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Note on length at sexual maturity of American plaice, *Hippoglossoides pl. platessoides*, on Saint Pierre Bank (ICNAF Subdiv. 3Ps)

by

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I. Introduction

The American plaice (*Hippoglossoides pl. platessoides*) population on Saint Pierre Bank has been long exploited by Canadian fishermen (especially Newfoundlanders) and Saint Pierrers. ICNAF statistics show that this fishing was of little importance until 1969. Average catches between 1960 and 1969 were 2,459 tons a year.

The sexual maturity of American plaice has been the subject of several studies notably that by Pitt (1966) part of which was on Saint Pierre Bank.

The samples for our study were collected during a cruise made by R/V *Cryos* on Saint Pierre Bank in February 1972. The trawling locations and stations where the sexual state of the fish was studied are shown in Fig. 1. Measurements (total length in centimeters below) and gonad examinations were made on 1,072 specimens. To determine precisely the maturity stages of the individuals collected, we used the descriptions of Pitt (1966, p. 653).

From these data, length frequency curves were established for immature individuals as well as for each sex. Further, these data permitted calculation of the length (Lt) at which 50% of the males and 50% of the females became ripe. For that, we used the method described by Fleming (1960).

II. Results

The results of gonad examination are shown in Table 1. This shows that 83.8% of the males were ripe and only 6.4% of the females. The average percent of ripe males and females combined was 39.5%.

The length frequency of immatures has been shown in relation to that for the males and females (Fig. 2). This shows very clearly the different proportions of immatures in each sex. We note, furthermore, that immature males are found to a length of 34 cm with a maximum number at 24 cm. For the females, the maximum length attained by the immatures is almost 50 cm, the modal length agreeing with that for all the females (30 cm).

The relationship between length and sexual maturity for males and females is shown in Fig. 3. The inflection points (where 50% of the individuals are mature) of the sigmoid curves show that the majority of males are mature at 22.7-cm length, while the majority of females are ripe at 44.3 cm. These lengths reported in the linear growth of American plaice on Saint Pierre Bank by Pitt (1967) correspond to about 6 years of age for the males and a little more than 14 years for the females. Our results are somewhat different from those of Pitt (1966) for Saint Pierre Bank; for this author, the length at 50% maturity is 27.8 cm (age 7.48 years) for males and 44.6 cm (age 14.21 years) for females. With the results for the females very close (lengths of 44.3 cm and 44.6 cm), the difference between the length at maturity of the males (22.7 cm and 27.8 cm) is difficult to explain.

III. Conclusions

Our results show that 16.2% of males and 93.6% of females taken on Saint Pierre Bank were immature; this gives an average of 60.5% of immatures for the whole population.

The length at 50% ripeness obtained in the combined sexes is about 33.5 cm (Lt). Now we know that the minimum commercial length of American plaice is fixed on the different markets at 32 cm (Lt). The fishing effort seems then to fall on the mature stock of the population, thus saving the individuals which have still not spawned once. Such a hasty conclusion would not take account of individuals captured of less than 32-cm length, largely immature, which are discarded at sea by the commercial vessels and so lost from the stock, as noted by Powles (1965, p. 573-574) for American plaice in the Gulf of St. Lawrence.

To better show the situation, we have calculated the percentage of males and females less than 32 cm taken by the R/V *Cryos* on Saint Pierre Bank in three other seasons (spring, summer and autumn). This vessel has made seasonal trawlings at the standard locations shown in Fig. 1. The length frequencies at different seasons (Fig. 4) allow us to assess the order of magnitude of the discards of young specimens by the commercial fishing boats on Saint Pierre Bank. We note that in the three seasons under consideration, the fish not of commercial size varied from 63 to 77%. Examining the length frequencies for February 1972 (Fig. 2), we note, on the other hand, that 71% males and 64% females are not commercial size. Taking account of the fact that all these percentages only take in immature females and a large proportion of males not yet sexually mature, the future of such a population appears very uncertain.

To these observations, it is necessary to add that fishing effort on American plaice on Saint Pierre Bank has very definitely intensified in 1970: 12,328 tons landed in 1970 against 4,295 tons only in 1969. Table 2 shows the development of the catches from Saint Pierre Bank from 1967 to 1970: catches by Saint Pierre relatively small and stable, catches by Canada increased 4X by the Maritimes and 3X by Newfoundland, a small Soviet fishery appearing in 1970.

It is very evident that all the factors just described:

- very important percentage of immature (60.5%) in the population,
- relatively great average length at maturity (33.5 cm),
- high capture or discard (average of 70% of the population) of young fish less than 32 cm in length,
- and considerable intensification of the fishery (total catch increases 3X from one year to the other),

can only, in this combination, seriously compromise the future of the American plaice fishery on Saint Pierre Bank.

Table 1. Results of gonad examination. (M% = percentage of ripe fish).

	N Immature	N Mature	N Total	M%
N males	74	384	458	83.8
N females	575	39	614	6.4
N total	649	423	1,072	39.5

Table 2. The development of the catches from 1967 to 1970 for American plaice from Saint Pierre Bank as shown by ICNAF statistics.

Year / Country	1967	1968	1969	1970
Maritime Provinces	805	1,512	1,162	4,227
Newfoundland	2,199	4,007	2,888	7,368
St.Pierre & Miquelon	533	524	245	397
USSR	-	-	-	336
Total	3,537	6,043	4,295	12,328

References

Fleming, A.M. 1960. Age, growth and sexual maturity of cod (*Gadus morhua* L.) in the Newfoundland area, 1947-1950. *J. Fish. Res. Bd. Canada*, Vol. 17(6), p. 775-809.

ICNAF. 1962-1972. *Stat. Bull. int. Comm. Northw. Atlant. Fish.*, Vol. 10-20, for the years 1960-1970.

Pitt, T.K. 1966. Sexual maturity and spawning of the American plaice, *Hippoglossoides platessoides* (Fabricius), from Newfoundland and Grand Bank area. *J. Fish. Res. Bd. Canada*, Vol. 23(5), p. 651-672.

1967. Age and growth of American plaice (*Hippoglossoides platessoides*) in the Newfoundland area of the Northwest Atlantic. *J. Fish. Res. Bd. Canada*, Vol. 24(5), p. 1077-1099.

Powles, P.M. 1965. Life history and ecology of American plaice (*Hippoglossoides platessoides* F.) in the Magdalen Shallows. *J. Fish. Res. Bd. Canada*, Vol. 22(2), p. 565-598.

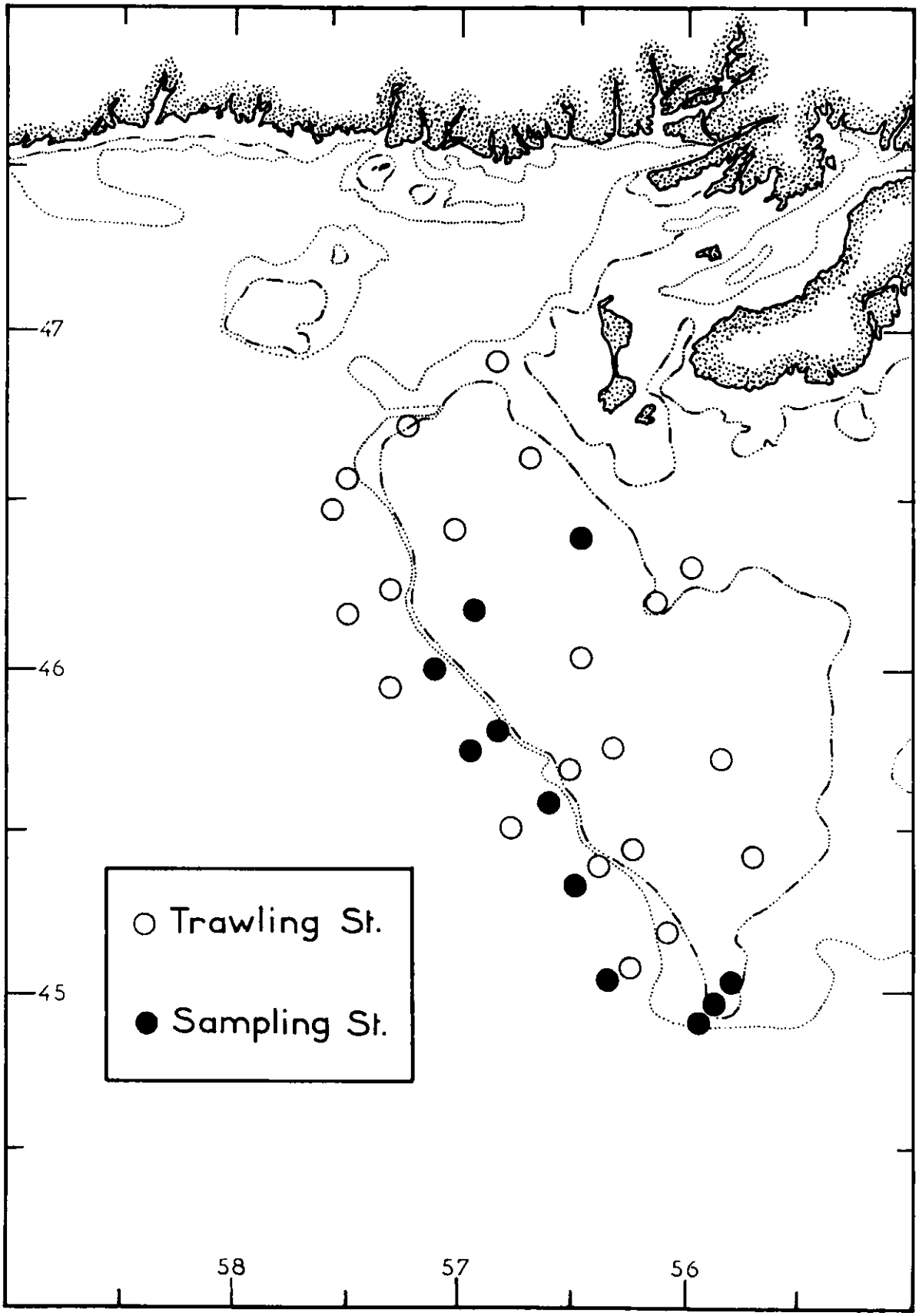

Fig. 1. Location of seasonal stations occupied by R/V *Cryos* on Saint Pierre Bank. Solid black circles: Gonad sampling stations during the February 1972 cruise.

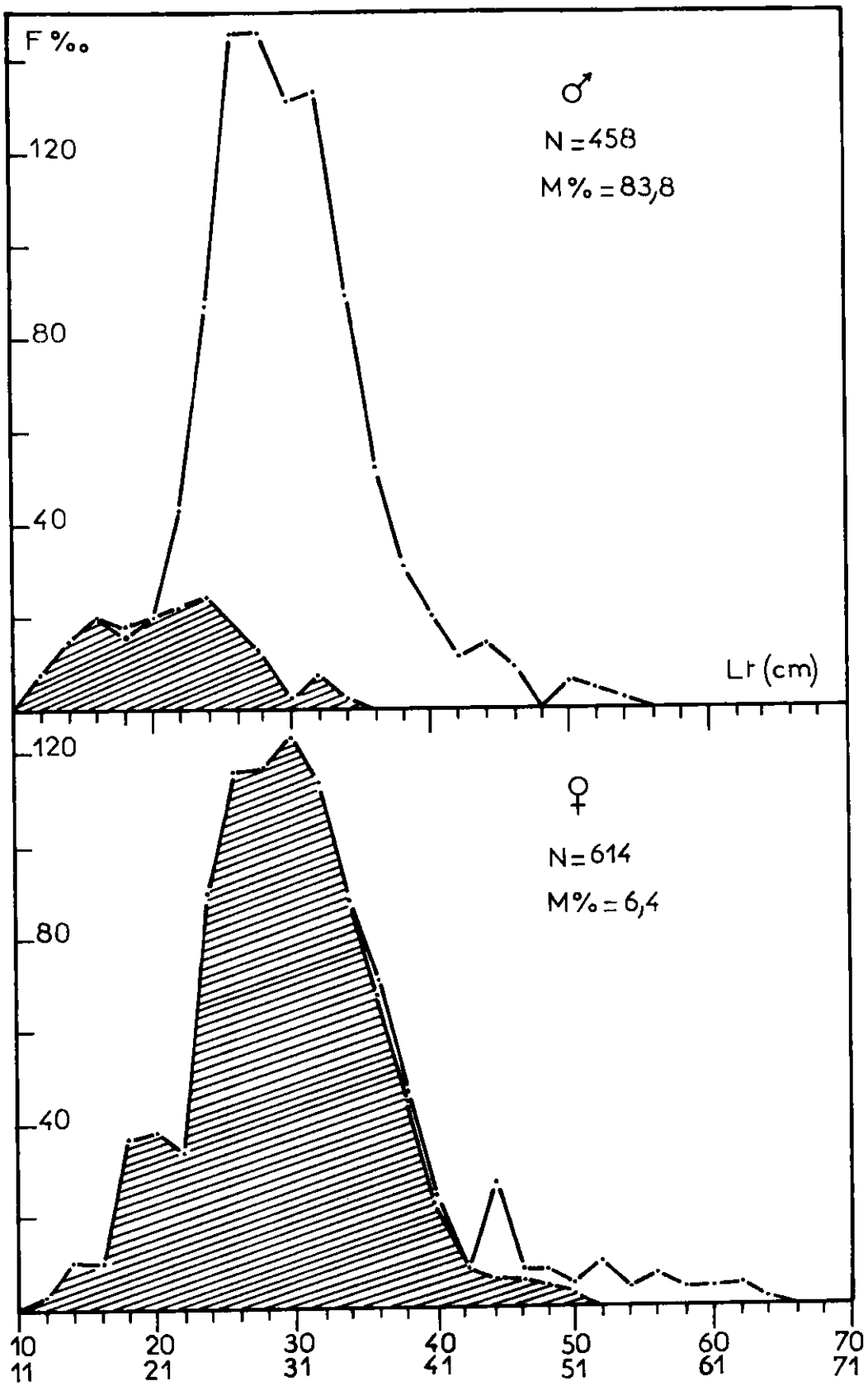

Fig. 2. Length frequency of males and females in February 1972. Hatched area: immatures.

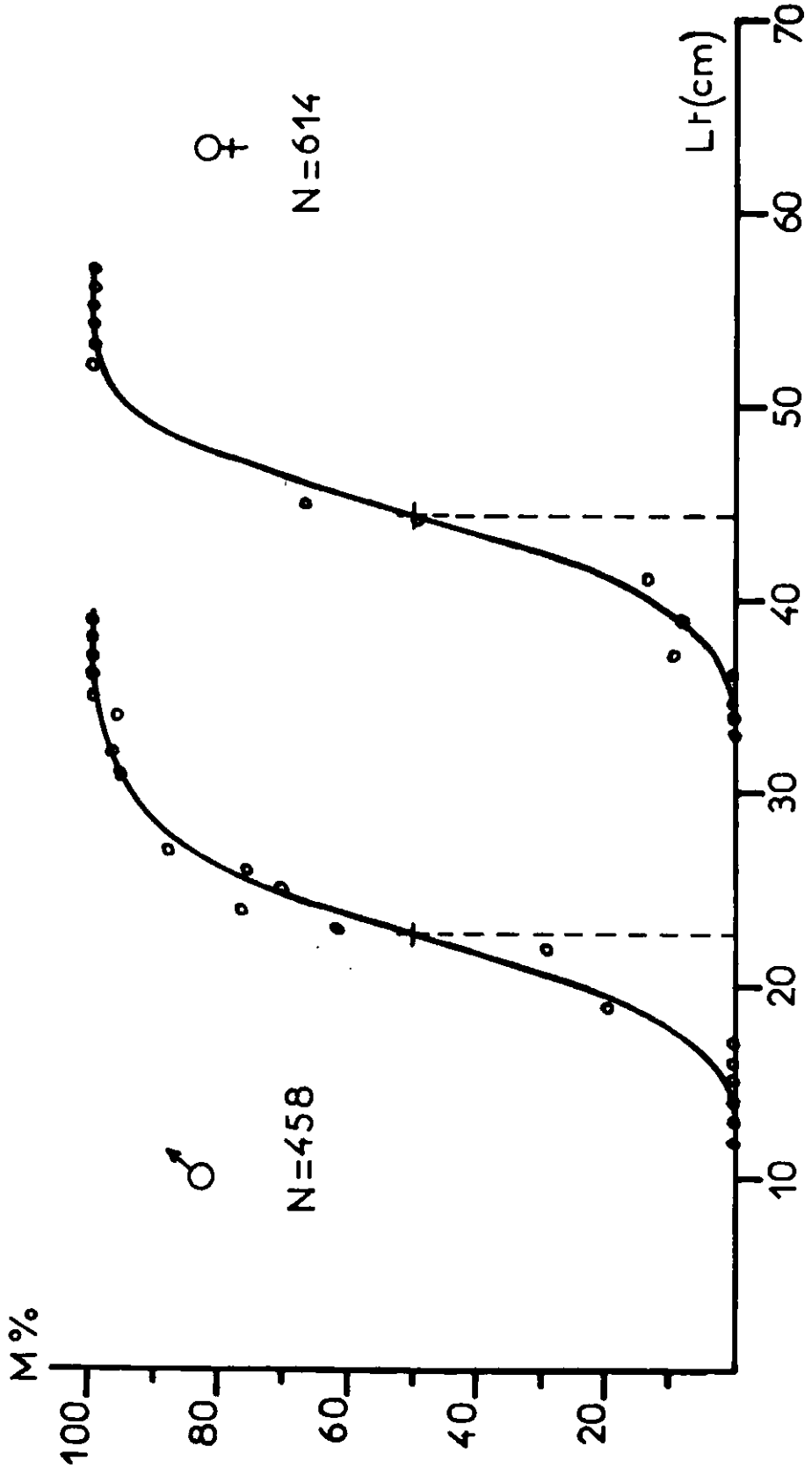

Fig. 3. Relation between length and maturity of males and females.

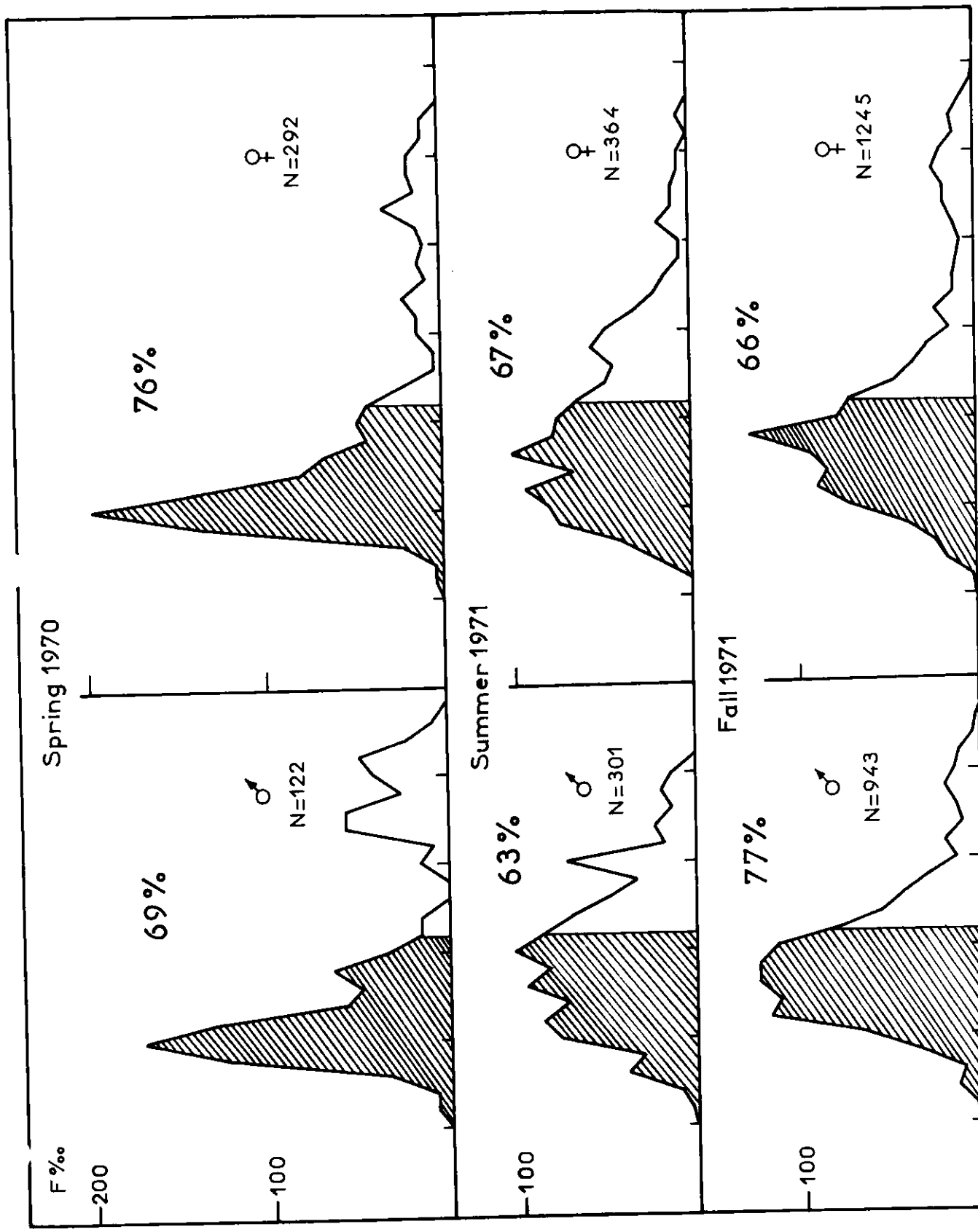

Fig. 4. Seasonal length frequencies of American plaice on Saint Pierre Bank. Hatched area: non-commercial specimens (Length less than 32 cm). The percentage non-commercial is also shown.