

CATCH AND FISHING INTENSITY OF BILLFISH SPECIES CAUGHT BY
THE ATLANTIC LONGLINE FISHERIES, 1956-1974

by

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SUMMARY

Estimates of catches, yields and fishing intensity of the blue marlin and the white marlin by all the longline fisheries in the Atlantic Ocean have been revised with the new 1974 data added to the previous report (Kikawa and Honma, 1975). For both species, these estimates were made under each of the following assumptions: 1) there is a single stock throughout the Atlantic fishing grounds, and 2) the fish in the North and the South Atlantic are distinct and independent of each other. Some comment has been made on the results.

RESUME

Des estimations de prise, production et intensité de pêche, concernant les makaires blancs et bleus pêchés par l'ensemble des flottilles palangrières dans l'Atlantique, ont été révisées au moyen des nouvelles données de 1974 incorporées au rapport précédent (Kikawa & Honma, 1975). Ces estimations ont été faites, pour les deux espèces, selon chacune des deux hypothèses suivantes: (1) il existe un stock unique pour toutes les zones de pêche de l'Atlantique, et (2) le poisson est distinct au nord et au sud, qui sont indépendants l'un de l'autre. Les résultats font l'objet de commentaires.

RESUMEN

Con los nuevos datos de 1974, incorporados al informe anterior (Kikawa y Honma, 1975) se revisan las estimaciones de capturas, producción e intensidad de pesca de aguja blanca y aguja azul, de todas las pesquerías de palangre en el Atlántico. Para ambas especies, las estimaciones se basan en las siguientes hipótesis: 1) existencia de un solo stock en el conjunto del Atlántico; 2) los peces al Norte y al Sur del Atlántico están diferenciados y son independientes entre sí. Se comentan brevemente los resultados de las deducciones.

Tables and Appendix figures reproduced in Data Record Vol. 9

Tableaux et Appendice figures reproduits dans le Vol. 9 du Recueil
de Données

Cuadros et Apéndice figuras reproducidos en Vol. 9 de la Colección
de Datos Estadísticos

Average year's pattern in fish distribution

As the necessary step to estimate annual fishing intensity for white marlin and blue marlin by the whole longline fisheries, average year's values of fish density were obtained for a period from 1965 to 1974 using data from the Japanese fishery. The average fish density was expressed as fish per 100 hooks by 5° grid area on the monthly basis. Values for area-time strata lacking data from the fishery were interpolated or arbitrarily chosen. The Atlantic area considered as the area of fish distribution covered from Lat. 45°N to 40°S and from Long. 100°W to 20°E, except for the Mediterranean Sea east of Long. 5°W.

The average year's pattern in areas of fish distribution from these values is shown in Appendix figures 1 and 2. These figures are comparable with the average year's pattern prepared by Ueyanagi et al. (1970) which referred to a period from 1956 to 1967. The figures seem to support a view that for either species of white marlin or blue marlin data from the entire Atlantic fishing grounds can be put together as collected from a single ocean-wide stock. The fish in such a stock would migrate seasonally between the North and the South Atlantic Oceans with areas of fish concentration deflected westerly. On the other hand, another way of looking may also not be fully denied, which simply assumes that the fish in the North and the South Atlantic Oceans are separate and of different stocks. If this is the case, the parallel of Lat. 5°N may probably be chosen as line bordering the areas of two tentative stocks. It seems to be more natural at present to follow the first view, but, considering no strong support for either of these alternatives, we have shown here the annual change in catch and fishing intensity both for the entire Atlantic fishing grounds and for two areas as divided into the North and the South Atlantic Oceans by Lat. 5°N.

Entire Atlantic fishing grounds

As the annual totals of combined billfish yields from the Atlantic longline fisheries were revised (ICCAT STAT. BUL. VOL. 5-1974), our previous estimates were again amended using the same procedure (Kikawa and Honma, 1975). The Japanese annual catch number and catch weight in official reports are from different statistical sources and have sometimes discrepancies between them, particularly for billfishes with extremely deflected values of annual average weight of fish. Such extreme values were here amended with more reliable means in an assumption that there were no significant annual differences in the average size of fish. Estimates of catch thus obtained, however, will be subject to future corrections. Catch number, catch weight and fishing intensity as estimated from data up to 1974 are given in Table 1. The Japanese catches are shown in Table 2.

White marlin

From 1973 to 1974, there was increase of 10,000 fish in catch number, 220 tons in catch weight and 37,000 hooks (per 5° grid area) in terms of fishing intensity (Table 1). An amended catch number/fishing intensity relationship shows, as in Figure 1, no considerable difference from the figure in our previous report, except for smaller fishing intensity. The calculated fishing intensity differed depending on how to set up the period for the average year's fish density and the range of area to be included. According to this figure, both catch and fishing intensity have remained relatively stable during the recent several years, although there is a drop in catch compared with the earlier level.

Blue marlin

There was also increase of 3,300 fish in catch number, 150 tons in weight and 77,000 hooks (per 5° grid area) in fishing intensity for this last one year. Compared with white marlin, smaller increase in catch with larger increase in fishing intensity is indicated (Table 1). An amended catch number/fishing intensity relationship is nearly identical with the previous one, as shown in Figure 2, except for much smaller values of fishing intensity. Figure 2 indicates that a total of 23,000-37,000 fish or 28,000 fish on the average is the catch level corresponding to varying but comparatively uniform fishing intensity in recent years, 1966-1974. Or from Table 1, a total of 1,700-2,800 tons or 2,090 tons on the average represents the catch level during the same period. It seems unlikely that the blue marlin catch will deviate significantly from this very low level within the recent range of fishing intensity.

North and South Atlantic Ocean fishing grounds

Only data from the Japanese and Taiwanese fisheries were used. They were processed separately and combined for these two areas of different stocks, as so assumed. Annual fishing intensity for the Taiwanese fishery was calculated using average year's values of fish density from the Japanese data (Tables 3 and 4).

White marlin

Catch number/fishing intensity relationships for these two areas are shown in Figure 3. Between the recent catches in these two areas, there is a difference in level. For the South Atlantic Ocean, a clear drop is indicated in the average level of catch from 1969 to 1974, compared with the earlier level. If the white marlin in the entire Atlantic fishing grounds are of a single ocean-wide stock, this clear difference might be due to the difference in availability or in fishing effort directed at the white marlin in recent years. In the South Atlantic Ocean, the Japanese longline effort in terms of X/G has reduced considerably after 1970 as well as the nominal number of hooks (Figure 4). Whichever the reason, care should be taken in fishing the South Atlantic white marlin.

Blue marlin

As shown in Figure 5, the trends in the fishery both in the North and the South Atlantic Oceans are generally identical, with the recent catch at very low level compared with that in earlier years. It is indicated, however, that in the South Atlantic fishery after 1966, larger fishing intensity on the average has resulted in smaller catch than in the North Atlantic Ocean. As in the case of white marlin, the Japanese longline effort in terms of X/G has reduced after 1967 in the South Atlantic Ocean as well as the nominal effort (Figure 6).

REFERENCES

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- Kikawa, S. and M. Honma. 1975. Catches and fishing intensity of billfish species caught by the Atlantic longline fisheries, 1956-1973. SCRS/75/32.
- Ueyanagi, S., S. Kikawa, M. Uto and Y. Nishikawa. 1970. Distribution, spawning, and relative abundance of billfishes in the Atlantic Ocean. Bul. Far Seas Fish. Res. Lab., 3, 15-55.

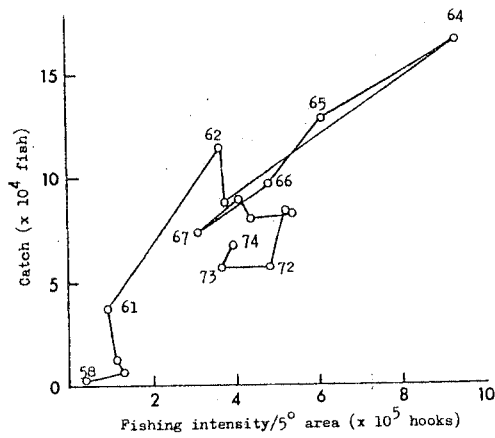


Figure 1 Catch number/fishing intensity relationship for white marlin by the whole Atlantic longline fisheries, 1958-1974.

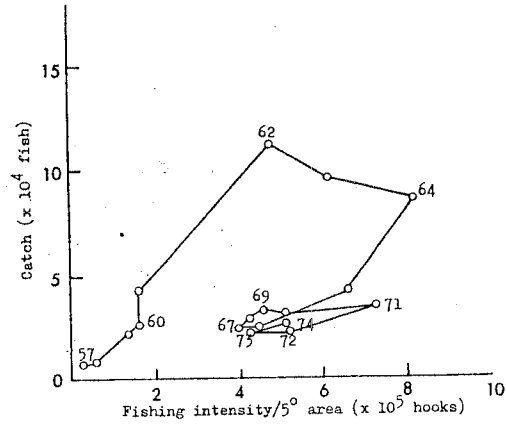


Figure 2 Catch number/fishing intensity relationship for blue marlin by the whole Atlantic longline fisheries, 1957-1974.

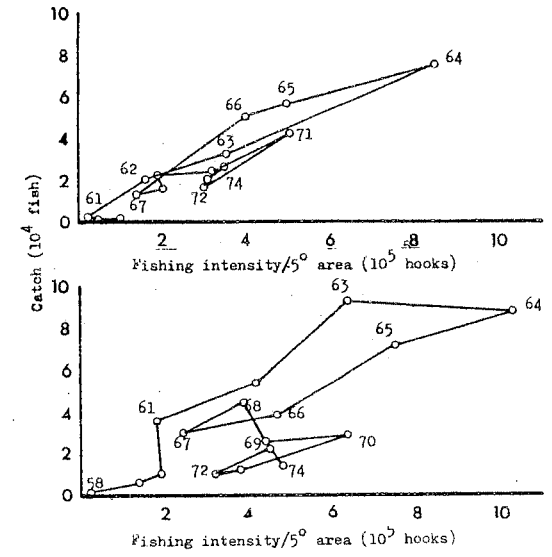


Figure 3 Catch number/fishing intensity relationship for white marlin.

Upper: North Atlantic white marlin as calculated to be a single stock.
Lower: South Atlantic white marlin as a single stock.

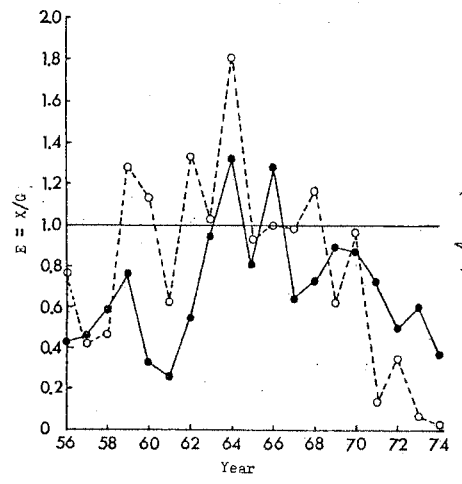


Figure 4 Trend in Japanese longline operations for white marlin, 1956-1974.

X Effective number of hooks directed at white marlin.
G Nominal number of hooks.
Solid circle: North Atlantic Ocean.
Open circle: South Atlantic Ocean.

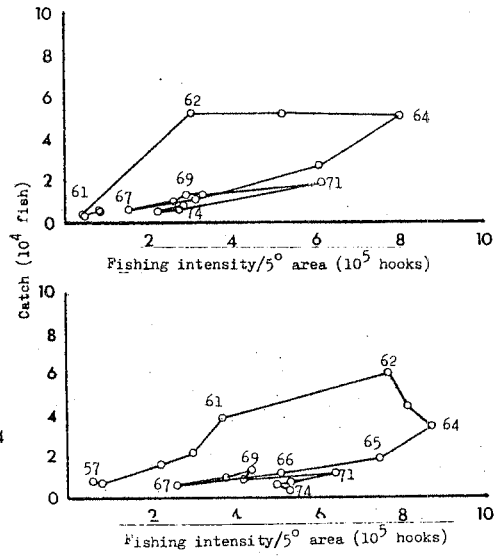


Figure 5 Catch number/fishing intensity relationship for blue marlin.

Upper: North Atlantic blue marlin as calculated to be a single stock.
Lower: South Atlantic blue marlin as a single stock.

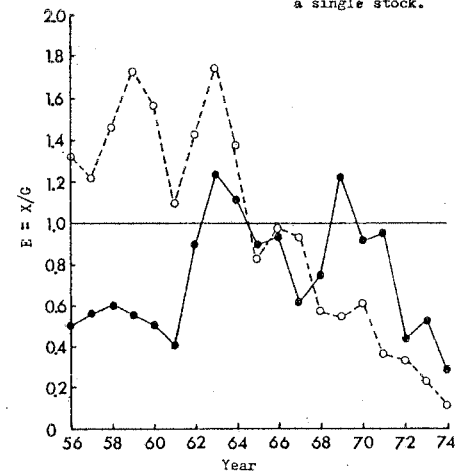


Figure 6 Trend in Japanese longline operations for blue marlin, 1956-1974.

X Effective number of hooks directed at blue marlin.
G Nominal number of hooks.
Legend as in Figure 4.