

DISTRIBUTION, APPARENT RELATIVE ABUNDANCE AND  
SIZE COMPOSITION OF SKIPJACK TUNA IN THE GULF  
OF GUINEA WATERS FROM JAPANESE SURFACE DATA

by

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SUMMARY

Using data from Japanese baitboat (1969-77) and purse seine (1967-74) fisheries in the Gulf of Guinea waters, the development and general situation on the skipjack tuna fisheries were briefly reviewed.

RESUME

On a brièvement passé en revue le développement et la situation générale des pêcheries de listao, en se basant sur des données concernant les canneurs (1969-77) et senneurs (1967-74) japonais dans le golfe de Guinée.

RESUMEN

Se examina brevemente el desarrollo y el estado general de las pesquerías de listado, utilizando datos de las pesquerías de cebo (1969-77) y cerco (1967-74) japonesas en el golfo de Guinea.

Japanese baitboats and seiners in the Gulf of Guinea waters have fished the skipjack tuna in their respective ways. This report aims to describe the general state of exploiting the skipjack tuna by these two different gears based on the available data.

#### Statistical data available

The following statistical data from the Japanese surface fisheries are available:

Baitboat- Catch in tons and number of fishing days by 1-degree area and by month, quarter and year for 1969-1977, without breakdown by the vessel classes.

Seiner - Catch in tons and number of sets by 1-degree area and by month, quarter and year for 1967-1974, with breakdown by the types of operation and the vessel classes.

#### Fishing activities by statistical areas

The catch and effort data from baitboats and seiners are summarized by the skipjack statistical areas (ORSTOM, Paris, 1976) in Table 1. The data prior to 1968 for baitboats and prior to 1966 for seiners are not available in this form. After 1975, no longler seiners operate in the Atlantic Ocean.

Baitboat have worked mostly in the Annobon area. Catches and effort by these vessels have increased after 1973 comparing to the earlier years, with the exception of the drop in 1975. The increase in catch and effort in the Sherbro area after 1973 is also remarkable. The average catch per day's fishing is very high in 1971 in both areas. It appears, however, to nearly level as the trend from 1969 to 1977.

Seiners have mainly fished in the Anno-bon area, too. After 1970, unlike the baitboat activities, the decrease in catch and effort in the Sherbro area and the increase in those in the Angola area are noted. In all areas, the average catch per set differs greatly from year to year. Not only is the annual change considerable, it is hardly comparable to annual change in catch per day's fishing. As the number of sets in Table 1 is given as the effort not standardized, we examine the yearly catch per set in the following section.

#### Comparison of catch per set between two types of purse seine operation

Both skipjack tuna and yellowfin tuna have been the primary species to be sought by the Japanese seiners in the Gulf of Guinea waters but their relative amount in the catches have changed from year to year. Generally, the yellowfin tuna exceeded the skipjack tuna prior to 1969 and in later years as a whole the skipjack tuna was more in quantities than the yellowfin tuna (ICCAT Stat. Bul., vol. 8). Such a catch history may suggest that more interest in the skipjack tuna was made in the recent purse seine operations. Further more, there are two types of operation in the Japanese seiners in this area, i.e. the single-boat type operation and the double-boat type operation.

Table 2 gives a comparison of the catch per set between two types of operation. It also gives a comparison of the yearly catch per set between the skipjack tuna and yellowfin tuna. The single-boat type includes, under the data format, two classes of vessels, 300-499 and 500-999 gross tons. The double-boat type comprises three classes, 80-99, 100-199 and 200-299 gross tons. In Table 2, the standardization of the number of sets was made to the 300-499-gross ton class for the single-boat type and to 100-199-gross ton class for the double-boat type.

Comparing between the types of operation, the double-boat type appears to give higher catch per set than does the single-boat type for both skipjack and yellowfin tuna.

For the single-boat type, the yearly catch per set does not change very greatly or, in other word, has no definite trend from 1968 to 1974. For the double-boat type, however, the skipjack tuna catch per set clearly increased after 1970, whereas the yellowfin tuna catch per set decreased after 1970. This is likely to indicate that in the double-boat type operation there was a change in the fishing strategy toward more interest in the skipjack tuna from 1969 to 1970. No such a change during the past years is suggested in the single-boat type operation with larger vessels.

#### Distribution of catch, effort and cpue

The general pattern of the distribution of catch, effort and cpue for the skipjack tuna by Japanese baitboats and seiners in the Gulf of Guinea waters is presented in Figs. 1 and 2.

The distribution of catch and effort is quite similar. It indicates a central area of fishing activities off the coast of Ghana where the catch and effort are especially concentrated. This pattern of the effort distribution seems to be inherent in this fishery where the live bait acts as a primary factor for expanding the fishing grounds. The distribution of the skipjack tuna catch per day's fishing is not similar in that there appear no particular areas with very high values of it. Many 1-degree areas with varying catch per day's fishing from less than 1 ton to more than 10 tons in the peripheral region of the fishery. These values do not well represent the average situation due to very few amount of effort.

## Seiner:

The area of fishery extends far to the south along the west African coast. The extension of purse seine activities to the south of 5° S latitude occurs from August to November. Two areas of catch and effort concentrations are seen in the Gulf of Guinea. One-degree areas marked with more than 10 tons per set are widely scattered, not centralized in a particular area.

Change in effort and cpue

## Baitboat:

Fig. 3 shows the annual change in effort and catch per day's fishing on a quarterly basis from 1969 to 1977. The baitboat effort was rather low until the 2nd quarter of 1972. After that, it has been very high up to the end of 1977, with the interruption in 1975. Until the 2nd quarter of 1972, the skipjack catch per day's fishing had fluctuated as effort fluctuated. It appears to have decreased a little on the average level in 1973 and 1974 when there was a marked increase in effort. However, during the past period from 1969 to 1977, it appears to nearly level off for Japanese baitboats. From this quarterly fluctuation, a definite or regular seasonal change in catch per day's fishing is hardly discernible. The monthly change as the average year's situation indicates a fairly clear peak of about 7 tons per day's fishing in September, as seen in Fig. 5.

## Seiner:

The annual change in the purse seine effort and catch per set on a quarterly basis from 1967 to 1974 is presented in Fig. 4. In this figure, all effort data from the fleet are standardized to the effort by the 300-499-gross ton class of the single-boat type operation. The purse seine effort, which had been in a decreasing trend since 1968, reduced considerably in 1973 and 1974. No longer the fishing operations were made in 1975, as already mentioned. The quarterly change in the purse seine effort has been very regular, with a definite peak in the 3rd or 4th quarter and a deep trough in the 1st or 2nd quarter. The skipjack catch per set, which does not agree well with such a change in effort on a quarterly basis, has increased after the 2nd quarter of 1970 with the large seasonal fluctuation. As to this matter, it should be considered that more interest in the skipjack tuna has probably been made in the double-boat type operation after 1970 than in the earlier years, as indicated previously. The monthly change as the average year's situation shows higher catch per set during the latter half of the year, with August and September at the highest, as given in Fig. 6.

Size composition of skipjack tuna

The size composition data for 1974 and 1975 for baitboats and for 1967-1974 for seiners are available. Data of measurement on the baitboat catches are very limited in time and area comparing to those on the purse seine catches. The body length is represented by the fork length (LCF), which is measured from the tip of the snout to the median ray of the caudal. These size data are put together here and arranged on a monthly basis for baitboats and for seiners, indifferent to years and areas they cover.

Fig. 7 gives a comparison of the size compositions by different gears, with the data from the longline catches for reference. Apart from the longline catches, a little larger range in the size composition in purse seine catches than in baitboat catches is suggested, although the total size compositions from both fisheries are very similar. In baitboat catches, only a very small number of fish less than 40 cm occur, while such small fish sometimes appear in fairly large numbers in purse seine catches. The monthly size composition, as shown in Figs. 8 and 9, indicates this more clearly. The monthly size composition from baitboat catches covers from May, 1974 to February, 1975 (Fig. 8). The monthly size composition from purse seine catches, which comprises mixed yearly data, differs considerably, probably reflecting lack of uniformity in the data. Very small fish below 40 cm, especially around 30 cm, appearing for most of the year on the size composition from seiners may be noted, as they may suggest a more or less continuous recruitment throughout the year.

Reference

- Annon. 1976. Rapport du groupe de travail sur le l'istao Atlantique. Dakar 22-27 Mars, 1976. Institut Senegalais de Recherches Agricoles, ORSTOM, Paris.

Table 1 Catch, effort and CPUE by statistical area for the skipjack tuna by Japanese Atlantic surface fisheries.

## Baitboat

Year	Catch in tons					Fishing days *					Catch per day's fishing				
	Total	N.W. Atl.	Sher-bro	Anno-bon	Ango-la	Total	N.W. Atl.	Sher-bro	Anno-bon	Ango-la	Total	N.W. Atl.	Sher-bro	Anno-bon	Ango-la
1969	4615	-	235	4379	-	897	-	39	858	-	5.14	-	6.03	5.10	-
1970	7399	-	6	7394	-	1155	-	3	1152	-	6.41	-	2.00	6.42	-
1971	9917	-	33	9884	-	1427	-	5	1422	-	6.95	-	6.60	6.95	-
1972	10008	-	75	9933	-	1678	-	17	1661	-	5.96	-	4.41	5.98	-
1973	13624	212	851	12561	-	3092	42	256	2774	-	4.41	5.05	3.32	4.53	-
1974	17510	1080	1409	15020	-	3713	414	306	2993	-	4.72	2.61	4.60	5.02	-
1975	3053	319	5	2730	-	623	66	1	556	-	4.90	4.83	5.00	4.91	-
1976	13823	-	400	13417	7	2609	-	106	2500	3	5.30	-	3.77	5.37	2.23
1977	16757	-	665	15941	151	2982	-	104	2850	27	5.62	-	6.39	5.59	5.59

## Purse seine

Year	Catch in tons					Number of sets *					Catch per set				
	Total	N.W. Atl.	Sher-bro	Anno-bon	Ango-la	Total	N.W. Atl.	Sher-bro	Anno-bon	Ango-la	Total	N.W. Atl.	Sher-bro	Anno-bon	Ango-la
1967	2171	-	396	1718	57	860	-	214	592	54	2.52	-	1.85	2.90	1.06
1968	6029	-	1615	4196	218	1278	-	324	900	54	4.72	-	4.98	4.66	4.04
1969	679	-	1	677	1	822	-	86	734	2	0.83	-	0.01	0.92	0.50
1970	3519	-	11	3508	0	558	-	5	552	1	6.31	-	2.20	6.36	0
1971	6219	-	157	5745	316	868	-	10	811	47	7.16	-	15.70	7.08	6.70
1972	3384	-	0	3073	311	876	-	2	791	83	3.86	-	0	3.88	3.75
1973	1544	-	-	1195	350	386	-	-	336	50	4.00	-	-	3.56	7.00
1974	792	-	6	538	249	243	-	3	199	41	3.26	-	2.00	2.70	6.07

\* Nominal effort.

Table 2 Comparison of catch per set between single-boat type and double-boat type and between skipjack tuna and yellowfin tuna.

	A Skipjack tuna						B Yellowfin tuna					
	Single-boat type			Double-boat type			Single-boat type			Double-boat type		
	f	C	cpue	f	C	cpue	f	C	cpue	f	C	cpue
1967	-	-	-	783.1	2171.1	2.77	-	-	-	860.9	5244.2	6.09
1968	215.5	866.0	4.02	1397.1	5211.2	3.73	196.6	688.8	3.50	978.1	6429.0	6.57
1969	227.0	255.1	1.12	520.5	423.7	0.81	227.0	1121.8	4.94	549.6	4683.4	8.60
1970	133.0	507.0	3.81	372.6	3012.0	8.08	133.0	322.5	2.42	384.3	995.2	2.59
1971	331.6	1645.7	4.96	481.5	4570.8	9.49	326.2	227.4	0.70	496.0	2001.2	4.03
1972	418.2	1324.1	3.17	422.2	2059.1	4.88	405.2	890.0	2.20	434.6	1937.6	4.46
1973	377.1	1247.7	3.31	26.8	296.3	11.06	369.2	1198.2	3.25	27.5	213.6	7.77
1974	250.0	542.9	2.17	-	-	-	245.0	755.9	3.09	-	-	-
Mean			3.22			5.83			2.87			5.73

f. Number of sets standardized.

C. Catch in tons.

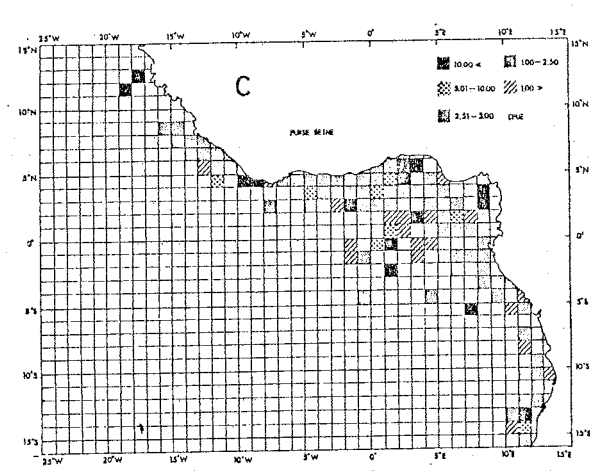
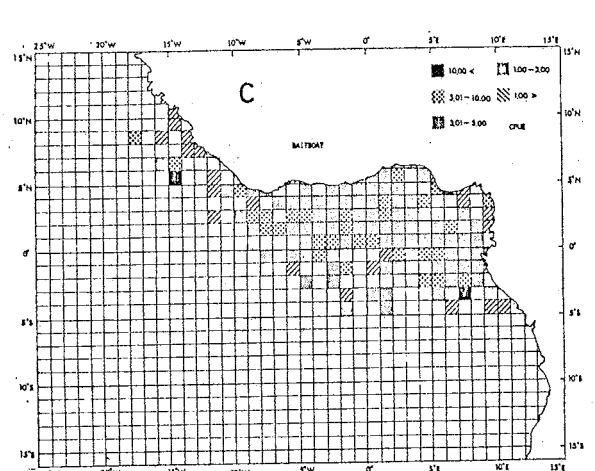
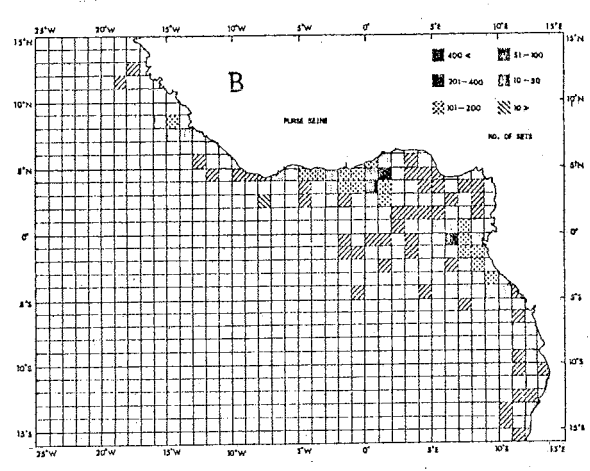
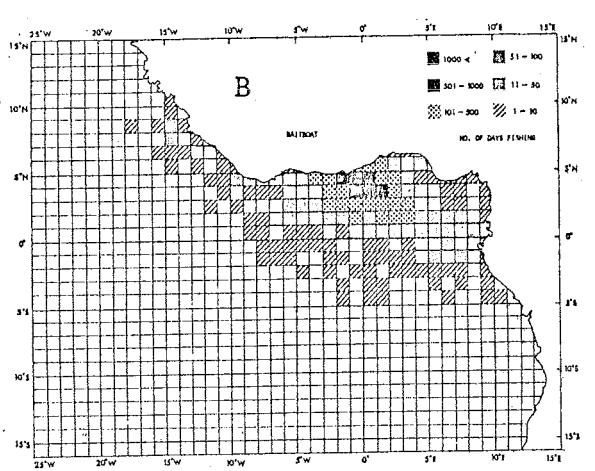
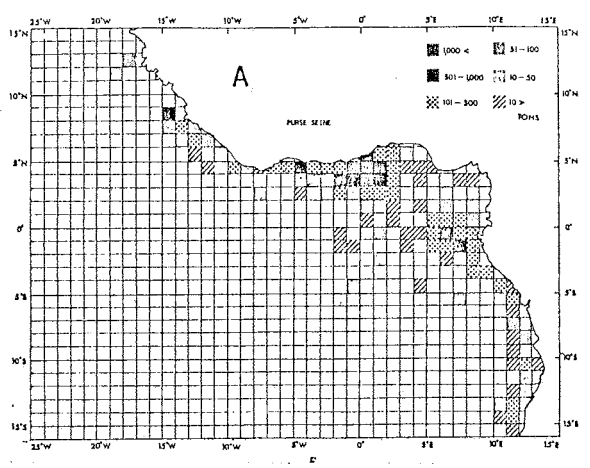
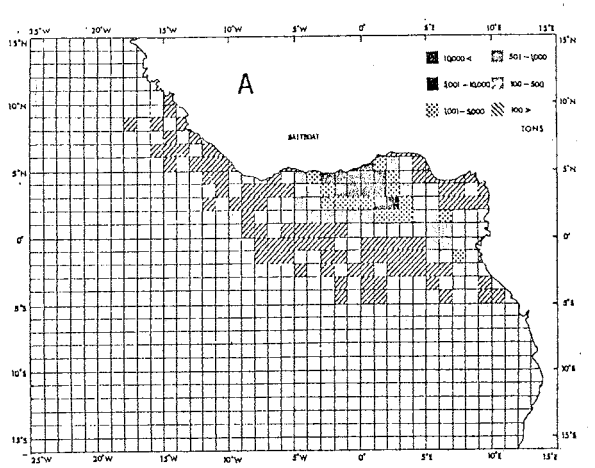


Fig. 1  
Distribution of catch, effort and cpue by 1-degree area for skipjack tuna by Japanese baitboats.

- A Catch in tons
- B No. of fishing days
- C Catch per day's fishing

Fig. 2  
Distribution of catch, effort and cpue by 1-degree area for skipjack tuna by Japanese seiners.

- A Catch in tons
- B No. of sets
- C Catch per set

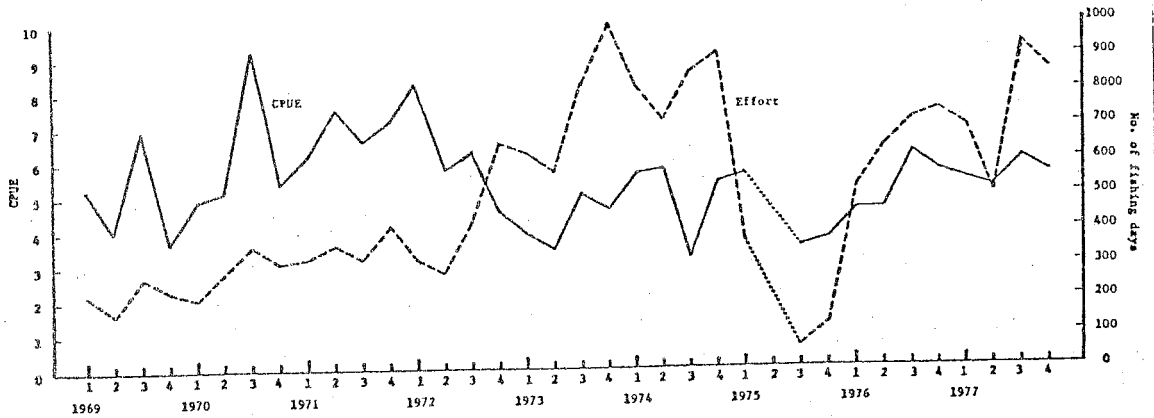


Fig. 3 Quarterly change in effort and catch per day's fishing for skipjack tuna by Japanese bait boats, 1969-1977.

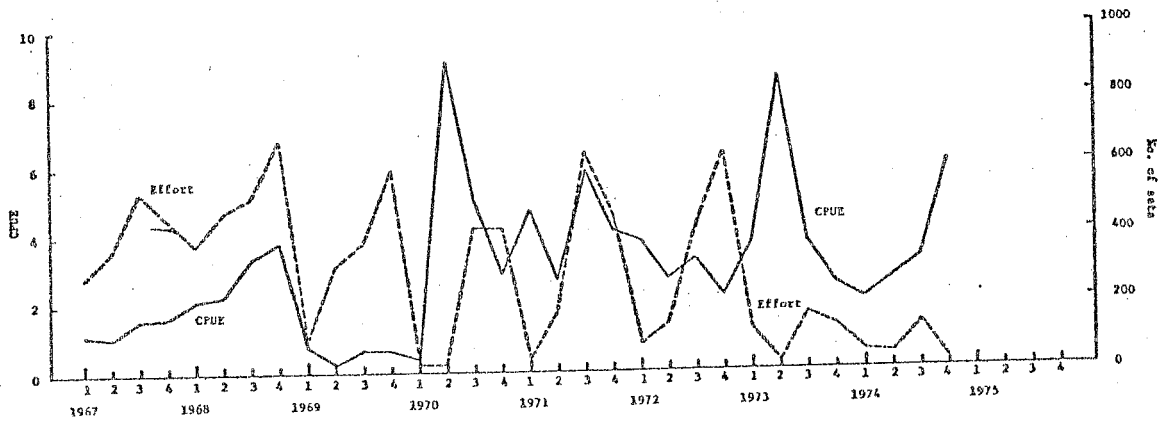


Fig. 4 Quarterly change in effort and catch per set for skipjack tuna by Japanese seiners, 1967-1974.

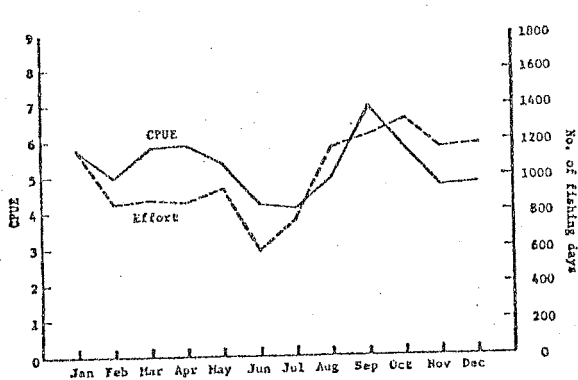


Fig. 5 Seasonal change in catch per day's fishing and effort for skipjack tuna by baitboat fishery (all years combined).

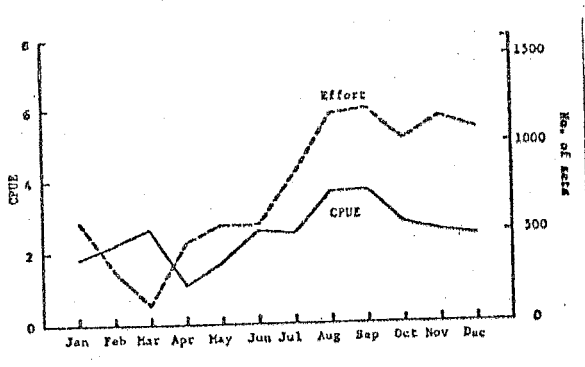


Fig. 6 Seasonal change in catch per set and effort for skipjack tuna by purse seine fishery (all years combined).

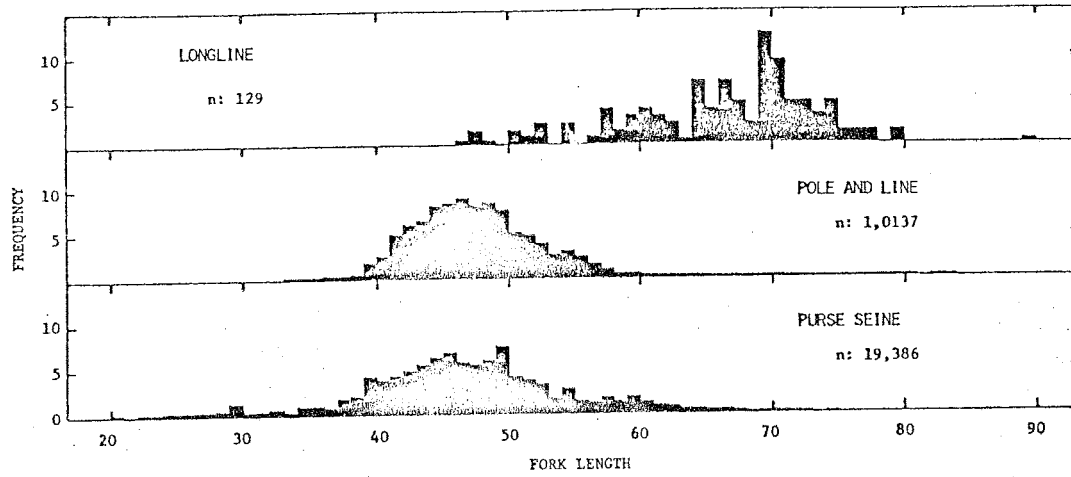


Fig. 7 Size compositions of skipjack tuna by different gears.

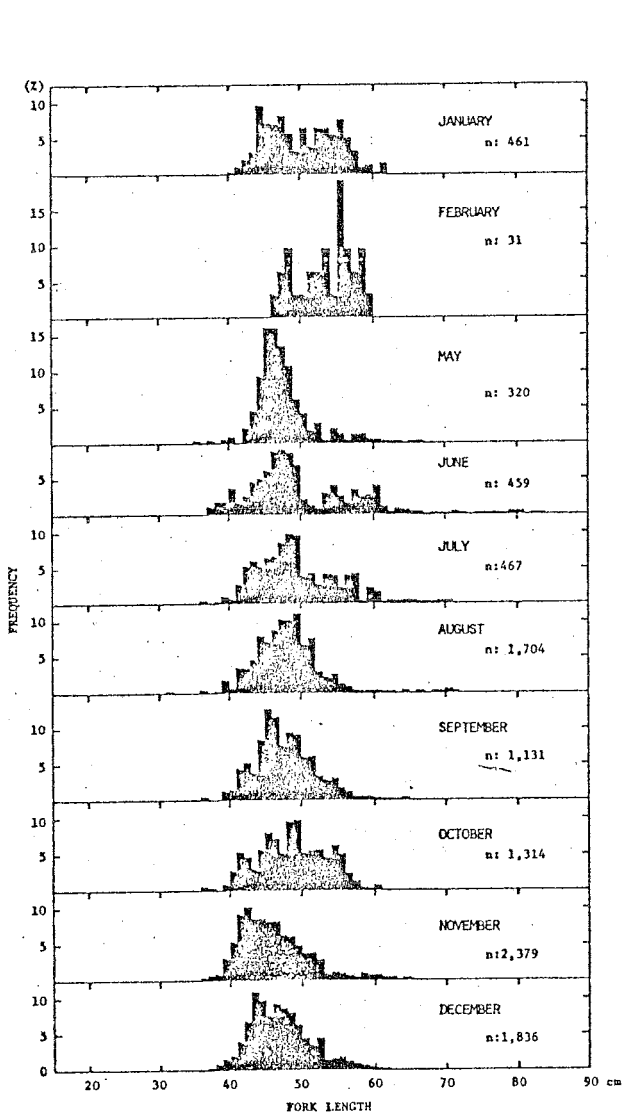


Fig.8 Monthly size composition of skipjack tuna by baitboats.

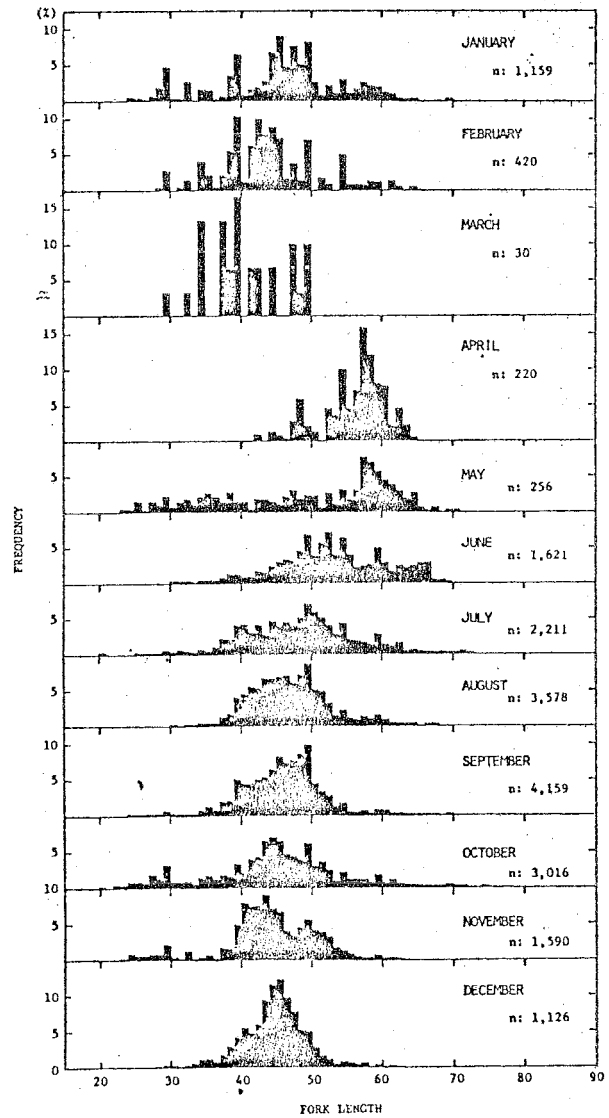


Fig.9 Monthly size composition of skipjack tuna by seiners.