RESTRICTED

INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

Serial No. 2532
(D.c.3)

ICNAF Res.Doc. 71/62

ANNUAL MEETING - JUNE 1971

Commercial Fishes Taken on the Shrimp Grounds of the Northwest Atlantic

by

B. Fontaine
ISTPM, St. Pierre et Miquelon

Introduction

Whether on coastal or in open waters, shrimp beds rarely provide exclusive catches of shrimp. Fish which appear in trawl hauls made on such beds, at least those which are of commercial value, are among the species common to the whole Northwest Atlantic.

We have tried to specify from trawl hauls made by research vessels, the importance and composition of catches which occur in hauls providing a good yield of deep shrimp: Pandalus borealis.

The beds described here are divided into different sections, starting from Georges Bank to the West Greenland coast; either coastal, such as the Burgeo trench or Esquiman Channel, or offshore beds as in all other sections.

Fishing Areas

To simplify matters, the beds which provided a good shrimp yield are designated by the name of the most general area where they are included. We shall specify for each section, the position and characteristics of these beds.

1. Georges Bank Section

The deep shrimp was taken in the dip located to the west of Georges Bank; this dip is indicated on the charts as Georges Basin.

In May and June 1969, seven trawl hauls, made between 145 and 195 m, provided an average shrimp yield of 38 kg/hr of trawling.

2. Nova Scotia Section

The shrimp beds are located in certain trenches dividing the banks, that is, the trench of the LaHave Bank, that of Emerald Bank of Canso Bank, etc.

In March and April 1967, eight trawl hauls, spread out in these dips at depths of between 17 and 250 m, gave an average shrimp yield of 40 kg/hr of fishing.

3. South Newfoundland Section

This region comprises the complex formed by the Laurentian Channel, its slopes and open trenches on the channel, that is, the dips located between the banks of the northeast region of Nova Scotia.

We do not include the Burgeo trench which is dealt with separately.

Eight hauls, made in May 1970 at 190-320 m, provided an average shrimp yield of 22.5 kg/hr of fishing.

4. Burgeo Trench

This well-defined trench has been used as a typical coastal bed, as well as the Esquiman Channel. It extends between the south Newfoundland coast and the Rose Blanche and Burgeo Banks, from La Poile Bay to Ramea Islands. The soundings are in the order of 220-250 m.

Ten hauls, made in this trench in December 1970, gave average shrimp yields of 42 kg/hr of fishing.

5. Esquiman Channel

This dip is located in the Gulf of St. Lawrence, along the west coast of Newfoundland; it is wide, about 43 miles at the level of Anticosti Island, gradually decreasing and disappearing near the coast opposite Port-au-Choix.

For six hauls, made in December 1970 at depths of 225-250 m, the average shrimp yield was 83 kg/hr of fishing.

6. Labrador Section

The interesting beds are located off the Labrador coast and east-northeast coast of Newfoundland, particularly northeast of Hopedale and off Bonavista Bay.

For eleven trawl hauls made at 350-400 m, we obtain shrimp catches averaging about 30 kg/hr of fishing.

7. West Greenland Section

In July and August 1970, R/V Thalassa made good catches in different areas of the west coast of Greenland. These consisted of dips located on the eastern edge of Fyllas Bank off Godthaab, east-southeast of Banana Bank, south-southeast and north of Lille Hellefiske Bank.

The soundings according to zone vary from 250-550 m; for 17 trawl hauls the average deep shrimp yields are 40-80 kg/hr of fishing.

Method of Capture

Two types of gear were used during the different cruises.

For the following sections: south of Newfoundland, Burgeo trench and Esquiman Channel, it consisted of a shrimp trawl "balloon type", with a 60-mm mesh in the wing, back and belly, and 40 mm in the "amorce" and codend (stretch mesh).

For all other sections, we used a bottom trawl of the "Lofoten" type, with a bobbin groundrope, 140-mm mesh in the wings, back and belly and 50 mm in the codend. In the study of the Greenland section, this codend was lined with a 30-mm mesh net.

Results

The results are given in three tables. Table 1 gives per 100 trawl hauls on the shrimp beds, the number of hauls in which each fish species of commercial value was observed. This table shows the rate of occurrence of a species and not the quantity of animals caught; the crosses indicate rates lower than 30 which, accordi to us, represented an accidental occurrence. Table 2 gives the average weight in kg of different commercial fish caught with 100 kg of deep shrimp. Table 3 indicates the size composition of catches for the five most important commercial species. These tables require, however, explanation which will be given when the different species considered are reviewed.

Sharks which appeared in certain hauls in the Georges Bank section are very small in number, if not isolated individuals. Rays are almost always present in shrimp beds; only the species Raia radiata is of some importance in weight, except in Greenland where it is replaced by Raia erinacea. Raia senta is often represented, but always by a very limited number of individuals.

Herring, even if not of great importance in weight, was caught more or less regularly in certain sections. In the Burgeo trench, the maximum caught in one hour of fishing was 86 kg. In the absence of pelagic detection, we can suppose that it is because of dispersal on the bottom.

Argentine was only caught on shrimp beds in two sections: south of Newfoundland in May and in the Burgeo trench in December.

Silver hake was caught on Georges Bank south of Newfoundland; the catches consisted of specimens 12-52 cm in total length, and about 30% were less than 15 cm.

Cusk whose presence seems almost accidental on Georges Bank was represented only by isolated individuals.

Red hake occurs in catches from Georges Bank to the Burgeo trench. In Table 2 only Urophycis chuss should be noted; this species is represented by a limited number of individuals whose sizes vary from 22-98 cm, and only 31% are less than 40 cm total length.

Cod caught with the deep shrimp in the Burgeo trench and Esquiman Channel were not measured, individuals of less than about 40 cm being weighted separately.

In the Burgeo trench the number of cod caught by trawl was very small, but these were always large size. Thus, one of the hauls provided two cod of 132 and 121 cm, weighing 19 and 17 kg respectively. The same observations are valid for Georges Bank and Greenland sections.

In Esquiman Channel cod less than 40 cm formed 20% of total weight. This section can be compared on this subject with those of Nova Scotia, south of Newfoundland, and Labrador.

Redfish caught in Esquiman Channel was not measured; the weight of individuals of less than 25 cm made up approximately 35-40% of total weight. Table 3 shows that the Labrador section and, to a lesser degree, the Nova Scotia section, provided along with shrimp, good commercial catches of redfish. From Nova Scotia to Labrador, the importance of catches of this species consitutes a problem for the shrimp fishery in imposing a nuisance and damaging the shrimp which are more fragile than the fish.

American plaice is present in nearly all hauls and when all sections are considered, this has an important variable in weight, it being very small in coastal trenches; approximately 90% of individuals caught are less than 40 cm.

Greenland halibut was not measured in the areas south of Newfoundland, nor in Esquiman Channel where it has some importance in weight, as well as in Greenland.

Grey sole, rare in Greenland where one sample only was caught, is well represented in hauls from Nova Scotia and from Gurgeo trench. Individuals of less than 30 cm are more numerous on both coastal beds than in the offshore beds. Catches from Newfoundland were not measured.

We observed that the American anglerfish was present fairly regularly in catches from Georges Bank to Burgeo trench; however, the number of individuals caught by trawl is always small.

Conclusion

Shrimp beds located off the west coast of Greenland are of particular interest as shown clearly in Table 2. For all other sections, fishing of deep shrimp involves taking a large quantity of fish of commercial value. These catches are unfortunately made up of a large number of individuals of small non-commercial size. This fact is particularly clear in the case of American plaice and redfish. The minimum sizes of fish caught are identical so we use a trawl with codend of 50 or 30 mm (stretch mesh); however, using a shrimp trawl catches a greater proportion of fish of smaller size.

The coastal shrimp beds and, to a lesser degree, those offshore in the Northwest Atlantic are the areas of concentration of the young of certain species.

Data listing fish catches accompanying the shrimp catch are not inaccurate in the text, but there exists little information as to weight importance of the rejected fish. We intend to pursue study of the influence of small mesh trawls on fish populations encountered in shrimp deeps offshore, while hoping that the shrimp deeps of coastal sections might also be researched.

TABLE 1. Abundance index (percentage of hauls containing each fish species) of commercial species taken on the shrimp beds. Crosses (+) indicate an index less than 30.

Species \ Fishing Areas	Georges Bank	Nova Scotia	Newfoundland South of	Burgeo Trench	Esquiman Channel	Labrador	Greenland
Squalus acanthias	57	+	+	-	-	-	-
Raia radiata	100	75	88	100	100	90	+
" senta	71	75	75	100	83	-	-
" spinicauda	-	-	-	-	-	+	-
" laevis	+	-	+	-	-	-	-
" erinacea	-	-	+	-	-	-	70
Clupea harengus harengus	85	+	75	100	100	-	-
Mallotus villosus villosus	-	50	+	+	+	30	+
Argentina silus	+	37	37	60	-	+	-
Merluccius bilinearis	100	37	62	+	-	-	-
Brosme brosme	42	-	-	-	-	-	-
Urophycis chuss	71	75	88	100	+	-	-
" chesteri	-	37	62	-	-	-	-
Gadus morhua morhua	85	100	37	100	100	100	65
" " ogac	-	-	-	-	-	-	+
Boreogadus saida	-	-	-	-	-	-	+
Melanogrammus aeglefinus	85	87	+	+	+	-	-
Pollachius virens	57	87	-	40	-	-	-
Molva dipterygia	-	-	-	-	-	-	+
Macrurus sp.	+	35	50	-	-	70	30
Anarhichas lupus	-	+	+	-	+	80	40
" minor	-	+	-	-	-	90	30
Sebastes sp.	100	100	100	100	100	100	85
Hippoglossoides platessoides	100	100	100	100	100	80	95
Hippoglossus hippoglossus	-	50	-	-	66	-	-
Reinhardtius hippoglossoides	+	87	62	100	100	90	95
Glyptocephalus cynoglossus	100	100	100	100	100	80	-
Lophius americanus	57	50	88	80	+	-	-

TABLE 2. Weight, in kilos, of the different commercial fishes taken with 100 kg of deep shrimp.

Vernacular Names \ Fishing areas and dates	May-June 1969	Georges Bank March-April 1967	Nova Scotia May 1970	South of Newfoundland December 1970	Burgeo Trench December 1970	Esquiman Channel September 1966	Labrador August-September 1970	Greenland July-August 1970
Chien de mer (Sea dog)	14	-	-	-	-	-	-	-
Raies (Ray)	154	87	103	45	37	67	12	
Hareng (Herring)	31	-	30	58	56	-	-	
Argentine	-	-	62	32	-	-	-	
Merlu (Silver hake)	41	28	36	1	-	-	-	
Brosme (Cusk)	15	-	-	-	-	-	-	
Morue barbue (Red hake)	88	110	154	165	1	-	-	
Morue (Cod)	253	390	29	62	218	322	28	
Eglefin	84	135	-	1	1	-	-	
Lieu noir (Pollock)	54	53	-	2	-	-	-	
Rats	-	-	-	-	-	200	-	
Loups (Wolffish)	-	27	-	-	-	105	24	
Rougets (Redfish)	175	867	940	2 703	1 044	939	21	
Balai (American plaice)	131	208	62	15	24	59	125	
Flétan (Halibut)	-	8	-	-	10	-	-	
Flétan noir (Greenland halibut)	-	13	27	43	126	74	125	
Sole grise (Grey sole)	32	272	83	272	72	54	-	
Lotte (Anglerfish)	19	5	35	21	-	-	-	
Total	1 091	2 203	1 561	3 420	1 589	1 820	335	

Species	Fishing areas	Georges Bank	Nova Scotia	Labrador	Greenland	South of Newfoundland	Burgeo Trench	Esquiman Channel
Cod	extreme lengths (cm)	53-132	39-92	19-128	35-99	20-95		
	less than 40 cm	0 %	5 %	31 %	0 %	20 %		
	between 40 and 60 cm	10 %	66 %	55 %	15 %	67 %		
Redfish	extreme lengths (cm)	14-42	7-38	7-60	7-43	11-43	7-43	
	less than 25 cm	77 %	51 %	20 %	70 %	83 %	87 %	
	between 25 and 35 cm	18 %	44 %	26 %	25 %	15 %	9 %	
American plaice	extreme lengths (cm)	13-68	10-52	13-56	11-50	15-57	14-66	10-63
	less than 30 cm	40 %	61 %	72 %	48 %	66 %	79 %	87 %
	between 30 and 40 cm	46 %	32 %	20 %	44 %	19 %	11 %	7 %
Greenland halibut	extreme lengths (cm)	-	-	13-84	12-78		21-61	
	less than 40 cm	-	-	43 %	79 %		48 %	
	between 40 and 60 cm	-	-	44 %	10 %		47 %	
Grey sole	extreme lengths (cm)	35-60	21-55	26-66	-		13-58	17-49
	less than 30 cm	0 %	5 %	13 %	-		32 %	42 %
	between 30 and 40 cm	15 %	76 %	27 %	-		41 %	30 %

TABLE 3. Length composition of the catch of five of the most important commercial species.