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French Research Report, 1978

by

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A. STATUS OF THE FISHERIES

The French provisional catches in 1978 were communicated to the ICNAF Secretariat and are indicated in Sum. Doc. 79/VI/30.

I - Subareas 0 and 1.

Provisional catch statistics for 1978 indicate catches of northern deepwater shrimp by French (M) trawlers in this area. Most of the catches (87 percent) were made in Div. 1B from April to December.

II - Subarea 2.

Preliminary figures indicate small catches of cod by French (M) trawlers in Divisions 2H and 2J during the first quarter of 1978.

III - Subarea 3.

1. Cod

In 1978, the French fishery operated on Ritu Bank (3K), Grand Bank (3LNO), Flemish Cap (3M), Rose Blanche Bank (3Pn), Saint-Pierre and Burgeo Banks (3Ps).

The French (M) trawlers operated in the first three months of the year while French (SP) trawlers operated throughout the year and dories only during the summer months in the French territorial waters of Subdiv. 3Ps.

2. Redfish

In 1978, French (SP) trawlers had a directed fishery on redfish, mainly in Subdiv. 3Ps during the summer months.

By-catches of redfish were also reported by French (M) trawlers fishing on cod.

3. American plaice

Catches were reported for French (SP) trawlers which operated on Grand Bank (Div. 3LNO) from April to July, and on St. Pierre Bank (Subdiv. 3Ps) in spring and winter of 1978.

4. Yellowtail

Catches were reported for the French (SP) trawlers operating on southern Grand Bank (Div. 3LNO) in spring and autumn and on St. Pierre Bank (Subdiv. 3Ps) during the last three months of 1978.

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5. Skates

Catches were reported in 1978 from the French (SP) trawlers when fishing on southern Grand Bank (Div. 3LNO) in spring, and on St. Pierre Bank (Subdiv. 3Ps) in spring and during the last three months of the year.

6. Squid

Catches of squid were reported in 1978 from the French (SP) dories fishing in the islands territorial waters of Subdiv. 3Ps. Fishing for squid occurred during the July to October period.

IV - Subarea 4

1. Cod

Most of the French (M and SP) catches in 1978 came from the eastern Gulf of St. Lawrence (Div. 4R) and were made during the first three months of the year. French (M and SP) catches were also reported from Scatarie Bank (Subdiv. 4Vn) during the same period. French (SP) catches were also reported from Banquereau Bank (Subdiv. 4Vs) in spring.

2. Redfish

In 1978, French (SP) trawlers fished this species in Div. 4R and Subdiv. 4Vn during the first half of the year.

3. Squid

In 1978, the French (M) trawlers fished for *Illex* in Subdiv. 4Vs and Div. 4X, during the August-October period.

Most of the catches were reported in September, in Div. 4W. More details, given at the Tokyo ICNAF Special Meeting in February 1979, are indicated in Res. Doc. 79/II/6.

B. SPECIAL RESEARCH STUDIES

I. Statistical Area 0

After the research survey of the R/V Cryos in September-October 1977, new data were presented in 1978.

Biological data on shrimp (Pandalus borealis) in this area were published in the ICNAF Selected Papers No. 4, 15-21.

Results on groundfish distribution, abundance and biomass were communicated in ICNAF Res.Doc. 78/VI/45.

The stratification scheme used during this survey in Stat. Division OB was communicated in ICNAF Res.Doc. 78/VI/64.

II. Subarea 2

Research were carried out in Div. 2J from 27 January to 5 February during a survey of the R/V Cryos.

1. Hydrographic studies.

Exceptional conditions at this period of the year: open water up to Southern slope of Hamilton Bank (53°30'N) where the pack extended.

In this division, 13 hydrographic stations were occupied. The surface temperatures ranged between -1.0 and -1.5° C. The cold layer extended down

to the mean depth of 70 m, reaching sometimes 100 m deep. After a small thermic gradient between 150 and 250 m, the bottom temperatures were ranging from 3.5 to 5.0° C.

## 2. Biological studies.

In Div. 2J, 13 trawling stations were occupied using a research trawl (50 mm mesh in the codend).

### a. Cod.

This species represented 95 p. cent of the total research catches and mean yield was 907 kg per half-hour.

Best yields (3,600 and 2,100 kg per half-hour) were obtained on the southern part of Hamilton Bank at 420 m deep.

A total of 6,524 individuals were measured. Mean length was 43.5 cm and mean weight 754 g. A total of 623 pairs of otoliths were read and the age/length key was sent to the Secretariat on 8 February 1979.

The 1973 year-class, already present in the 1976 and 1977 research catches, was the most abundant, followed by the 1974 and 1975 year-classes which seemed to be also strong ones.

Sexual examination on this 6,524 fish showed that most of them were immature.

A sample of 100 stomachs was collected, showing a great majority of empty stomachs that can be related to the absence of capelin in the catches and detections.

### b. Redfish.

This species was caught in small quantities between 255 and 480 m deep. A sample of 254 individuals were measured showing modal length at 23.0 cm, mean length at 24.0 cm and mean weight at 201 g.

Length distributions for both sexes of this sample were sent to the Secretariat in February 1979.

## III. Subarea 3

Research were carried out during four surveys of the R/V Cryos in :

- Div. 3KL (January-February)
- Div. 3MNO (September-October)
- Subdiv. 3Pn - February
- Subdiv. 3Ps - March and October.

### 1. Hydrographic studies.

(a) On Ritu bank (Div. 3K), 14 hydrographic stations were occupied between 27 January and 5 February, showing roughly the same thermic conditions as observed in Div. 2J except for the surface temperatures (around 0° C).

(b) On the Northern part of the Grand Bank (Div. 3L), 12 hydrographic stations were occupied, between 10 and 17 February; surface temperatures around 0° C, no thermic gradient and bottom temperatures ranging from 2.0 to 3.0° C at 200-300 m deep.

(c) Observations were made on surface temperatures, on the Southern and Southeastern parts of the Grand Bank (Div. 3MNO) from 14 September to 9 October. This area (40°N to 42°N - 40°W to 56°W)

presented at this period extremely complex thermic structures in surface (12.5° to 22.3°C) due to the contact of warm and cold water masses. The warm waters observed were typical tropical ones: Sargatia, Physalia, Tetrapturus, Coryphaenae and flying fishes.

(d) On Rose Blanche bank (Subdiv. 3Pn), 5 hydrographic stations were occupied from 21 to 26 February. No ice was observed and bottom temperatures ranged from 5 to 6° C.

(e) On Saint-Pierre and Burgeo banks (Subdiv. 3Ps), 141 hydrographic stations were occupied: 68 from 5 to 25 March and 73 from 13 to 31 October. The surface layer (30 to 50 m deep) ranged from -1.0° C in winter to 9.0° C in autumn. The intermediate cold layer (around 0° C) and the bottom slope waters (5 to 8° C) were relatively stable and separated by a strong thermic gradient which position throughout the year determined fish concentrations.

## 2. Biological studies.

### a. Cod.

- On Ritu Bank (3K), this species represented 72 p.cent of the total research catches and the mean yield was 244 kg per half-hour.

Best yield (1,650 kg per half-hour) was obtained on the Western part of the bank between 284 and 290 m deep.

A total of 1,615 individuals were measured. Mean length was 51.3 cm and 39.9 cm in two samples collected respectively in January and February.

The 1973 and 1974 year-classes are the most abundant in the research catches but 1972 and 1975 are also relatively well represented.

- On Northern Grand Bank (3L), cod represented only 39 p.cent of the total research catches and the mean yield was 187 kg per half-hour. Best yield was 660 kg per half-hour.

A total of 2549 individuals was measured. Mean length was 46.9 cm and mean weight 861 g.

Here again 1973 and 1974 year-classes are the most abundant in the research catches.

The age/length tables for Div. 3K and 3L were sent to the Secretariat on 8 February 1979.

- On Rose Blanche bank (3Pn), cod was very scarce in late February due to the hydrographic conditions. It represents only 5 p.cent of the catches with mean yield of 32 kg per half-hour.

A sample of 112 individuals was measured showing a mean length at 50.1 cm and a mean weight at 1,393 g.

The 1973 year-class was the most abundant, just followed by the 1974 and the 1972 ones.

- On St. Pierre and Burgeo banks (3Ps), this species represented 14 p.cent of the catches in spring and 28 p.cent in autumn. The mean yields were respectively 20 kg and 48 kg per half-hour in spring and autumn.

A total of 3798 individuals were measured in different samples. Mean lengths ranged from 46.1 to 56.2 cm and mean weights from 1,075 to 1,829 g.

In the research catches, the 1974 year-class was the most abundant, followed by the 1973, 1972, 1975 and 1971 year-classes.

Assessments on this stock indicated that it is considerably under the equilibrium level (MSY = 63,000 T) since fishing at  $F_{max}$  (0.25) produced only catches of 25,000 T (1978 and 1979 TACs).

b. Redfish.

- On Ritu bank (3K), this species was caught in small quantities between 340 and 430 m deep. A sample of 953 individuals were measured in February showing a mean length at 29.6 cm and a mean weight at 313 g.

Length distribution for both sexes of this sample were sent to the Secretariat in February 1979.

- On Northern Grand Bank (3L), redfish was also scarce in the research catches between 200 and 300 m deep. A sample of 503 individuals were measured in February showing a mean length at 24.2 cm and a mean weight at 266 g.

Length distributions for both sexes were sent to the Secretariat in February 1979.

- On Rose Blanche bank (3Pn), research catches of redfish were made in February between 120 and 135 m deep. A sample of 3513 individuals were measured showing a mean length at 20.5 cm and a mean weight at 85 g.

Length distributions for both sexes were sent to the Secretariat in February 1979.

- On Burgeo and Saint-Pierre banks (3Ps), redfish was the most abundant species : 25 p.cent of the total research catches in spring and 44 p.cent in autumn.

The mean yields were respectively 37 kg and 77 kg per half-hour in spring and autumn.

On a sample of 3271 fish measured in February, the distribution showed a mean length at 20.2 cm and a mean weight at 176 g. In a sample of 7408 fish measured in October, the mean length was 24.1 cm and the mean weight 241 g.

Assessments on this 3P redfish stock indicated that catch per effort and abundance indices were constantly decreasing since 1958 due to very poor recruitment.

c. American plaice.

During surveys on Saint-Pierre and Burgeo banks (3Ps) in February, March and October, the American plaice represented from 11 to 20 p.cent of the total research catches.

The mean yields were ranging from 18 kg to 29 kg per half-hour between 50 and 375 m deep.

A sample of 430 fish measured in February showed a mean length of 31.7 cm for males and 31.5 for females; the mean weights were respectively 320 g and 370 g for males and females.

A sample of 4187 fish measured in March showed a mean length of 27.1 cm for males and 28.9 for females; the mean weights were respectively 200 g and 295 g for males and females.

A sample of 4018 fish measured in October showed a mean length of 22.5 cm for males and 24.7 for females; the mean weights were respectively 159 g and 242 g for males and females.

The 1972 year-class already strong in 1977 was the most important one in the 1978 research catches.

Assessments on this stock indicated a constant drop in the catch per effort and in the abundance indices and an actual level well below the MSY due to a too strong fishing effort in the past years.

d. Witch.

This species represented respectively 2 and 3 p.cent of the total

research catches in March and October, with mean yield close to 4 kg per half-hour.

A sample of 172 fish measured in February showed a mean length at 39.3 cm for males and 38.3 cm for females; mean weights were respectively 436 g and 451 g for males and females.

A sample of 629 fish measured in March showed a mean length at 36.3 cm for males and 39.9 cm for females; mean weights were respectively 373 g and 399 g for males and females.

Age groups II to XVI for males and to XXI for females were present in the research catches with the 1963 year-class dominant, and relatively good 1968 and 1969 year-classes.

#### e. Squid.

From a survey in Saint-Pierre bank (3Ps) in autumn 1977, biomass estimates of the squid Illex illecebrosus were presented to the ICNAF Special Meeting of February 1978 held in Cuba (Res.Doc. 78/II/12). These estimates concluded to a biomass close to 48,000 metric tons.

New data on distribution and biological characteristics of squid in Subdiv. 3Ps were presented (ICNAF Res.Doc. 79/II/5) from a research survey in October 1978.

Three modes were observed in the length distributions of this species at this period (11-15 cm, 22.7 cm and 26.5 cm for males; 11-15 cm, 21.0 cm and 22.0 cm for females).

#### IV. Subarea 4

Research were carried out during a survey of the R/V Gryos in Div. 4R from 12 to 21 January and from 23 to 25 February.

##### 1. Hydrographic studies.

Ice conditions in the Gulf of St. Lawrence were very peculiar in winter 1978 since the pack never completely covered the area.

In this division, 18 hydrographic stations were occupied. The surface temperatures ranged between -0.5 and -1.0°C, sometimes reaching the freezing point (-1.8°C). The cold layer of negative temperatures extended down to the mean depth of 60 m and a very small thermic gradient was observed after 150 m deep.

##### 2. Biological studies.

In Div. 4R, 11 trawling stations were occupied using a research trawl (50 mm mesh in the codend) and 7 stations were occupied using a commercial gear (140 mm mesh in the codend).

##### a. Cod.

This species represented 77 p.cent of the total research catches and mean yield was 434 kg per half-hour.

The best yield (3900 kg per half-hour) was obtained off Bonne Bay at 165 m depth.

In January, a sample of 3462 fish caught with the research trawl were measured. Mean length was 46.8 cm and mean weight 871 g.

In February, another sample of 3128 fish caught with the research trawl were measured. Mean length was 43.6 cm and mean weight 651 g.

A sample of 1000 pairs of otoliths read showed that the 1973 and 1974 year-classes were the most abundant in the research catches and that the 1972 year-class was still strong this year. Also, the 1975 year-class not yet recruited in the fishery appeared to be a good one.

In January, a sample of 1236 cod caught with the commercial trawl were also measured giving a mean length at 53.3 cm and a mean weight at 1121 g. The age-length key applied to this distribution indicated that the 1972 year-class was dominant in the commercial catches, just followed by the 1973, 1971 and 1974 year-classes.

Sexual examination on 4678 individuals indicated that most of the fish was ripening (stage II), or ripe (stage III). Immature fish was in very small quantity.

A sample of 162 stomachs were collected and studied showing a great majority of empty ones related to total absence of capelin and smaller abundance of herring this year.

Assessments on this 4R-S-3Pn stock indicated regular increasing of catch per effort, good recruitment in the past seven years and a status close to the maximum level.

b. Redfish.

This species was found in small quantities in the research catches between 130 and 315 m deep. A sample of 998 fish were measured showing a mean length at 16.6 cm for males and 16.4 cm for females; mean weight were respectively 66 and 81 g for males and females.

Assessments on this Gulf redfish indicated that the stock is well below the MSY level due to the poor recruitment in the past 20 years and to the exaggerated fishing effort supported by the species.

