual cephalopod landings were only slightly higher in area A viz., 39.2 t when compared with that in area B viz., 36.6 t. Good catches were obtained in March in area A and in January and August-October in area B.

In the period 1973-77, shore seines (*Karai valai*) accounted for 43.0% of the cephalopod production in the State closely followed by trawl nets, 40.6% and boat seines (*Thuri valai*), 16.4% (Fig. 8). Along the Pondicherry coast although hooks and lines (*Choondai*) were employed, cephalopods were not obtained. The best cephalopod catches were obtained in shore seines in March and August, in boat seines in January, and in trawl nets April-May and August-October.

Maximum cephalopod landings of 151 t were observed in area A in 1976 during 1973-77. In the other years the production was much lower varying between 3.7 t and 35 t. The catches were better in January, March and April than in other months. Cephalopods formed on an average 2.4% but in March 1976 they accounted for as much as 54%. The major portion (73.5%) of cephalopods caught in area A were obtained in shore seines, 26.1% in trawl net and the rest in boat seines. The shore seine landings of cephalopods amounted to 138.7 t in 1976 although the effort was less by 20% as compared to that in 1975. In other years the landings were extremely low. In 1976 the catches formed 28.8% of the total production by the gear and CPUE was high, 23.5 kg. The cephalopod landings of trawlers were very less in 1973 and 1975 but there was an improvement in the fishing in 1976 and 1977 when the annual production amounted to 12.4 t and 34.3 t with CPUEs of 2.7 kg and 3.9 kg respectively. Boat seines and hooks and lines were operated in all the years and only in one year, 1973 meagre landings of 1.6 t of cephalopods were landed in the former gear.

In area B the maximum landings were obtained in 1976 as in area A but the catches were much lesser than

CEPHALOPOD LANDINGS IN PONDICHERRY (IN TONNES)

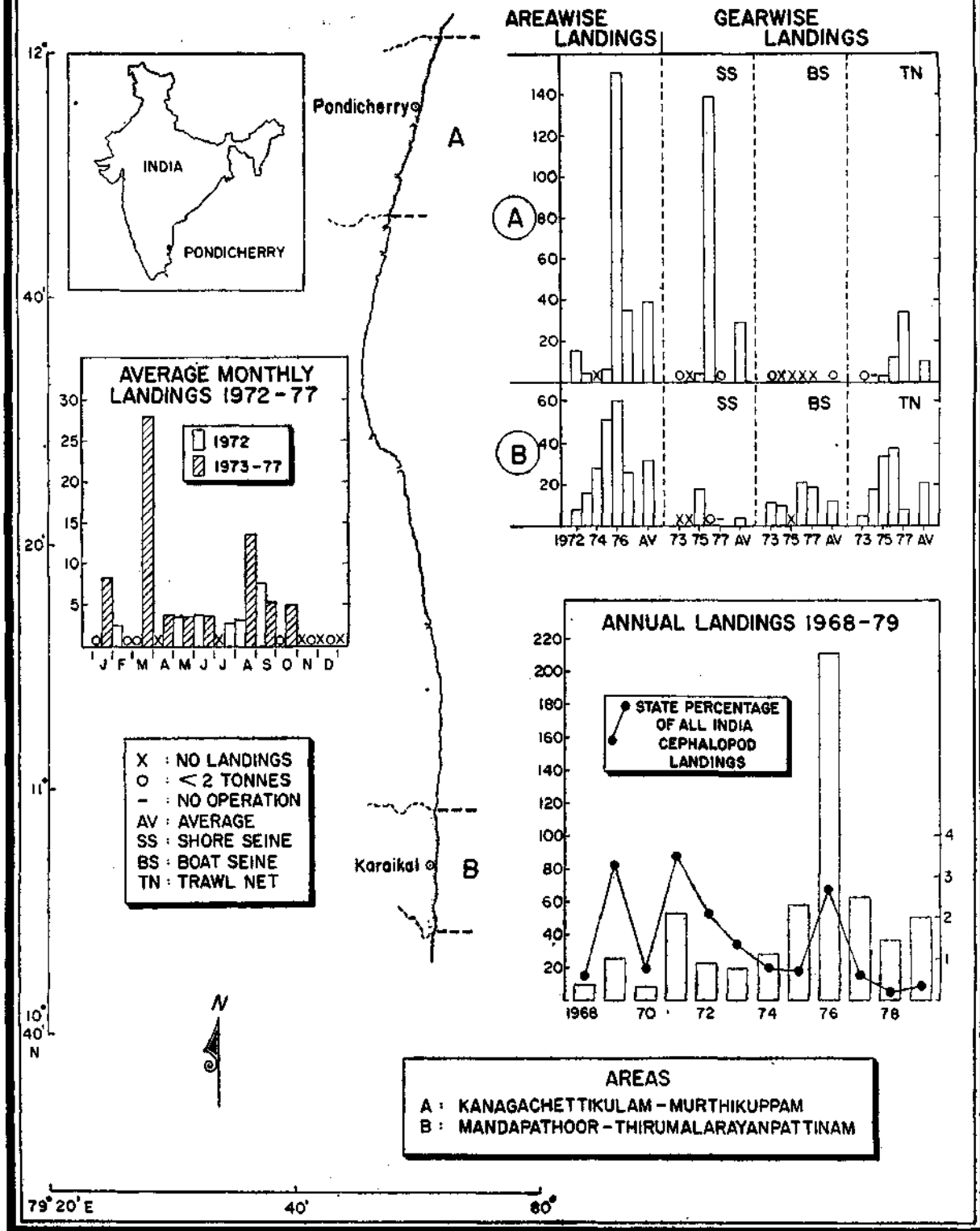


Fig. 7. Annual landings, State percentage in all India cephalopod landings (1968-'79), areawise (1972-'77) and gearwise (1973-'77) landings and average monthly landings (1972-'77) of Pondicherry.

that in area A, being 60.7 t. In the remaining years the production varied between 16.4 t and 52 t. The productive months in this area were January and August to October. In area B, trawl nets landed 56.4% of cephalopods, boat seines 33.1% and shore seines 10.5%. The cephalopod production of trawlers was higher viz., 33.9 t and 38.3 t in 1975 and 1976 compared to those in 1973-74 due to a rise in effort. However, there was fall in catch to 7.6 t in 1977 even though the effort spent was slightly more than that in 1976. During 1975-'76 the CPUE varied between 3.0 kg

respectively. In 1973-'74 no cephalopods were netted in this gear and it was not at all operated in 1977. Hooks and lines were operated in this area only in 1976 and there were no cephalopod landings.

KERALA

The Kerala coast is demarcated into seven areas viz., A-Kollengode to Valia Veli (40 km), B-Pallithura to Pozhimukkam (46 km), C-Eravipuram to Than-

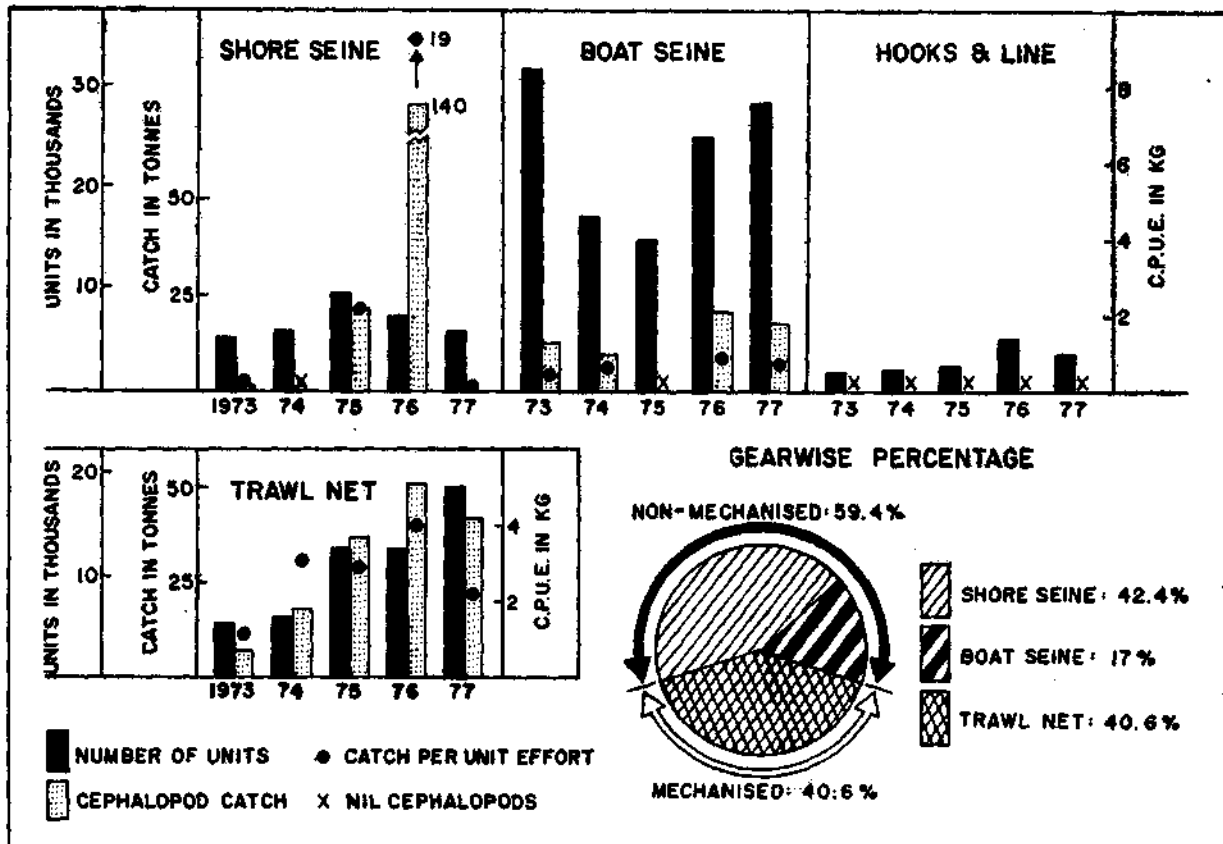


FIG. 8. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Pondicherry, 1973-'77.

and 4.7 kg. In trawl catches cephalopods formed 1.3% (1973) to 4.1% (1974). During 1975 there were no cephalopod landings by boat seines but in the other years of the period 1973-77 the annual catch fluctuated between 9.8 t (1974) and 21.2 t (1976). The CPUE amounted to only 0.7 kg to 1.2 kg and the percentage contribution of cephalopods 1.7-3.2. The shore seine production amounted to 18.1 t in 1975 and declined to 1.2 t in 1976 following a fall in effort by 39%. In 1975 the CPUE and percentage contribution of cephalopods were high, 7.8 kg and 18.5%

niazhikkal (54 km), D-Tharayilakadaby to Ottamasser (50 km), E-Vettakkal to Kathialam (54 km), F-Attupuram to Ponnani (71 km) and G-Koottayi to Kunnathur (245 km) (Fig. 9).

The cephalopod landings in Kerala during 1968-72 indicate that area B ranks first in production with 52% of the State's cephalopod production and area A occupied the second place with 42.5%. The remaining small landings were obtained from the areas C, D, G and E and no landings were observed

CEPHALOPOD LANDINGS IN KERALA (IN TONNES)

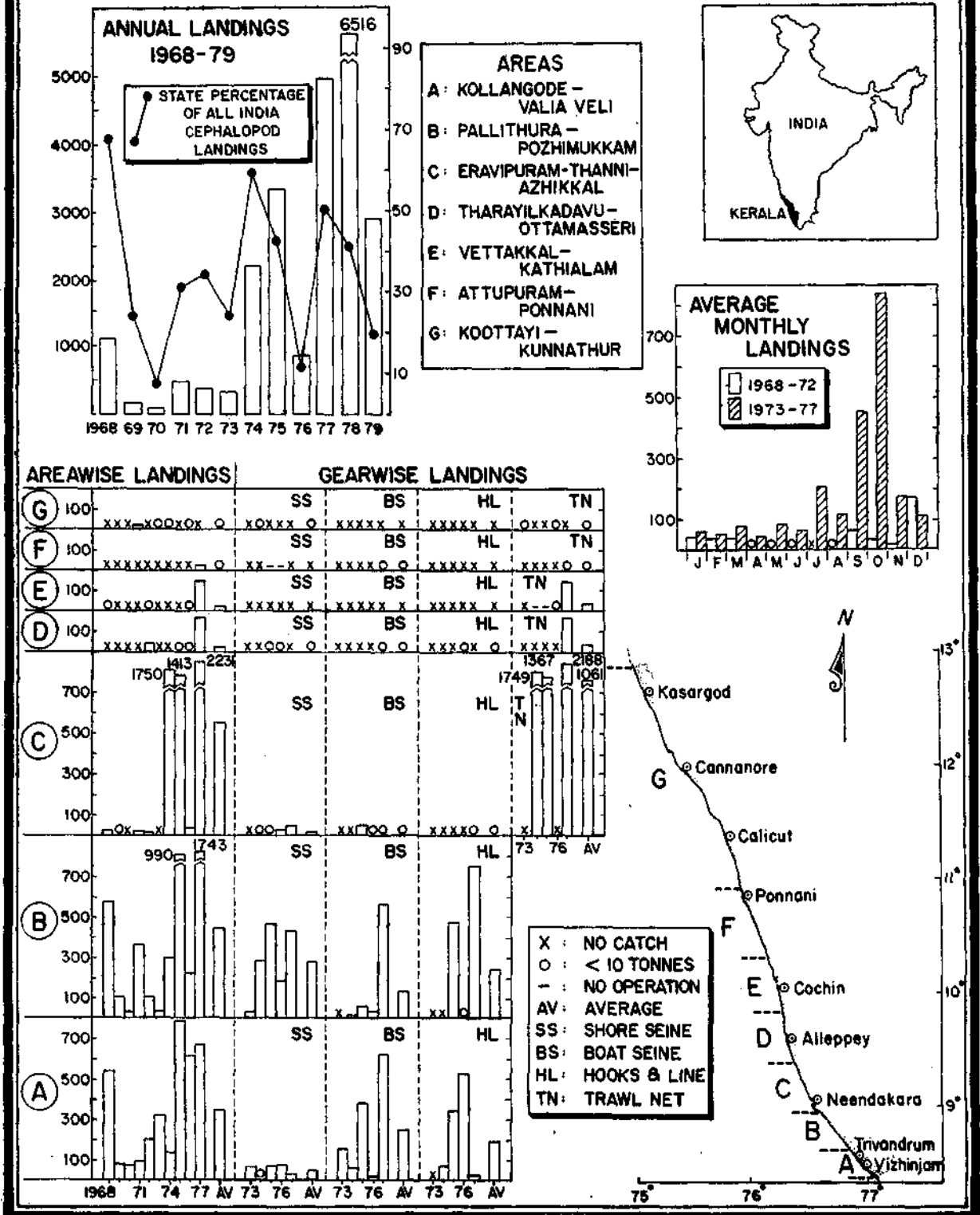


FIG. 9. Annual landings, State percentage in all India cephalopod landings (1968-'79), areawise (1968-'77) and gearwise (1973-'77) landings and average monthly landings (1968-'77) of Kerala.

in area F. The annual cephalopod landings were highest in 1968 in area B, showed a decline to 20.8 t in 1970 and once again increased to 356.4 t in 1971. The landings amounted to only 100.2 t in 1972. The best months for cephalopod catches in area B were January, September, October and December. The cephalopod landings in area A formed 528.7 t in 1968, decreased very much in the next three years and there was a slight recovery of the fishery in 1972 when the annual landings amounted to 186.9 t. In this area best catches were obtained in February-March, September-October and December. While cephalopods formed less than 1% to 11.3% in area B, they formed a maximum of 6.7% in area A. The annual landings in area C were low with maximum production of 20.9 t and 19.7 t in 1968 and 1971 respectively.

In contrast to 1968-72, area C accounted for highest cephalopod landings in the State during 1973-77 with 47% of the production. Area B (28.3%) and A (21.6%) were next in importance.

48.9% of the State's cephalopod production came from trawl nets, 19.7% from hooks and lines (*Choonda*), 16.8% from boat seines (*Thattumadi*, *Thanguvala*, *Kollivala*) and 14.6% from shore seines (*Karamadi*, *Kamba vala*) during the period 1973-77 (Fig. 10). The CPUE of trawl nets was high (6.2-22.8 kg) in July, September and October, of hooks and lines (1.2-4.5 kg) in January, October and November, of boat seines (0.6-1.5 kg) in July, September and October and of shore seines (2.1-13.4 kg) in March, June, September and December.

The annual cephalopod landings in area C were high in 1974 and 1975 with production of 1,749.9 t and 1,413.3 t and after a sharp decline in 1976, once again rose to a peak level of 2,231.1 t in 1977. The best cephalopod landings were obtained in May and from July to November. 96.8 to 99.9% of the production in this area was obtained by trawlers with CPUEs ranging from 4.8 kg to 11.7 kg. There was no relationship between the effort expended and the landings. The maximum cephalopod production of 2,188.2 t was got by trawlers in 1977 and it accounted for 0.9 to 3.5% in the total trawl landings. The shore seines landed 1.5% of the cephalopods caught in the area and the annual landings formed only 0.9 t and 5.5 t in 1974 and 1975 but increased to 32 t and 40.5 t in 1976 and 1977. The CPUE increased from less than 1 kg in 1974 to 3.01 kg in 1977 and in the latter year the cephalopods formed 2.8% in the total shore seine catches. The boat seines landed only 0.8% of cephalopods caught in the area. The landings amounted to 40.4 t in 1975 but they were very low in 1977 although

the effort spent was slightly higher. Hooks and lines were operated in large numbers throughout the period in this area but only negligible landings were obtained in 1977.

The cephalopod landings in area B increased from a low level of 22.8 t in 1973 to 990.3 t in 1975 when the effort increased only by about 31%. After a fall to 216 t in 1976, the landings again increased steeply to 1,742.9 t in 1977 following an increase in the effort by only about 56% compared to that in 1976. The best cephalopod catches were obtained in this area in March, June and September to December. The shore seines accounted for 42.2% of the cephalopod production in the area. The landings showed two peaks, 463.8 t and 429 t in 1975 and 1977 and fluctuated between 22.8 t and 281 t in the other three years of the 1973-77 period. In the years of the peak catches the CPUEs were 9.2 kg and 5.8 kg and cephalopods formed 4.9 to 5.1% in total catches. The hooks and lines were the next important gear which landed 37.5% of cephalopods in this area. The landings amounted to 472.7 t and 749 t in 1975 and 1977 but in other years there were either no catches as in 1973-74 or they were negligible. The CPUEs of hooks and lines were high 11.3 kg and 11.3 kg in 1975 and 1977 when cephalopods formed 62.9% and 44.6% of the total landings from the gear in the area. 20.3% of the cephalopod production in the area came from boat-seines. The annual landings amounted to only 12.5t 53.8 t during 1974-76 and showed a sharp rise to 564.7 t in 1977 although there was not much difference in the effort expended. In 1977 the CPUE as well as the percentage contribution of cephalopods to the total landings were high, 9.8 kg and 8.7% respectively. Trawlers did not operate in this area.

In area A the estimated cephalopod landings increased from 314.3 t in 1973 to 784.4 t in 1975 and in the succeeding two years they amounted to 604 t and 663.8 t. In this area the best months for cephalopods were January and July to October. Boat seines landed 49.1% of the production in the area. The cephalopod landings by this gear more than doubled in 1975 and amounted to 381.5 t although the effort was less than that in 1973 by 26%. The landings increased much further to 622.1 t in 1977 inspite of a further decrease in effort by 32%. The CPUE of boat seines ranged from less than 1 kg to 5.7 kg. In the total production of boat seines, cephalopods formed 0.2 to 5.5%. Good quantities of cephalopods, were landed by hooks and lines also, the production from the gear amounting to 42%. Catches from this gear increased from 98 t in 1973 to 526.7 t in 1976 when

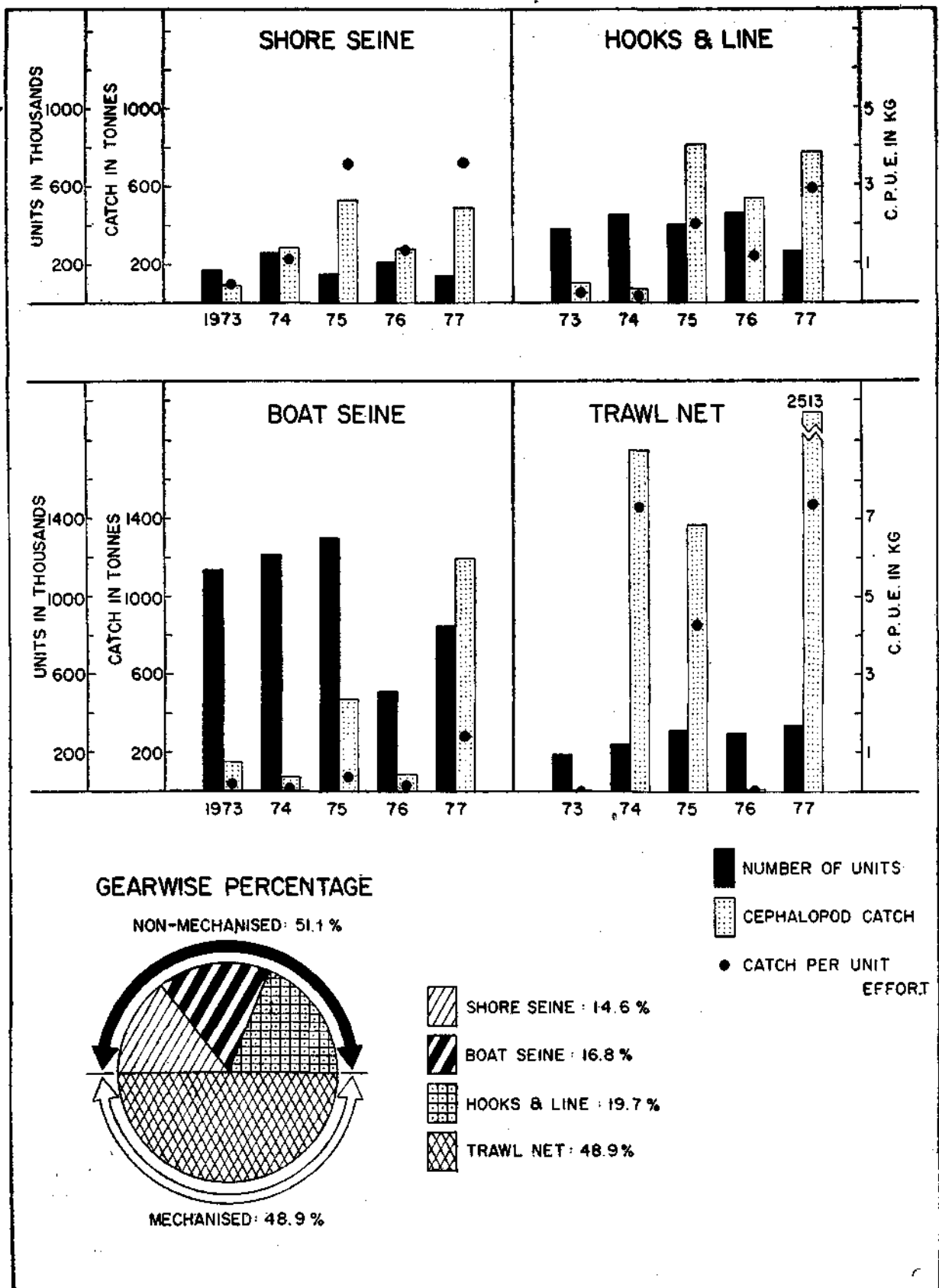


Fig. 10. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Kerala, 1973-'77.

there was a rise in effort by 31% but declined to 16.9 t in 1977 following a fall in effort by 63%. The CPUE of hooks and lines fluctuated from less than 1 kg to 1.6 kg and cephalopods formed 7.8 and 11.1% in total production in 1975 and 1976. Only low to moderately good landings ranging between 3.3 t and 65.4 t were obtained from shore seines and the catches did not show any well-defined changes with the effort. Cephalopods accounted for 0.4 to 5.7% of the total shore seine landings. Trawlers were not operated in this area.

In area D the cephalopod landings were very poor, 5-7 t in 1975-1976 and sharply rose to 175 t in 1977 when the effort increased only by 18% compared to that in 1976. The cephalopods were obtained in good quantities in October. 99.9% of the total cephalopod production in this area during 1973-77 was obtained in trawl nets in 1977 when the average CPUE was 3.2 kg and percentage contribution 1.9. Meagre landings of 6.1 t were obtained in shore seines in 1975 and 6 t in hooks and lines from this area.

In area E, the cephalopod landings amounted to only 9 t in 1976 with a CPUE of 0.1 kg and increased to 141 t with a CPUE of 2.2 kg in 1977 when there was a fall in effort by about 13%. The cephalopod catches were better in February and October than in other months. The entire production in this area was accounted for by trawl nets and there were no landings from other gears though they were employed.

In area F there were no cephalopod landings during 1973-76 and only in 1977, a total of 19.1 t were obtained out of which 10.1 t were from boat seines and 9 t from trawl nets. In this area also, though shore seines and hooks and lines were operated, there were no catches. In this area cephalopods were landed in April-May and August-September.

Area G too is one with very poor landings with annual catches of 1.2-3 t. Cephalopods were obtained in January and April in trawl nets (80%) and shore seines (20%).

KARNATAKA

The Karnataka coast is divided into three areas viz., area A-Talapady to Coondapookodi (106 km), B-Kharvikeri to Kasarkodi (115 km) and C-Alivekodi to Gotnebag (79 km). During 1968-72 the cephalopod landings in area C were higher than in areas A and B and varied from 2.2 t (1970) to 57 t (1969) with an average annual production of 20.2 t. The cephalopod catches were better in January and February than in

other months in area C. In area A the cephalopod catches were very poor, the annual landings increasing from 0.4 t in 1968 to 9.1 t in 1970 and decreasing to very low level in 1971 and 1972 (Fig. 11). In this area the cephalopods were caught from September to November. In area B only 1.5 t of cephalopods were obtained in 1971 and there were no landings during the other four years.

Unlike in 1968-72 the cephalopod production was highest during 1973-77 in areas B being 71.2% of the state's production in the period. Areas C and A accounted for 24.4% and 4.4% respectively of the production during 1973-77.

Along Karnataka coast the major portion of the catches of 85.5% were obtained in trawl nets, 14.3% in shore seines (*Rampant, Yendil*) and 0.2% in hooks and lines (*Gala, Beppu*). Boat seines were operated but no cephalopod catches were obtained. Cephalopods were caught in trawl nets during January-May, September and December, in shore seines in January, February, April and September-December and in hooks and lines in October (Fig. 12).

In area B, the cephalopod production was very high, 947.8 t in 1977 which amounted to 98.8% of the cephalopod production in 1973-77. However, in the period prior to 1977, the annual production was very low 0.2-7.4 t even though the effort was almost similar or much higher in the different years. The best cephalopod catches were obtained in the months March-May. 98.8% (947.1 t) of the total cephalopod production of this area during 1973-77 came from trawl catches and the rest from shore seines and hooks and lines. Though trawlers were operated throughout the period, cephalopod catches were obtained only in 1977 when the CPUE was 34.2 kg and the percentage contribution was 13. The shore seine landings ranged from 0.2 t (1974) to 7.4 t (1975). In 1975 the CPUE was 6.2 kg but it was much less in the other years. 2.8 t of cephalopods were caught in hooks and lines only in one year, 1973.

The production from area C increased from 14.4 t in 1973 to 156.5 t in 1975 following an increase in effort by 23% and decreased to 141.6 t in 1976 with a fall in effort by 18%. There was a drastic decline in landings to 16.2 t in 1977 in spite of about 11% increase in effort and the best catches were obtained in two months March and October. About 52.2% of the cephalopod production in this area was contributed by shore seines. The shore seine landings amounted to 141.6 t in 1976 but were low in other years. The CPUE was 24.6 kg in 1976 with a percentage contribution of 1.2. Trawlers

CEPHALOPOD LANDINGS IN KARNATAKA (IN TONNES)

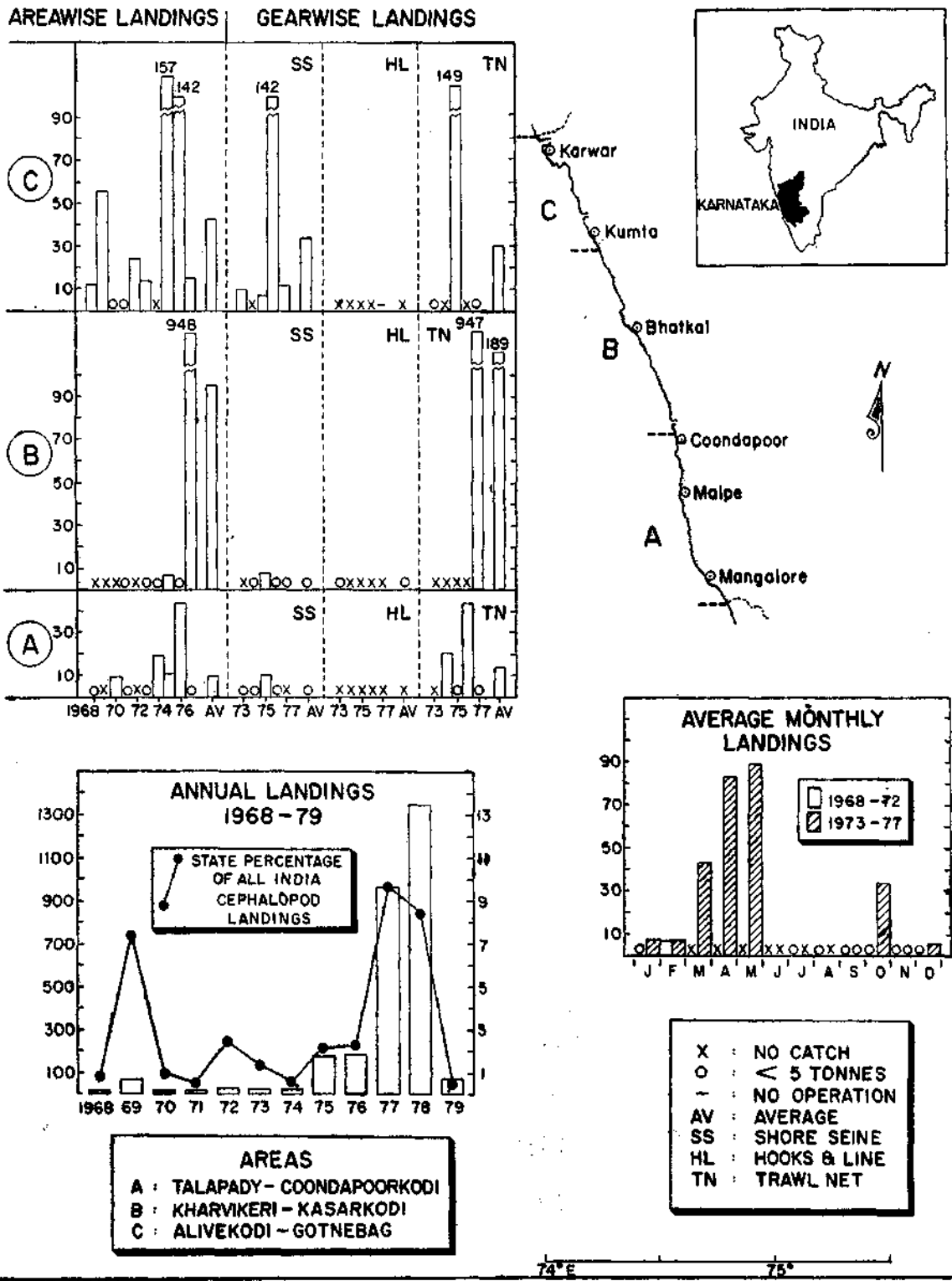


FIG. 11. Annual landings, State percentages in all India cephalopod landings (1968-'79), areawise (1968-'72) and gearwise (1973-'77) landings and average monthly landings (1968-'77) of Karnataka.

accounted for 47.8% of the cephalopod production of the area and the highest production of 149.2 t was in 1975 with a CPUE of 9.0 kg and a percentage contribution of 2.8. In 1973 and 1977 trawlers landed only 3.8 t and 4 t and in 1974 and 1976 there were no cephalopod landings. Boat seines and hooks and lines were operated in this area in small numbers but no cephalopod yield was obtained.

In 1973 and 1977 the annual cephalopod production in area A was very meagre, 1.0-1.8 t and during 1974-76 the production was higher, 11.4-44.9 t. Cephalopod

in 1974 to 10.1 t in 1975. The CPUE of this gear fluctuated between less than 1 kg and 1.6 kg. Cephalopods were not obtained in boat seines and hooks and lines although the gears were operated in the area.

GOA

The Goa coast is divided into two areas viz., area A-extending from Polem to Majorda (75 km) and B-from Cansaulim to Querim (78 km) (Fig. 13).

The cephalopod landings were low (6.3 t) in area A in 1974 and in the next three years they were higher

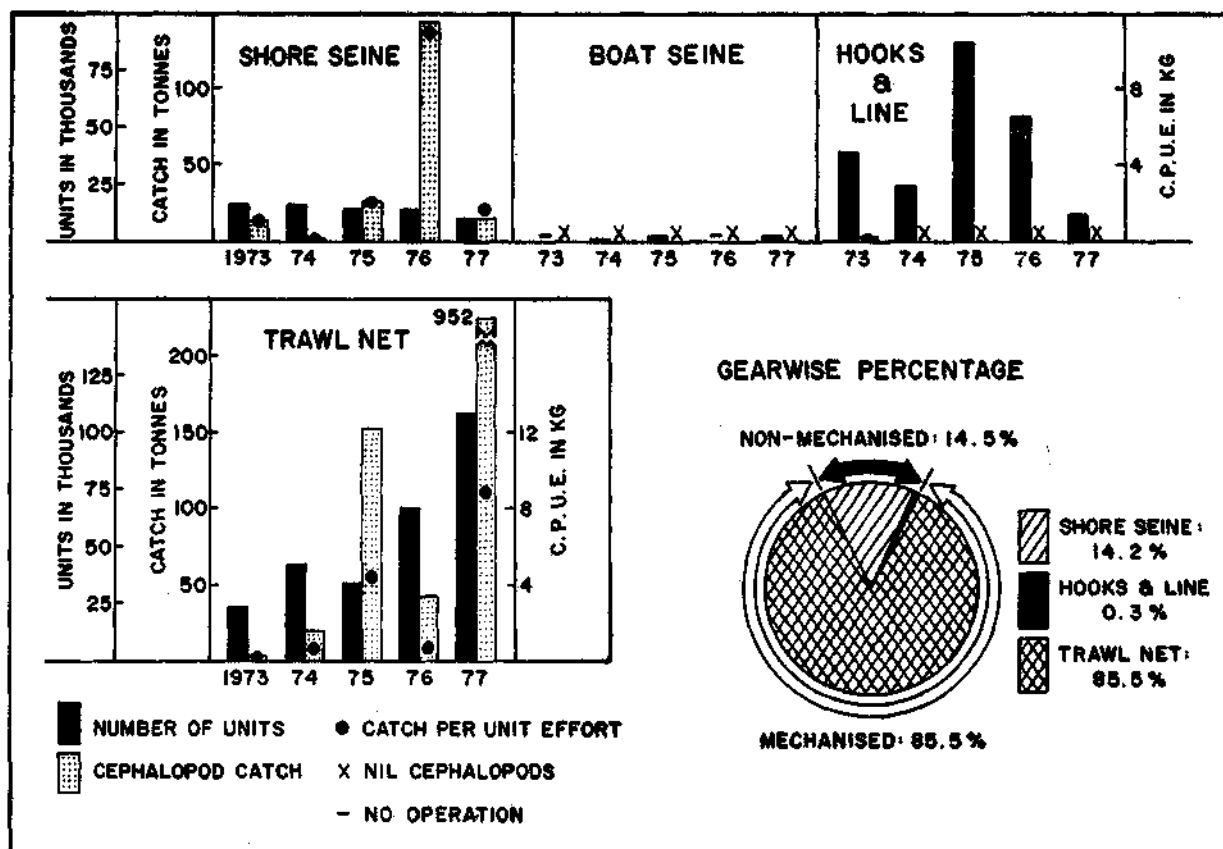


FIG. 12. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Karnataka, 1973-77.

catches were better in January-February. Trawl nets obtained 82.3% of the total cephalopod production with better catches of 19.6 t and 42.5 t in 1974 and 1976 with CPUEs of 1.5 kg and 1.8 kg. The trawl landings in this area in successive years did not show any clear trend compared to the effort put in. The shore seines accounted for the rest of the catches, 17.7% with the annual landings varying between 0.4 t

varying between 44 t (1976) and 80 t (1977). In this area the catches were higher in January, February September and October compared to other months. In area B the cephalopod landings increased steadily from 8.2 t in 1974 to 98 t in 1976. In 1977 the production decreased to 84 t. The best catches were obtained in this area in February, September, October and December. The average landings in area B during

CEPHALOPOD LANDINGS IN GOA (IN TONNES)

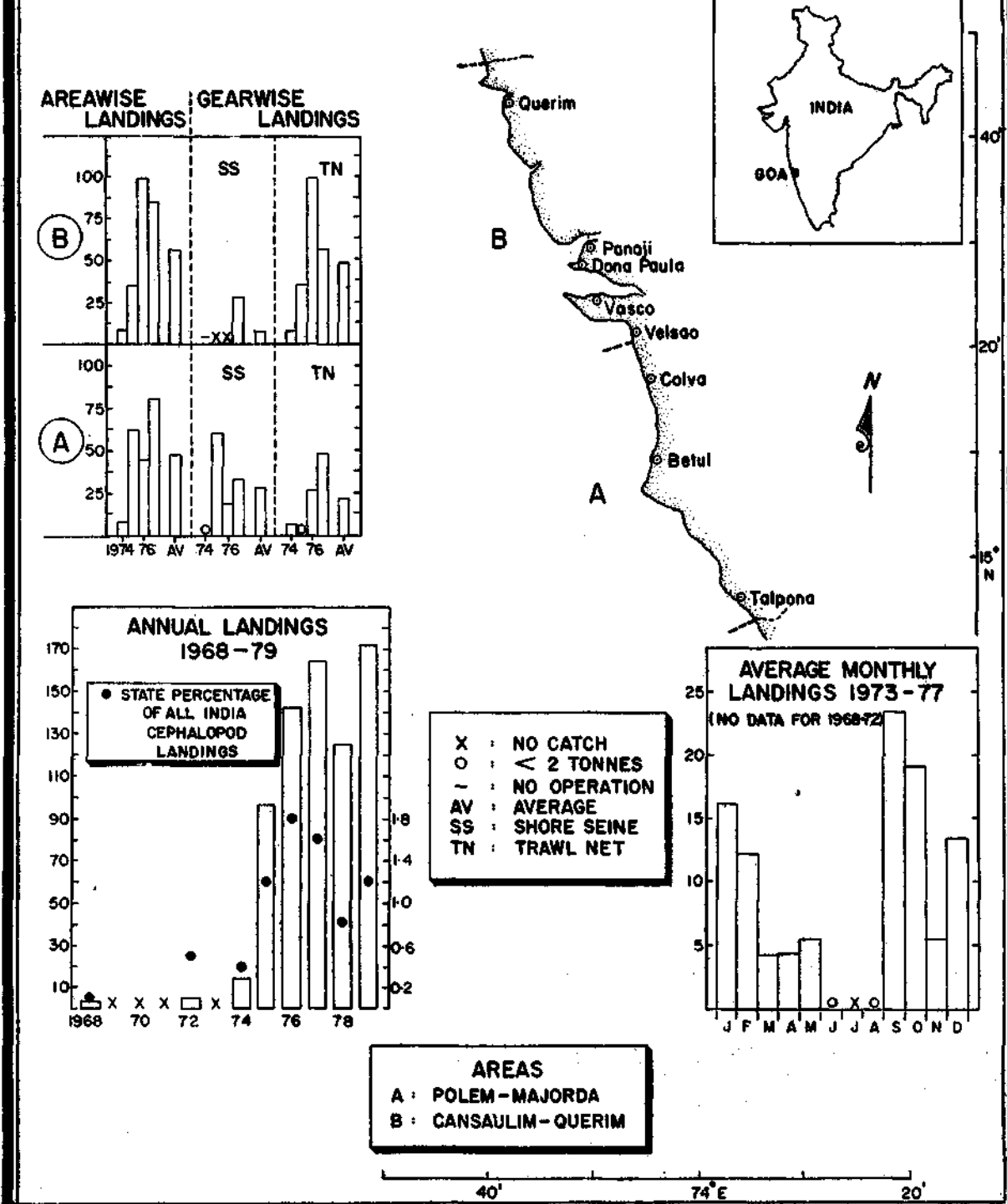


FIG. 13. Annual landings, State percentages in all India cephalopod landings (1968-'79), areawise and gearwise landings (1974-'77) and average monthly landings (1968-'77) of Goa.

1974-77 were slightly higher (56.2 t) compared to that in area A (47.8 t).

67% of the cephalopod landings along Goa coast were caught in trawl nets and the rest in shore seines (Fig. 14). Boat seines were not operated along Goa coast while hooks and lines were employed in small numbers but there were no cephalopod landings from the gear. The average CPUEs of trawlers were 2.6 kg with higher CPUE (4.8-10.6 kg) in January, September

during 1975-'77. The cephalopod landings of trawlers in this area amounted to 6.1 t and 1.4 t in 1974 and 1975 respectively. There was distinct rise in the landings to 26 t and 48 t in 1976 and 1977 when there was an increase in effort by 39 to 40% as compared to that in 1975. The CPUE increased from 0.5 kg in 1974 to 4.6 kg in 1977

In area B the shore seine cephalopod landings during 1974-'77 amounted to only 12.4% and the rest were

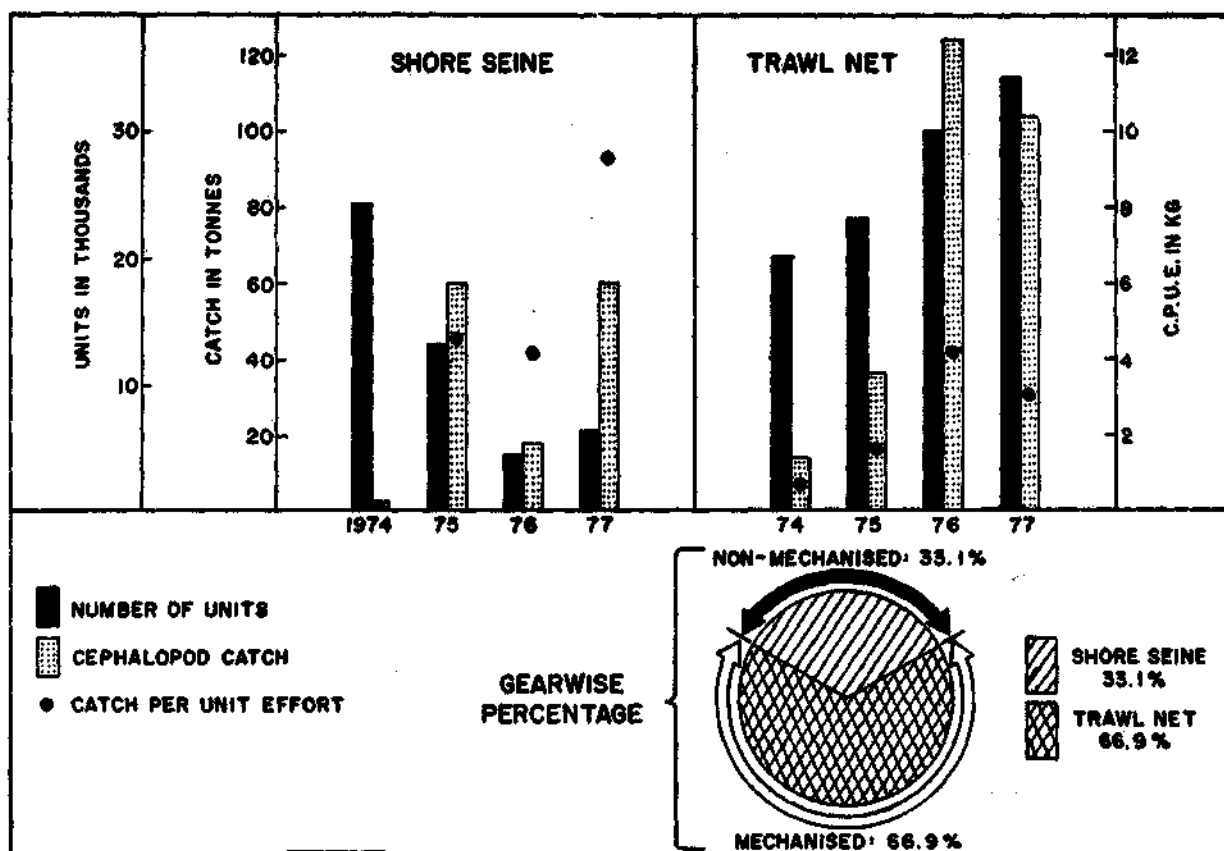


Fig. 14. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Goa, 1974-'77.

and October. The average CPUE of shore seines was 2.9 kg with higher values (9.1-11.5 kg in October and December).

In area A, shore seines landed 57.4% of cephalopod production and trawl nets 42.6%. The shore seine landings increased from very low level in 1974 to 59.7 t in 1975 though there was a decrease in effort by about 46%. The production decreased to 32 t in 1977 when the effort declined by 70%. The CPUE of shore seines varied from 4.5 kg to 8.1 kg

accounted for by trawlers. The cephalopod production of trawlers increased from 8.2 t in 1974 to 98 t in 1976 following a large increase in the effort by nearly three times. In spite of a further rise in effort by about 23%, the production decreased to 56 t in 1977. The CPUE of trawlers showed an increase from 1.2 kg in 1974 to 5.0 kg in 1976 and a fall to 2.4 kg in 1977. The entire shore seine production of 27.9 t was got obtained in 1977 with a CPUE of 11.4 kg and there were no cephalopod landings in 1975 and 1976 from the gear although they were operated.

MAHARASHTRA

The Maharashtra coast is divided into five areas, viz., A-Redi to Rameswarwadi (87 km), B-Vijayadurg to Dhabol (142 km), C-Boorondi to Mora (205 km), D-Sassoon Docks to Arnala (125 km) and E-Datiwari to Zavi (161 km) (Fig. 15).

During 1968-72, the highest cephalopod production was obtained from area D with 55.4% of the total cephalopod landings. In areas B and A, 23.6% and 20.5% of the total landings of the state were obtained and area C accounted for a negligible portion (0.5%). There were no cephalopod landings in area E at the northern end of Maharashtra. The landings in area D increased progressively from 33.2 t in 1968 to 268.6 t in 1971 but there was a decrease to 211.8 t in 1972. The best catches were obtained in this area in the first and last quarters. In area B the highest catches (150.9 t) were obtained in 1970 followed by a steep fall to 3.5 t in 1972. The landings were higher in this area in January, February and October-December. The production amounted to 79.7 t in 1970 in area A and later stabilized at 61.1 t and 66.8 t in 1971 and 1972 with good catches in February, September and October. In area C the catches were very poor and only in November 1971, 5.7 t were landed.

In the period 1973-77 also the cephalopod landings were highest in area D as in the previous five year period but the average annual production (508.3 t) was nearly four times that in 1968-72. Areas B and A were next in importance with average annual production of 225.5 t and 90.7 t respectively. The average annual production in area C was only 47.1 t and that in area E was insignificant (1.4 t). The cephalopod landings in area D exhibited a very steep rise by over five times from 286.7 t in 1973 to 1,541.5 t in 1976. However, there was a drastic decline to 120.2 t in 1977. In area B, the landings were low varying between 14.5 t and 48.4 t during 1973-75. But in 1976 the production was very high comparatively, 666 t and in 1977 there was a fall by about 46% to 361 t. In area A the cephalopod landings amounted to 176.4 t and 135.2 t in 1973 and 1976 and the production was much less during the other three years with annual landings of 29-82.6 t. In area C the cephalopod production was very meagre (6 t) in 1974 and 1975, increased to 145.3 t in 1976 and showed large decrease (77.2 t) in 1977 as in other areas. In area E there were no cephalopod landings during 1973-76 and only in 1977, a total of 6.7 t were landed.

The major portion of the production of Maharashtra amounting to 81.4% was obtained in trawl nets, 11.3% in *Dol* nets, 6.8% in shore seines (*Rampan*) and the rest in hooks and lines (*Hath gal*, *Garkadi*) (Fig. 16). The average CPUE of trawl nets during 1973-77 was 9.1 kg with high values (10.4-17.5 kg) in the months February, April, September and November-December. The average CPUE of shore seines was 7.5 kg with better yields (9.1-15.7 kg) in January, September and October. The CPUE of *Dol* nets and hooks and lines were very low.

In area D, trawl nets accounted for 86.2% of the total cephalopod production during 1973-77 and the rest of the production was obtained in *Dol* nets. Although hooks and lines and shore seines were operated on a small scale in this area, no cephalopods were obtained. The annual trawler landings increased from 171.4 t in 1973 to 271 t in 1975 and there was a five-fold increase in 1976 to 1,447.8 t with an increase in effort by 49% compared to that in 1975. The CPUE increased steadily from 4.5 kg in 1973 to as much as 27.7 kg in 1976. In 1977 the catch as well as CPUE showed a sharp fall to 87 t and 3.0 kg respectively. The cephalopods formed a maximum of 2.5% of the total landings in 1976 and they accounted for less than 1% in other years. The *Dol* net landings amounted to 115.3 t in 1973 and in the succeeding years they were less varying between 33.2 t (1977) and 93.6 t (1976) when the effort showed a decrease by 13-45% except in 1976 when there was a seven-fold rise in effort. The annual CPUE of *Dol* nets was 0.7 kg in 1973 and much less in other years.

In area B also the major portion of the production, 97.1%, came from trawl nets while 2.8% was from *Dol* nets and the rest from hooks and lines. During 1973-75 the cephalopod landings from trawlers varied between 3.1 t and 38 t and there was a sharp rise to 666 t in 1976. In 1977 with a fall in effort by 34% compared to that in the previous year, the landings decreased by about 47% to 354.3 t. The CPUE showed a very large increase from 1.2 kg in 1973 to 23.4 kg in 1976 while in 1977 it was 18.8 kg. In the period 1973-75 cephalopods formed less than 1% of the total trawl landings. But in 1976 and 1977 they accounted for as much as 8.4% and 5.2%. The annual landings from *Dol* nets were quite low, 4.4-10.4 t and correspondingly the CPUE was also low, less than 1 kg. Hooks and lines were operated in moderate to fairly good numbers but only in 1974 about 1 t of cephalopods was caught. Shore seines were operated in small numbers but no cephalopod yields were obtained.

CEPHALOPOD LANDINGS IN MAHARASHTRA (IN TONNES)

X : NO CATCH
 O : < 10 TONNES
 - : NO OPERATION
 AV : AVERAGE
 SS : SHORE SEINE
 DOL : DOL NET
 HL : HOOKS & LINE

AREAS

A : REDI - RAMESWARWADI
 B : VIJAYADURG - DHABOL
 C : BOORONDI - MORA
 D : SASSOON DOCKS - ARNALA
 E : DATIWARI - ZAYI

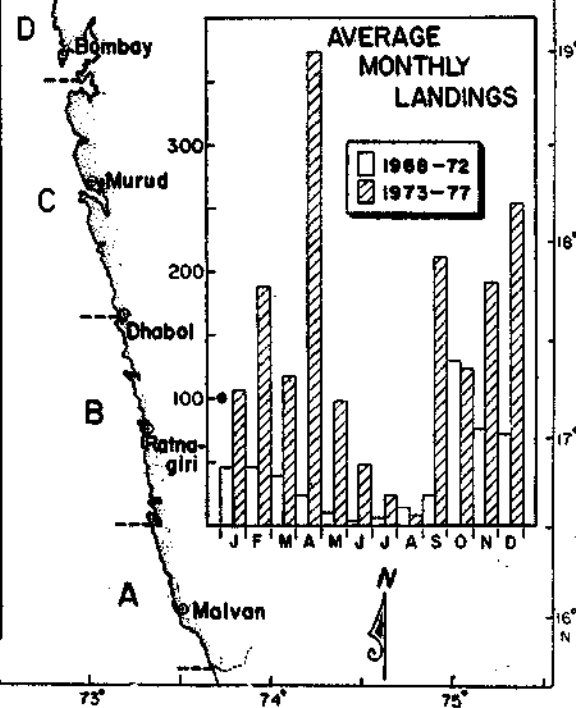
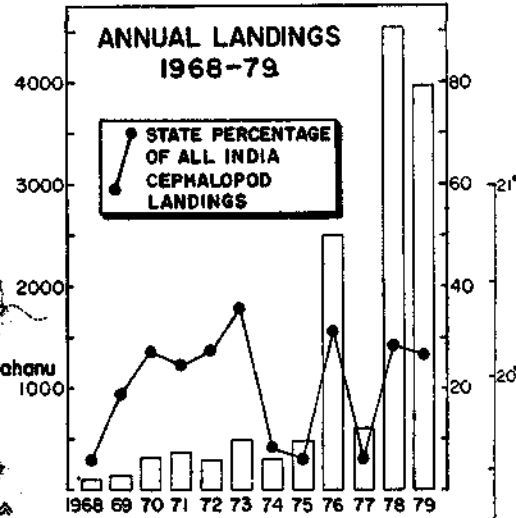
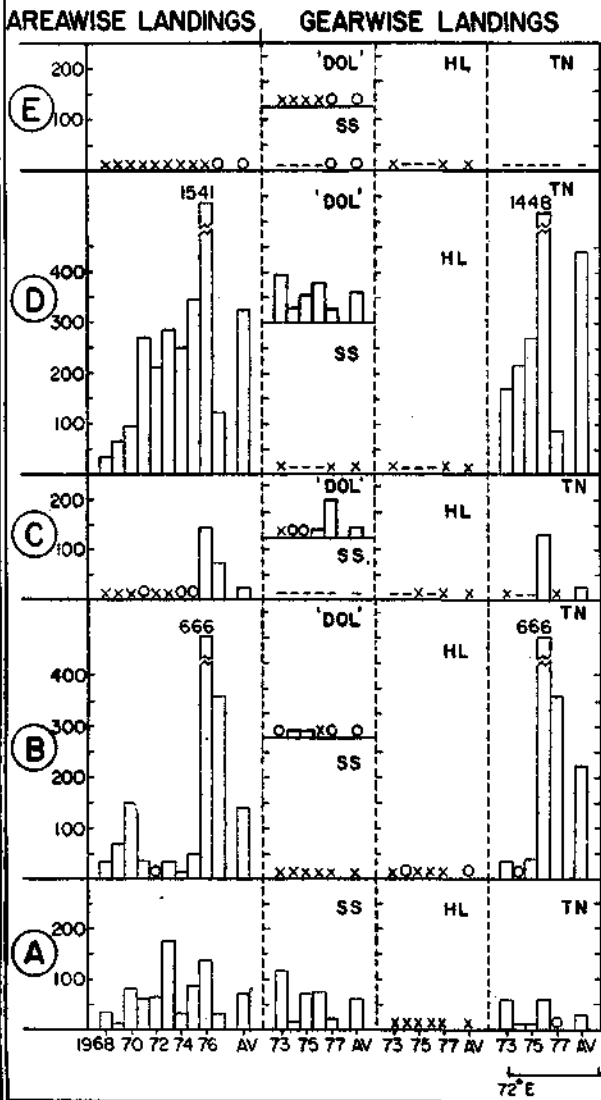


FIG. 15. Annual landings, State percentages in all India cephalopod landings (1968-'79), areawise (1968-'72) and gearwise (1973-'77) landings and average monthly landings (1968-'77) of Maharashtra.

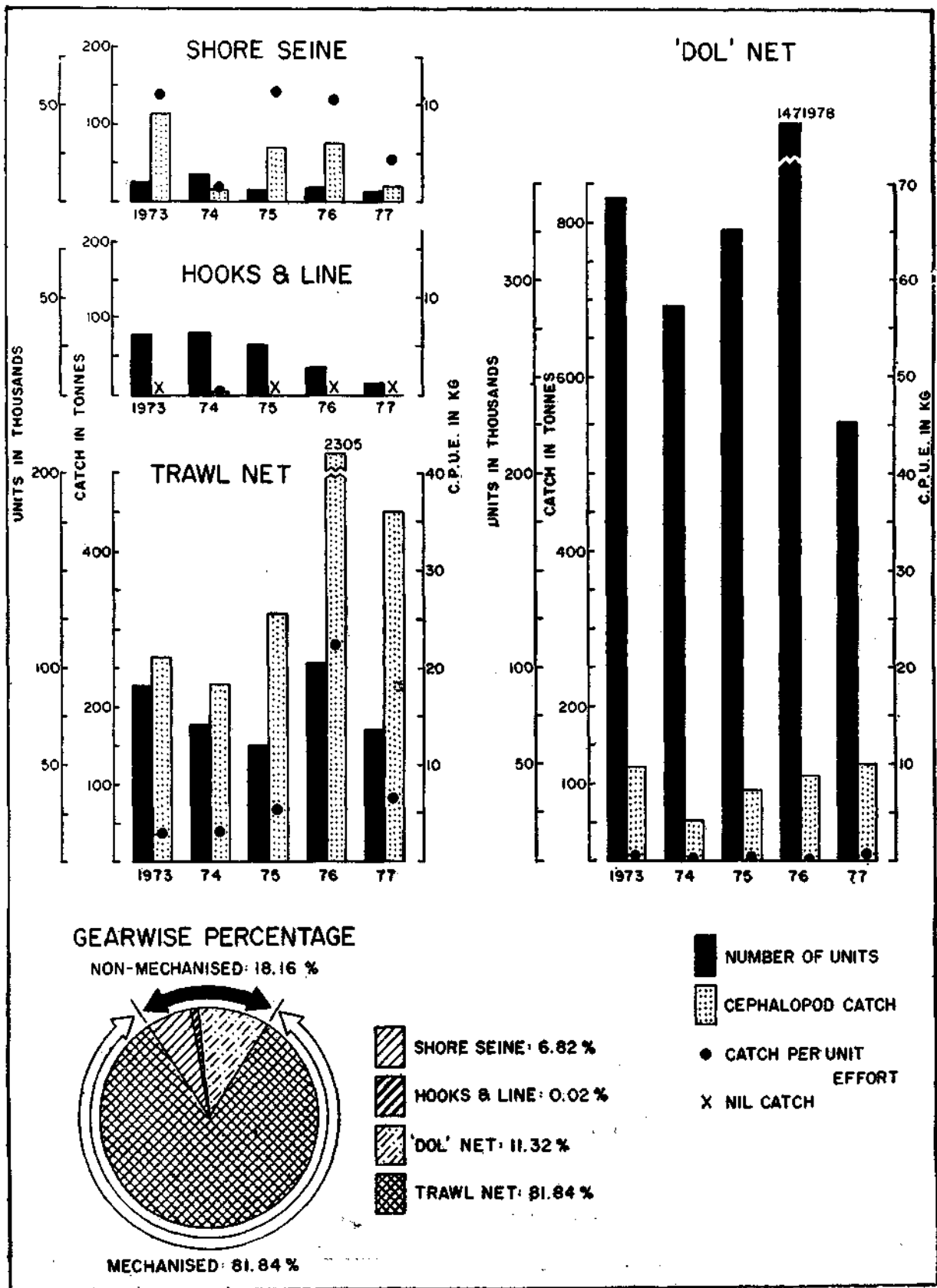


FIG. 16. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Maharashtra, 1973-'77.

In area A shore seines landed 65.6% of the total cephalopod production and the rest (34.4%) by trawl nets. The highest annual production 114.3 t was obtained in shore seines in 1973 with a CPUE of 11.7 kg. During the rest of the period the landings fluctuated between 17.1 t and 74.3 t with the higher landings in 1975 and 1976 in which years the CPUE also was high (12.4 kg and 11.4 kg). The landings of trawl nets amounted to 62.1 t and decreased to 11.9 t in 1974 and 1975 when there was a fall in effort by 14% and 68% respectively. There was a rise in production to 60.9 t in 1976 though effort increased only by 7.3%. Notwithstanding the effort being 2.5 times that in 1976 there was a sharp decline in the landings to 9.3 t in 1977. The CPUE amounted to 2.9 kg and 8.2 kg in 1973 and 1976 but it was less than 1 kg in other years. Cephalopods formed from less than 1% to 3.8% of the total trawl landings. Hooks and lines were operated in all the years but cephalopods were not caught in the gear. *Dol* nets were not operated in this area.

55.4% of the total cephalopod production in area C during 1973-77 was obtained in trawl catches in a single year, 1976 with a CPUE of 9.1 kg and the rest (44.6%) in *Dol* nets in the period 1974-77. In 1973 and 1977 trawlers were operated but cephalopods were not netted. The *Dol* nets landed 6.4-15 t of cephalopods during 1974-76. The landings increased to 77.2 t in 1977 in spite of a fall in effort by 18%. Shore seines were not operated while hooks and lines were operated in two years 1975 and 1977 and no cephalopods were caught in the gear.

In area E, only in 1977 *Dol* nets landed 6.7 t of cephalopods and 0.02 t was landed by shore seines. Cephalopods were not caught in these gears in other years. Hooks and lines were operated in small numbers in two years, 1973 and 1977 without any cephalopod yield. Trawl nets were not at all operated in this area.

GUJARAT

Among the maritime states of India, Gujarat has the longest coast extending to 1,663 km. The Gujarat coast is divided into three areas viz., area A-Ambergoan to Cambay (400 km), B-Ghogha to Porbander (491 km) and C-Maini to Hanjiasar (772 km) (Fig. 17).

The estimated cephalopod production in Gujarat during 1968-72 was extremely low, 5.3 t. Of this 1.4 t and 1.6 t were landed from areas A and C in 1972 and 1.4 t and 1 t from area B in 1968 and 1969 respectively. The small landings of cephalopods

were obtained in the months September and October in area A, February and August in area B and November in area C.

During 1973-77 the cephalopod landings continued to be very poor or there were no landings at all in areas A and C. The annual landings amounted to 1.4 t and 9.5 t in area A in 1973 and 1975 while in area C only in two years 1974 and 1975 the annual production amounted to 6.3 t and 4.2 t. In area B there were no landings up to 1974 but in 1975 a high production of 597 t was obtained for the first time in the state which very sharply increased by over 3½ times to 2,284.9 t in 1976. In 1977 there was a fall in the landings by 37% to 1,439 t in spite of the effort being more than double that in 1976. Very good catches were obtained in area B in six months January-April and October-November.

Most of the cephalopod production amounting to 99.5% was obtained in trawl nets while boat seines (*Golwa*, *Gunja*) accounted for 0.4% and hooks and lines (*Gul*, *Dor*, *Hat Dori*) 0.1% (Fig. 18). High CPUEs of 11.4-14.0 kg were observed in the case of trawl catches in March, April and October.

The cephalopod production from area B during the period 1975-77 amounted to 4,320.9 t which constituted 99.5% of the state's production during 1973-77. Although trawlers were operated in large numbers during 1973-74, cephalopods were not caught. The trawl catches of cephalopods increased from 597 t in 1975 to 2,284.9 t in 1976 following a rise in effort by about 56%. However, with a further rise in effort by 31% in 1977, there was a fall in the production by 37% to 1,439 t. The CPUE more than doubled from 6.5 kg in 1975 to 15.9 kg in 1976 and it was 7.6 kg in 1977. In the total trawl catches cephalopods formed 0.8-1.7% during 1975 and 1977 and 2.8% in 1976.

In area A boat seines landed 1.4 t and 9.5 t of cephalopods in 1973 and 1975 with CPUEs of 0.1 kg and 0.6 kg respectively. But during other years there were no landings despite operation of the gear in small to large numbers. Even though the other cephalopod gears viz., trawl nets, hooks and lines and *Dol* nets, the last mentioned in large numbers, were employed in this area, cephalopods were never netted.

In area C, boat seines and hooks and lines landed small quantities of cephalopods, 7 t and 3.5 t respectively. The boat seine landings decreased from 5.9 t in 1974 to 1.1 t in 1975 although the effort increased by more than three times. The CPUE amounted to 2.7 kg

CEPHALOPOD LANDINGS IN GUJARAT (IN TONNES)

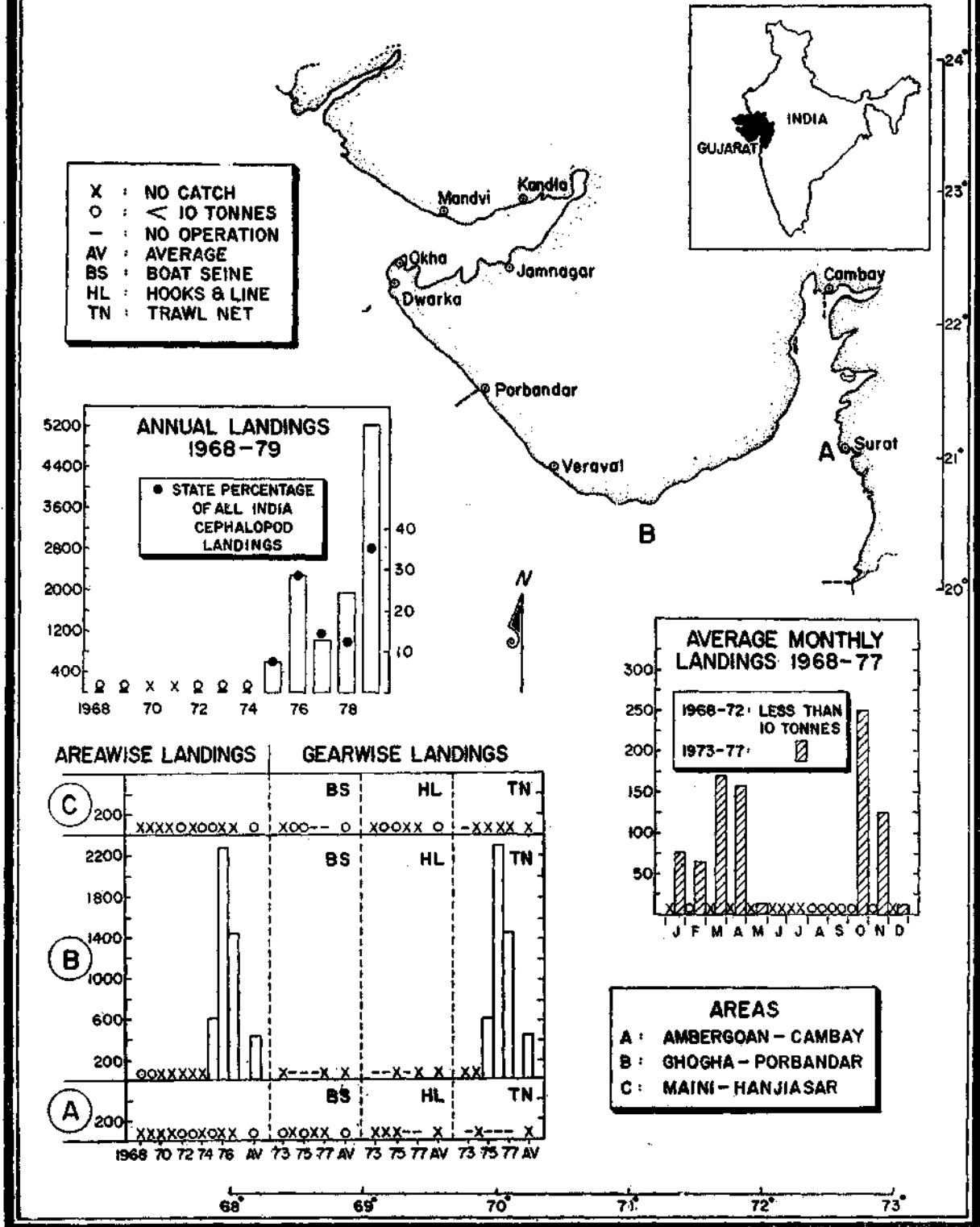


Fig. 17: Annual landings, State percentage in all India cephalopod landings (1968-79), areawise(1968-77) and gearwise (1973-77) landings and average monthly landings (1968-77) of Gujarat.

of total boat seine catches in the area in 1974 but they accounted for less than 1% in the succeeding year. The hooks and line catches in the area were less than 1 t in 1974 but amounted to 3.1 t in 1975 though there was a slight decrease in effort. The CPUE varied between 0.1 kg (1974) and 1.3 kg (1975). In 1975 cephalopods contributed 4.4% of the hooks and line catches in the area. Trawl nets and *Dol* nets were operated in the area, the former in moderate to large numbers but there were no cephalopod landings.

at low tides and octopods taking shelter therein are caught.

The annual octopod landings of Kalpeni island varied between 0.2 t and 1.9 t in the period 1968-'75 and only in 1976 and 1977 the production was higher viz., 7.9 t and 5.5 t respectively (Fig. 19). There were no landings in 1969 and 1970. The octopods formed 1% (IV quarter) to 2.1% (II quarter) in the average quarterly production of this island.

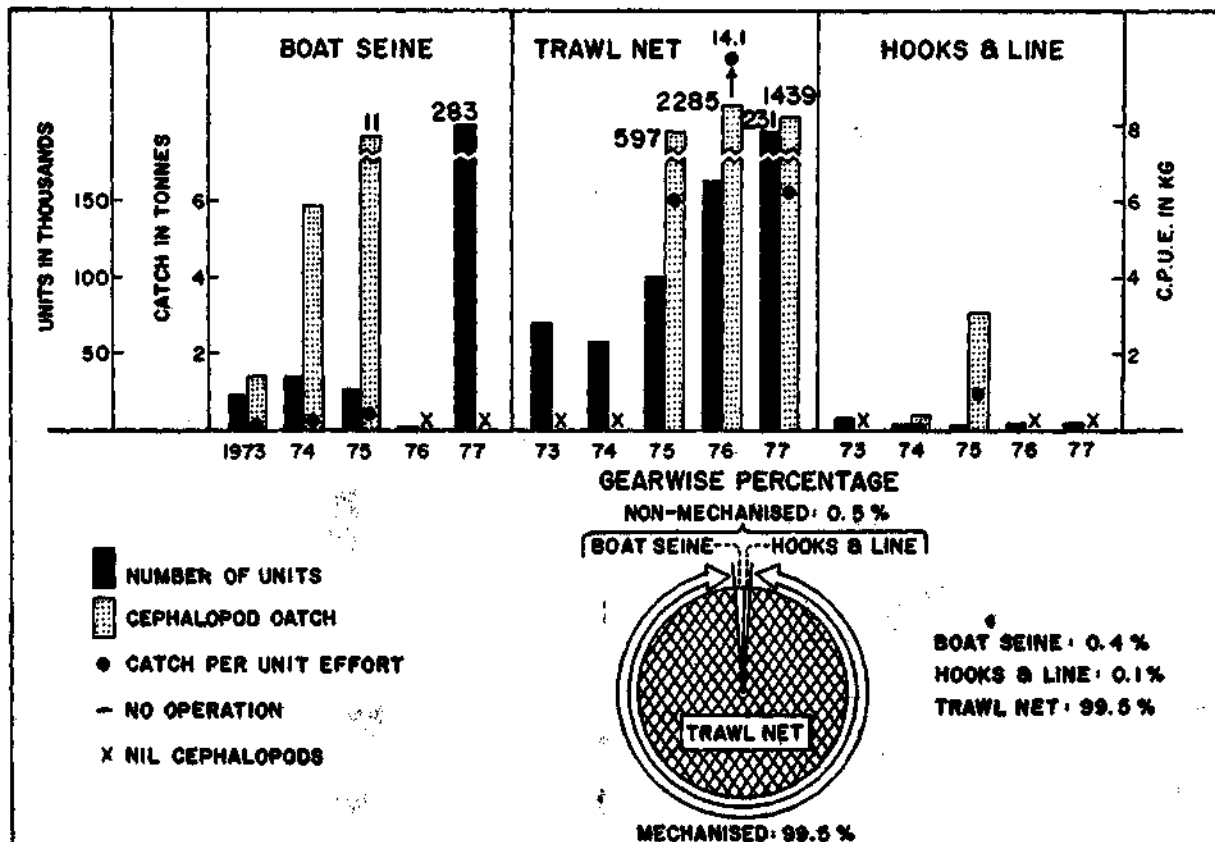


FIG. 18. Gearwise units, catch, C.P.U.E. and percentage in total cephalopod catches in Gujarat, 1973-'77.

LAKSHADWEEP

The Lakshadweep comprises of twenty seven islands, out of which ten viz., Minicoy, Kalpeni, Kavarathi, Agati, Androth, Amini, Kadamat, Kiltan, Bitra and Chetlat are inhabited. The cephalopod fishery in the Lakshadweep is supported exclusively by octopods which are fished in all the inhabited islands. The method of fishing employed is spearing which is carried out throughout the year. The spear used is an iron rod, about one metre or more in length which is sharpened at one end. The spear is thrust into coral crevices

The annual production of Kavarathi island was highest, 5.3 t in 1972 and in the other years it fluctuated between 0.3 t (1969) and 3.9 t (1976). Octopods formed 1.7% (IV quarter) to 2.4% (III quarter) in the average quarterly production of the island.

In Agati island the annual octopod catches varied between 0.1 t (1977) and 3.4 t (1973). There were no landings in 1972, 1974 and 1976. Compared to the other quarters the catches were comparatively poor in the first quarter with a contribution of about 10%.

CEPHALOPOD LANDINGS IN LAKSHADWEEP (IN TONNES)

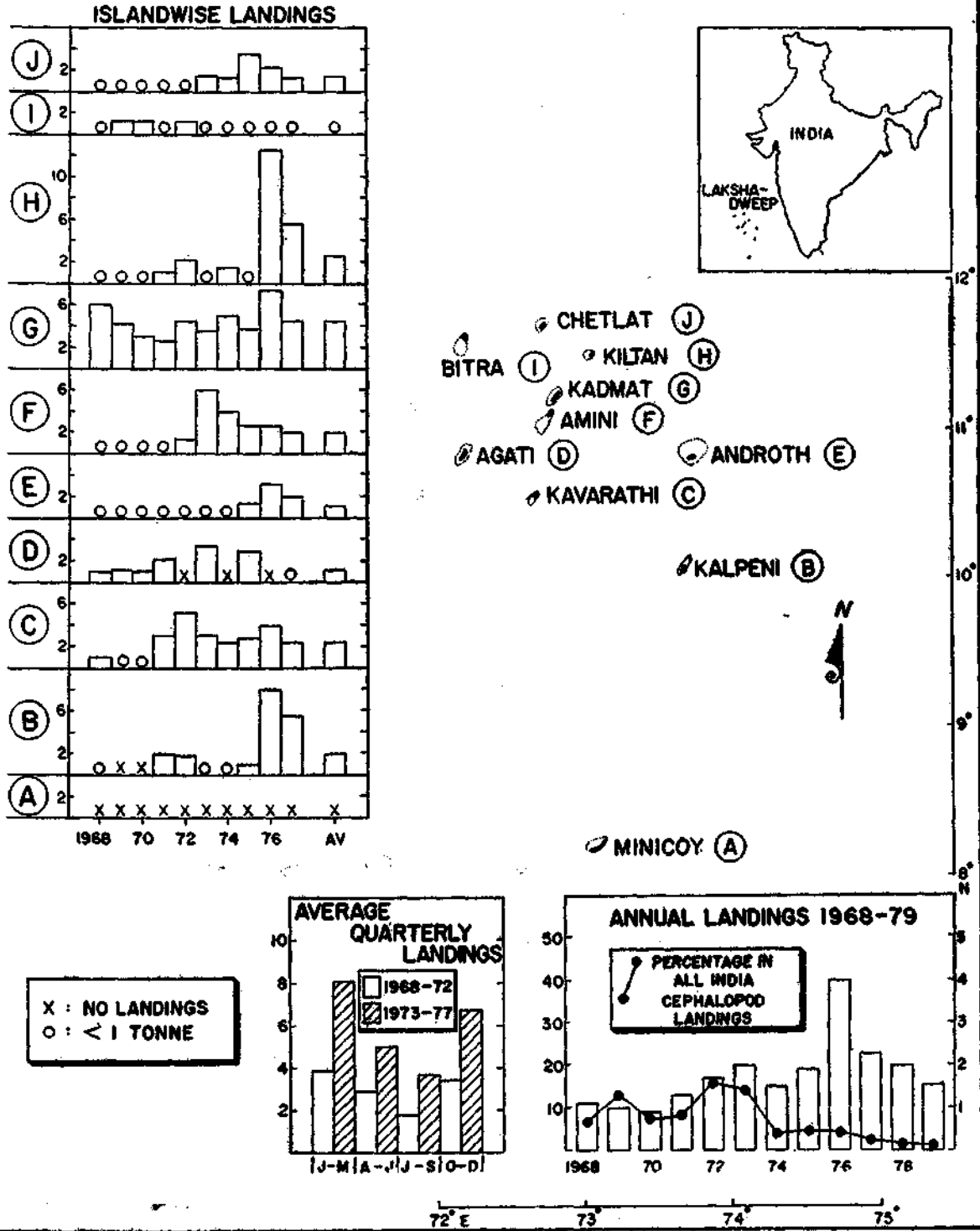


FIG. 19. Annual landings, percentage in all India cephalopod landings (1968-'79), average quarterly landings (1968-'72 and 1973-'77) and Islandwise landings (1968-'77) of Lakshadweep.

The annual landings around Androth island amounted in 1974. Cephalopods formed as much as 23.3% to less than 1 t during 1968-'74 and fluctuated between 1.4 t and 3.2 t in the period 1975-'77. The catches were less in the first quarter (18%) than in the other quarters.

The Octopod landings around Amini island in 1973 were 6 t. But in the other years they varied between 0.1 t (1968) and 4 t (1974). Octopods formed 1.6% (III quarter) to 2.4% (II quarter) in the average quarterly marine production of the island.

In the octopod production of Lakshadweep, the Kadamat island was foremost with a total production of 44.1 t in the period 1968-'77. The annual landings varied between 2.6 t (1971) and 7.3 t (1976). The

best catches were obtained during first quarter (47%) and last quarter (24%). The octopods formed 3.8% of the total fish production in the island.

The octopod catch of Kiltan island formed 12.4 t and 5.6 t in 1976 and 1977 and in the other years they fluctuated between 0.8 t and 2.2 t. The catches were better in the first and fourth quarters. In this island octopods formed 2.9% of the total marine production.

Very poor landings varying from less than 1 t to 1.2 t only were landed in Bitra island. In Chetlat island also the landings of octopods were poor with a maximum of 3.5 t in 1975 while in other years the landings varied between 0.7 t and 2.2 t. In this island the octopods accounted for about 1.4% of the all fish landings.

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