

BLUEFIN TUNA SEX PROPORTION AT LENGTH IN THE CANADIAN SAMPLES 1974-1983

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SUMMARY

Canadian bluefin tuna samples during 1974-1983 were examined for variable sex proportion as a function of length. Year-to-year variability are evident but when the data for all years are combined (either in 1 cm interval or 5 cm interval) it is obvious that females become less and less abundant as bluefin get larger. The proportion of females decreases regularly above 242 cm and bluefin larger than 257 cm are predominantly males.

RESUME

Les échantillons canadiens de thon rouge prélevés en 1983-84 ont été étudiés à la recherche d'un pourcentage variable des sexes en fonction de la taille. La variabilité est évidente d'une année à l'autre, mais il est clair, en combinant les données pour toutes les années (que ce soit en intervalles de 1 ou 5 cm), que les femelles sont de moins en moins abondantes au fur et à mesure de la croissance du thon rouge. Le pourcentage de femelles décroît régulièrement au-dessus de 242 cm, et les thons rouges de plus de 257 cm sont en majorité des mâles.

RESUMEN

Se examinaron muestras biológicas canadienses, de atún rojo, entre 1974 y 1983, para hallar una proporción de sexos variable, en función de la talla. La variabilidad es evidente de un año a otro, pero cuando se combinan los datos de todos los años (bien en intervalos de 1 cm., bien de 5 cm.), es obvio que las hembras son cada vez menos abundantes, a medida que los ejemplares de atún rojo aumentan de tamaño. La proporción de hembras disminuye regularmente por encima de los 242 cm., y los animales de más de 257 cm. son predominantemente machos.

INTRODUCTION

Discussions at the Bluefin Workshops (August 31 - September 8, 1983) underlined the importance of reporting and analysing a sex ratio at length for bluefin tuna. This would be the first step in an attempt to estimate sex-specific growth parameters by simulation. The results could be used to obtain estimates of catch at age for each sex. This document presents the relevant data collected by Canada.

MATERIAL AND METHODS

Biological data were collected on bluefin tuna caught by Canadian vessels using different gears (purse seine, trap, rod and reel, tended line) for the years 1974 to 1983. The catches were sampled at various locations within the Maritimes provinces (St. Margerets Bay, Caraquet, North Lake, Malpeque, St. Georges Bay, St. Andrews). The data presented in this document are amalgamated by year regardless of the gear used, the sampling location or the time of year. The data were too few to go to that level of details.

RESULTS

Table 1 presents the number of males (M), the number of females (F) and the percentage females (PC) by one cm fork length interval for each year during 1974 to 1983 and for 1974-1983 combined. The number of fish sampled annually varied from 122 fish in 1979 to 554 in 1976. A total of 2861 fish were sampled for fork length and sex during the period

covered. The percentage of female varied from 23% in 1976 to 58% in 1979 and was always lower than 50% except in 1979 and 1981. Overall, 35% of the 2861 bluefin sampled were females during 1974 to 1983. The proportion of female at length varies greatly from year to year as can be expected from such relatively small sample sizes. However, for 1974-1983 combined, a general decline in the percentage of female can be identified from length 242 cm onwards (figure 1). For smaller lengths, the percentage female is highly variable.

In an attempt to better identify trends, the data were grouped in 5 cm fork length intervals (table 2 and figure 2). Here again, the percentage female below 242 cm is highly variable, but for 242 cm and above, the decline is remarkably steady (figure 2).

An examination of table 2 shows three distinct length groups with different percentages of females. From 85 cm to 234 cm, the sex ratio appears to be 1:1 (table 3). For a short range, from 235 cm to 254 cm, the females are predominant while for 255 cm to 349 cm the males are clearly more abundant. This is also shown in figure 3 although that figure by itself could be misleading as it is a frequency.

CONCLUSION

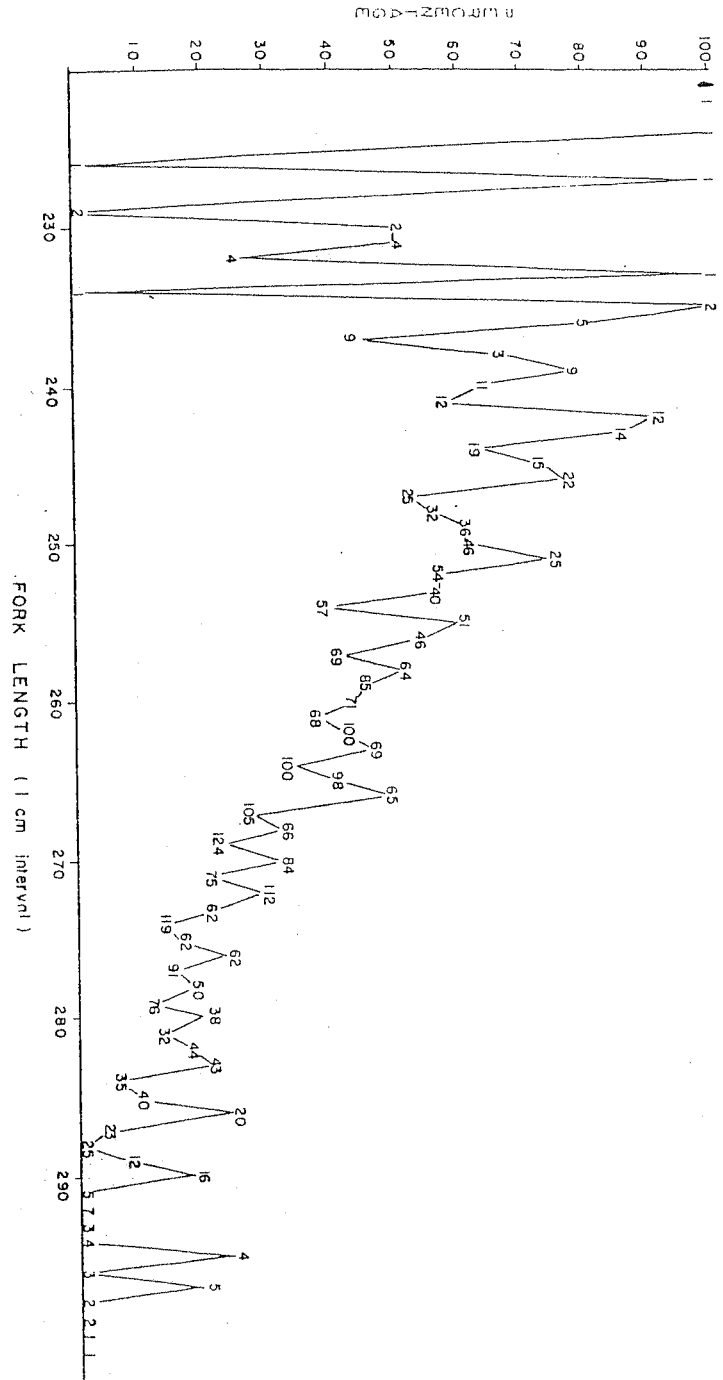
The Canadian data does not indicate that the sex ratio below 235 cm is different from 1:1. It shows a dominance of female from 235 cm to 254 cm. Above 255 cm, the males are progressively more predominant.

Table 3: Proportion of each sex of bluefin tuna for three length intervals.

Length Interval	Sample Size	Observed		Expected with 1:1 sex ratio		Chi-square	P*
		Males	Females	Males	Females		
85-234	76	40	36	38	38	.21	.5
235-254	447	176	271	223.5	223.5	20.19	.005
255-349	2338	1657	681	1169	1169	407.43	.005

* Probability of a greater value.

Figure 1: Proportion of female bluefin tuna by 1cm fork length interval sampled by Canada for 1974-1983. The numbers on the graph indicate the total number of bluefin sexed for that length.



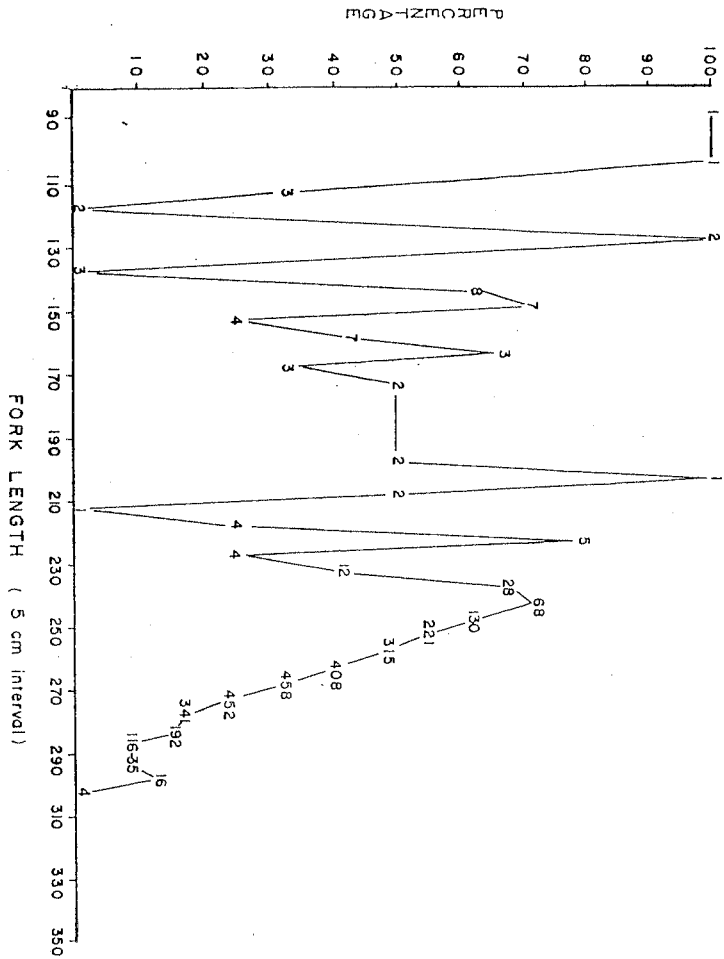


Figure 2: Proportion of female bluefin tuna by 5cm fork length interval sampled by Canada for 1974-1983. The numbers on the graph indicate the total number of bluefin sexed for that length interval.

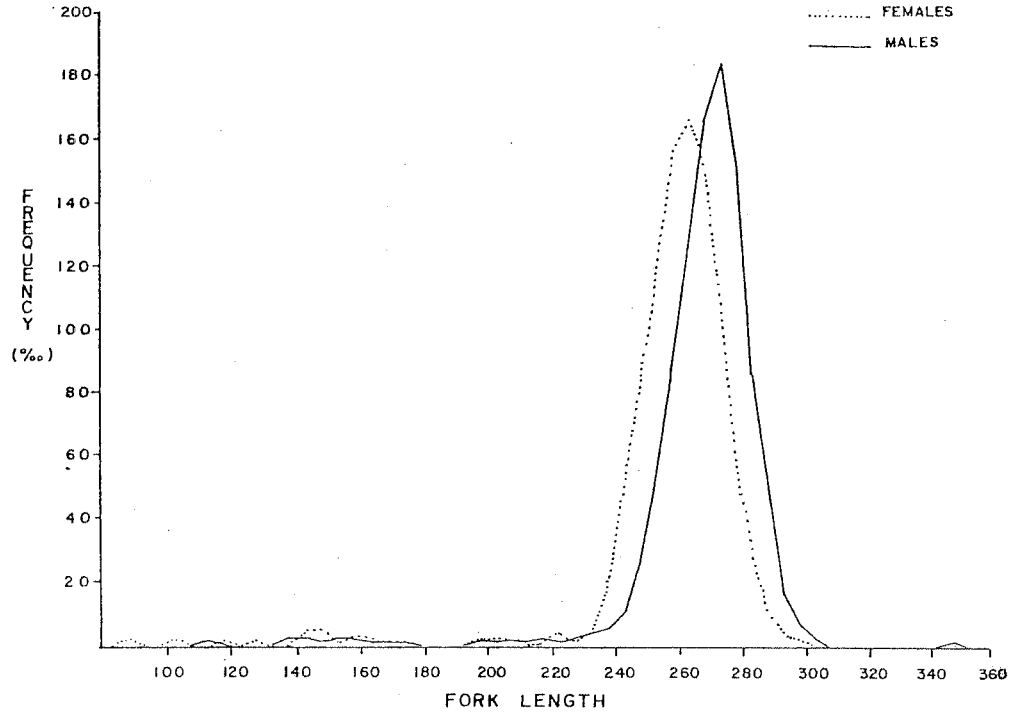


Figure 3: Length frequencies (by 5cm interval) for male and female bluefin tuna sampled by Canada during 1974-1983.