



ANNUAL MEETING - JUNE 1965

^{rm}
Short characteristics of argentine (*Argentina silus* Ascanius) occurring
in the region of Nova Scotia

by Feliks Chrzan and Czeslaw Zukowski

Introduction

During the trip of the research trawler M/T WIECZNO some observations were made on argentine on the fishing grounds off Nova Scotia from Sable Island Bank to Browns Bank. In the period of our observations argentine were not found in large or dense concentrations but were a by-catch among other species. The only exception in this respect was on the deeper fishing ground in the region of Browns Bank, where the catch was almost 100% argentine. It is known that the largest concentrations of argentine appear in this region in autumn-winter seasons. As far as possible, they are exploited by commercial fisheries for their high nutritious value and for the market demand. Accordingly, our observations may be helpful in the biological characteristics of this species.

Material and methods

This paper is based on material collected from 1-19 July 1964. The observations included investigation of the catch composition, catch per unit effort, measurements of total length and determination of the age and maturity stage of gonads.

The samples and the number of fish measured from particular fishing grounds are given in Table 1.

Table 1.

Fishing ground	Argentine	
	Measured (no.)	analysed in detail (no.)
Sable Island Bank	207	60
Emerald Bank - northwestern slopes	81	-
Sambro Bank	239	-
Browns Bank, at the depth of 120 m	1,154	103
Browns Bank, at the depth of 220 m	446	108

On Sable Island, Emerald and Sambro Banks, bottom trawls were used with 100 mm mesh in the codend. On Browns Bank, trawls of 70 mm mesh in the codend were used. The average duration of haul was 2 hours. To determine the sexual maturity of the fish, Maier's scale of 8 degrees was used. The age of these fish was estimated from otoliths.

Fish size in the fishing grounds

Figure 1 shows the length composition of the fish occurring on particular fishing grounds.

In the region of Sable Island Bank the catch was made from 100 to 460 m. In this catch 207 individuals were measured. The length composition of these fish varied considerably. The length ranged from 18-43 cm (average length 29.6 cm). The great range of fish length seems to have been the result of fishing at different depths.

Over the northwestern slopes of Emerald Bank rather slight variation of fish length (from 18 to 30 cm) was found. The average length of these fish was 23.3 cm and they were caught from 120 to 250 m.

On Sambro Bank, which has a more or less even bottom and depth of 260 m, the captured fish were 18-38 cm long. The length-frequency curve shows that most individuals were 21-25 cm long (average length 23.6 cm).

In the region of Browns Bank, catches were made on two fishing grounds, one at 120 m depth and the other at 220 m depth. The same type of trawl was used on both grounds. Nevertheless, the size of fish varied with depth. At 120 m the length of fish ranged from 15-28 cm with two peaks, which represent two different age-groups. The first peak represents the fish of 17-18 cm length, whereas, the second peak represents those of 21-23 cm length. The average length of fish occurring on this shallow ground was 20 cm.

In the catches made at 220 m, the fish were considerably larger (from 23-38 cm). The length-frequency curve shows one peak only. The average length of fish was 32.4 cm.

Sexual maturity

The results of investigations on the stage of maturity of gonads are shown in Table 2. The data show that the argentine were in I and II stages of maturity in the shallower fishing ground (120 m) of Browns Bank. In the deeper parts of this fishing ground (220 m) fish in stage I were not found and most of the fish were in stage II. Relatively large numbers of fish had their gonads in the stage VIII indicating that spawning had only recently occurred. Other stages of maturity were represented by single individuals.

On Sable Island Bank the fish were almost exclusively in stages I and II. Only one individual was in stage IV. The smaller fish (18-26 cm) had gonads in stage I, while the fish 22-34 cm long had gonads in stage II.

Females were decidedly more numerous on the shallower fishing grounds of Browns Bank in contrast to the predominance of males in the deeper waters. On Sable Island Bank males were more numerous (76%).

TABLE 2.

FISHING GROUND	SEX	STAGE OF MATURITY											
		I		II		III		VI		VII		VIII	
		OCCUR- RENCE %	LENGTH (CM)										
BROWNS BANK 120 M	♂	21.4	17-23	12.6	20-28	-	-	-	-	-	-	-	-
	♀	33.0	16-25	33.0	17-25	-	-	-	-	-	-	-	-
BROWNS BANK 220 M	♂	-	-	44.5	23-36	0.9	33	1.8	33	1.8	32-34	10.2	29-33
	♀	-	-	37.1	29-36	0.9	32	-	-	-	-	2.8	33-34
SABLE ISLAND BANK 100-460 M	♂	22.0	18-26	54.3	22-32								
	♀	6.8	20-22	15.2	23-34	1.7	34						

Age

Age was estimated from otolith readings. The age composition of fish from Sable Island and Browns Banks is given in Table 3 and Fig. 2.

Table 3. The length of age-groups of argentine from particular fishing grounds

Age-group	Sable Island Bank 100-460 m			Browns Bank 120 m			Browns Bank 220 m		
	range of length (cm)	average length cm	No. of fish	range of length cm	average length cm	No. of fish	range of length cm	average length cm	No. of fish
II	-	-	-	16-23	19.1	14			
III	18-22	20.2	5	16-24	20.2	49			
IV	20-27	22.7	12	19-25	22.2	27			
V	23-28	25.7	9	22-24	22.4	11	23-32	28.6	3
VI	25-27	26.3	10	22	22.0	1	28-36	30.7	8
VII	24-31	27.0	15	28.0	28.0	1	28-34	31.1	12
VIII	26-34	29.3	9	-	-	-	29-36	32.2	24
IX	-	-	-	-	-	-	30-35	32.5	20
X	-	-	-	-	-	-	30-36	32.8	28
XI	-	-	-	-	-	-	31-36	33.8	11
XII	-	-	-	-	-	-	31-33	32.0	2

Table 3 shows that, on Sable Island Bank, the fish belonged to age-groups II-VIII. The 3-year-old fish were found in the smallest numbers and the 7-year-old fish were the most abundant.

At 120 m on Browns Bank, the fish were mainly 3- and 4-year-old individuals. Here, age-groups II-IV consisted mainly of females, age-group V was mainly males and age-groups VI and VII was exclusively males. In the same area at 220 m, larger and older fish were taken. Here 8, 9 and 10-year-old fish were the most numerous group. Contrary to the findings for the shallow fishing grounds on Browns Bank, males were more numerous than females.

Occurrence and yield in the fishing grounds

During the research cruise, catches were made on many fishing grounds of Nova Scotia, but argentine occurred in only a few of them. On some fishing grounds, only single individuals were encountered. The fishing grounds from which this species was taken in larger amounts are given in Table 4.

Table 4. The catch per unit effort and the occurrence of argentine

Fishing ground	Catch per 1 hour trawling of all species (kg)	Percentage argentine in the catch
Sable Island Bank	370	6.0
Emerald Bank, north western slopes	100	8.0
Sambro Bank	700	3.2
Browns Bank 120 m	200	10.8
Browns Bank 220 m	150	100.0

Most of the argentine were found in the deeper waters of Browns Bank. In the shallower fishing grounds of Browns Bank, over the north-western slopes of Emerald Bank and on Sable Island Bank, argentine was taken as a by-catch only, while the main mass of the landings consisted of such fish as redfish (mentella-type) and haddock.

In only one catch was there 100% argentine. This catch was made in the deeper parts of Browns Bank.

On Sable Island Bank, the catch included various fish species, mainly silver hake (57.8%) and, also, small flatfish and redfish (mentella-type) (11.1%). There was a small by-catch of haddock, coal-fish, cod, herring and argentine. The yield per 1 hour trawling amounted to about 370 kg.

On the grounds between Sable Island Bank and Emerald Bank the main mass of the landings consisted of silver hake and small argentine, totalling 87.9% with a small number of haddock, cod, redfish (mentella-type) and flatfish. The yield per 1 hour trawling was low here (about 100 kg.)

On Emerald Bank the main part of the catches (90%) were haddock and pollock. There were very few cod, silver hake and flatfish. Argentine made up about 8% of the total catch. The yield of all species per 1 hour trawling was about 100 kg.

On Sambro Bank, the highest catch per unit effort, amounting to 700 kg per 1 hour trawling, was obtained. There was a marked domination of small redfish (mentella-type) (84.3%). Next in importance were red hake (4.3%), argentine (3.2%) and haddock (2.3%), pollock, other demersal fish and a few herring.

The catch from Browns Bank at 120 m amounted to 200 kg per 1 hour of trawling. The catch consisted mainly of haddock; argentine made up 10.8% with silver hake and flatfish as a by-catch.

In the deeper part of Browns Bank (220 m) argentine was the only species taken. The yield was 150 kg per 1 hour trawling.

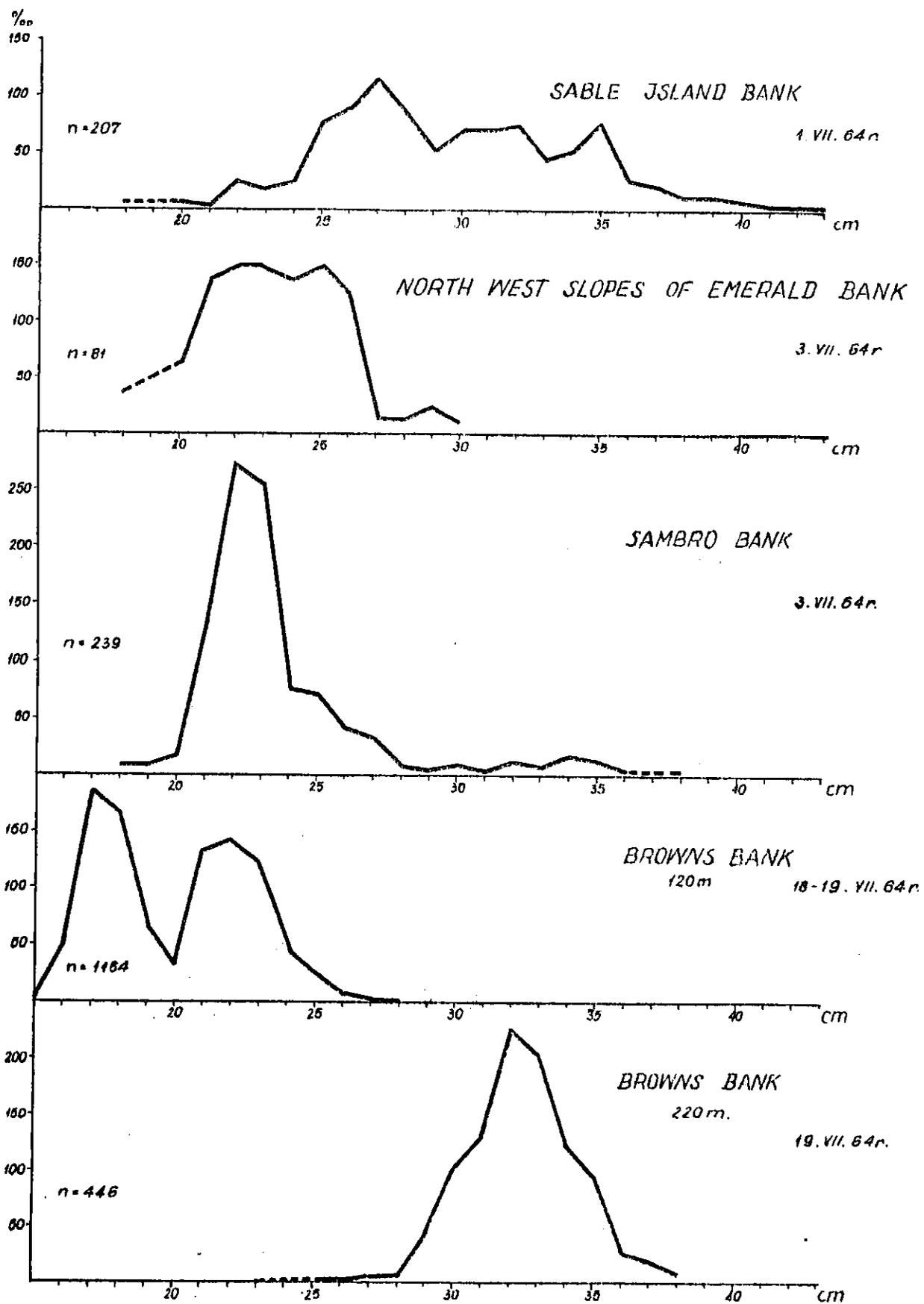


Fig. I. Length composition of Argentina on particular fishing grounds.

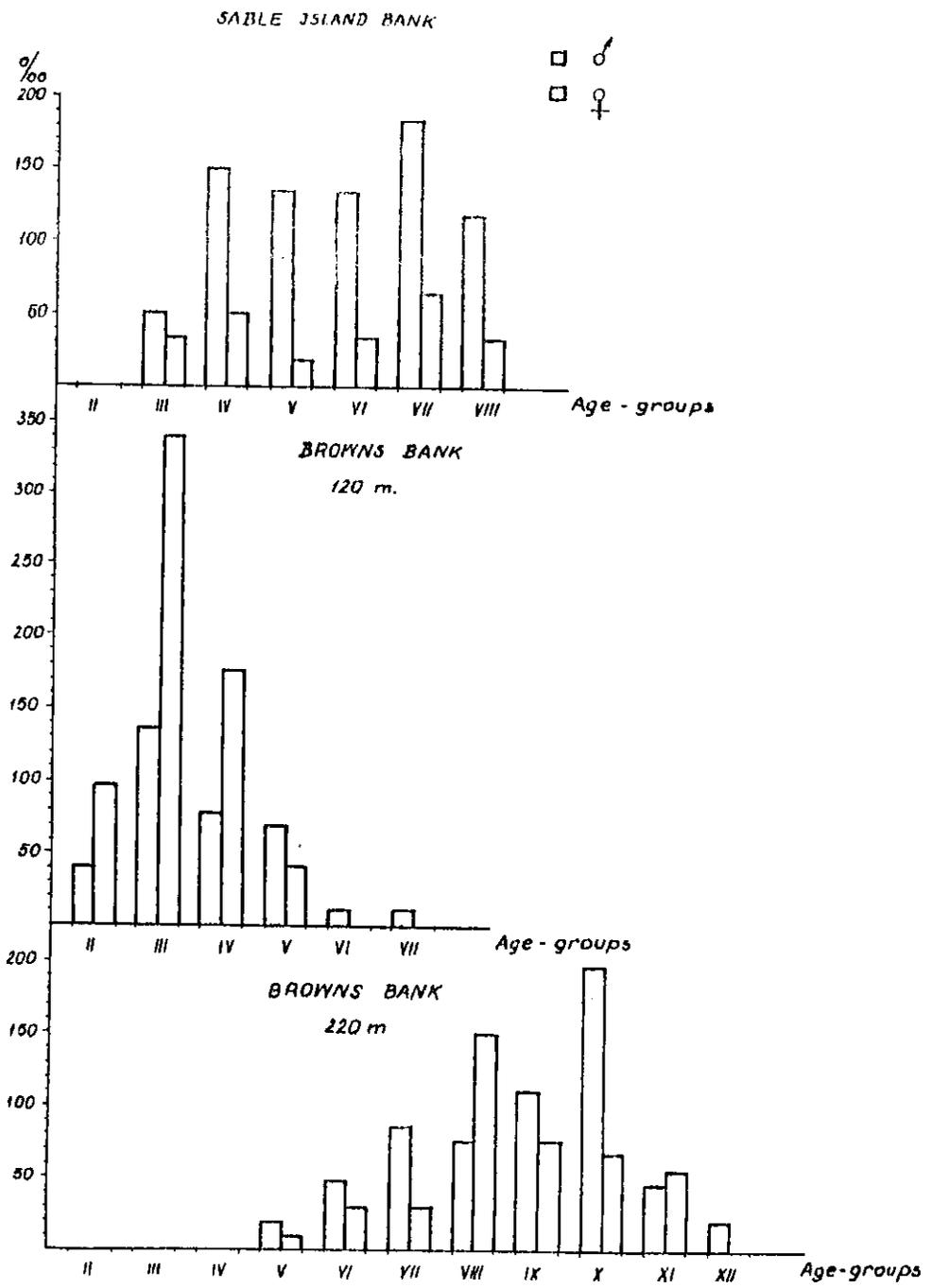


Fig.2. Age and sex - composition.