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MONTHLY CHANGES OF CATCH PER UNIT EFFORT OF BIGEYE AND YELLOWFIN TUNAS FOR THE KOREAN AND JAPANESE LONGLINE FISHERY IN THE ATLANTIC OCEAN, 1984-1986

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SUMMARY

Monthly changes of catch per unit effort of bigeye and yellowfin tunas were analyzed by latitude and longitude based on the catch and effort data from the Korean and Japanese longline fishery from 1984 to 1986. CPUEs of bigeye tuna were high in the northern hemisphere in winter and the area with high CPUEs shifted to the southern hemisphere in spring-autumn, crossing the equatorial area in the summer season. For yellowfin tuna, it appeared at 70°-84°W in the northern hemisphere throughout the months and at 45°-54°W in the southern hemisphere from May to January.

RESUME

Les changements mensuels de la prise par unité d'effort du thon obèse et de l'albacore ont été analysés par latitude et longitude basés sur les données de prise et effort de la pêcherie palangrière coréenne et japonaise correspondant à la période 1984-1986. Les CPUE du thon obèse étaient élevées dans l'hémisphère nord en hiver et la zone à forte CPUE s'est déplacée vers l'hémisphère sud en été-automne, traversant la zone équatoriale en été. L'albacore est apparu à 70Ω - 84ΩW dans l'hémisphère nord pendant toute l'année et à 45Ω - 54ΩW dans l'hémisphère sud de mai à janvier.

RESUMEN

Los cambios mensuales de captura por unidad de esfuerzo de patudo y rabil se analizaron por latitud y longitud en base a los datos de captura y esfuerzo de las pesquerías de palangre de Corea y Japón, de 1984 a 1986. Las CPUE de patudo fueron altas en el hemisferio Norte en invierno, y la zona con altas CPUE se desplazó al hemisferio Sur en primavera y otoño, cruzando la zona ecuatorial en la temporada estival. Para el rabil, apareció a 70° - 84°W en el hemisferio Norte a lo largo de varios meses, y a 45° - 54° W en el hemisferio Sur de mayo a enero.

INTRODUCTION

The Korean and Japanese tuna longline fishery have targetted for large bigeye and yellowfin tunas since 1974 and 1971, though there are several countries used to longline gear to catch tunas and tuna-like species in the Atlantic Ocean. The catch of yellowfin tuna had been prevailed before 1979 for Korea and 1968 for Japan, since then, however, the catch of bigeye tuna has been predominated. Under the influence of deep longline gear introduced in recent years (Yang and Gong, 1986 ; Yao, 1987), bigeye tuna catch was reached to over 60 percent of total catch for both countries during the period of 1984 to 1986. The purpose of this study is to analyze the monthly changes of catch per unit effort (CPUE) by latitude and longitude of bigeye and yellowfin tunas taken from the Korean and Japanese longline gear.

MATERIALS AND METHODS

The data used in this study were the catch and effort statistics of bigeye and yellowfin tunas for the Korean and Japanese tuna longline fishery which had been submitted to International Commission for the Conservation of Atlantic Tunas as a Task II from 1984 to 1986. The data was compiled by accumulative month and area (5 degree squares), then divided it into north and south, and totaled by latitude and longitude for bigeye and yellowfin tunas for three years. Catch per unit effort (no. of fish per 1,000 hooks) was used as an index of abundance.

RESULTS

1. Bigeye tuna

CPUE of bigeye tuna by latitude was generally higher than that of yellowfin throughout the months. From December to March CPUEs were high in the northern hemisphere and the area with high CPUEs sifted to the southern hemisphere from April to October, crossing the equatiorial area during July-September. They were again moved to the northward from November (Fig. 1). The high CPUEs by longitude in the northern hemisphere were occurred between 20°W and 34°W from January to May. From June to October, however, they were revealed at 80°-84°W. In the southern hemisphere, though there was not a distinct trend, the highest CPUE was disclosed at 0°-9°W during April-June and high CPUEs were chiefly maintained at 0°-19°E and 0°-29°W (Fig. 2).

2. Yellowfin tuna

In latitude, CPUE of yellowfin tuna was high between 0° and 9°N from December to March and between 30°S and 34°S from May to November. High CPUEs were expanded into 29°N in the northern hemisphere during April-September and shrunk into the equatorial area from October to March. The highest CPUE by longitude was appeared at 70°-84°W in the northern hemisphere throughout the months except October and at 45°-54°W in the southern hemisphere from May to January except November (Fig. 1 and 3).

DISCUSSION

The high CPUEs of bigeye tuna were gradually shifted from northern hemisphere in winter to the southern hemisphere in

spring-autumn (Fig. 1). Rudomiotkina(1982) reported that the intensive spawning of bigeye tuna was observed around 5°N in summer with the peak in July-August (Kume and Morita, 1976). It is suggested that bigeye tuna seems to be crossed the equatorial area during July-September according to the monthly changes of CPUE in this paper, though it had not included any biological data which will be found out spawning area and season.

It is generally known that there are two groups of the eastern and the western for yellowfin tuna (Hayasi, 1973 ; Suzuki, 1978). In the western area, the CPUE in the northern hemisphere was high at 70°-84°W throughout the months and at 45°-54°W in the southern hemisphere from May to January, but the high CPUE in the eastern area was intermittently shown in April, July and November at 0°-9°E (Fig. 3). Honma(1971) reported that in spring and summer the eastern concentration shifts westward. It is not clearly appeared that yellowfin tuna moves westward at the same season compared with this results. It could be considered that this difference was due to the deep longline gear introduced in recent years.

In the future, to grasp perfectly their movements at the deep layers, it should be deeply studied with oceanographic conditions and biological data.

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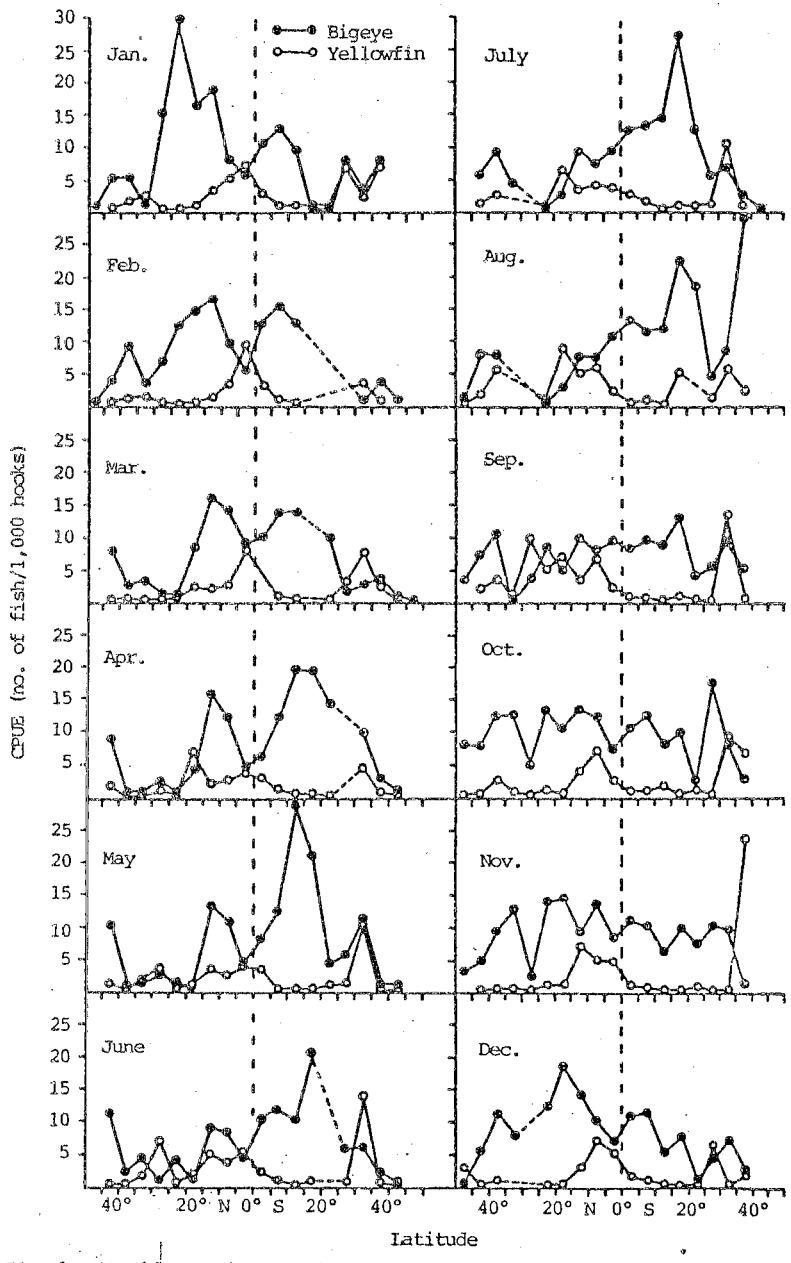

Fig. 1. Monthly catch per unit effort (no. of fish/1,000 hooks) of bigeye and yellowfin tunas by latitude taken from the Korean and Japanese longline fishery in the Atlantic Ocean, 1984-1986.

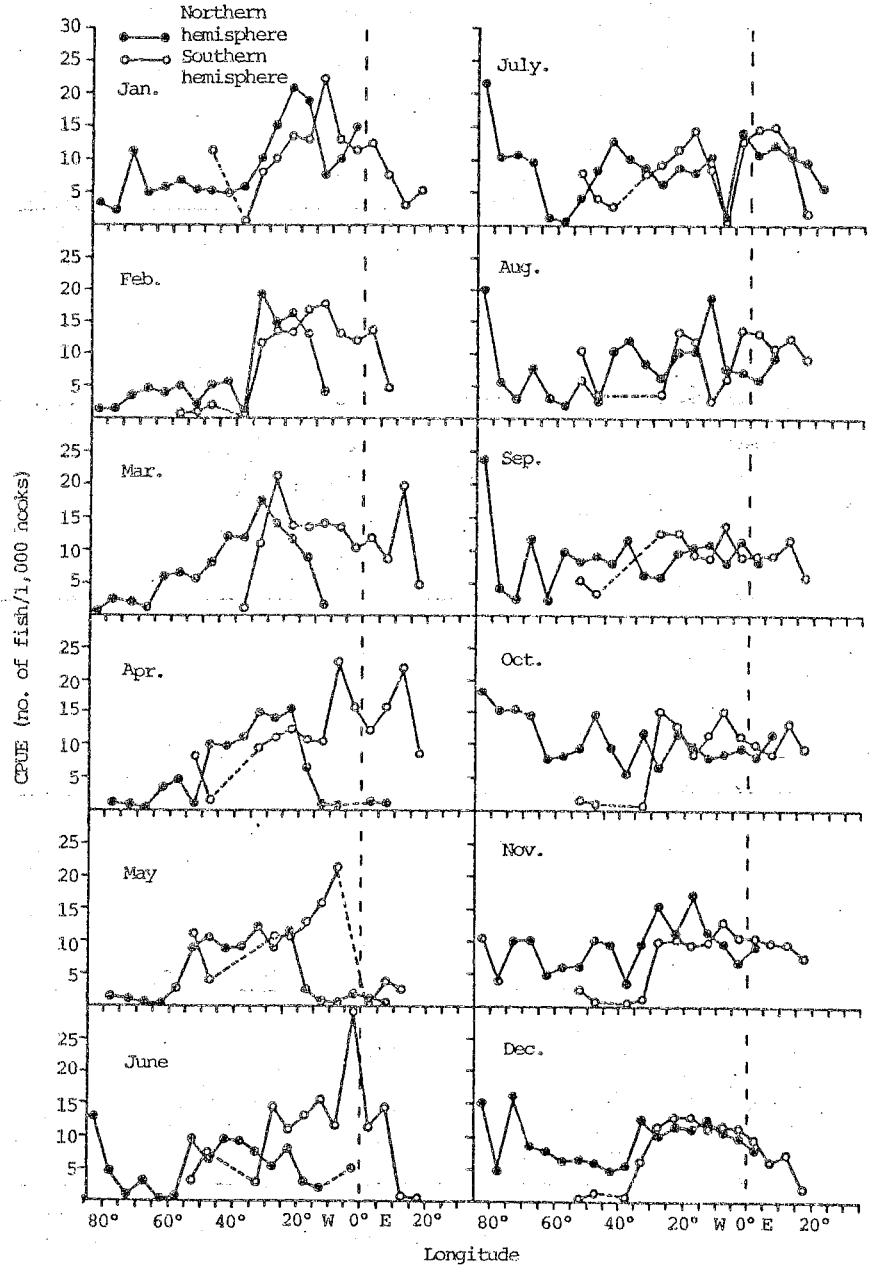

Fig. 2. Monthly catch per unit effort (no. of fish/1,000 hooks) of bigeye tuna by longitude taken from the Korean and Japanese longline fishery in the Atlantic Ocean, 1984-1986.

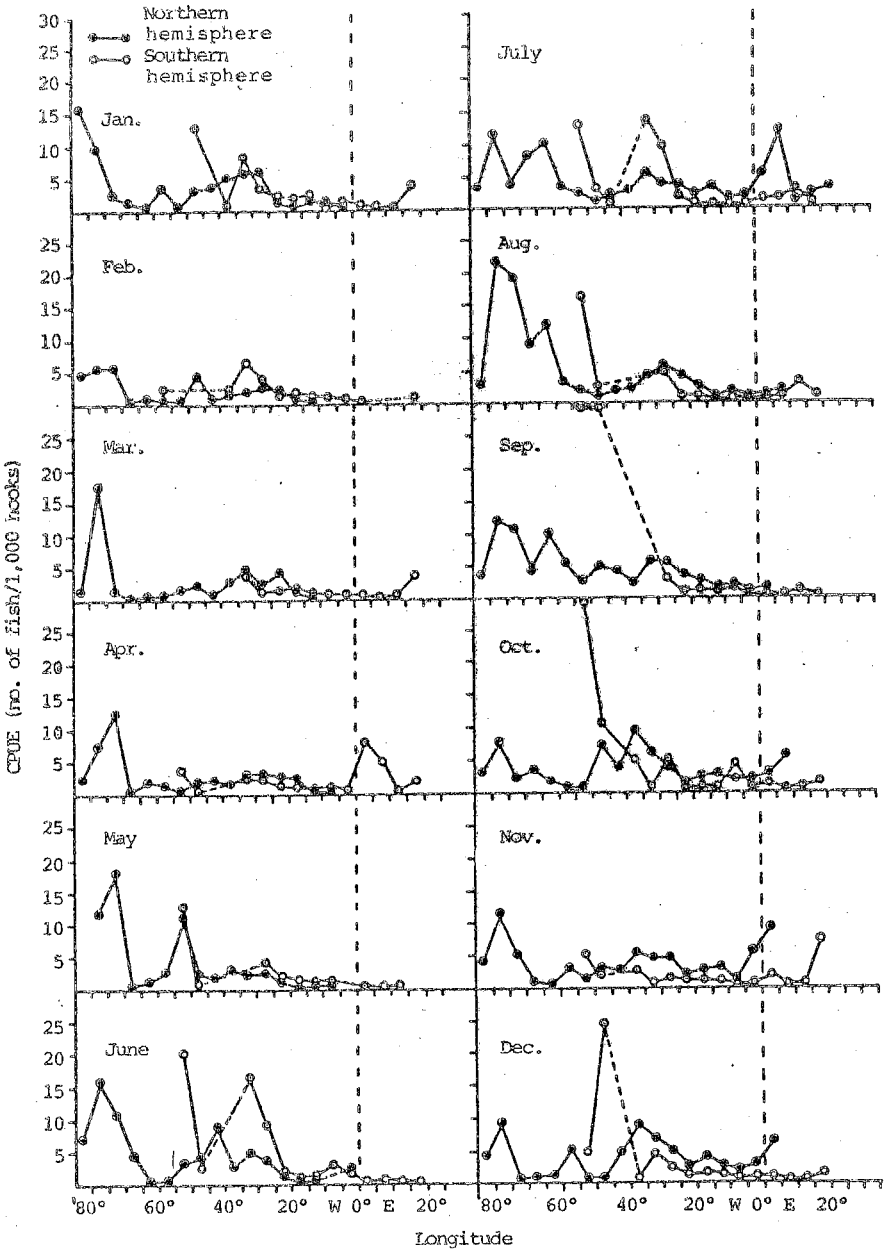

Fig. 3. Monthly catch per unit effort (no. of fish/1,000 hooks) of yellowfin tuna by longitude taken from the Korean and Japanese longline fishery in the Atlantic Ocean, 1984-1986.