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Trends in the witch fishery on St. Pierre Bank

by

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Introduction

Landings from this fishery have fluctuated from 500 tons in 1965 to almost 5,000 tons in 1967 (Fig. 1). The landings from 1967 were on a steady decline (with the exception of 1973) until 1977 when the catch increased to 4,200 tons.

This fishery,as with most witch fisheries in the Northwest Atlantic, is primarily a by-catch of other main fisheries such as redfish, American plaice and cod. Because of this and the fact that this species has a varied distribution pattern seasonally, any effort and catch per unit effort data have little real value in determining estimates of fishing mortality for this stock. Since the data are still insufficient to perform a virtual population type of analysis, this document is essentially a review of a previous yield-per-recruit assessment (Bowering, 1977) presented at last year's meeting with the addition of 1977 data.

Materials and Methods

Sampling data were collected from Canadian commercial otter trawlers fishing the St. Pierre Bank and Burgeo Bank area during 1975-77. It was assumed that these catches were representative of total landings from the stock for all countries.

Length and age compositions were plotted for 1975-77 commercial otter trawl samples (Fig. 2 and 3) for comparison of the three years.

Length and age compositions of research catches taken in regular random-stratified cruises of the A.T. Cameron were also plotted for 1974-77 (Fig. 4 and 5).

Catch curves were constructed from commercial otter trawl data for 1975-77 by weighting the numbers caught at age for each year and obtaining the total numbers landed at age for the three years combined (Fig. 6).

The Beverton and Holt yield-per-recruit model (Fig. 7) was applied to males and females separately using the following parameters:

		Males		Females	
W_∞	- asymptotic weight	1.70	kg	2.97	kg
K	- growth coefficient	0.097		0.073	
t_0	- theoretical age at length = 0 cm	0.41	yrs	0.25	yrs
t_ρ	- age at recruitment	7.0	yrs	7.0	yrs
$t_{\rho'}$	- age at mean selection length	9.2	yrs	9.8	yrs
t_λ	- age at last significant contribution to the fishery	20.0	yrs	24.0	yrs
M	- natural mortality	0.20		0.15	

Results and Discussion

The size and age distribution of the commercial catches (Fig. 2 and 3) are practically the same for 1975 and 1977 however the 1976 catches appear to consist of larger, older individuals. It is difficult to determine why this is so since the sampling was done in the same unit areas and same quarters each year. It is possible however that the 1976 samples were taken from catches which were fished from local prespawning concentrations since sampling was done during spawning season If such is the case, one would expect to find the larger and older fish more numerous. If the differences were real, they would be expected to show in research catches also (Fig. 4 and 5), which is certainly not the case. The 1975-76 length and age compositions (Fig. 4 and 5) are practically the same. The 1974 research catches have a similar length composition as other years, however the age composition is somewhat different with higher numbers of younger fish present. This may possibly be due to a couple of strong year-classes in 1974; however, they did appear unusually strong in later years. Once again, the changes in seasonal distribution may be a contributing factor since all these research surveys were done just before or just after the spawning season.

Catch curves (Fig. 6) from commercial age composition gave estimates of instantaneous total mortality (Z) of 0.70 for males and 0.51 for females with correlation coefficients (r) of 0.97 and 0.98 respectively. These gave a little higher F values for males than in the previous assessment and about the same for females. The yield-per-recruit curves are almost flat-topped with the $F_{0.1}$ = 0.29 for males and 0.22 for females (Fig. 7). The present levels of F for males and females are both above the $F_{0.1}$ levels and these present F levels probably represent an average removal of 2,000-3,000 tons annually.

References

Bowering, W. R. 1977. An analysis of the status of the witch flounder stock of ICNAF Subdivision 3Ps. Can. Atlant. Fish. Sci. Adv. Comm. Res. Doc. No. 77/17, 1977.

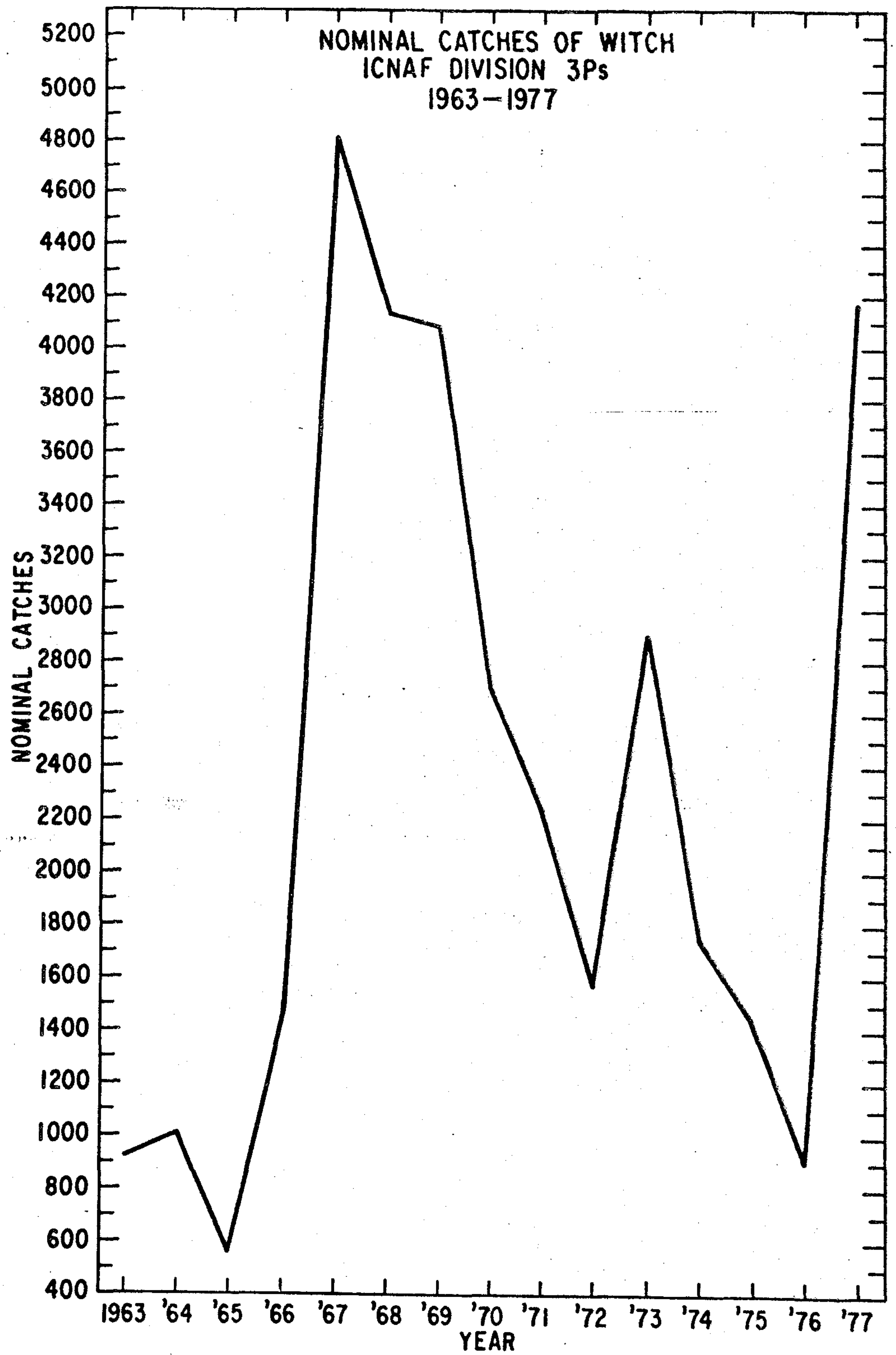

Fig. 1. Nominal catches of witch for ICNAF Subdivison 3Ps for 1963-77.

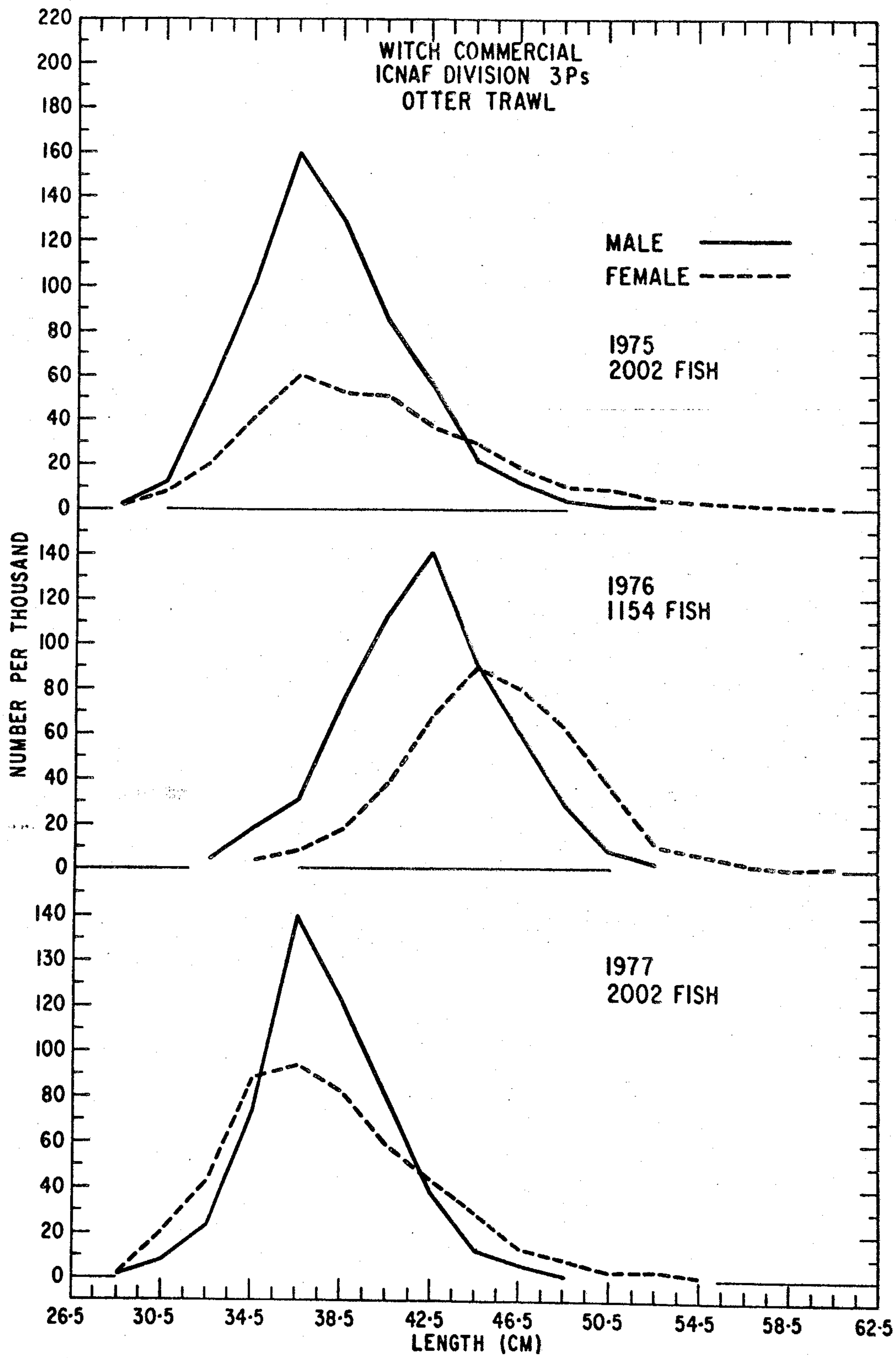

Fig. 2. Length composition for male and female witch from commercial otter trawl, 1975-77, for ICNAF Subdivision 3Ps.

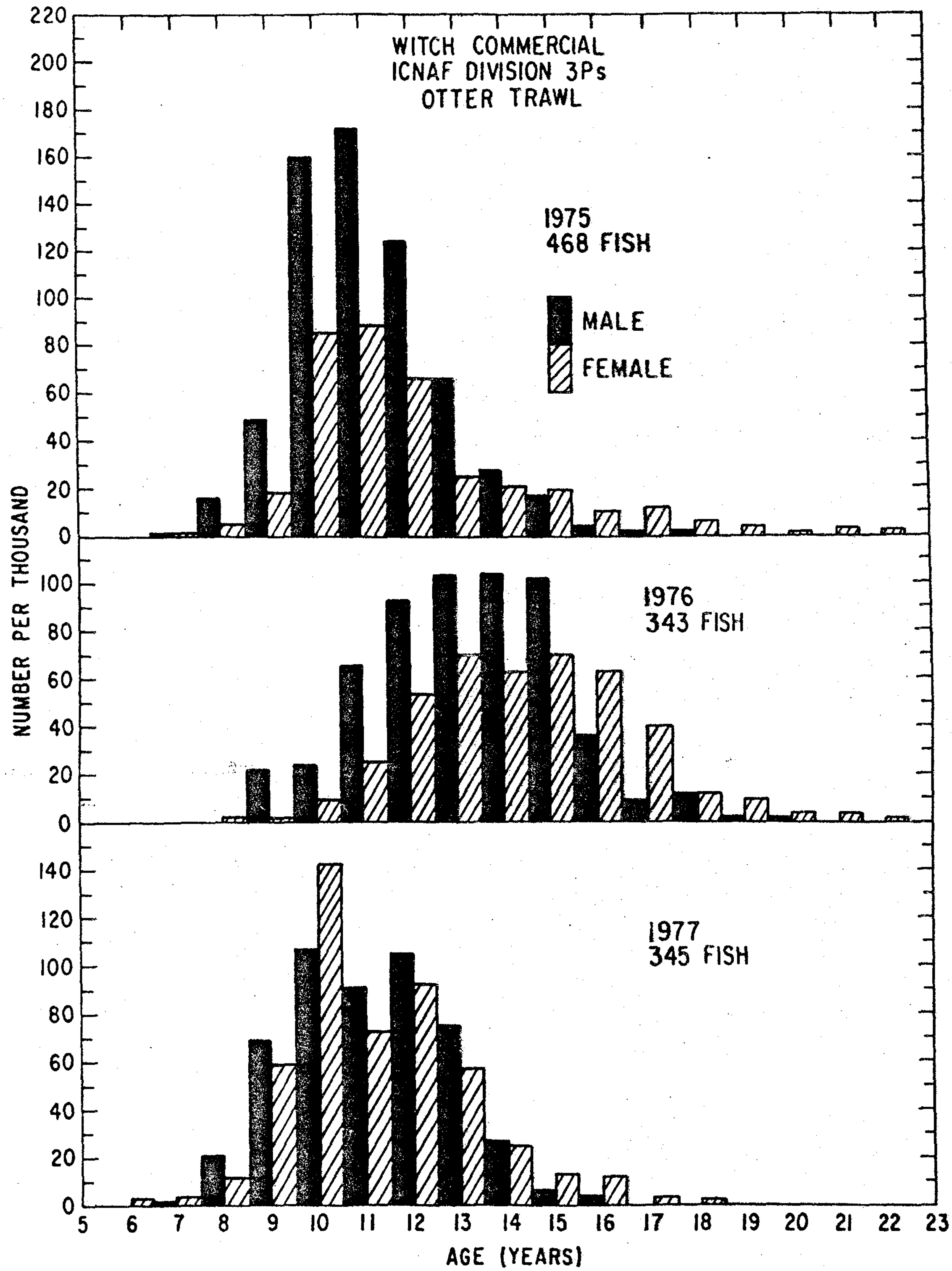

Fig. 3. Age composition for male and female witch from commercial otter trawl, 1975-77, for ICNAF Subdivision 3Ps.

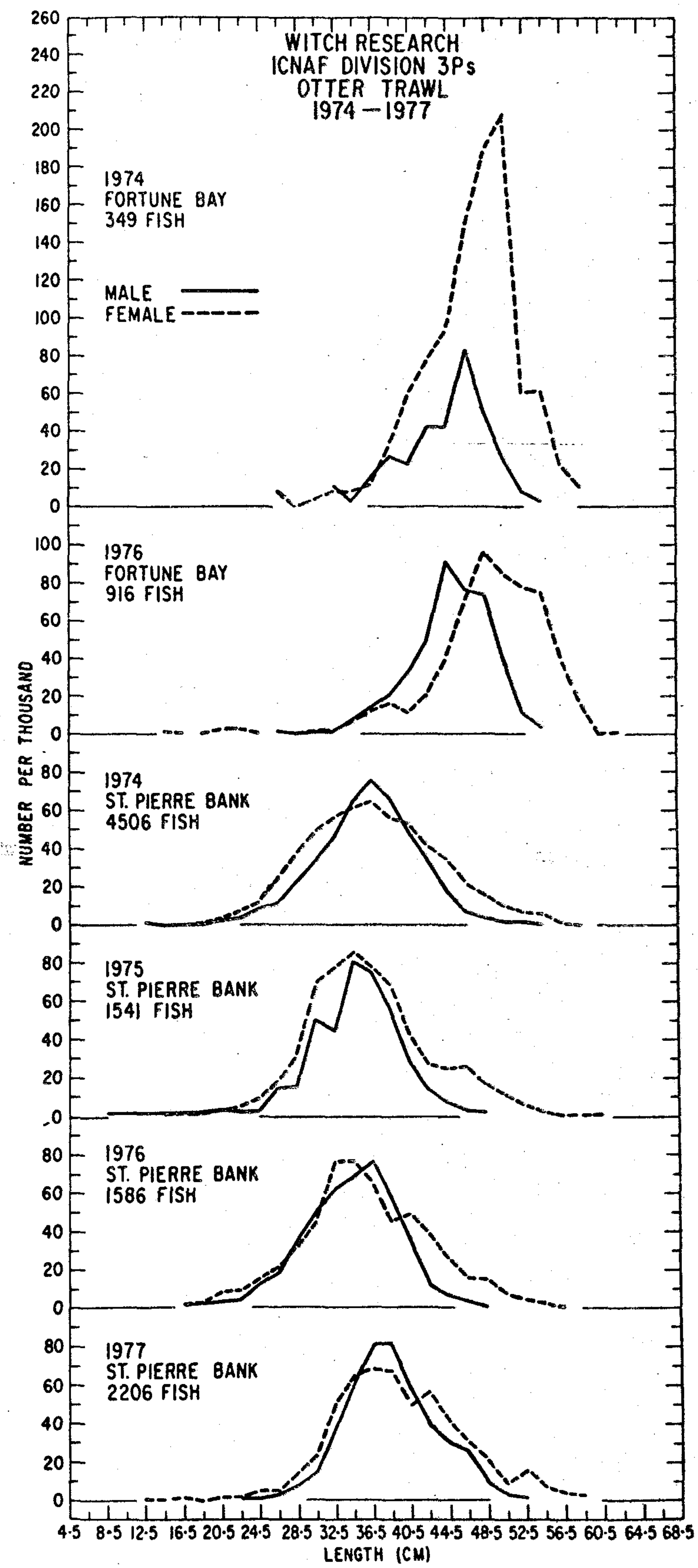

Fig. 4. Length composition for male and female research witch, 1974-77, from ICNAF Subdivision 3Ps.

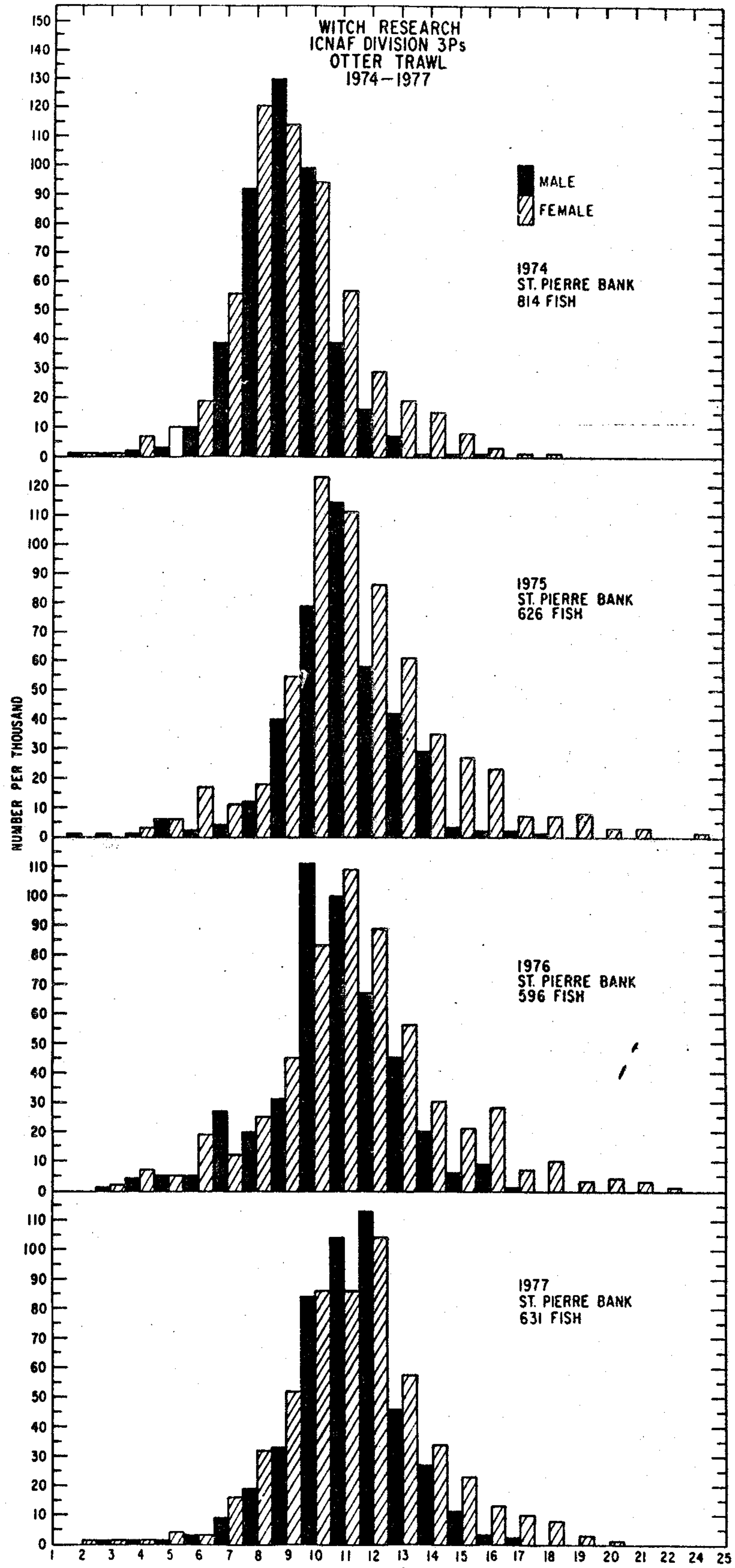

Fig. 5. Age composition for male and female research witch, 1974-77, from ICNAF Subdivision 3Ps.

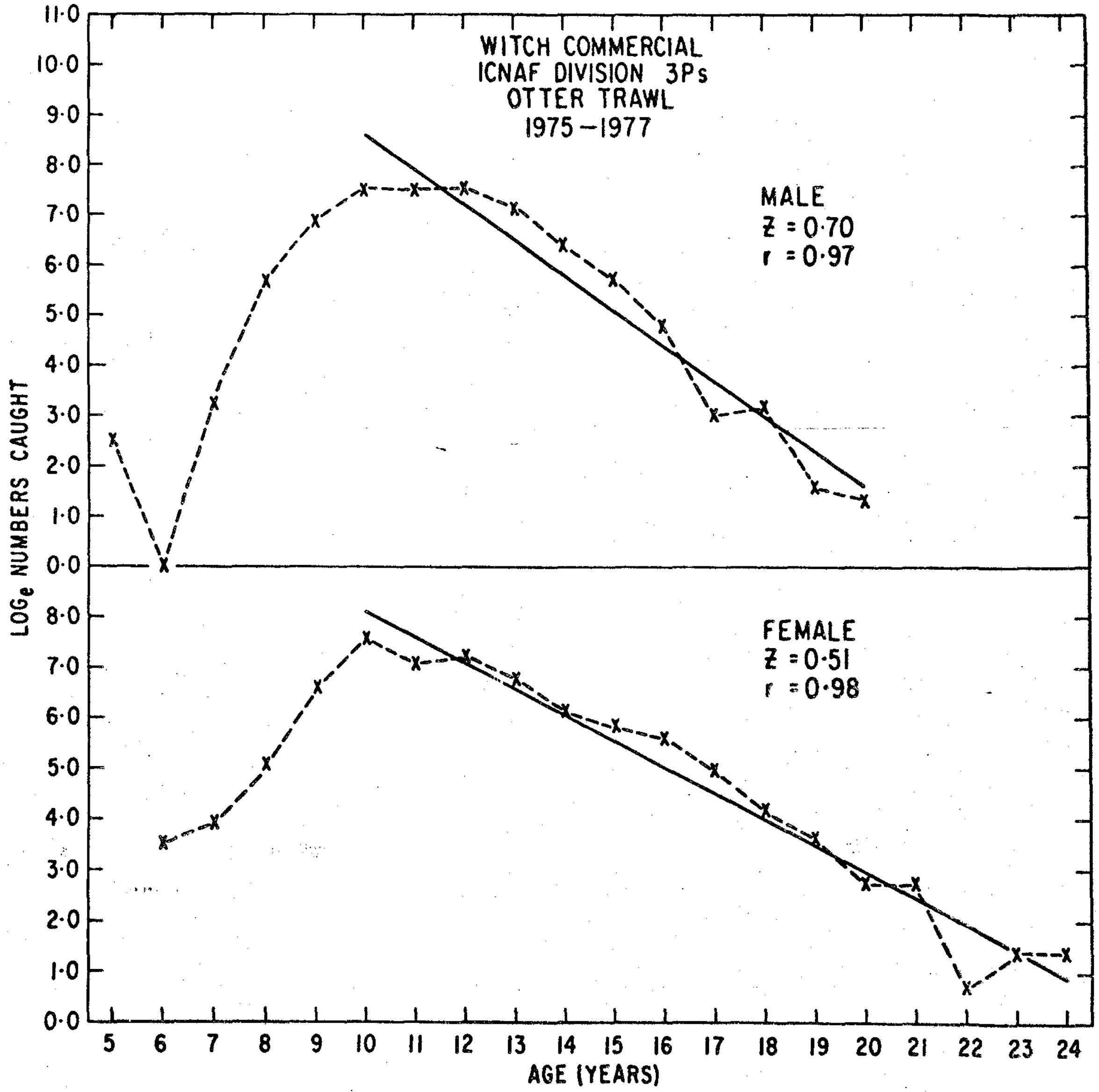

Fig. 6. Catch curves for male and female witch, 1975-77, from ICNAF Subdivision 3Ps.

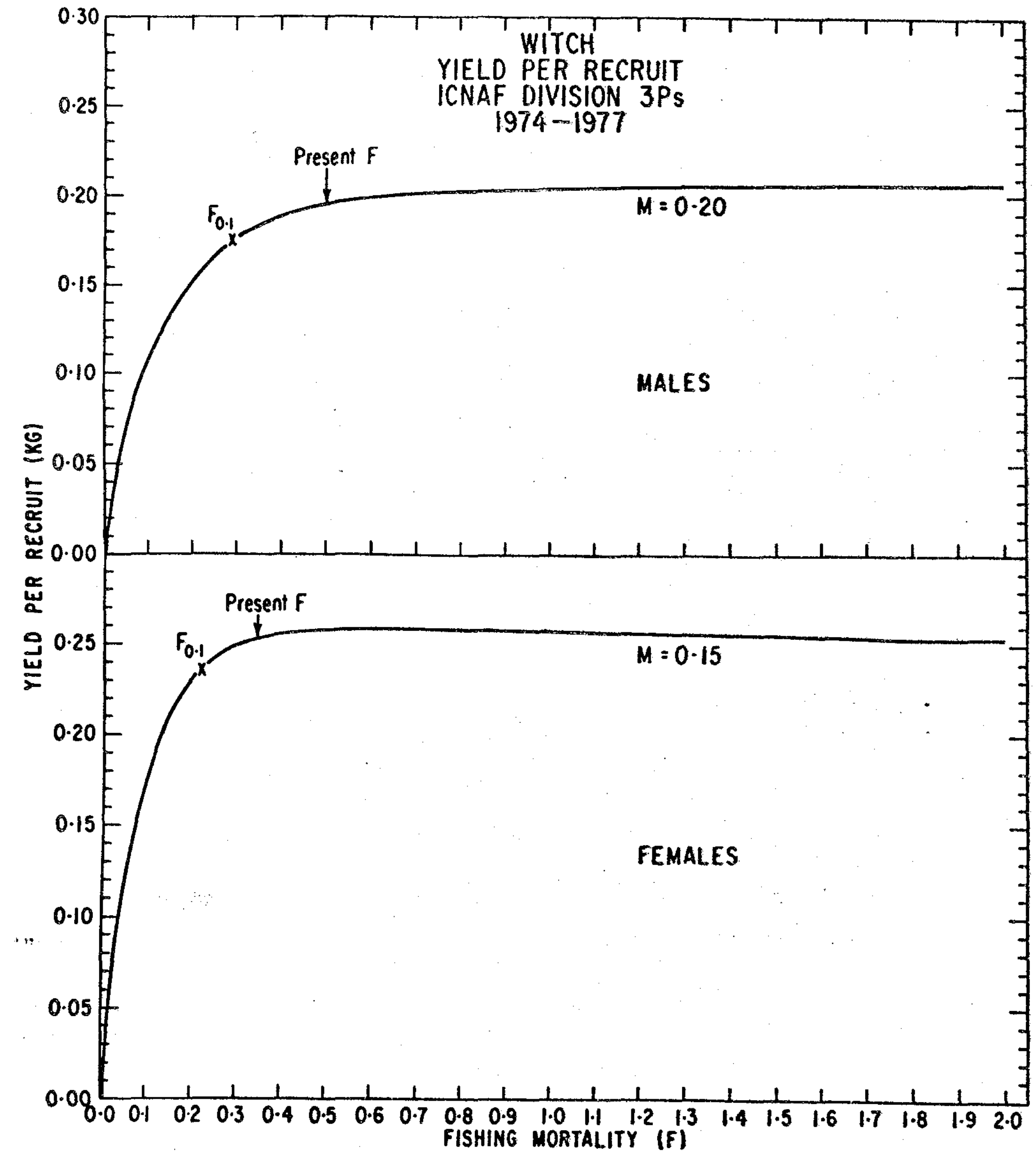

Fig. 7. Yield-per-recruit curves for male and female witch from ICNAF Subdivision 3Ps.