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Distribution and biological characteristics of the short-finned squid,
Illex illecebrosus, off southern Newfoundland (ICNAF Subdiv. 3Ps) in the autumn of 1978

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I - Introduction

This paper deals with the distribution and the biological characteristics of the squid *Illex illecebrosus*, from data collected during the R/V *Cryos* cruise carried out from 13 to 31 October 1978 on the St. Pierre bank and adjacent areas (ICNAF Subdiv. 3Ps).

The positions of the trawling stations were randomly selected, using the ICNAF stratification scheme recommended for groundfish survey in this area.

A total of 71 hauls of 30 minutes duration were made. The gear used was the standard Lofoten trawl with specifications : 31.20 m headrope, 17.70 footrope and 50 mm stretched mesh in the codend. At each station, a XBT profile was obtained.

Measurements to the nearest half-centimeter were made on the squid catches, or on a representative sample, each sex apart. Maturity stages were recorded using the scales defined by MERCER (1973) for the males and by AMARATUNGA and DURWARD (1978) for the females.

II - Results

A total catch of 1 823 individuals representing 444 kg was made during the whole cruise.

A - Geographical distribution (Fig.1)

Squid were absent in the Halibut Channel and in the eastern part of the St. Pierre bank.

At the contrary, numerous (36 tows) but small catches of squid were obtained on the western part of the bank. The two best yields were observed between 100 and 150 fathoms deep (stratum 313) : 63 and 43 kg per half-hour.

B - Composition of the catches (Fig.2)

A group of young individuals, all immature, ranging from 11 to 15 cm mantle length is present in both sexes. They represent about 1 % of the total catch, but this is probably underestimated because of the trawl selection. The sex ratio (females/males) in this group approximates 1.

Most of the catches is composed of adults showing differences in size and in number between males and females (sex ratio close to 2).

A graphical analysis of length distribution by sex was made in this adults group, following the method of HARDING (1949).

For the females, the separation in two modes was easy to put in evidence by this way (Tabl.1). But, for the males, the graphical analysis was more difficult ; it can mean that the distribution is bimodal (hypothesis A) or unimodal (hypothesis B, in Tabl.1).

Examination of maturity stages (Fig.2) shows that females are immature or in maturation. The majority of individuals of the first mode (20 to 25 cm long) are in stages 2 and 3, meanwhile those of the second mode (24 to 29 cm long) are mainly at stages 3 and 4.

Although some males are still immature, the majority are maturing and even achieved for the individuals greater than 23 cm long.

III - Discussion

The composition of the squid population laying in ICNAF Subdiv. 3Ps in October 1978 is very similar to those described in the Newfoundland area at the same period of the year (SQUIRES, 1957 ; MERCER, 1975 ; COLLINS and ENNIS, 1978).

For the adults, this period is, indeed, that of the southward migration towards deeper waters where reproduction takes place during the winter time.

The inequality in the sex ratio confirms the observations by MERCER (1975), that in autumn the males, which are mature before females, leave earlier the inshore waters.

This can be confirmed by the fact that the mode of larger males is more difficult to put in evidence than for the females. So, the second mode (hypothesis A in Tabl.1), present in the catches, is strongly underestimated resulting in a shift of the calculated mean towards smaller figure, due to the fact that after 23 cm long, the majority of mature males would be already migrating.

A third small group is also represented by individuals of 11 to 15 cm long. Although scarce in ICNAF Subdiv. 3Ps at this period, this group had been already mentioned by SQUIRES (1957). This author suggested a northern migration of juveniles towards the south coast of Newfoundland in some years.

For MERCER (1975), these 3 groups belong to the same generation and would be issued from successive spawnings between January and June of 1978.

For MESNIL (1977), the small and the large squids would be born in summer 1978 and 1977 respectively ; the medium being issued from the spawning of winter 1978.

It is difficult to confirm one or the other hypothesis due to the lack of data on the spawning zones and on the larval distribution.

On the other hand, the small yield obtained offshore are surprising compared to the large abundance observed during this summer in the inshore waters.

It is possible that the offshore migration was almost achieved in late October, since the last catches had been made in early October in St. Pierre and Miquelon inshore waters.

An other explanation can be found in the thermic situation (Fig.3). Cold waters laying in the Halibut Channel and along the western edge of the St. Pierre bank, between 40 and 60 fathoms, might be an obstacle preventing the squid to reach by this way the warmer waters of the slope.

References

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Tabl.1 - Analysis of size distribution of the squid Illex illecebrosus in ICNAF Subdivision 3Ps (R/V Cryos cruise - 13 to 31 October 1978).
The figures represent the mean (underlined) \pm 2 s.d. of the modal groups.
(a) - underestimated because the trawl selection
(b) - underestimated mean because the earlier migration of mature males.

	Small	Medium	Large	
Females	11-15 cm <1 % (a)	<u>20.1-22.7</u> -25.3 cm 82 %	24.0- <u>26.5</u> -29.0 cm 17 %	
Males	11-15 cm <1 % (a)	19.5- <u>21.0</u> -22.5 cm 80 %	19.5- <u>22.0</u> -24.5 cm 19 % (b)	Hypothesis A
		<u>19.5-21.3</u> -23.1 cm 99 %		Hypothesis B

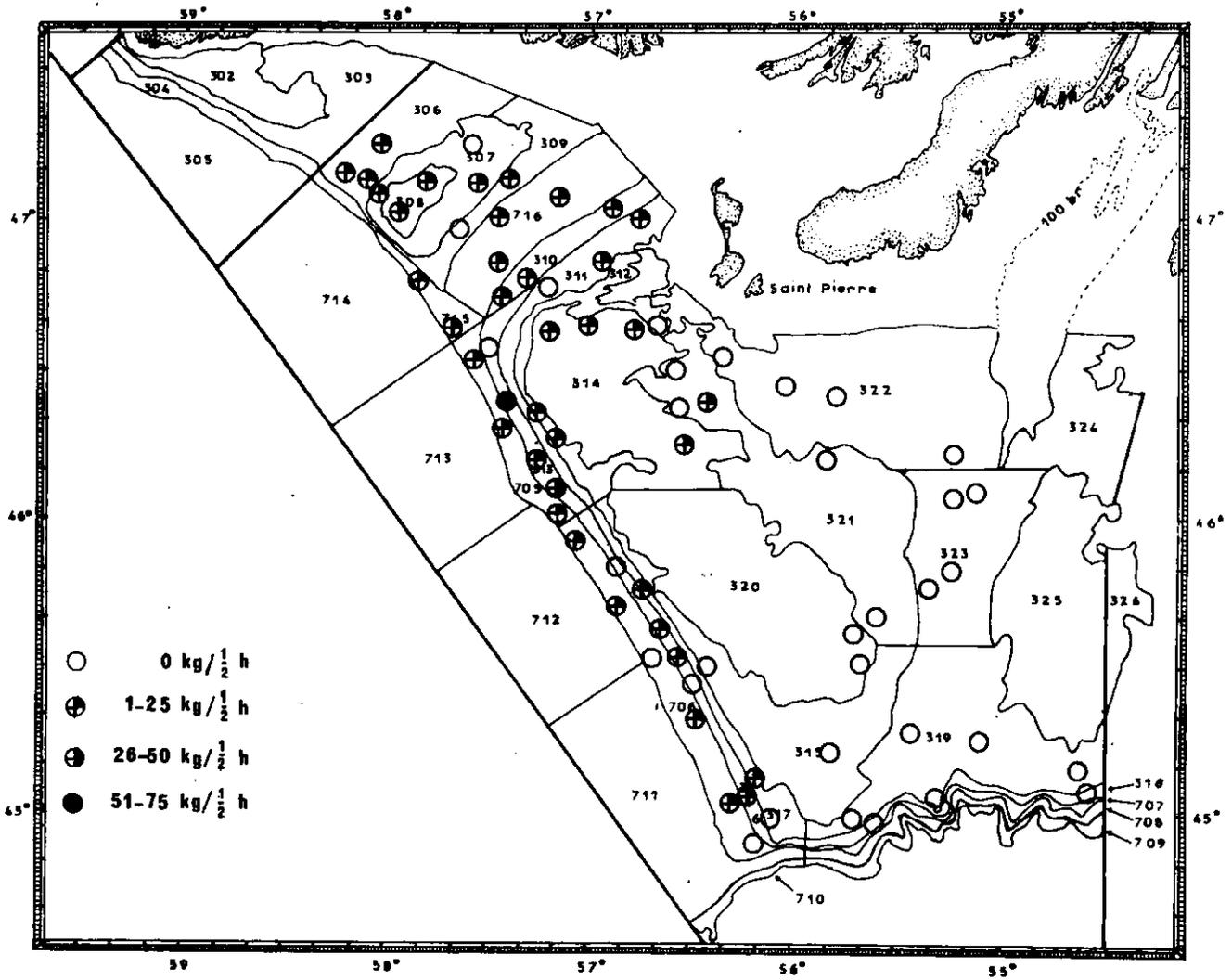


Fig. 1. Distribution and yield of squid *Illex illecebrosus* in ICNAF Subdiv. 3Ps (R/V *Cryos* cruise, 13 to 31 October 1978).

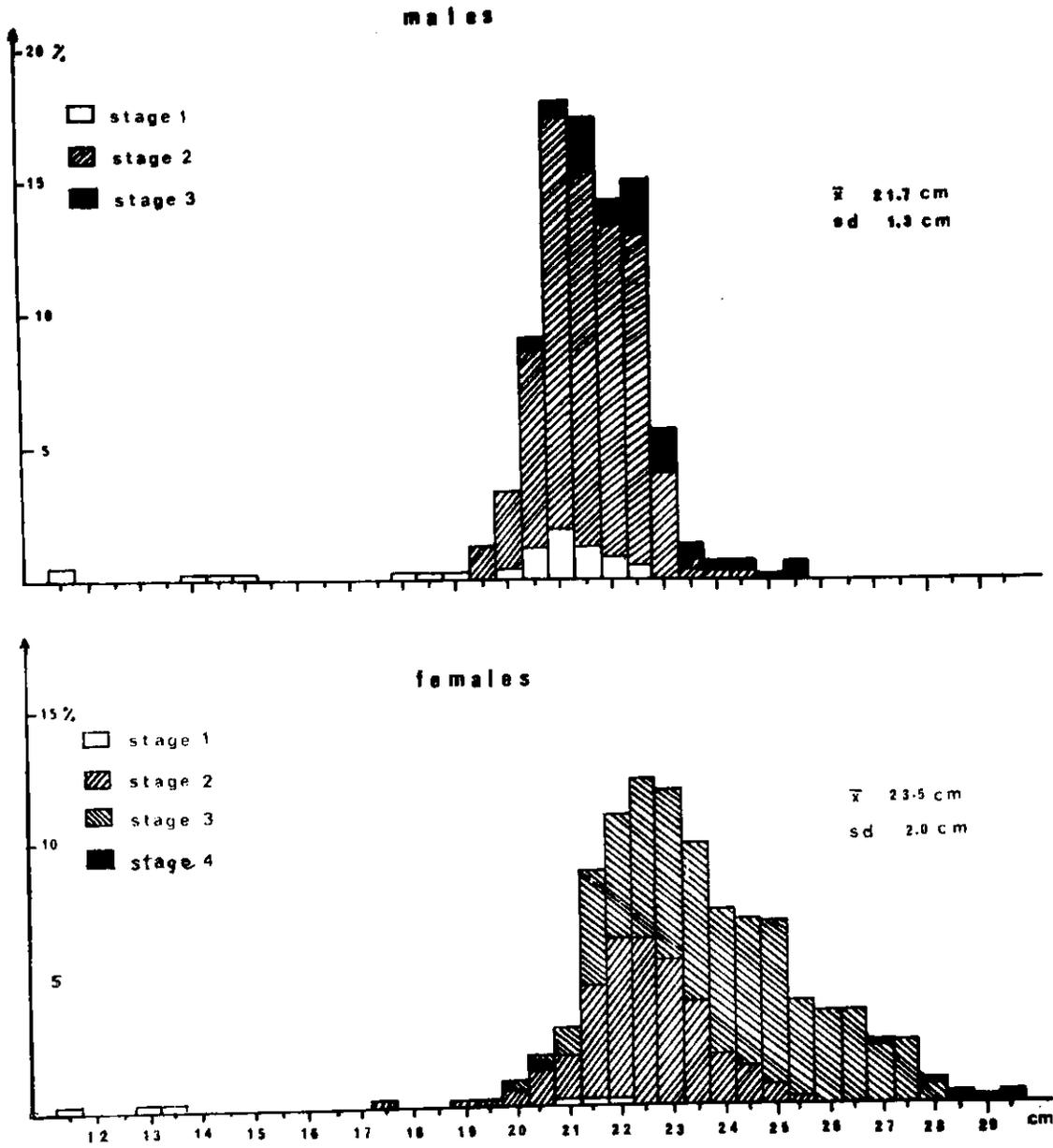


Fig. 2. Length distribution and maturity stages of squid *Illex illecebrosus* in ICNAF Subdiv. 3Ps (R/V *Cryos* cruise, 13 to 31 October 1978).

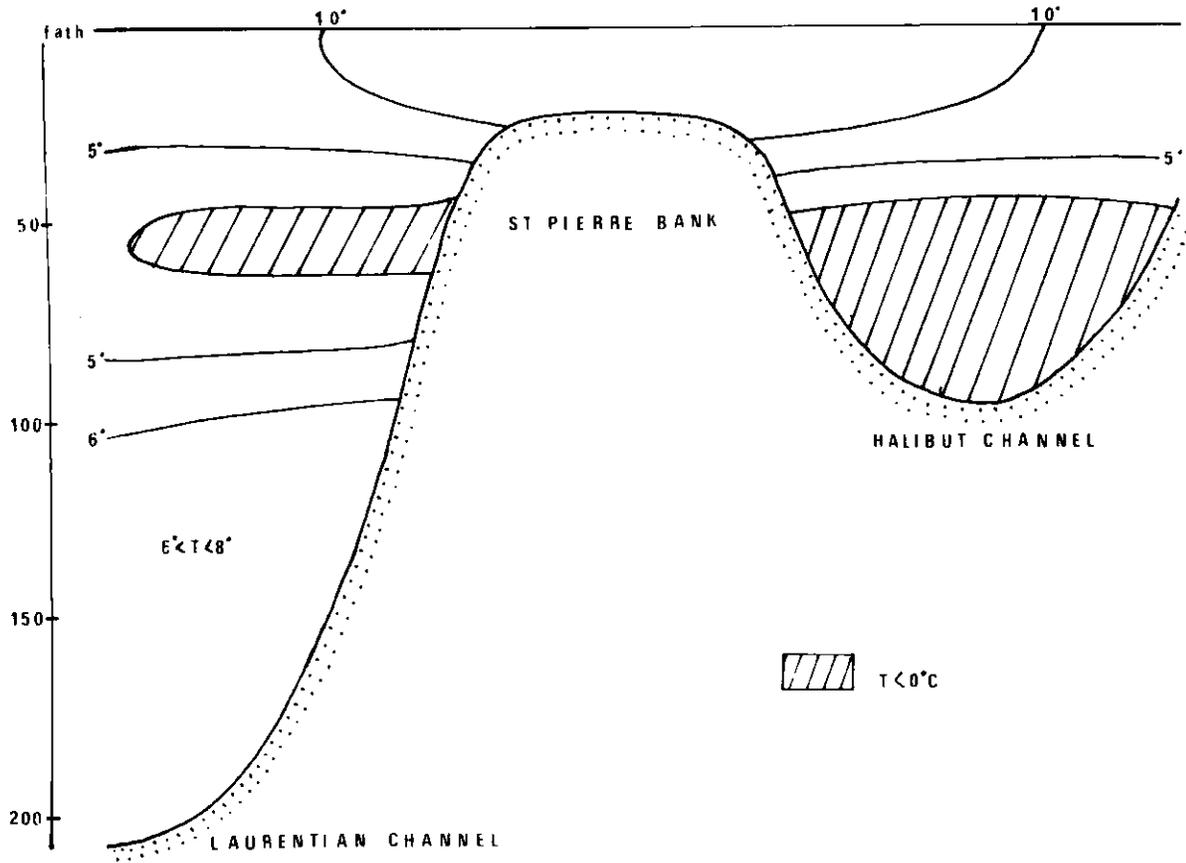


Fig. 3. Diagram of hydrographic situation in ICNAF Subdiv. 3Ps (R/V *Cryos* cruise, 13 to 31 October 1978).

