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Catch, Effort and Biological Characteristics of Squid (*Illex illecebrosus*) in the French Inshore Fishery (Subdiv. 3Ps), in 1981

by

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I.- Introduction

In 1981, as in previous years, the French fishery on squid (Illex illecebrosus) was conducted by small inshore boats arount St. Pierre and Miquelon Islands (Subdiv. 3 Ps) and by large freezer trawlers off the Scotian Shelf (Div. 4 V W X) and on St. Pierre Bank (Subdiv. 3 Ps). The characteristics of squid in the inshore fishery has been studied in the St. Pierre laboratory and those in the offshore fishery during two surveys in September (4 V W X) and October (3 Ps) 1981.

This paper provides data collected on the inshore migration of squid around St. Pierre and Miquelon Islands : information on landing and abundance indices related to water temperatures, distribution by sex and maturity stages of squid sampled, length-weight relation, etc...

II.- Results

1. Catch and abundance

The inshore fishery took place inside the territorial waters of the French archipelago, mostly in the entrance of St. Pierre harbour. The fishery was conducted by 50 dories equipped with mechanical jigging systems. The first squid appearance was noted on June 15 but commercial landing started on June 27. The season stopped at the beginning of August since the abundance of squid was too low after this date to support a commercial fishery.

Consequently, the level of the catch obtained for 1981 (only 314 m.tons) is the lowest one observed from the starting of this fishery in St Pierre, i.e. from 1976. In Table 1, catches per month and mean CPUE are presented for the years 1979 to 1981. Althrough the CPUE index is rough -mostly because of the variability of days fished from year to year- it indicates a sharp decline of abundance in 1981 (6.28 m.t/dory against 37.7 m.t. in 1980) representing only 17 % of the level of 1980. However it is important to note that good concentrations were observed during July 1981 but desappearing almost completely during the second week of August.

2. Hydrographic observations related to abundance

Observations on water temperature (fig. 1) were made at a standard station in the entrance of St. Pierre harbour (10 meters depth) where most of squid are usually caught from dories. As also noted in 1979 (MINET and DUPOUY, 1980) and in 1980 (DUPOUY and DERIBLE, 1981), the first arrival of squid corresponded in 1981 at a level of temperature close to 7°C (fig. 1). This level was reached in mid-June, as in 1979, but one month earlier than in 1980.

In July, temperatures were ranging between 8°C and 11°C, as in 1979 and the abundance index of squid reached to 4.16 metric tons per dory for the month (5.66 in 1979). These figures are relatively close if compared with the poor index obtained in July of 1980 (1.72 m.tons) when the temperature was colder.

In mid-August the temperature rose upper the maximum level of 13°C recorded on a 4 years period and reached the highest value even observed à 15°C in mid-September, some three and half degrees above the mean curve. Usually, squid abundance around St. Pierre and Miquelon Islands presents a peak in August-September, when mean temperature are at its maximum (11 to 12°C). But in 1981, squid left this area when temperatures exceeded 13°C.

3. Biological characteristics

- Growth and lenght distributions

Six samples of squid were measured on a weekly basis, from June 27 to August 13. Except for the sample of June, all squid were sexed and measured after determination of maturity stages according to the procedure established by AMARATUNGA and DURWARD (1979). During this period, the mean size (ML) increased of about 30 mm for males and 40 mm for females (table 2) corresponding to an average growth per month of 19.5 mm and 25.8 mm for each sex respectively. These growth rates are higher of about 50 % than those observed for the same period in 1979 and 1980. Although, the mean length at arrival was lower than those of 1979 and 1980 (10 to 20 mm). However length distributions related to maturity stages (fig. 2) present no marked differences with previous years. The results of sex ratio (Table 2) ranged from 37 to 52 indicating a lower proportion of males for the corresponding period than in 1979 and 1980.

- Length-weight relationsships

For both sexes, the mean weight increased of about 70 g between July 6 and August 13 (Table 2), although the increase in length is higher for females. This can be explained by a better Condition Factor ($100\ W/L^3$) for males (1.89 against 1.77). The length weight relationships (fig. 3) based on data collected in 1980 and 1981 (400 values) confirm that for individuals higher than 18 cm M.L. males are beavier than females for a given length. The parameters of relation $W = a\ L^n$, estimated by the least-square method are as follows :

- for males $a = 4.22 \times 10^{-3}$; $n = 3.496$; $r = 0.996$
  for females $a = 6.38 \times 10^{-3}$; $n = 3.350$; $r = 0.997$.

III.- Conclusions

In 1981, the inshore migration of squid around St. Pierre and Miquelon archipelago appeared when water temperatures rose in the vininity of 7°C, as in 1979 and 1980. In spite of good abundance in July (close to the 1979 level), squid disapeared after mid-August. This resulted in the lowest level of catches recorded in St. Pierre and Miquelon during the recent history of the fishery, from 1976.

This abnormal pattern of migration is possibly related to excessive temperatures in coastal waters (3 degrees and half in excess) observed after mid-August 1981.

References

AMARATUNGA, T. and R.D. DURWARD, 1979.- Standardization of Data Collection for the short-Finned Squid, Illex illecebrosus. ICNAF Sel. Papers, No 5 : 37-41.

DUPOUY, H. and P. DERIBLE, 1981.- Catch, Effort and Biological Characteristics of Squid (Illex illecebrosus) in the French Fishery in Subarea 3 and 4, 1980. NAFO SCR.DOC. 81/VI/37.

MINET, J.P. and H. DUPOUY, 1980.- Catch, Effort and Biological Characteristics of Squid (Illex illecebrosus) in the French Fishery in Subarea 3 and 4, 1979. NAFO SCR. DOC. 80/II/12.

Table 1. Catch (m.tons) and CPUE data from French (Saint-Pierre) Illex inshore fishery.

Month	1979 (1)	1980 (2)	1981 (2)
June	32	0	1
July	283	86	208
August	918	225	104
September	612	1,317	1
October		257	
Total	1,845	1,885	314
CPUE (t/dory)	36.9	37.7	6.28

(1) Landing restricted after July 23 and stopped after September 26.
(2) Landing not restricted.

Table 2. Characteristics of Illex samples collected from inshore fishery around Saint-Pierre and Miquelon islands (June-August 1981).
ML = mantle length ; S.d. = standard error on length ; M.w = mean weight

Date	Number measured	Males			Females			Sex-ratio M/M+F
		ML (cm)	S.d.	M.w (g)	ML (cm)	S.d.	M.w (g)	
June 27	116	Non sexed ML = 17.25 S.d. 1.02						
July 6	200	17.51	0.85	88.70	17.88	1.00	101.94	49
July 21	202	18.30	1.26	95.95	19.52	1.36	128.91	37
July 27	199	18.90	0.95	121.36	20.15	1.43	140.63	52
August 5	198	19.47	0.94	122.22	20.28	1.37	138.90	46
August 13	199	20.31	0.81	157.30	21.16	1.33	168.18	45

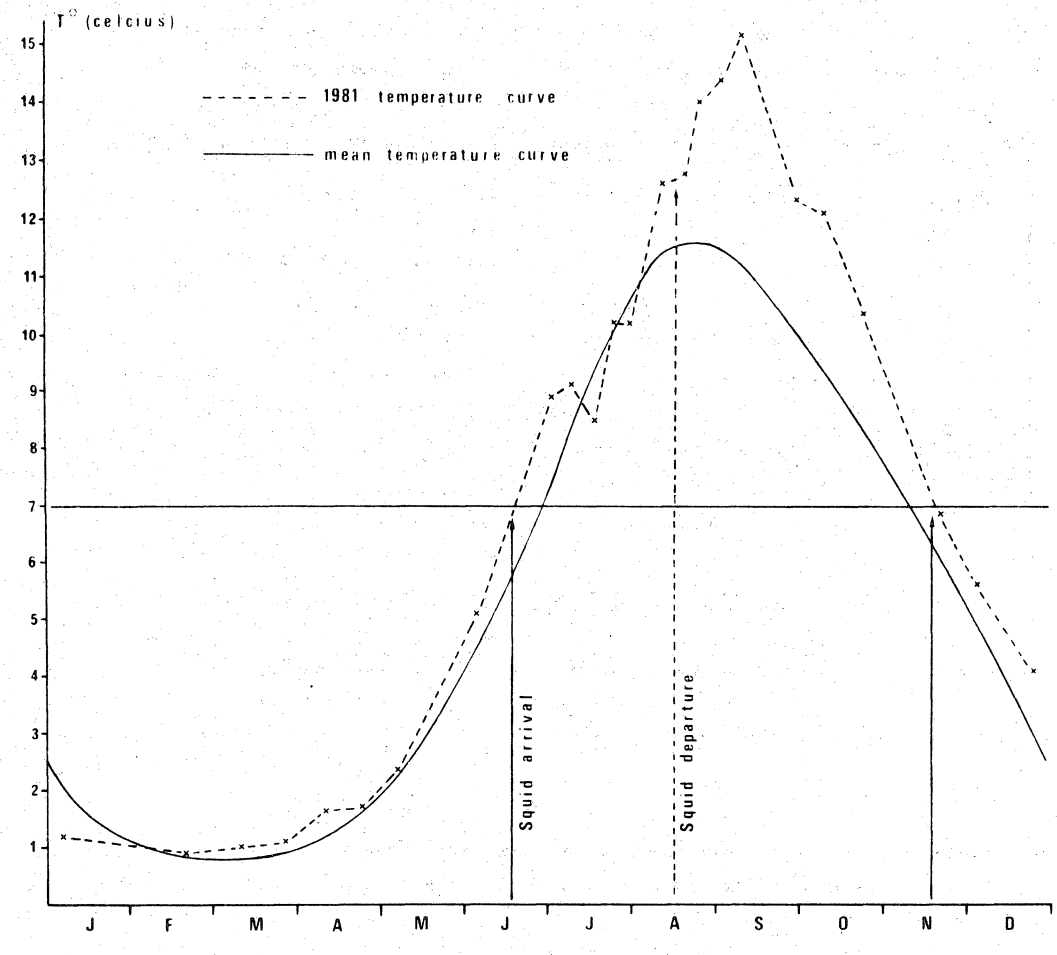

Fig. 1. Evolution of water temperatures in St Pierre entrance (10 m depth) in 1981.

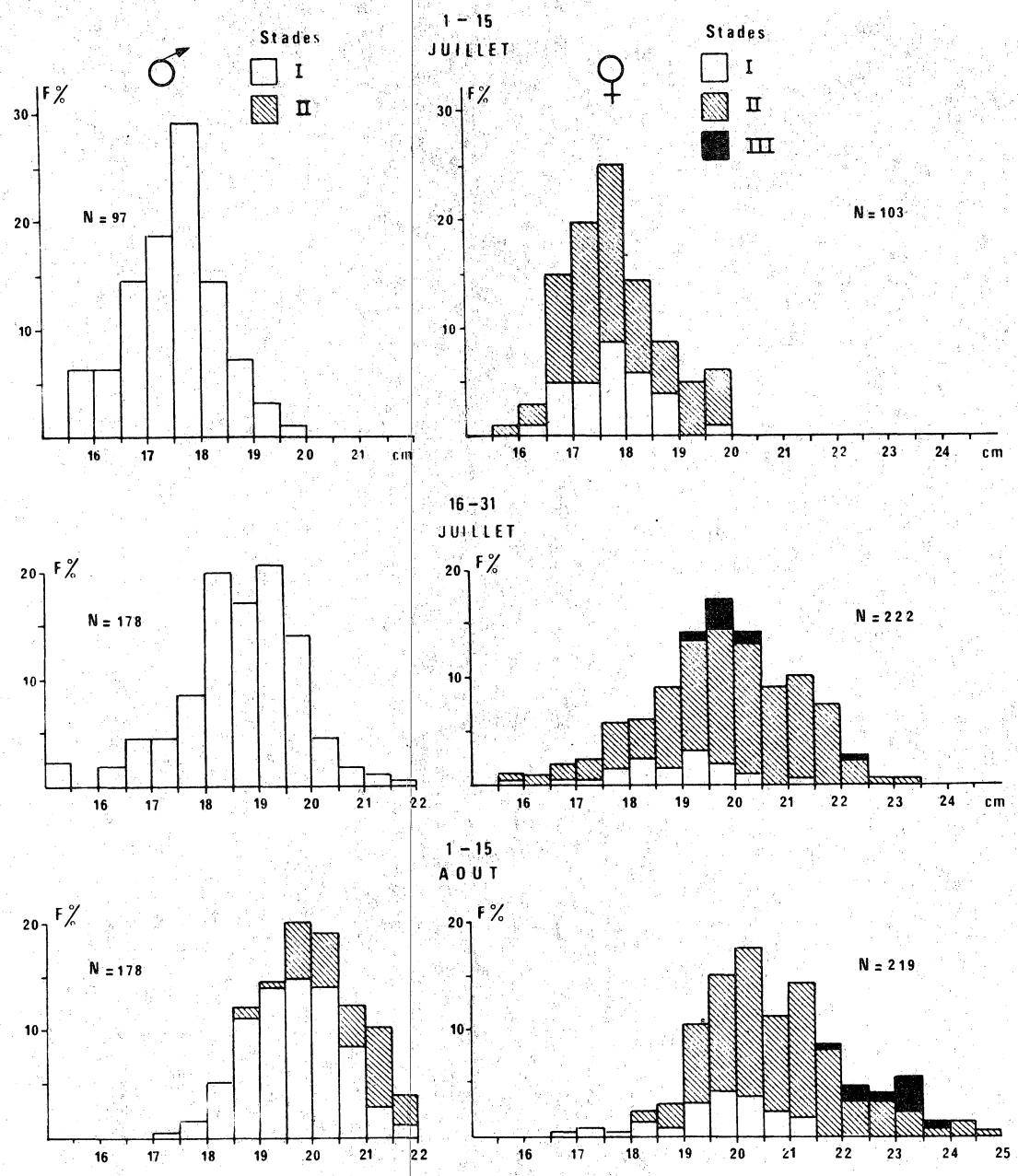

Fig. 2. Length distributions of squid, *Illex*, in the French (SP) inshore fishery (Subdiv. 3Ps) according to sex and maturity stages.

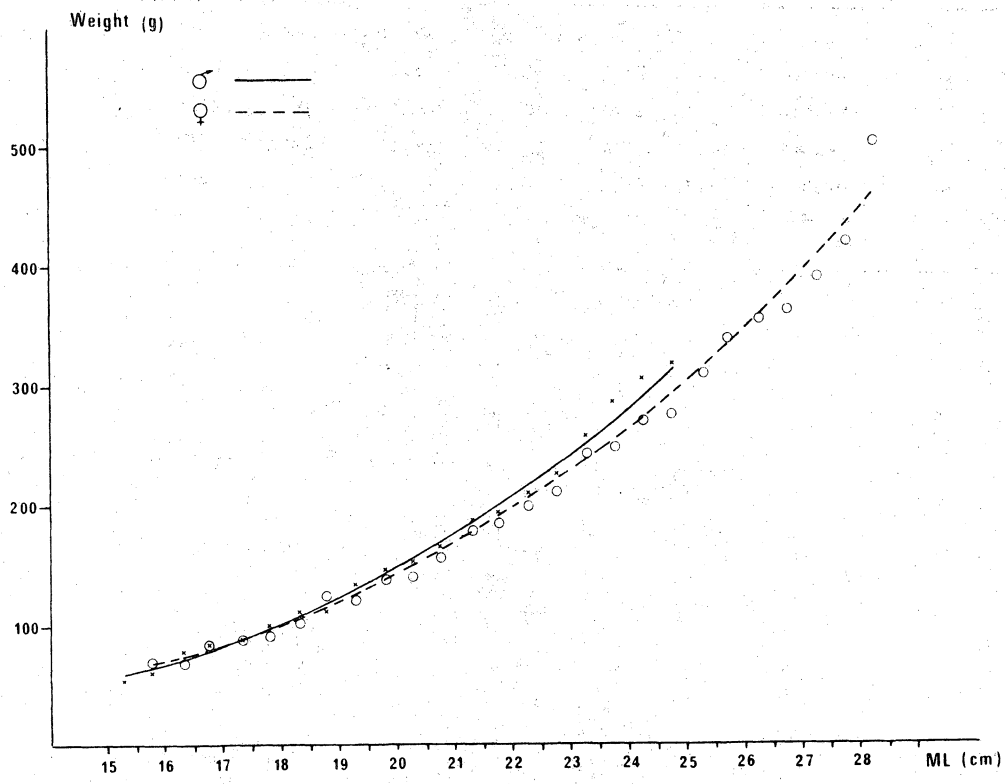

Fig. 3. Length-weight relationships for male and female squid, *Illex*, during the inshore migration around St. Pierre and Miquelon (based on observations made in 1980 and 1981).