

ANNUAL MEETING - JUNE 1965Some biological characteristics of blueback, *Pomolobus aestivalis* (Mitch.) and alewife, *Pomolobus pseudoharengus* (Wils.) based on sampling material taken in Georges Bank (July and October, 1964)

by Jan Netzel and Eugeniusz Stanek

Introduction

For determination of biological characteristics of blueback and alewife, the materials were collected in July, 1964, during the research trip of M/T WIECZNO and during the October operation of M/T URAN. Both ships were fishing with bottom trawls on the fishing grounds off Nova Scotia and Georges Bank.

In the samples total fish body length, sex and the stage of maturity (according to Maier's scale) were taken into consideration. For age determination otoliths were taken. Also the degree of fullness of the stomachs was estimated and recorded according to a 5-degree scale. In respect of alewife, investigated in October, the degree of fattening of the digestive tract and fish body weight were determined. A total of 550 blueback and 347 alewife were measured, and biological characteristics of 115 blueback and 255 alewife were determined.

Occurrence in the catches

Mass occurrence of blueback and alewife was found in the catches on the western slopes of Georges Bank (41°29'N, 68°34'W) only. Few blueback were captured on Middle Ground, on the northern (41°58'N, 67°09'W) and southeastern slopes of Georges Bank (40°44'N, 67°24'W). Also, few alewife occurred in the catches on the southern slopes of Georges Bank (40°26'N, 68°50'W). The results of observations on the occurrence of blueback and alewife on Nova Scotia Banks and Georges Bank are given in Table 1.

Table 1. Occurrence of blueback and alewife in the catches in July, 1964

Fishing ground	Blueback	Alewife
Sable Island Bank	-	-
Middle Ground	few	-
Emerald Bank - southern slopes	-	-
Emerald Bank - northwestern slopes	-	-
Sambro Bank	-	-
Browns Bank	-	-
Georges Bank - 41°58'N, 67°09'W	few	-
Georges Bank - 41°29'N, 68°34'W	mass occurrence	mass occurrence
Georges Bank - 40°26'N, 68°50'W	-	few
Georges Bank - 40°44'N, 67°24'W	few	-
Corsair Canyon	-	-

In October 1964 during 35 fishing days of factory trawler M/T URAN on the fishing grounds of Nova Scotia, and mainly on Georges Bank, 13 tons of alewife and blueback were captured. Analysis of the catches shows a decided dominance of alewife.

Both in July and October, blueback and alewife were captured along with herring.

Length composition

Length composition of captured fish is shown in Fig. 1 and 2.

Blueback, captured in July, were 22-33 cm long, while most of the fish in the catches were 28-29 cm long (mean length 28.6 cm).

Alewife were, in general, similar in length to blueback. In July, alewife were 17-33 cm long with the largest number 29-30 cm long (mean length 29.3 cm). In October, alewife were 25-34 cm long (mean length 28.8 cm) and were thus slightly smaller than those captured during the summer.

The females of both blueback and alewife were longer than males (Table 2).

Table 2. Mean length (in cm) of males and female blueback and alewife

Species	Captured in	Mean length (cm) of		
		♂	♀	♂ + ♀
Blueback	July	27.5	29.0	28.6
Alewife	July	28.0	29.8	29.3
Alewife	October	28.2	29.2	28.8

Age composition

Age composition of blueback and alewife in the catches is shown in Fig. 1 and 2.

In July, the age of captured blueback was 3-8 years (1961-1956 year-classes). The most numerous group was 5-year-old fish (56.1%), belonging to the 1959 year-class.

Age composition of alewife, captured in July, was considerably different from the age composition of the fish captured in October. In July, the fish were 2-9 years old (1962-1955 year-classes), though most of the fish were 4-6 years old (1960, 1959 and 1958 year-classes). These year-classes were represented by more or less equal numbers of individuals and made up 79.6% of the alewife catches.

In October, however, captured alewife were 3-8 years old (1961-1956 year-classes), the most numerous being 5-year-old ones (1959 year-classes - 56.9%). The next most numerous were the 4 and 6 year olds (1960 and 1958 year-classes). In the samples investigated, the 4-, 5- and 6-year-old fish made up 95.0% of the total numbers.

Rate of growth

The rate of growth of blueback and alewife is presented as mean fish length in particular year-classes. In addition, the weight of some age-groups of alewife captured in October 1964 is given.

Table 3. Mean length and weight of subsequent age-groups of blueback and alewife

Species	Captured in	Age-groups							
		2	3	4	5	6	7	8	9
		Mean length (cm)							
Blueback	July		24.0	26.9	28.1	29.2	30.2	31.3	
Alewife	July	18.0	27.0	28.4	29.4	30.6	31.6	32.7	33.0
Alewife	October		25.0	27.8	28.8	29.6	31.0	33.0	
		Mean weight (g)							
Alewife	October		158	201	225	243	271	328	

The figures given in Table 3 show that the length of particular year-classes of blueback is smaller than that of alewife. There is, however, a difference between the length of alewife captured in July and those captured in October. Apparently, alewife captured in July had a better rate of growth than alewife captured in October. This may indicate that two different year-classes were being dealt with.

Sexual maturity

Sexual maturity of blueback and alewife is presented in Table 4.

Table 4. Sexual maturity of blueback and alewife according to Maier's scale

Species	Captured in	Sex	% of fish in particular stages of sexual maturity								Total %
			I	II	III	IV	V	VI	VII	VIII	
Blueback	July	♂		26.1							26.1
		♀		73.9							73.9
		♂+♀		100.0							100.0
Alewife	July	♂	0.9	24.4			0.8			0.8	26.9
		♀	0.9	70.6	0.8					0.8	73.1
		♂+♀	1.8	95.0	0.8		0.8			1.6	100.0
Alewife	October	♂		21.9	16.1	0.7					38.7
		♀		56.2	5.1						61.3
		♂+♀		78.1	21.2	0.7					100.0

In July, all blueback had the gonads in the maturity stage II, which may indicate that they return to the feeding ground in the sea after spawning.

Also, in July, it has been found among alewife in the investigated samples that 1.8% were virgin fish (I) and 95.% in the maturity stage II. Few individuals were in stage III (0.8%) and stage V (0.8%). The presence of alewife in the stage VIII, in the amount of 1.6%, indicates that this species returned a little later than blueback from their spawning grounds in inland waters. The investigations of gonads of fish captured in October point to considerable progress in their development, since along with the most numerous group in stage II (78.1%) there appeared a rather large group with gonads in stage III (21.2%) and few individuals in stage IV (0.7%).

In the ratio of males and females, for both blueback and alewife, there was a considerable predominance of females, the proportion being 1 : 3. This might lead to the conclusion that the return migration of males to their feeding in the sea was retarded. In October, there was a predominance of alewife females, the ratio of sexes being 1 : 1.5.

Feeding

Feeding intensity of blueback and alewife is shown in Fig. 3 and 4.

In summer, the stomachs of 84.4% of blueback were empty. Further, 15.6% of these fish had either traces of food or their stomachs had various amount of food contents. No fish with full stomachs were observed.

The feeding of alewife was much more intensive in July and October. The number of fish with empty stomachs was slightly over 40% in both seasons. About 60% of fish had some contents in their stomachs, though more fish with large amount of food and with full stomachs (15.1%) were found in July and October. The observations on the condition of fish have shown that in October the digestive tract of alewife was covered with fat.

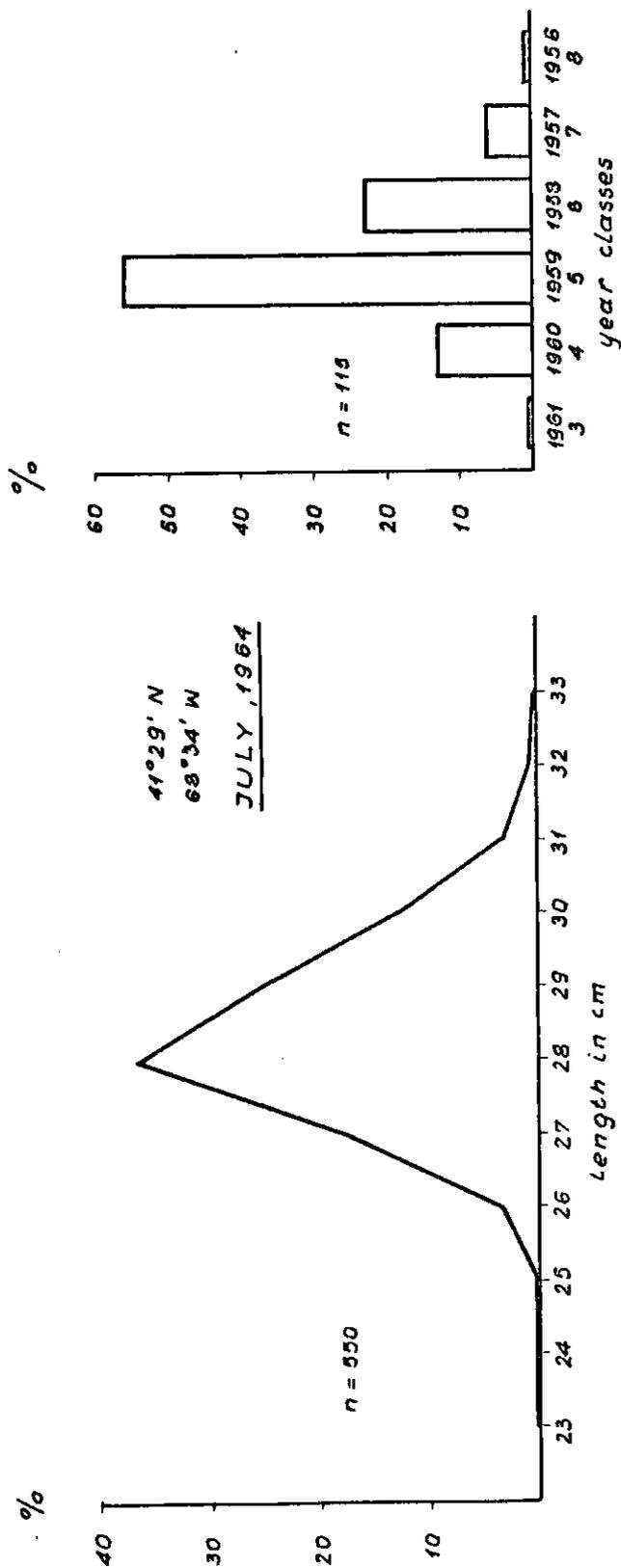


Fig. 1. Length and age composition of blueback on Georges Bank, July 1964

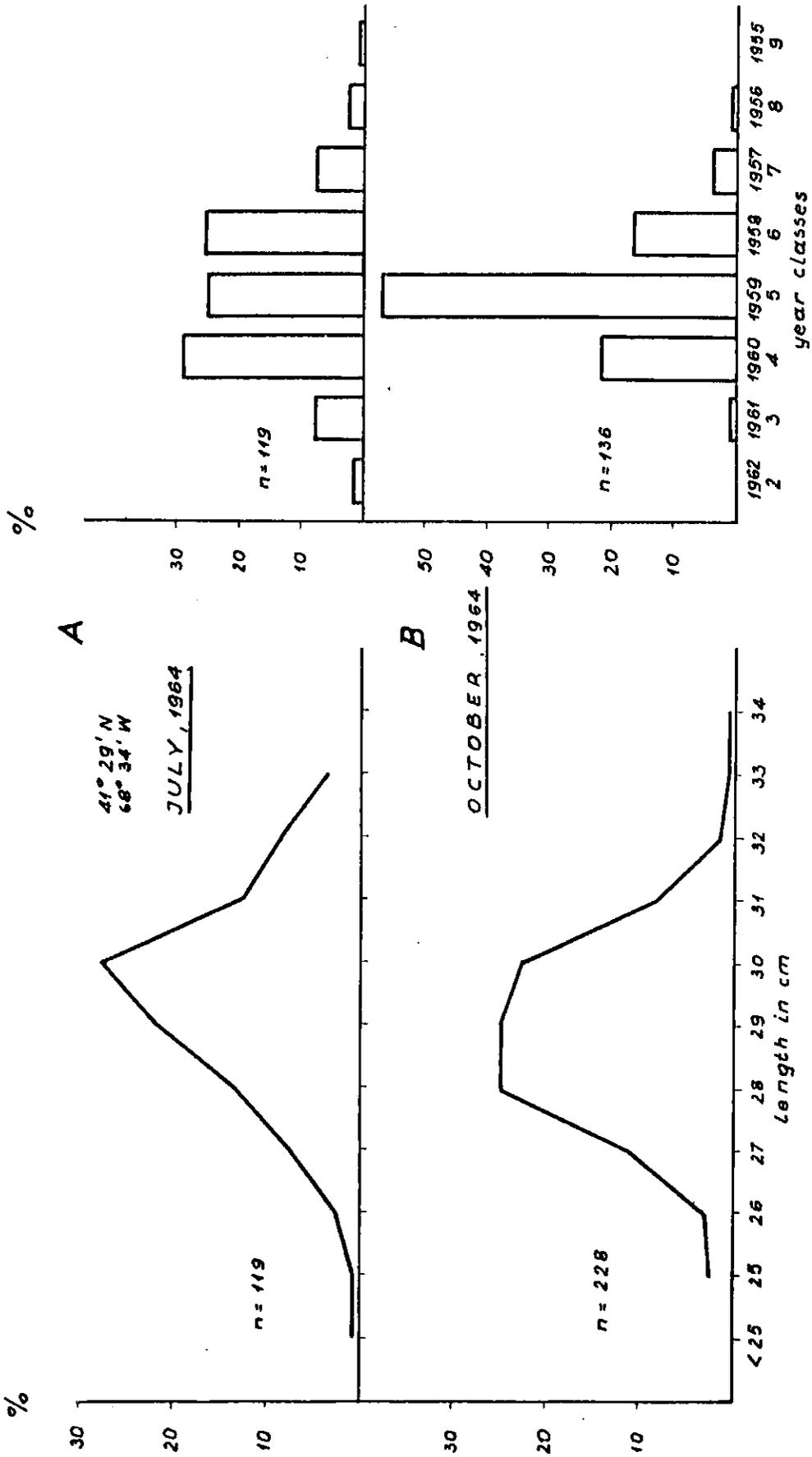


Fig. 2. Length and age composition of alewife on Georges Bank, July (A) and October (B), 1964

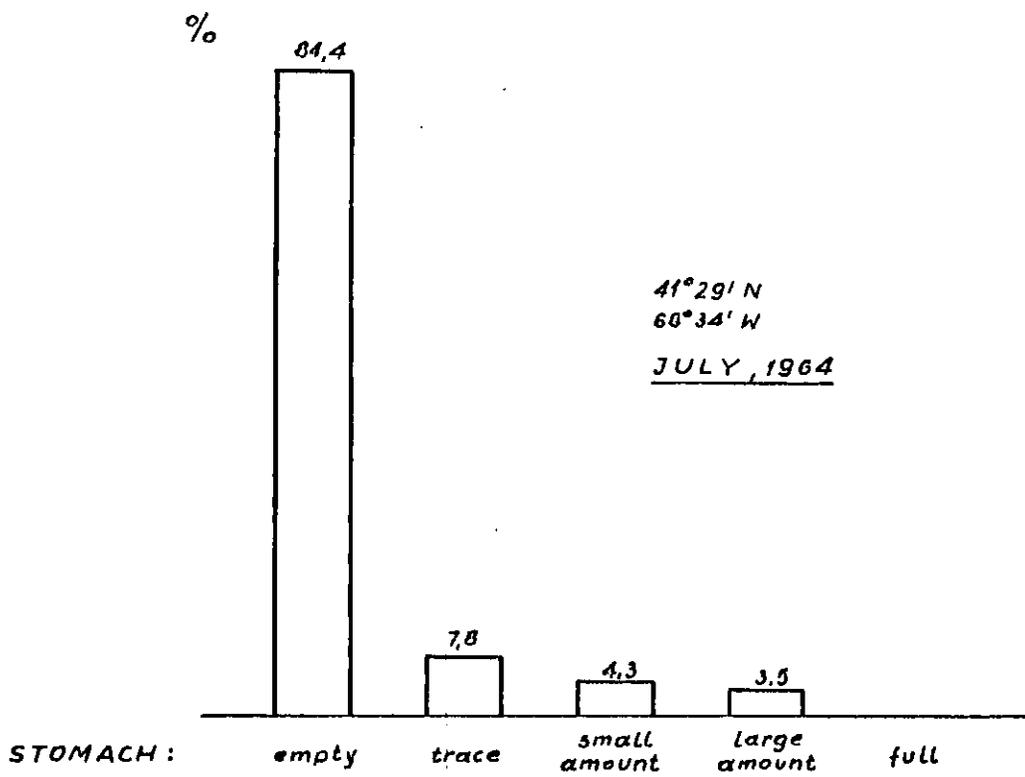


Fig. 3. Percent rate of stomach contents of blueback from Georges Bank, July 1964.

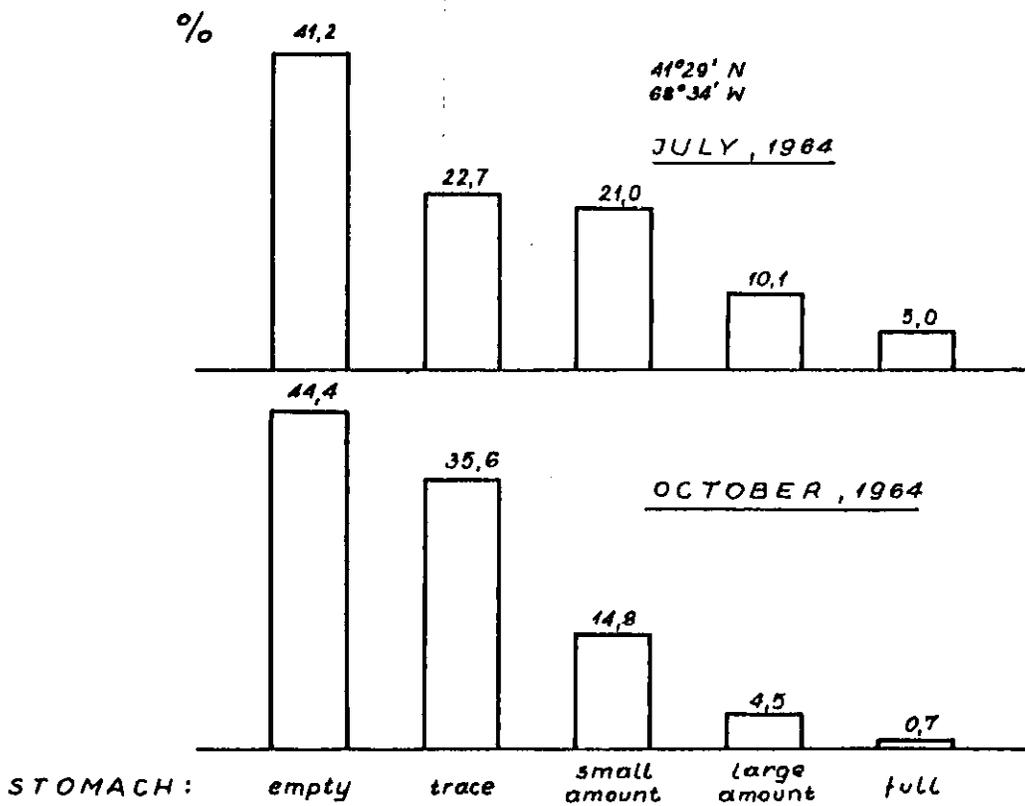


Fig. 4. Percent rate of stomach contents of alewife from Georges Bank, July and October, 1964