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OBSERVATIONS ON THE LARVAL CATCHES MADE BY THE OREGON II WITH JAPANESE AND BONGO NETS IN THE GULF OF MEXICO IN 1994

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SUMMARY

Some of the results of a study conducted in 1994 in the Gulf of Mexico by the National Marine Fisheries Service (NMFS) and the Japanese Fisheries Agency (JFA) of the relative efficiencies of ichthyoplankton gear for catchinig bluefin tuna larvae are presented. These results are only from the NMFS's "Oregon II" catches which were made using both U.S. and Japanese bongo nets. A total of 19 bluefin larvae were caught in the U.S. nets and 25 bluefin larvae in the Japanese nets. The size of those larvae were similar; the Japanese catches of all *Thunnus* larvae show a higher relative frequency from 3 mm to 37 mm than the U.S. catches, perhaps reflecting the differences in mesh size used by the two gears (333 mm for U.S. and 505 mm for Japanese). The Japanese nets had higher catch rates than the U.S. nets for bluefin; among the nets which caught bluefin the Japanese gear had a higher frequency of catches with more than one larva than the U.S. gear. The Japanese bongo nets also had higher catch rates for all *Thunnus* than the U.S. bongos, but the proportions of the positive tows which caught n larvae were similar.

RESUME

Le présent rapport fait état des résultats d'une étude menée en 1994 dans le Golfe du Mexique par les services du National Marine Fisheries Service (NMFS) et de la Japanese Fisheries Agency (JFA) sur l'efficacité relative des engins de pêche à l'ichtyoplancton pour capturer des larves de thon rouge. Ces résultats proviennent exclusivement des captures effectuées par l'"Oregon II" du NMFS au moyen de filets bongo américains et japonais. La taille des larves était similaire ; les prises japonaises de larves montrent toutes une fréquence relative plus élevée de 3 mm à 37 mm que les prises américaines, ce qui est peut-être le fait des dimensions de la maille de ces deux engins (333 mm pour le filet américain, et 505 mm pour le filet japonais). Les filets japonais ont donné un taux de capture plus élevé que les américains en ce qui concerne le thon rouge ; parmi les filets qui ont pris du thon rouge, l'engin japonais a donné une plus forte fréquence de capture contenant plus d'une larve que l'engin américain. Les filets bongo japonais ont aussi donné un taux plus élevé de capture pour tous les *Thunnus* que les bongos américains, mais la proportion de hâlages amenant *n* larves était similaire.

RESUMEN

Se presentan algunos resultados de un estudio realizado en 1994 en el Golfo de México por el "National Marine Fisheries Service (NMFS)" y por la "Japanese Fisheries Agency (JFA)" sobre la eficacia relativa del arte de ictioplancton para capturar larvas de atún rojo. Estos resultados proceden sólo de las capturas del Oregon II del NMFS, realizadas empleando redes Bongo japonesas y norteamericanas. Las redes norteamericanas pescaron 19 larvas de atún rojo y las japonesas, 25. Su tamaño era similar. Las larvas de *Thunnus* pescadas por Japón presentaban una frecuencia relativa de 3 a 37 mm mas alta que las pescadas por Estados Unidos, lo cual podría ser un reflejo de las diferencias en el tamaño de la malla de ambos artes (333 mm las de Estados Unidos y 505 mm las de Japón). Las redes japonesas para atún rojo tenían tasas de captura mas altas que las norteamericanas. En el caso de las redes japonesas, la frecuencia de las capturas con mas de una larva era mas alta que en el caso de las redes norteamericanas. Las redes Bongo japonesas presentaban también tasas de captura de *Thunnus* mas altas que las norteamericanas, pero las proporciones de lances positivos eran similares.

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Introduction

The National Marine Fisheries Service (NMFS) and the Japanese Fisheries Agency (JFA) conducted joint ichthyoplankton sampling in the northern Gulf of Mexico for the purpose of gear comparison during the annual SEAMAP (Southeast Area Monitoring and Assessment Program) Spring Ichthyoplankton Survey. The vessel Oregon II was used by the NMFS and the Shoyo Maru was used by the JFA. Joint sampling was conducted from 28 April through 19 May 1994. At each joint station each vessel fished two U.S. bongo nets in one haul and two Japanese bongo nets in another haul.

All samples (both nets from every haul) from the Oregon II were sorted at the Polish Sorting Center and all scombrid identifications were verified by Dr. William Richards of the NMFS. The analyses reported below include data from all nets fished unless a sample was lost.

The purpose of this note is to compare the larval sizes and catch rates from the two types of gear fished from the Oregon II.

Size Composition

Cumulative frequency distributions of bluefin tuna catches at length from the Japanese and U.S. gear appeared quite similar (Figure 1) even though the numbers caught were small (25 measured from Japanese nets and 19 from U.S. nets).

The combined size composition showed a large mode at about 3 mm and at about 7 mm (Figure 2).

To further investigate the size distribution of fish caught by the two gears, information from all *Thunnus* were examined; a total of 111 *Thunnus* larvae were caught in the U.S. gear and 138 in the Japanese gear. Once again the cumulative frequency distributions were quite similar (Figure 3); the slightly lower percentage of the total catch by the U.S. gear below 7 mm suggests slightly higher selectivity of the Japanese gear with its 505 micron mesh net towards larvae under that size (Figure 4).

Catch per net

The average catch per net which caught bluefin larvae was 1.8 larvae for the Japanese gear and 1.3 larvae for the U.S. gear with coefficients of variations of 44% and 46% respectively.

Cumulative frequency distributions of catch per net showed that the U.S. gear had a higher relative frequency of single catches of bluefin tuna and lower relative frequency of multiple catches of bluefin than the Japanese gear (Figure 5). Neither gear had more than 4 bluefin in a net during the joint survey (Figure 6).

The average catch per net which caught *Thunnus* larvae was 2.1 larvae for the Japanese gear and 1.8 larvae for the U.S. gear with coefficients of variation of 90% and 70% respectively.

The cumulative frequency distributions of catch per net for all *Thunnus* showed a more consistent pattern between the two gears, though there were indications that the U.S. gear had a higher proportion of sets with fewer larvae than the Japanese gear (Figure 7). As with the bluefin catches, the catch per net distribution for both gears indicated that the majority of catches were of 4 or fewer larvae, though there were a small number of catches of 10+ (10 and over) larvae (Figure 8).

Catch per 10 m^2

On the Oregon II the U.S. nets were fished to a maximum depth of 200 m while the Japanese nets were fished to a maximum depth of 100 m. The average volume filtered was almost 5 times larger for the U.S. nets (average 286 m^3) than for the Japanese nets (average 60.6 m^3). Because bluefin are found primarily in the upper water column and apparently much of the additional filtering was below the depth sampled by the Japanese net, the average catch per volume filtered standardized for differences in depths fished (catch per 10 m^2) was much lower for the U.S. gear (12.1 for all *Thunnus* and 9.1 for bluefin) than for the Japanese gear (42.5 and 37.5 respectively).

Proportion of Positive Catches

The number of stations at which bluefin larvae and *Thunnus* larvae were caught was very similar for both gear types. There were 12 stations with catches of bluefin taken with Japanese gear and 11 stations with U.S. gear. There were 36 stations catching any *Thunnus* with Japanese gear and 37 with U.S. gear. Thus there were few differences in this component of catch rates.

The similarity of catch per positive tow, the high variability in those catch rates, and the similarity in the proportions of positive stations strongly suggest that statistical differences in catch rates would not be found between these gear types as fished on the Oregon II if more sophisticated analytical techniques were used.

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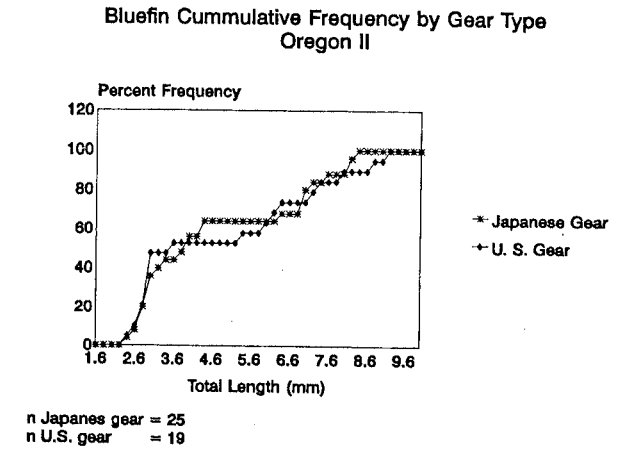

Figure 1. Cumulative frequency distributions for bluefin larval lengths caught by Japanese and U.S. bongo nets.

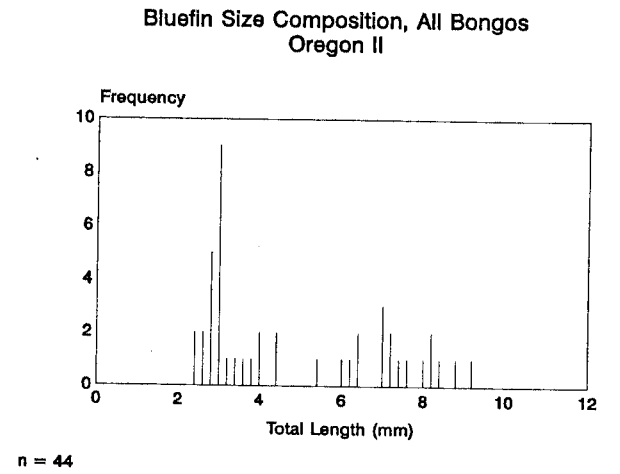

Figure 2. Length frequency of bluefin larvae caught by the Oregon II at jointly sampled stations.

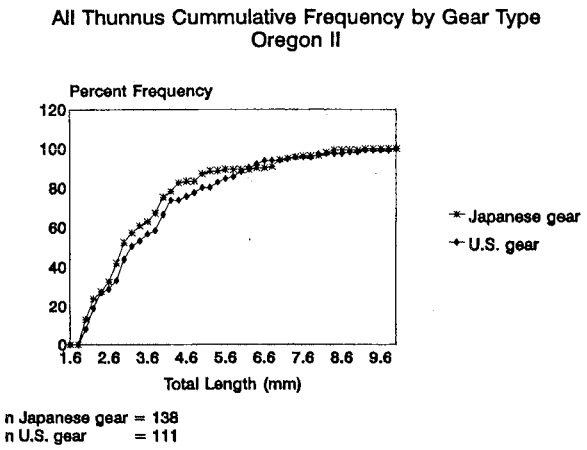

Figure 3. Cumulative frequency distributions of Thunnus caught by Japanese and U.S. bongo nets.

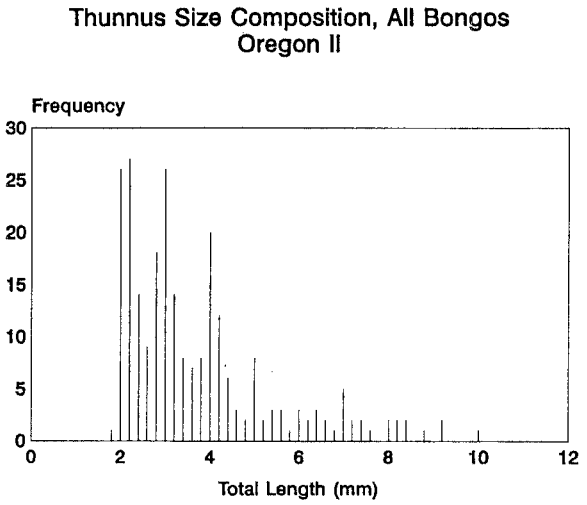

Figure 4. Length frequency of Thunnus larvae caught by Japanese and U.S. nets combined.

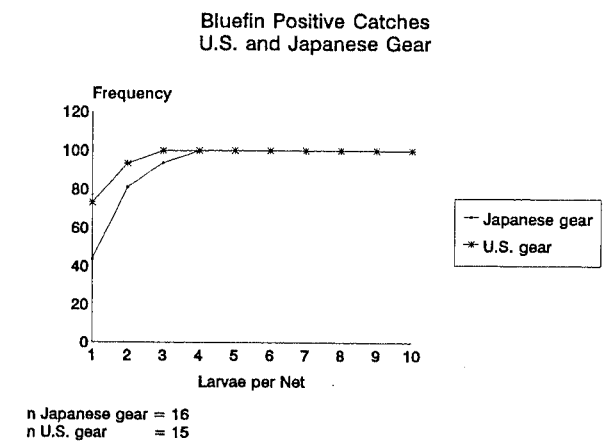

Figure 5. Cumulative frequency distributions of bluefin tuna catches in Japanese and U.S. bongo nets.

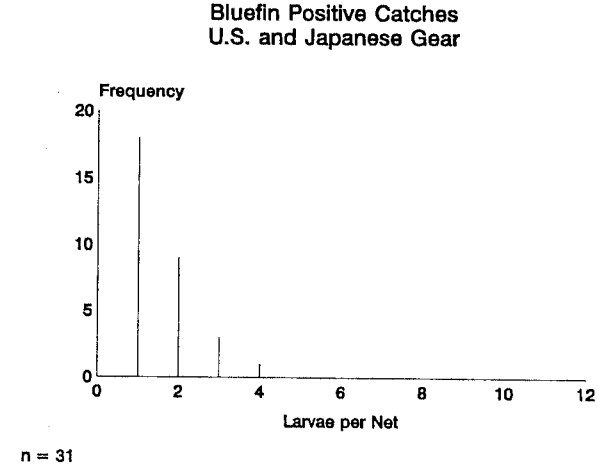

Figure 6. Frequency distribution of bluefin tuna catch per net from Japanese and U.S. nets combined.

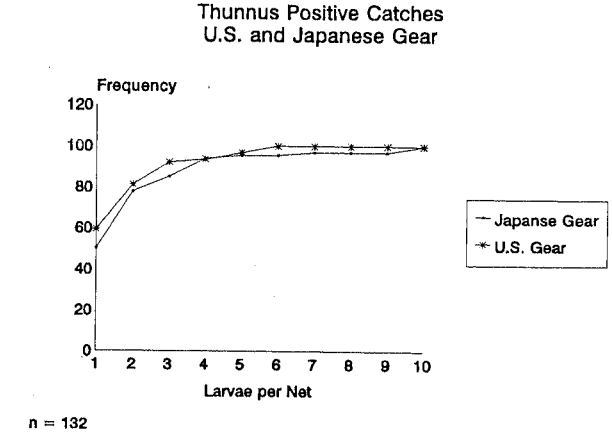

Figure 7. Cumulative frequency distributions of Thunnus larval catches by Japanese and U.S. gears,

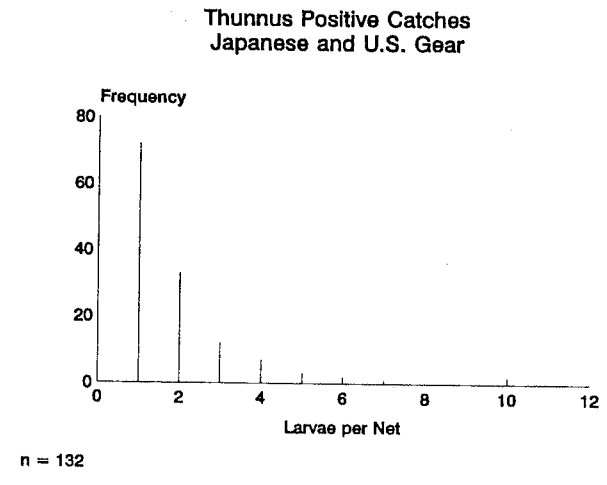

Figure 8. Frequency distribution of catches of Thunnus larvae by Japanese and U.S. nets combined.