BLUE MARLIN (Makaira nigricans) FISHERIES OFF BRAZILIAN COAST BY NATIONAL AND LEASED LONGLINERS (1971-1991)

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SUMMARY

Blue marlin, Makaira nigricans, are caught in low number all year round off the Brazilian coast. The CPUEs for blue marlin, in terms of number of fish, were higher off the northeast coast of Brazil than off the south and southeast coasts. The quarterly mean CPUE did not show any seasonal pattern of fluctuation in the northeast, whereas in the south and southeast the values of CPUE were higher in the first and fourth quarters. A comparison among all longline fisheries off the Brazilian coast was made, including some analysis of yield, fishing effort, CPUE, and average weight.

RESUME

Le makaire bleu, Makaira nigricans, est capturé en nombre réduit tout au long de l'année au large des côtes brésiliennes. La CPUE du makaire bleu, en termes du nombre de poissons, était plus élevée au large des côtes nord-est du Brésil qu'au large des côtes sud et sud-est. La CPUE trimestrielle moyenne n'a pas montré de mode saisonnier de fluctuation dans le nord-est, alors que dans le sud et le sud-est les valeurs de CPUE étaient plus élevées pendant les premier et quatrième trimestres. Une comparaison de toutes les pêcheries palangrières au large des côtes brésiliennes a été faite, y compris l'analyse de la production, de l'effort de pêche, de la CPUE et du poids moyen.

RESUMEN

Frente a la costa de Brasil, la aguja azul (Makaira nigricans) se captura en escaso número de ejemplares durante todo el año. Las CPUEs de aguja azul, en número de peces, eran mas altas frente a la costa nordeste de Brasil que frente a las costas sur y sudeste. La CPUE media trimestral no presentaba tipo alguno de fluctuación estacional en el nordeste, mientras que en el sur y sudeste, los valores de CPUE eran mas altos durante los trimestres primero y cuarto. Se estableció una comparación entre todas las pesquerías palangreras de la costa brasileña, incluyendo algún análisis del rendimiento, esfuerzo de pesca, CPUE y peso medio.

1. INTRODUCTION

The longline fishery for tunas and billfishes in the Atlantic Ocean began in 1956 by Japanese longliners leased by a Brazilian Company, operating from the port of Recife in the northeast coast. These activities lasted until 1964.

At the moment, three ports where longliners are based include: Natal (in the northeast), Santos (in the southeast) and Rio Grande (in the south). The first port is about 3000km distance from the second, whereas Rio Grande is 1500km from Santos.

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In Santos, the longline fishery began in 1958 with three boats. From 1971 to 1984, this fleet increased from 3 to 8 boats. After that, from 1988 on, this fleet began to increase again, reaching 17 boats by 1992 (Amorim & Arfelli, SCRS/92/31).

The tuna fisheries in Rio Grande started in 1977 when Japanese longliners were leased. A minimum of 2 boats operated in 1991 and a maximum of 6 in 1982 and 1986. After 1991, they stopped their operation in Brazil (Antero-Silva, SCRS/92/33).

In 1982, a Brazilian company began a tuna longline fishery from Rio Grande, with a single boat. In 1983, another boat was incorporated. These activities ended in 1987.

In June 1991, tuna longline operations started from Rio Grande, when 11 Taiwanese longliners were leased.

The tuna longline fishery from the Northeast coast of Brazil, suspended in 1964, was reborn in 1983 with 3 Brazilian fishing boats based in Natal (Hazin et al., SCRS/92/30).

The catches of these longliners based on the Brazilian coast are composed of the following species: Tunas--yellowfin, albacore, bigeye and southern bluefin tuna; billfishes: blue marlin, white marlin, sailfish, longbill spearfish and swordfish; sharks, and other fishes, such as dolphin fish, barracuda, etc. Among the billfishes, the blue marlin is the largest and the least abundant species. It is caught in small numbers all year round off all Brazilian coasts.

2. MATERIAL AND METHODS

This study is based on catch data form Brazilian fleets based in Santos (data from 1971 to 1991); Natal (data form 1983 to 1991); and Rio Grande (data from 1982 to 1987); and also, the Japanese leased fleet based on Rio Grande (data from 1978 to 1991).

The boats based in Natal are made of wood and have total lengths of 16, 18 and 22m. The number of baskets of the longline ranges from 150 to 250, with each basket carrying 6 to 7 hooks. The fishing effort of these boats was concentrated from 0° to 10°S latitude, and from 30°W to 40°W longitude.

The Japanese leased boats based in Rio Grande have an average total length of 48m and operated between 10°N and 43°S. During the winter, the fishing effort was located mainly in the south of Brazil between 28°S to 35°S. In the summer and spring, these boats usually extended their operations to the equatorial region, between the Brazilian northeast coast and Ascençao Islands. The major baits of all fleets were frozen sardine and squid.

In order to allow comparison between data from all fleets, the fishing grounds were divided into three areas, as follows: A= 0° to 10°S and 30°W to 40°W; B= 10°S to 20°S and 30°W to coast; C= 20°S to 35°S and 40°W to coast (Fig.1 of SCRS/92/51).

Area A was fished by both the Brazilian fleet from Natal and by the leased fleet form Rio Grande. Area B was fished only by the leased fleet form Rio Grande. Area C was fished by the Brazilian fleets from Santos and Rio Grande, as well as by the leased fleet form Rio Grande.

The dressed weight is the weight of the fish gilled and gutted, and without bill and tips of the caudal fin.

3. RESULTS AND DISCUSSION

The percentage (dressed weight) of blue marlin in the total catch ranged from 0.7 to 3.9% in area A; from 0 to 10.8% in area B; and from 0 to 2.2% in area C (Fig.l). In this last area, it is apparent that the percentage of blue marlin in the total catch of the fleet from Santos tended to decrease from 1971

to 1990. The Brazilian longliners from Rio Grande had the lowest percentage of blue marlin in the total catch.

The distribution of the fishing effort in the fishing area of all four fleets (i.e. Natal - Brazilian, Santos - Brazilian, Rio Grande - leased, and Rio Grande - Brazilian) is shown in Figs. 2, 3 and 4 of SCRS/92/51.

Figure 5 of SCRS/92/51 shows the historical trend of the fishing effort in the three areas. In area A, the fishing effort reached a maximum value in the years 1986 and 1987, decreasing significantly afterwards. The fishing effort in area B was developed only by the leased fleet and was the lowest among the three areas, with a maximum of 55,850 hooks in 1977, declining to less than half of this value in the following years. Area C had the heaviest fishing effort among the three areas, being fished by 3 different fleets. The total effort reached its highest value in 1990 .

In area A, the highest numbers of blue marlins were caught in 1986 and 1987, because during these years the fishing efforts were also the highest (Figs. 2 and 3). Area B had a very low fishing effort and consequently blue marlin catches were also quite small. In area C, the highest catch of blue marlins took place in 1981, when 125 specimens were caught.

In area A, the CPUEs of blue marlins caught by Brazilian longliners showed a slight decreasing trend (Fig. 4). The CPUEs from the leased boats, however, do not show any clear trend, reaching higher values with more variation than those of the Brazilian fleet. A marked fluctuation in the CPUEs is also apparent in area B. In area C, the CPUEs from Santos show a clear declining trend, being much higher from 1971 to 1981, than from 1982 to 1990. The CPUEs from the leased fleet were relatively stable in the whole period, showing only a slight increase in 1991. The CPUEs of the Brazilian fleet of Rio Grande had the lowest values among the three fleets in this area.

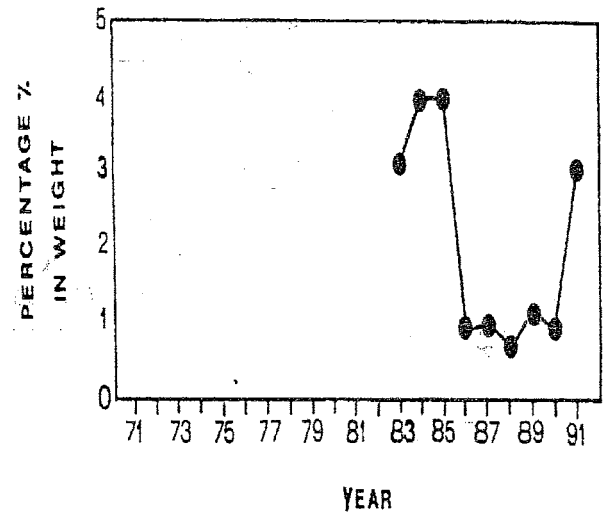
Comparison among the areas A, B and C shows that the CPUE obtained by different fleets may be quite different, even if they are fishing in the same area. It is apparent also that the CPUEs tended to decrease from north to south, with the highest values being reached in area A and the lowest in area C. This indicates that the highest abundance of blue marlins in the southwest Atlantic is located in the equatorial region. These results agree with Wise and Davis (1973), who found two major concentrations of blue marlin in the Atlantic, both of them in the western part of the ocean and in warm waters. One of these concentrations lies in the Gulf of Mexico and Caribbean, centered around Cuba. The second lies off the easternmost part of South America, from 5°S to 20°S and from 15°W to the coast (areas A and B of the present study).

The mean dressed weight of blue marlin in area A ranged from 66 to 88kg, and in area C from 50 to 262kg, averaging around 100 to 250kg (Fig. 5). These results indicate that the largest and oldest specimens are located in colder waters, more to the south than the younger and smaller ones. In both areas no clear trend is apparent.

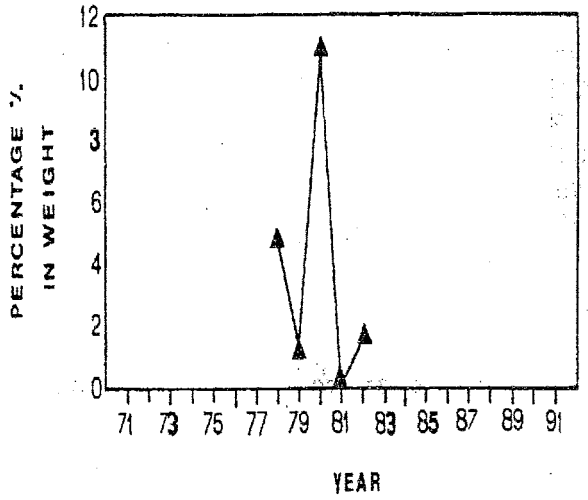
Figure 6 shows the quarterly mean CPUE of blue marlin in area A and C, respectively, from 1982 to 1991. Sample sizes from area B were too small to allow any comparison and thus were not included. The data from area A do not show any clear pattern of seasonal fluctuation in abundance, whereas the quarterly mean CPUE in area C from all three fleets tended to show the highest values in the first and fourth quarters. This seasonal fluctuation in abundance in area C is probably related to the sea water temperatures which are highest from middle spring to summer. Since the highest CPUE of blue marlin are found in area A, in the equatorial region, this seasonal fluctuation in abundance is probably due to a southern immigration of blue marlins during the warmest period of the year, in the first and fourth quarters.

4. LITERATURE CITED

WISE, J.P., and C. W. DAVIS, 1973. Seasonal distribution of tunas and billfishes in the Atlantic. NOAA Tech. Rep. NMFS (Spec. Sci. Rep. Fish. Ser.), (662):24p.



Area A



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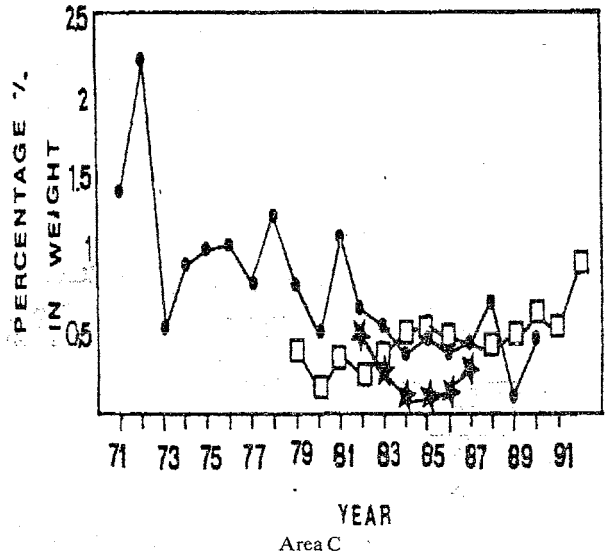
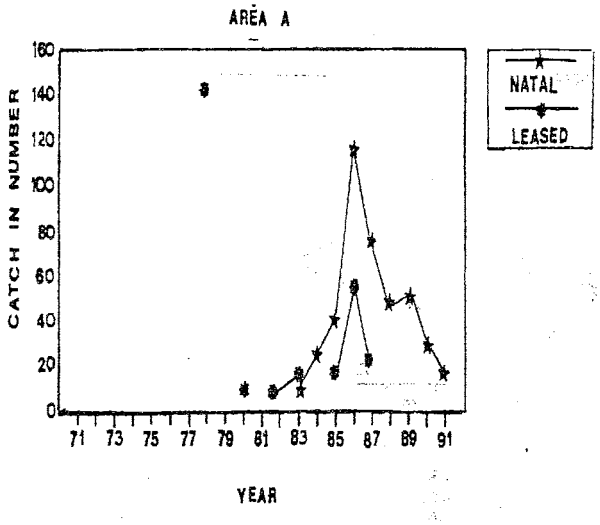
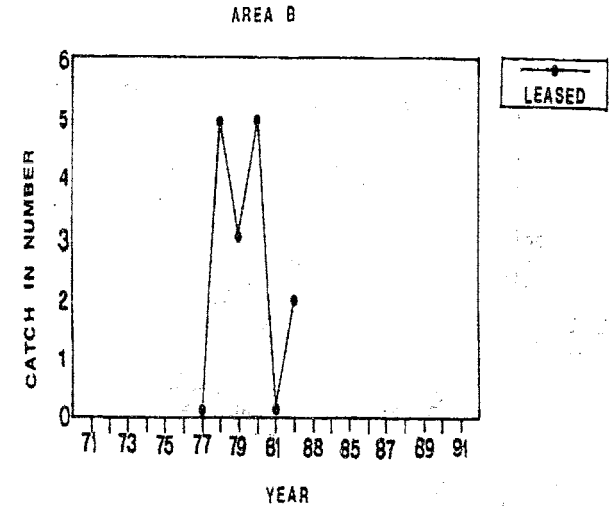


Area C

Figure 1. Percentage of blue marlin in the total catch by different fleets.





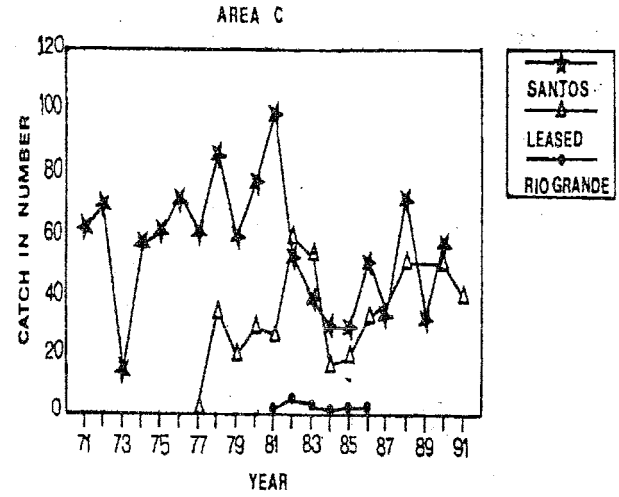
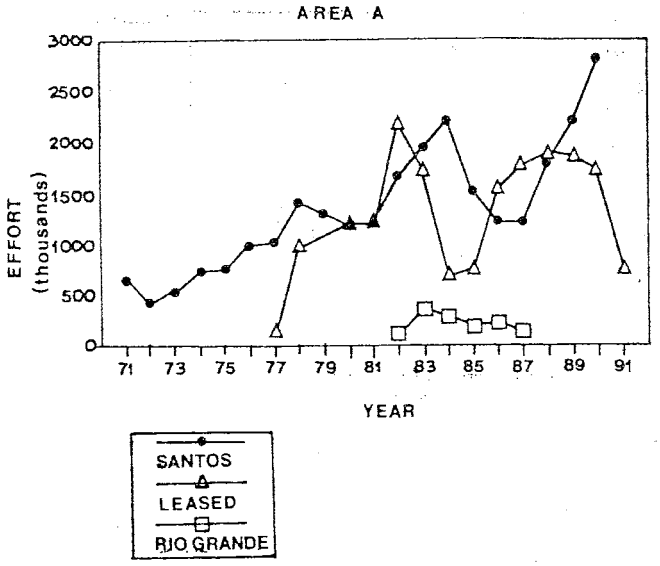
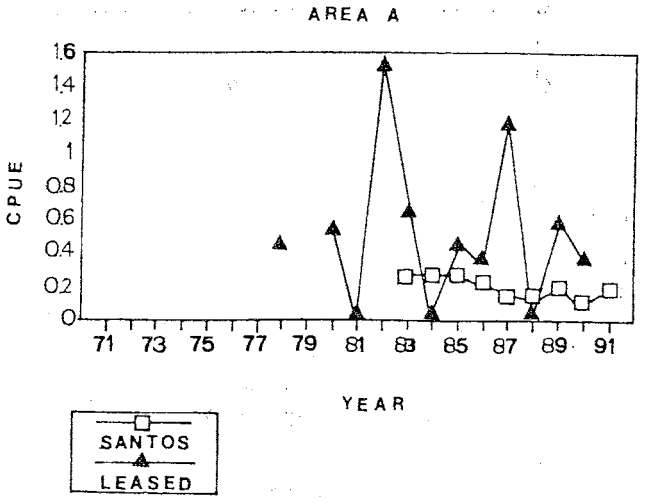
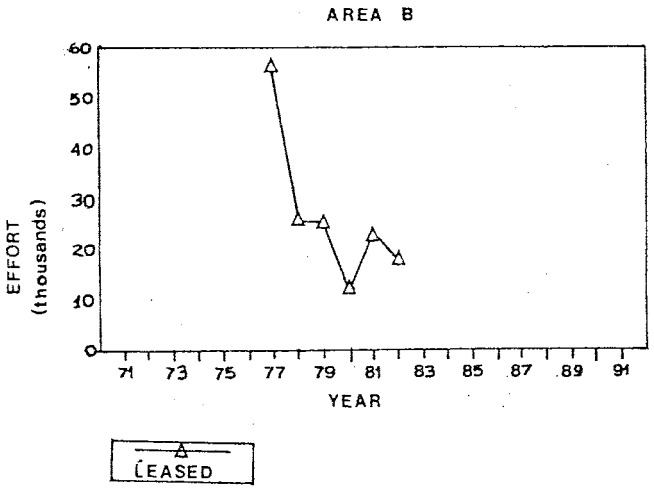
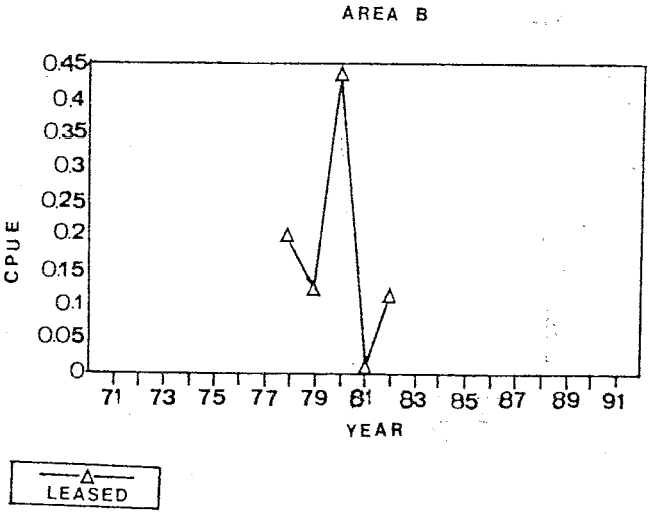


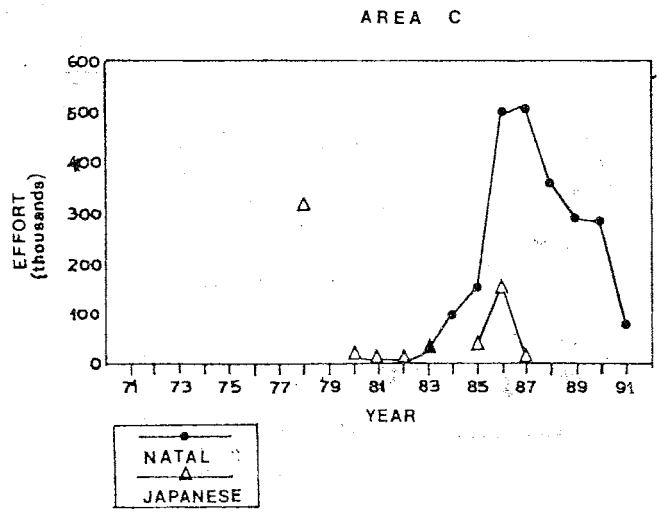
Figure 2. Blue marlin annual catch by number of fish from areas A, B, and C.











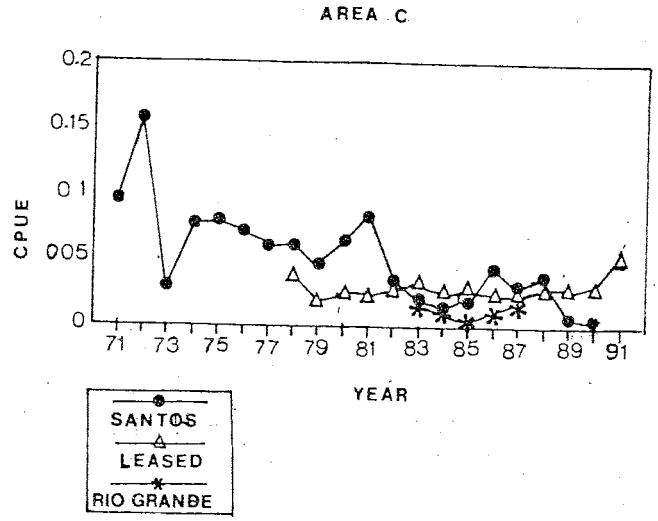


Figure 3. Annual fishing effort of blue marlin from areas A, B and C.

Figure 4. Blue marlin annual CPUE from areas A, B, and C.

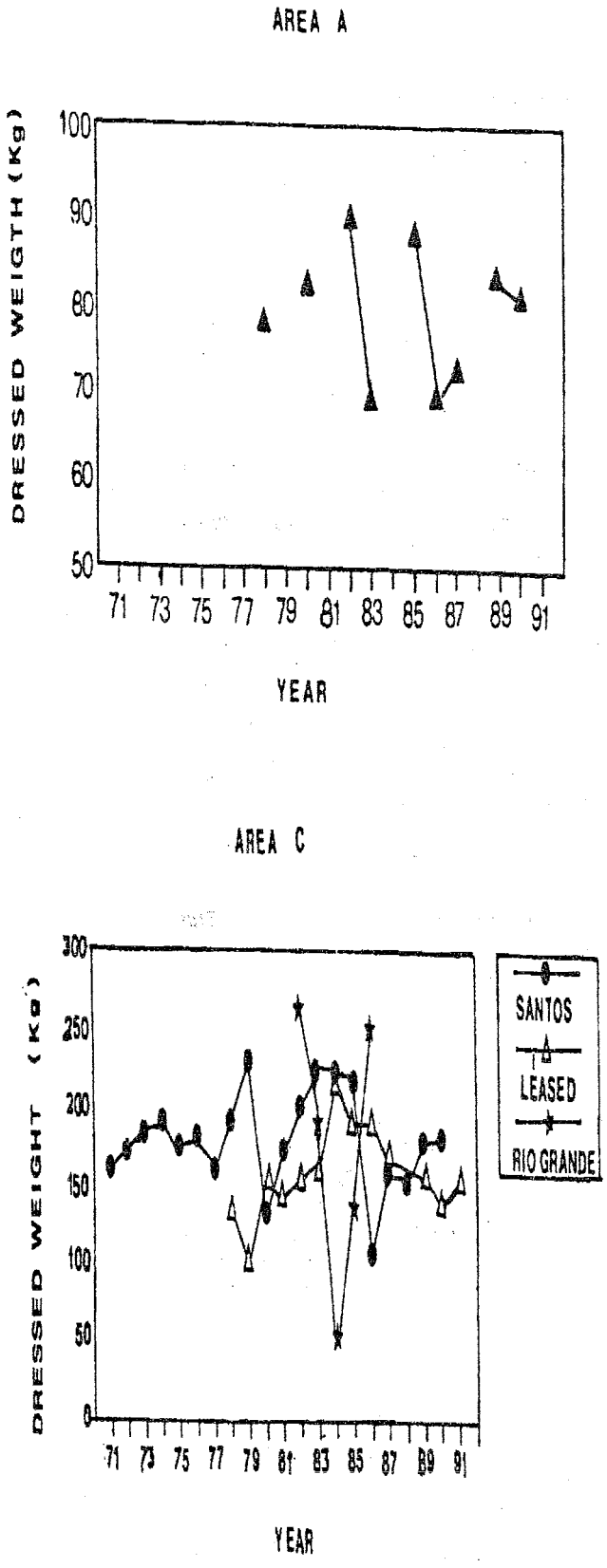


Figure 5. Blue marlin mean dressed weight from areas A (leased fleet only) and C.

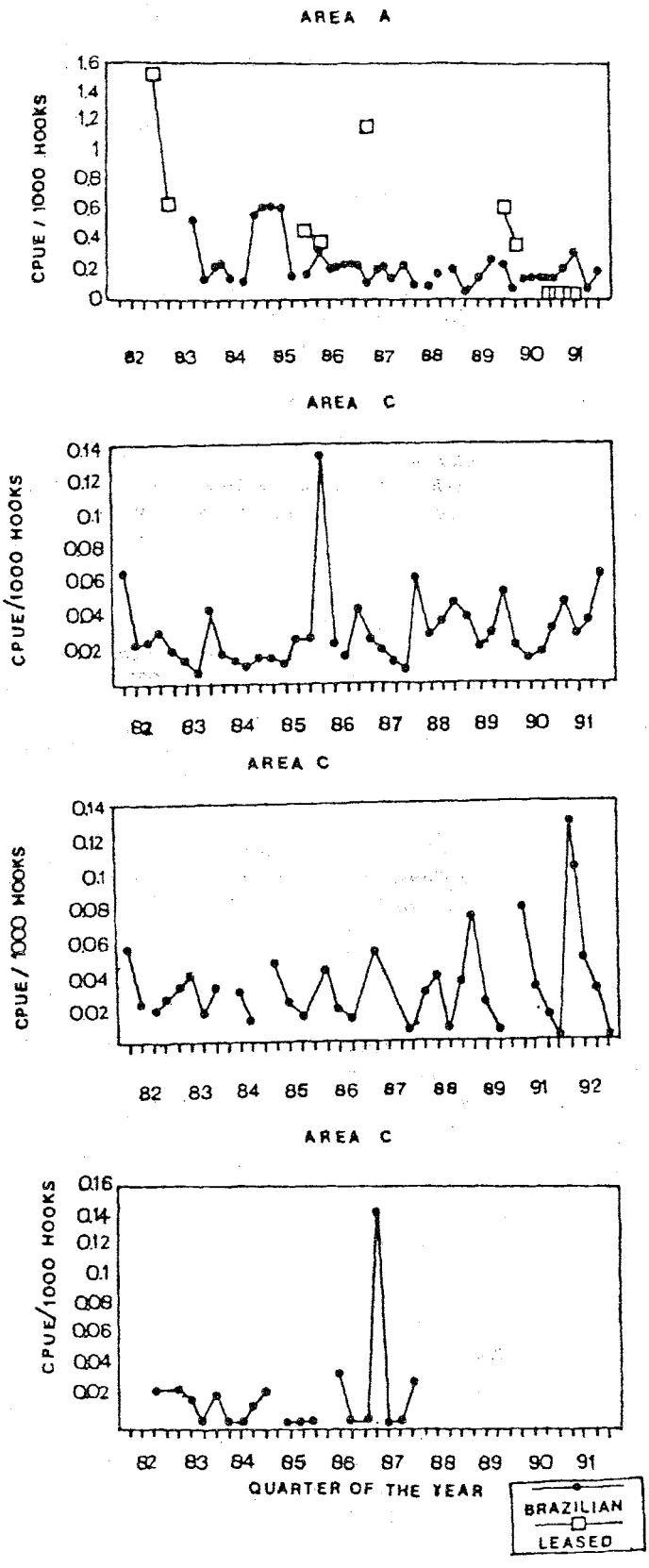


Figure 6. Blue marlin quarterly CPUE from area A and C (Brazilian fleet based on Santos, leased fleet and Brazilian fleet from Rio Grande) respectively.