

Ceylon's tuna longline fishing effort and Catch Distribution in the Indian Ocean, 1967-70

By

K. SIVASUBRAMANIAM*

INTRODUCTION

In 1967, the Ceylon Fisheries Corporation, a Government-sponsored organisation, commenced longlining for oceanic tunas in the Indian Ocean with two vessels (315 Gr. T. class). The vessels have restricted the operational range to the equatorial belt and hence the effort has been directed chiefly on the yellowfin and bigeye tunas. At the commencement, the standard five-hooks units were utilised but these were modified into the six-hooks units and three hundred to three-hundred and fifty baskets were used in each set. The bait used was mainly saury (*Colalabis Saira*) Brevoort imported from Japan. Recently there has been an increase in the usage of locally available bait fish like Mackerel (*Rastrelliger kanagurta*) flying fish (*Hirundichthys coramandelensis*) Milk fish (*Chanos chanos*) squid (*Loligo* sp.), etc.

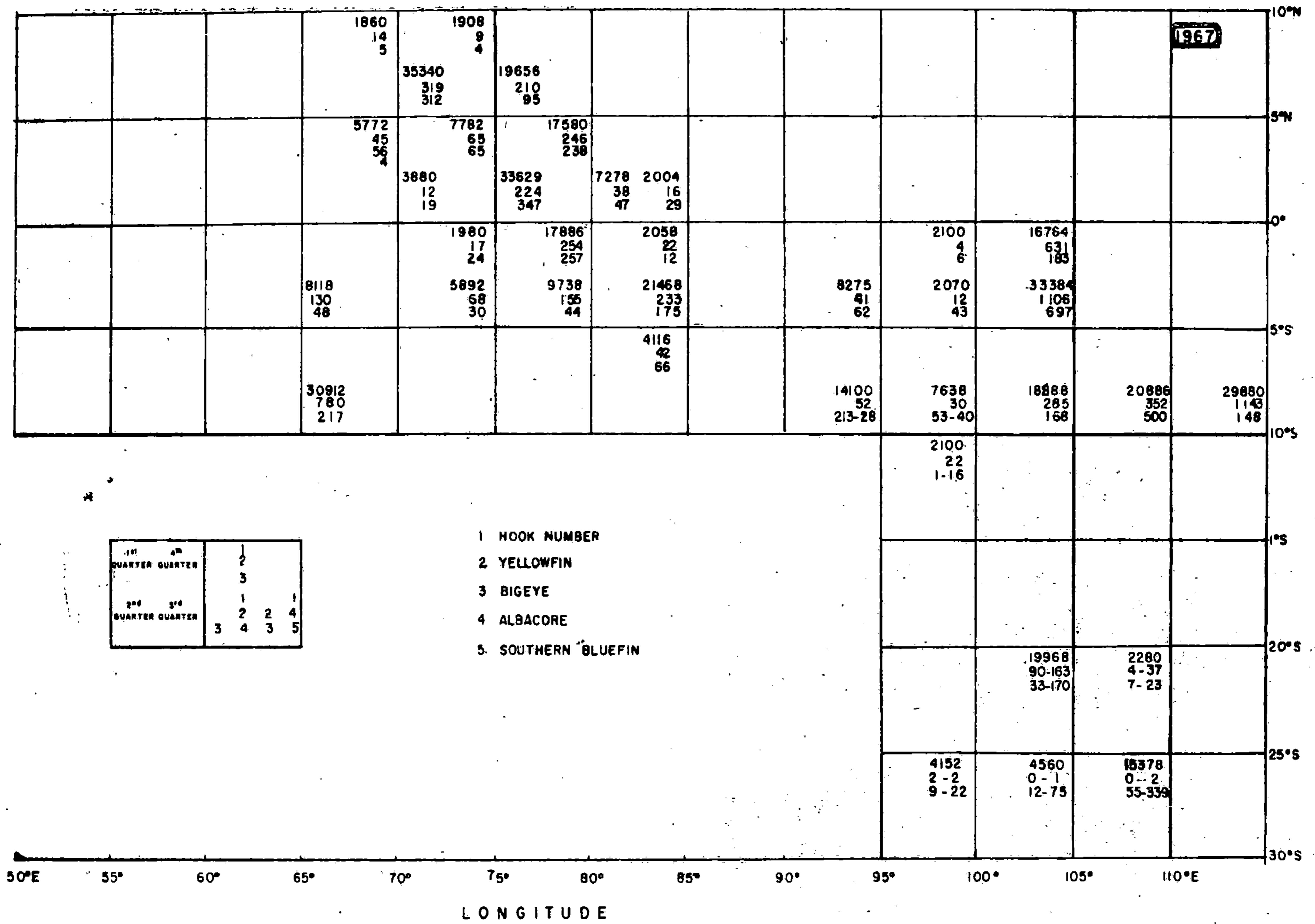
The present report was prepared to evaluate the performance of the two vessels, study trends in fishing condition, the status of the stocks exploited and also to contribute basic information required by the Indian Ocean Fisheries Commission for management of the tuna resources.

Distribution of effort

Figures 1 and 2 show distribution of effort within $5^{\circ} \times 5^{\circ}$ areas for the four quarters of the year and for the four years. It is clearly evident that, throughout the period, the effort has been concentrated in the central equatorial belt (70° — 100° E, 10° N— 10° S). At the beginning of the fishery, there was an interest in the Southern bluefin (*T. thynnus maccoyi*) and albacore (*T. alalunga*) in Southern areas (20° S— 30° S) but this was discontinued. Recently (1970-1971) the effort in the West equatorial region has also showed a decline resulting in an increase in interest in the higher latitudes of the north-central region (10° — 20° N, 70° — 100° E) since this year. A little over 70% of the effort had been within the central equatorial region, with the balance divided almost equally between Western and Eastern regions (Table 1).

Analysing the performance, the tuna boats have averaged only 30 fishing days per trip and a maximum of four trips per year has been achieved. Each vessel has been out of port for about 190-200 days with 120 days fishing per annum. A low ratio of fishing days to days out of port was realised partly due to unloading of the catches in Penang (author 1970).

* Fisheries Research Station, Colombo 3, Ceylon.



1st QUARTER	2nd QUARTER	1	2	3
3rd QUARTER	4th QUARTER	1	2	3
		3	4	5

- 1 HOOK NUMBER
- 2 YELLOWFIN
- 3 BIGEYE
- 4 ALBACORE
- 5 SOUTHERN BLUEFIN

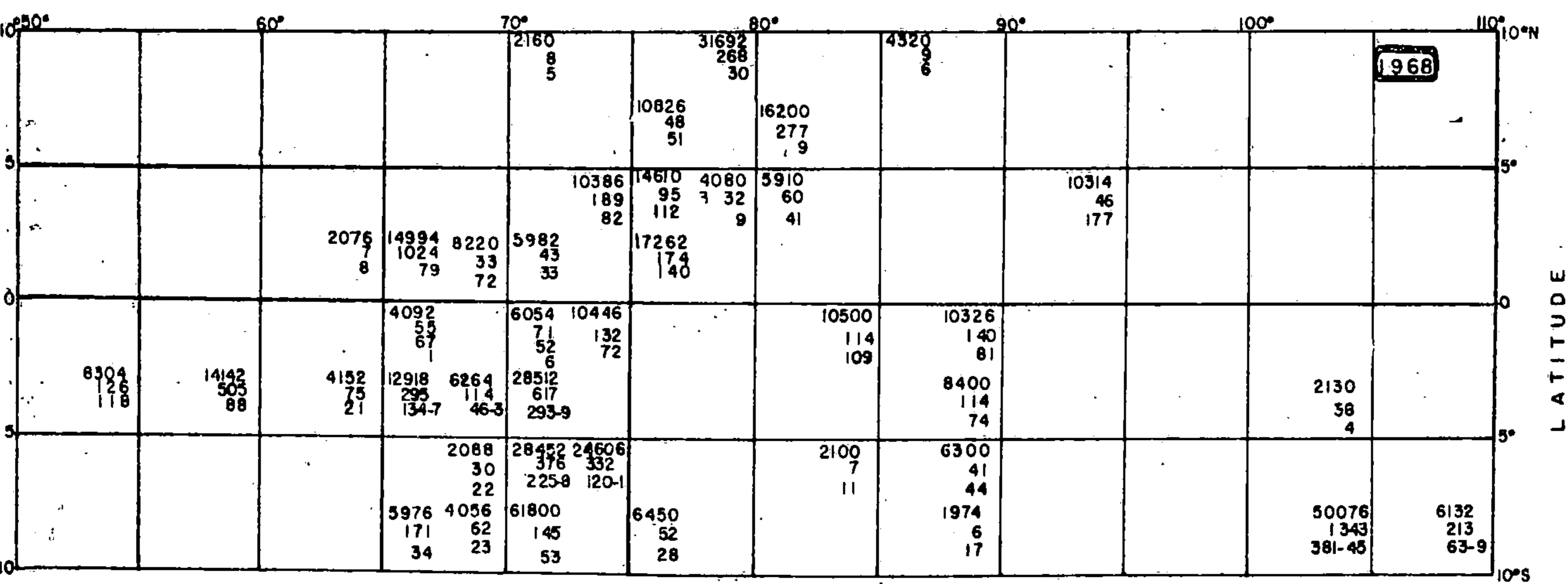


Fig. 1. Distribution of longline effort by Ceylon vessels during 1967 and 1968 and the catch number by species.

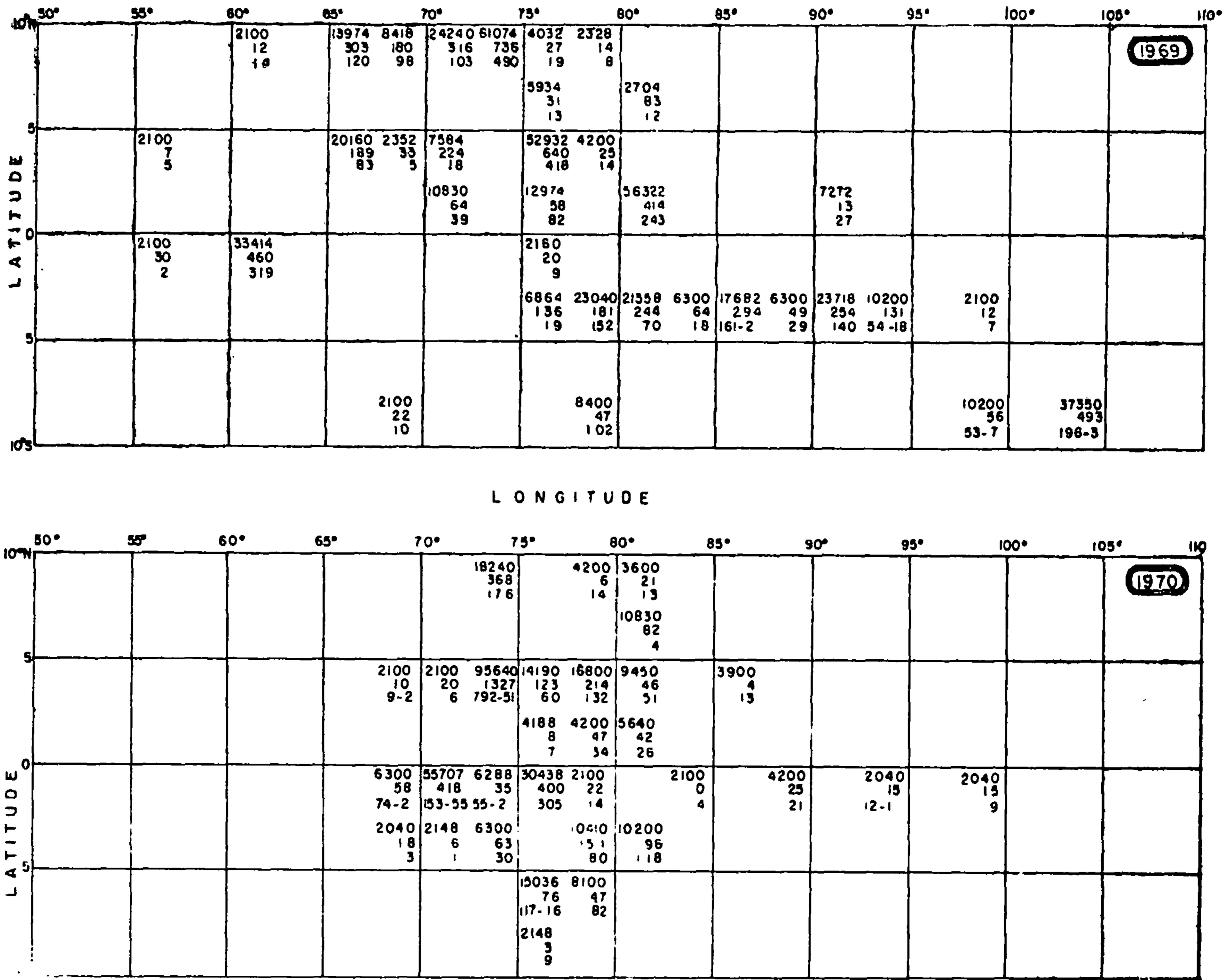


Fig. 2. Distribution of longline effort by Ceylon vessels, during 1969 and 1970 and the catch number by species.

TABLE 1

Effort, Catch and hooked rates (within brackets) for the different regions exploited by Ceylon's tuna vessels

Region		1967	1968	1969	1970
50°-70°E	.. HOOKNUMBERS	46,662	77,282	86,718	10,440
10°N-10°S	.. YELLOWFIN ..	969(2.07)	2,497(3.23)	1,213(1.39)	860(0.82)
(Western)	.. BIGEYE ..	326(0.69)	712(0.92)	656(0.75)	860(0.82)
70°-100°E	.. HOOKNUMBERS	226,384	339,662	415,298	352,233
10°N-10°S	.. YELLOWFIN ..	2,069(0.91)	3,396(0.99)	4,133(0.99)	3,674(1.04)
(Central Equatorial)	.. BIGEYE ..	2,141(0.94)	1,874(0.55)	2,317(0.55)	2,338(0.66)
100°-120°E	.. HOOKNUMBERS	119,122	58,338	37,350	—
10°N-10°S	.. YELLOWFIN ..	3,517(2.95)	1,594(2.73)	493(1.32)	—
(Eastern)	.. BIGEYE ..	1,696(1.42)	448(0.76)	196(0.52)	—
100°-120°E	.. HOOKNUMBERS	46,338	—	—	—
20°-30°S	.. YELLOWFIN ..	96(0.21)	—	—	—
(South-Eastern)	.. BIGEYE ..	116(0.25)	—	—	—
	.. ALBACORE ..	205(0.44)	—	—	—
	.. BLUEFIN ..	629(1.36)	—	—	—

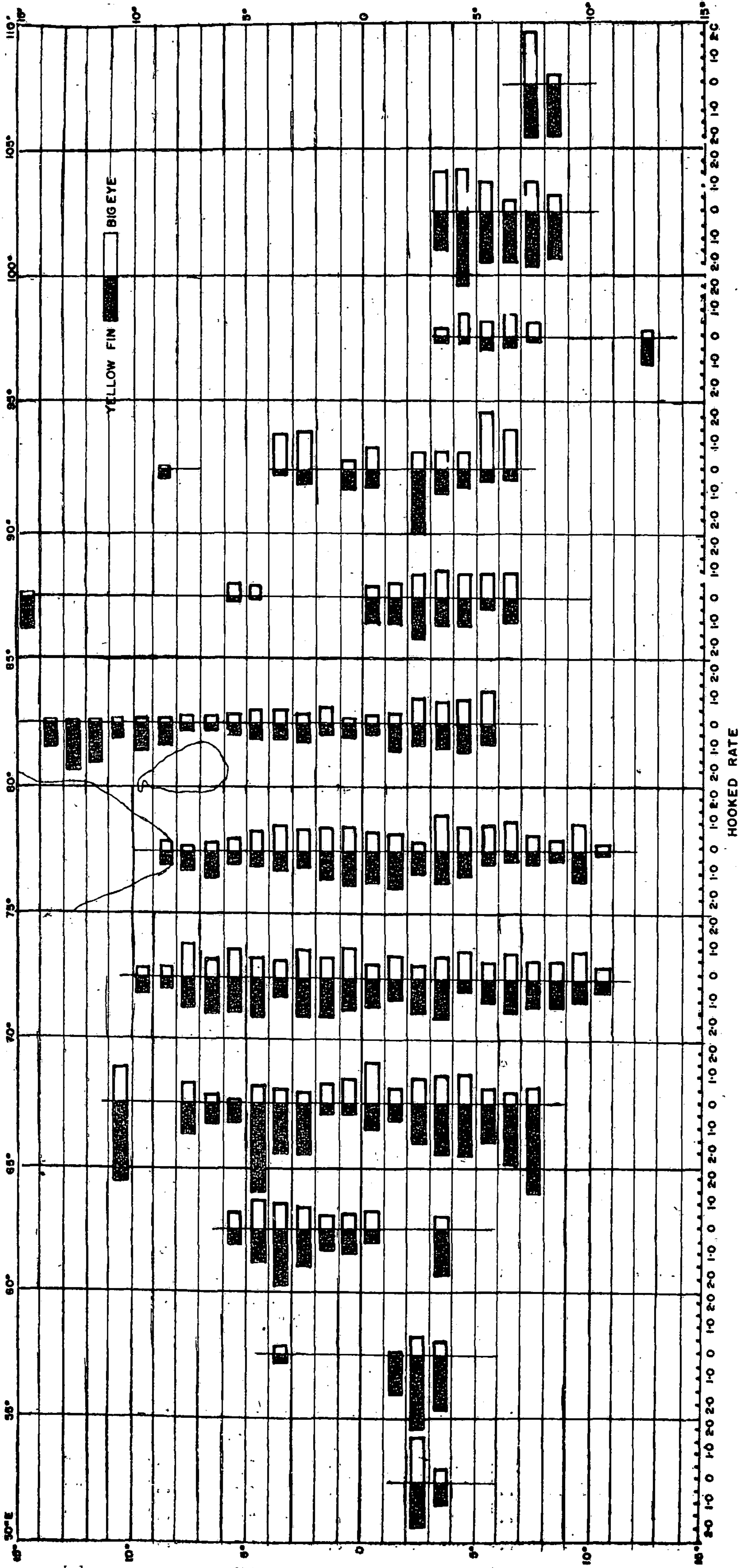


Fig. 3. Mean hooked rates for yellowfin (shaded) and bigeye tuna for Ceylon vessels fishing in the Indian Ocean (1967-1970).

Catch Distribution

The mean hooked rates (1967-1970) realised for the yellowfin and bigeye tuna in the areas fished are given in figure 3. Relatively higher hooked rates for yellowfin tuna were realised in the Western region and also in the Eastern region, than in Central equatorial region. West of Ceylon, bigeye tuna show equally variable hooked rate within latitudes of the equatorial belt but east of Ceylon the hooked rates appear to decline rapidly northward. The mean hooked rates for the two species in the years 1967 and 1968, does not appear to be significantly different from those realised by the Japanese vessels operating in the same areas. The operations during the first half of 1971 indicates higher hooked rates for yellowfin tuna in the areas North of 10° N.

The size compositions (by weight) of yellowfin and bigeye tuna caught by one of the two vessels, are illustrated in figures 4 and 5. It appears that the fishery for both species are dependant considerably on the small and medium-sized fish and relatively high hooked rates are realised in areas where proportions of younger fish are relatively high.

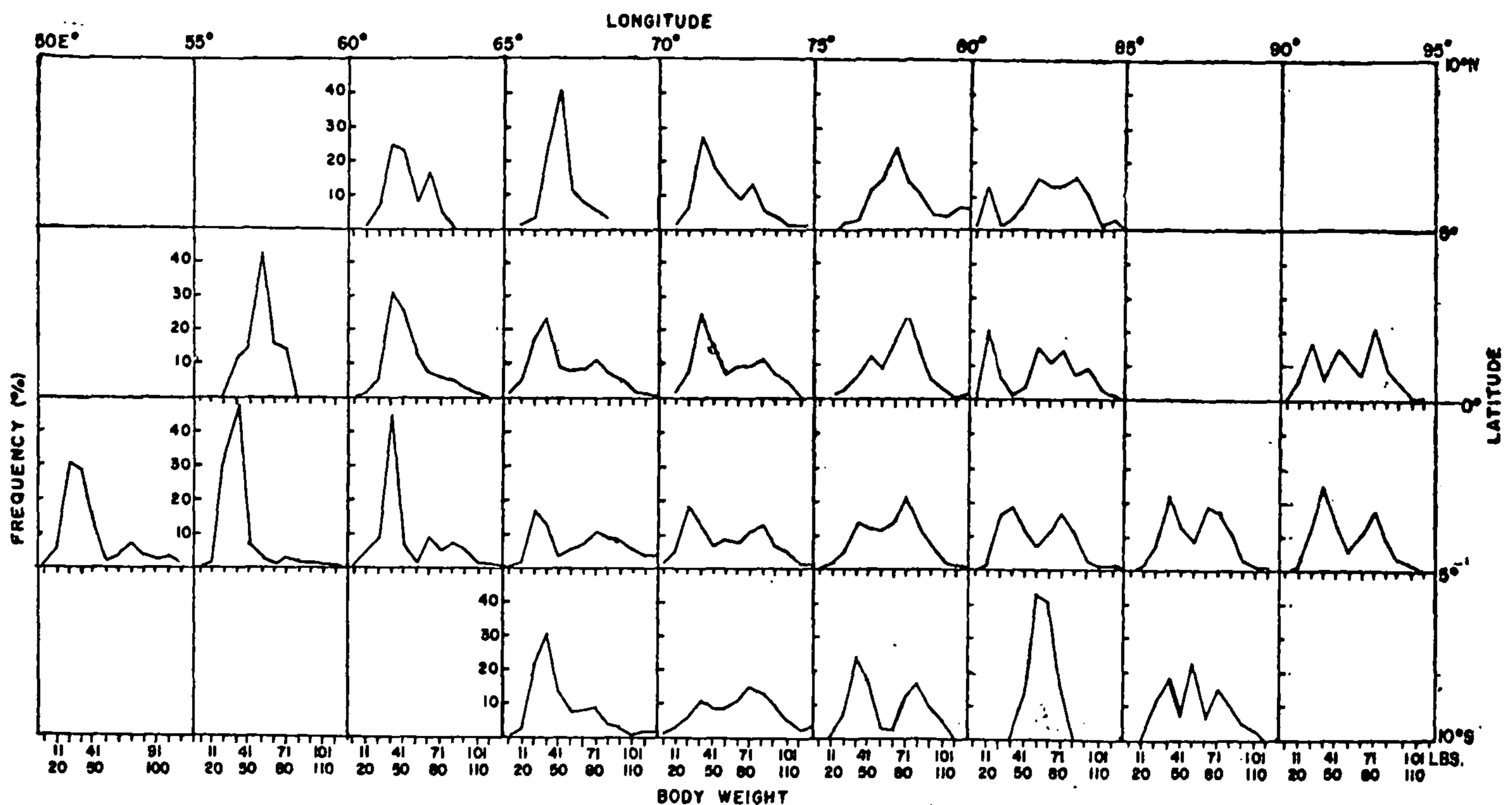


Fig. 4. Frequency distributions of the body weight (lbs.) for yellowfin tuna caught by Ceylon's tuna longliners, in the Indian Ocean.

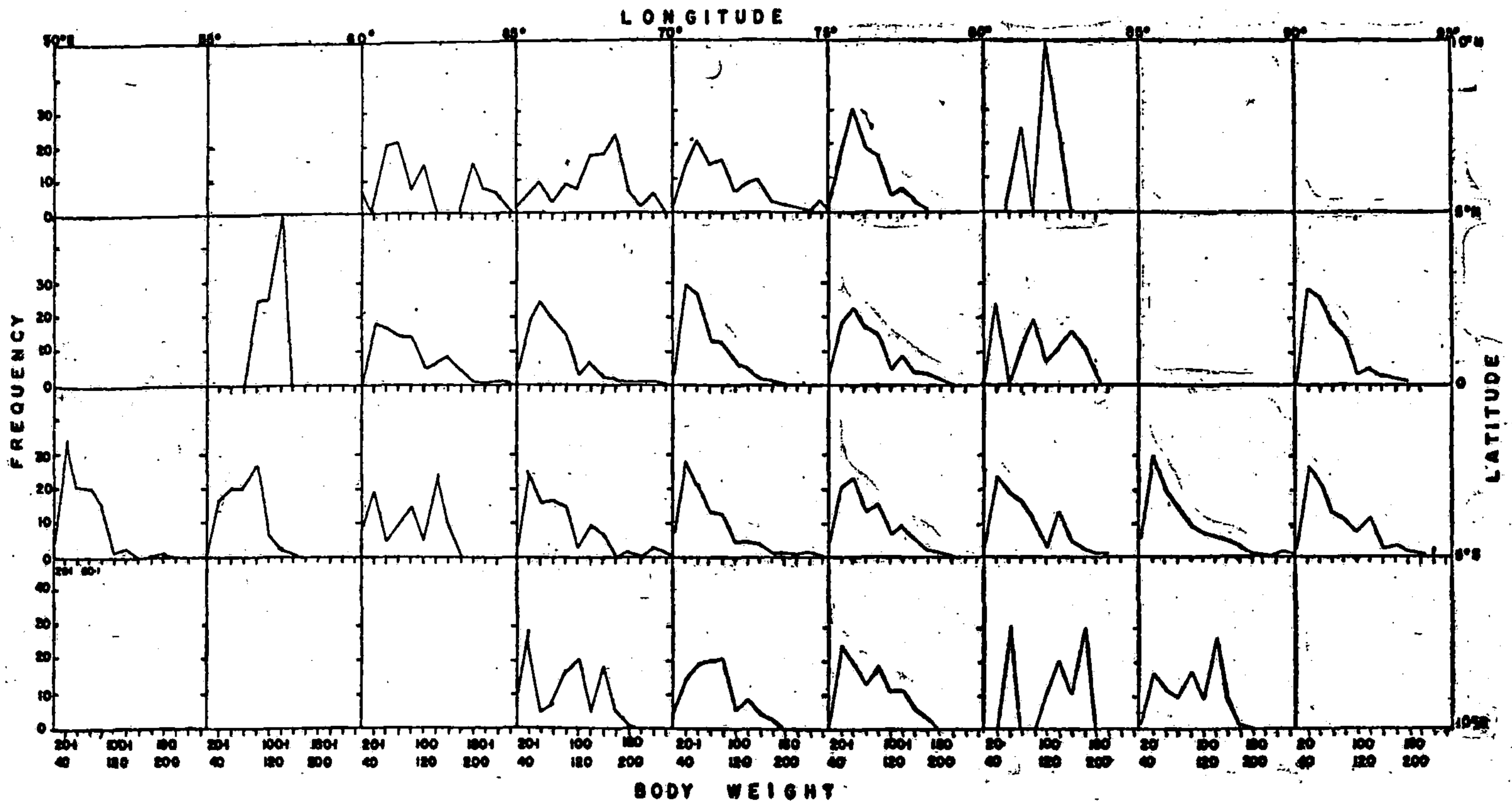


Fig. 5. Frequency distribution of the body weight for Bigeye tuna caught by Ceylon's tuna longliners.

Present status of stocks

The effort, catch and catch per unit of effort for the three main regions, covered by Ceylon's vessels are given in Table 1. Geographically and seasonally, the distribution of effort in the Western and Eastern regions has been considered insufficient to be indicative of the changes in the status of stock. In this respect the central equatorial region appears to be a relatively well covered region and thus, trends in the annual variations in the hooked rates of both yellowfin and bigeye tuna are illustrated in figure 6. The hooked rates appear to have been fairly stable over the last four years, though at a low level.

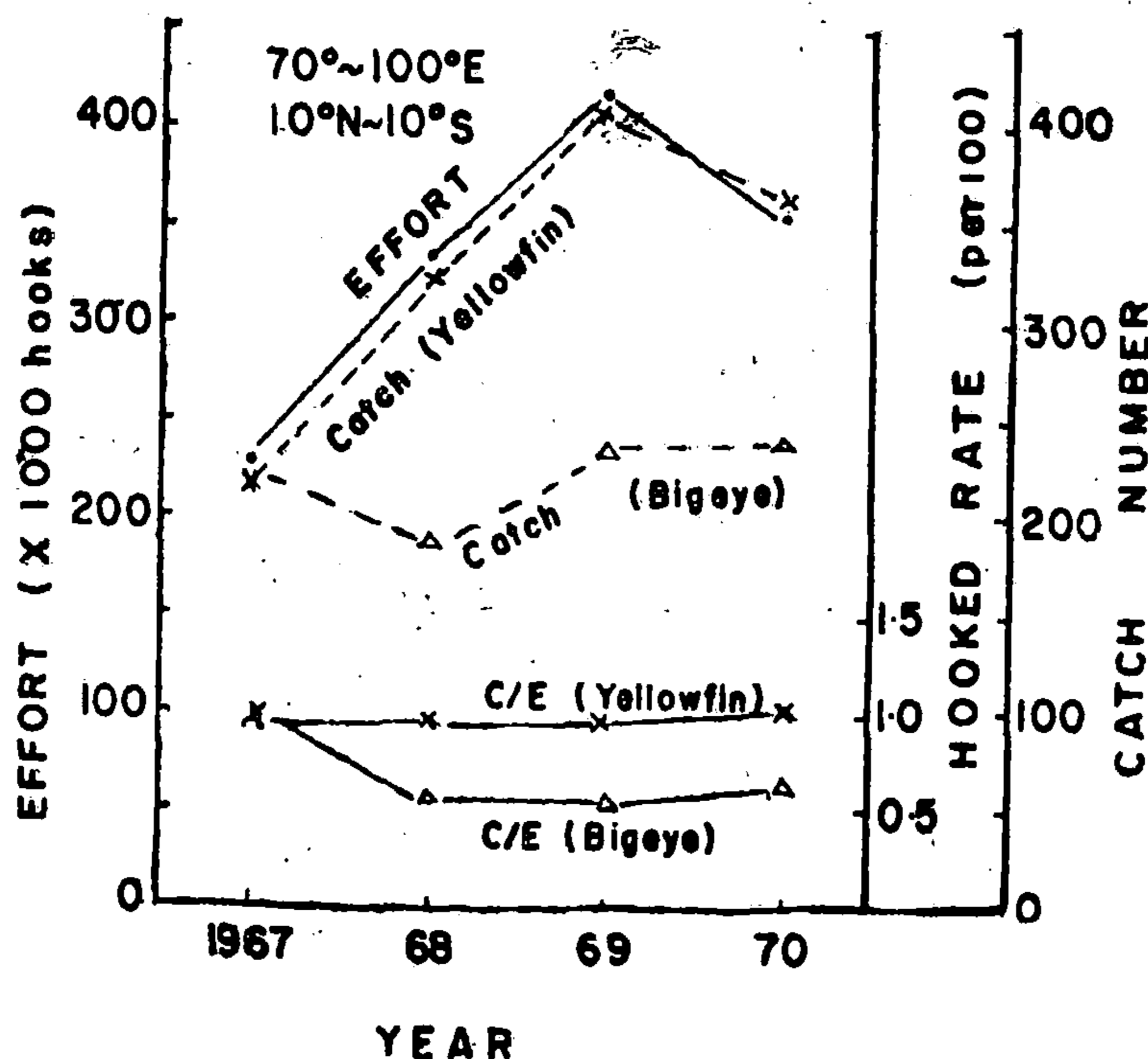


Fig. 6. Annual variations in the Effort, Catch of yellowfin and bigeye tunas and the hooked rates for Ceylon vessels operating in the Central equatorial region.

ACKNOWLEDGEMENT

The author is thankful to Messrs. E. Nanayakkara and M. Dharmasena of the Fisheries Research Station for their assistance in processing the data and drawing the figures.

REFERENCES

- ANONYMUS, 1968. Report of the meeting of a group of experts on tuna stock assessment *Miami, U. S. A., F. A. O. Fish. Rep., No. 61.*
- , 1969. Report of I. O. F. C. working party on stock assessment in relation to immediate problems of in the Indian Ocean. *F. A. O. Fish. Rep. No. 82.*
- , 1964–1969. *Annual report of effort and catch statistics by area in Japanese tuna longline fishery ; Research Division. Fish-Agency, Japan.*
- SHOMURA, R. et al 1967. Present status of fisheries and assessment of potential resources of Indian Ocean and adjacent Seas ; *Report of I. P. F. C. group of experts on Ind. Ocean. Rome Jan. 23rd–25th.*
- SHOJI KIKAWA, et al 1968. The status of tuna fisheries of the Indian Ocean as of 1968, *Far Seas Fish. Res. Lab. Japan S. Series 2.*
- SIVASUBRAMANIAM, K. 1970. Developing Ceylon's tuna longline fishery (*Manu. Report*) *Fish. Res. Station, Ceylon.*
- , 1971. Apparent abundance of yellowfin and bigeye tuna in the inshore offshore and near oceanic ranges around Ceylon. *Bull. Fish. Res. Stn., Ceylon, Vol.22 No. 1.*