

Serial No. 2034
(D. c. 9)

ICNAF Res. Doc. 68/52

ANNUAL MEETING - JUNE 1968

Some Biological Data on Yellowtail Flounder *Limanda ferruginea* (Storer)
from the Southern Part of Georges Bank, November, 1967By: A. Kosior
Sea Fisheries Institute, Gdynia

Materials concerning the occurrence of flatfish were collected during the research trip of R/V *Wieczno* to the ICNAF Area in the period from 28 August till 12 December, 1967.

This short report deals only with yellowtail flounder from the southern part of Georges Bank, though the species also occurred in small quantities on other fishing grounds. Observations included: distribution, fishing yield, length, age, weight and sexual maturity. The samples of yellowtail flounder were taken from bottom-trawl catches (cod trawl and herring trawl).

Occurrence in the catches

Small quantities of yellowtail flounder were found on the southern part of Georges Bank. The species made up abt. 5% of the total catch. An average of 20 kg. was caught per 1 hour trawling. It is considered a by-catch among the catches of other fish on this part of Georges Bank.

Length composition

The lengths of yellowtail flounder in the catches are given in Fig. 1A. They ranged from 18 to 49 cm. Most of the fish were represented by the length-classes 30-35 cm. and mean length in the sample was 32.7 cm.

Age composition

Age composition is given in Fig. 1B. This was determined from reading the otoliths of 122 fish. In the material examined contained fish of age-groups II-IX. The most abundant were age-groups V and VI, which in total made 53.28%. It should be mentioned here that in the older age-groups the females were predominant.

Weight

The relation between weight and length of fish is given graphically in Fig. 2. This relation has been established according to the formula:

$$W = KL^n$$

The calculated coefficients for yellowtail from the southern part of Georges Bank were in November as follows:

$$K = 0.00916$$

$$n = 2.985.$$

Sexual maturity

Sexual maturity is given in Table 1. The data show that most of the fish in November were in the resting stage of maturity (Stage II - 76.8%). In this month the beginning of a new cycle of sexual maturation was noted.

Table 1. Sexual maturity of yellowtail flounder according to Maier's scale

Fishing ground	Date	No. of fish	Sex	% of fish in particular state of sexual maturity								Total
				I	II	III	IV	V	VI	VII	VIII	
Georges Bank	2 Nov.	113	♂	8.3	49.3	0.8	6.6	5.0	-	-	-	70.0
	to 11 Nov.	49	♀	5.0	27.5	5.8	1.7	-	-	-	-	30.0
Total		162	♂♀	13.3	76.8	6.8	8.3	5.0	-	-	-	100.0

(over)

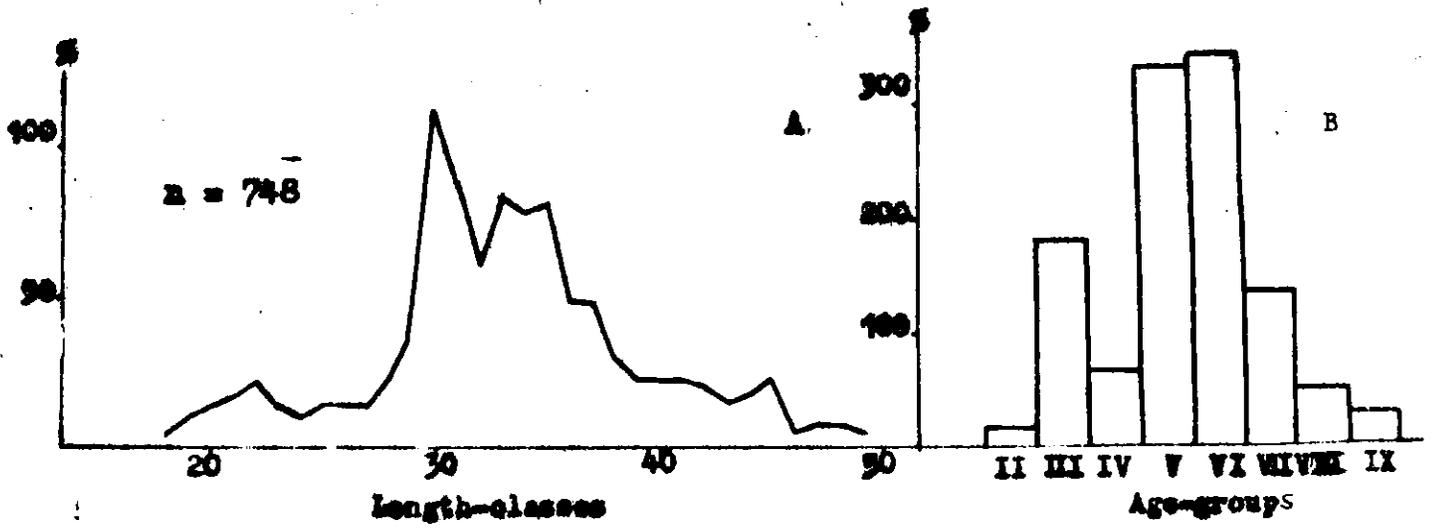


Fig. 1. Length and age composition of yellowtail in southern part of Georges Bank.

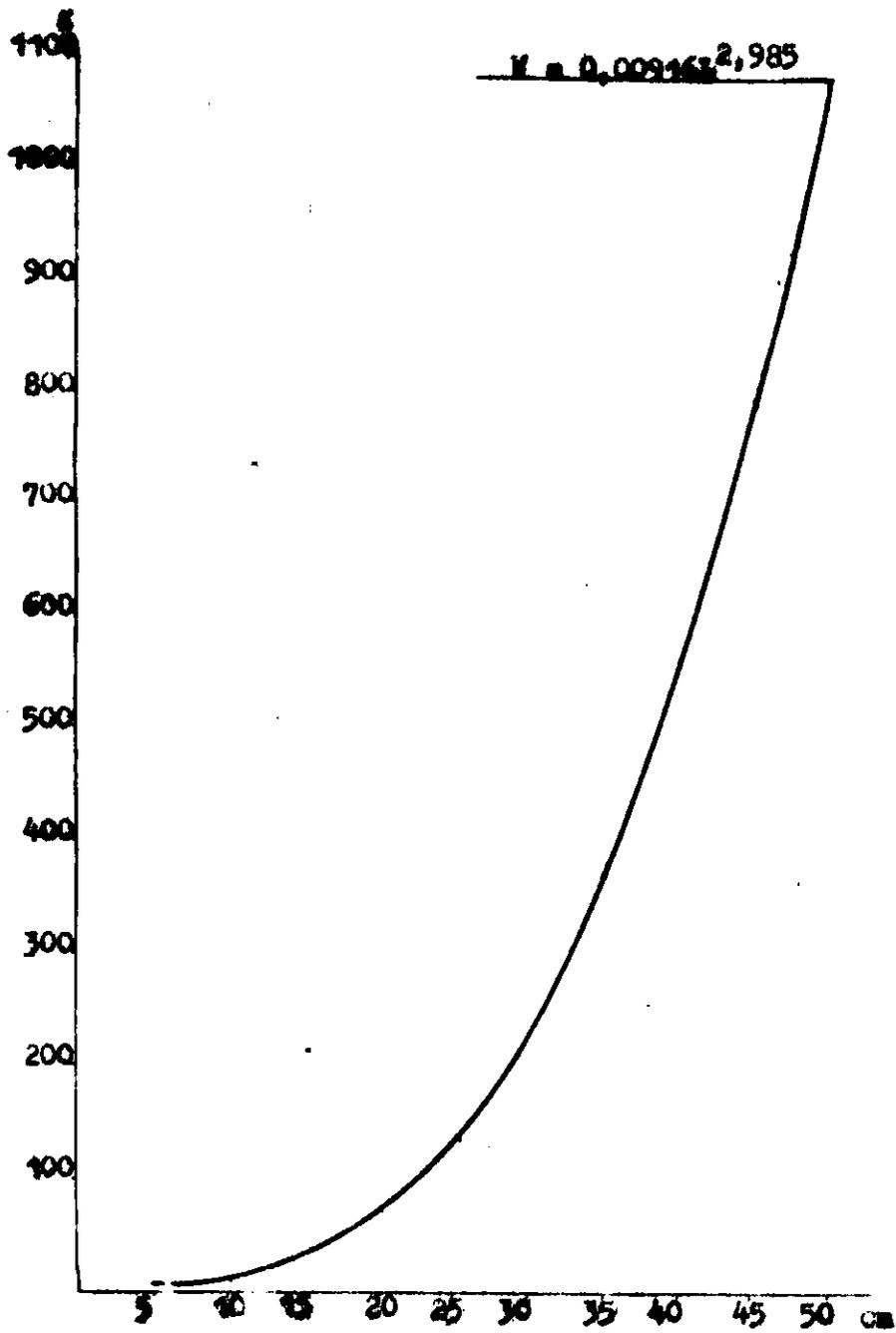


Fig. 2. Length-weight relation of yellowtail in the southern part of Georges Bank.

Length and age of herring caught in 1967

Length composition of herring caught in Georges Bank in 1967 is given in the Fig. 3. The curve shows that the length of herring ranged from 25 to 37 cm. This curve has one peak, as similarly the curves of length-classes in the years 1965 and 1966 are single-peaked. In 1967 most of herring were of the length-class of 29 to 33 cm., and the peak of the curve corresponds to the length of 31.5 cm. The fish of this length were caught in August, September and October, 1967.

In turn, age readings, performed in the manner described above, permitted to determine age composition of herring caught by Polish fishing vessels in 1967. This age composition is given in the Fig. 4. We note the predomination of 1960 year-class. The next is the year-class 1961.

Worth attention is the year-class 1963, which occurred in the proportion similar to the year-class 1962. Since the year-class 1963 is younger we may assume that in the near future it may be more abundant in the catches.

On the basis of previous investigations, carried out by B. Draganik and C. Zukowski, we find that in the period of 1965 - 1967 the participation of the year-class 1960 decreased by about 10%, whereas the reduction of this year-class due to natural and fishing mortality amounted to 65% /Noskov and Zinkevich/. We see therefore that total herring stock was reduced considerably during the last two years.

Rate of growth

The rate of growth of herring investigated in 1967 was determined on the basis of mean length of age-groups. These data were used for calculation of parameters of the von Bertalanffy formula. They were as follows:

$$\begin{aligned} L & - 37.3 \text{ cm.} \\ K & - 0.195 \\ t_0 & - -2.7 \end{aligned}$$

On the basis of these parameters mean lengths of fish in particular age-groups were calculated. For comparison the curve for the rate of growth was plotted and two more curves, prepared by B. Draganik and C. Zukowski for herring in the years 1965 and 1966, were brought together. The three curves are given in the Fig. 5. From comparison of the spread of these curves it appears that the rate of growth of herring was very similar to each other in the last three years.

The relation between length and weight of herring

In order to establish the relation between length and weight of herring in its different biological state the fish were measured and weighed aboard the vessel immediately upon their taking on deck. In total 1000 specimens were weighed. This amount contained the following groups of herring: 400 specimens of full herring, 400 running fish and 200 spent fish. The data obtained served as a basis for ascertainment of the relation between the length /l/ and weight /W/ for the above three groups of herring. The results found are as follows:

$$\text{For full herring } \log W = \bar{3}.3860 + 3.378 \log l;$$

$$\text{For running herring } \log W = \bar{3}.8401 + 3.055 \log l;$$

$$\text{For spent herring } \log W = \bar{2}.0162 + 2.899 \log l.$$

Graphic representation of the above equation is given in the Fig. 6.

As it could be foreseen the ration of weight/length was found to have the highest value for full herring and the lowest for spent herring. The coefficient of condition, calculated from the above data according to Fulton's formula was as follows: for the most representative length-group /31.5 cm., full herring/ $K=0.895$; for running herring $K=0.835$ and for spent herring $K=0.736$.

Other observations

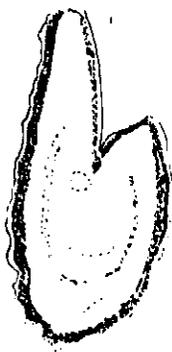
Some of our observations on the state of gonads and feeding are to be mentioned here. The studied herring population is to be considered a spawning stock. Only in the catches, carried out in August, some admixture of spring spawners was found in the amount reaching 5%. Later on no spring spawners were found in the catches.

In August the males of herring, belonging to the stock of summer-autumn spawners, had gonads in the stage of maturity V, while the females in the stage IV. At the beginning of September the development of gonads reached common stage in both sexes and from the middle of September most of the herring had running gonads.

The observations on stomach filling in herring showed that in August and further on the stomachs of most fish were empty. In some hauls, however, a number of fish were found with stomachs filled with food. As a rule all herring had empty stomachs in the top period of their spawning.

References

1. H.C.Boyar, 1967 - Age, length and maturity of adult herring in subareas 4 and 5, 1966 - ICNAF Res.Doc.67/24
2. B.Draganik, 1966 - Age, rate of growth and sexual maturity of herring captured on Georges Bank 29 August - 10 October 1965 - ICNAF Res. Doc. 66-48
3. B.Draganik, Cz.Zukowski, 1967 - Further studies on herring caught on Georges Bank in November and December, 1966 - ICNAF Res. Doc. 67/53
4. A.W. May, 1967 - Otolith Age Validation in Labrador Cod. ICNAF Res. Bull. No. 4, Dartmouth, 1967
5. A.S.Noskov and V.M.Zikevich, 1967 - Abundance and Mortality of Herring /Clupea harengus L./ on Georges Bank According to the Results of Eggs Calculation in Spawning Areas in 1964-1966. ICNAF Res.Doc. 67/98
6. N.S.Tibbo, 1967 - 1966 ICNAF Herring Otolith Exchange. ICNAF Res.Doc. 67/111.



a-1964-III

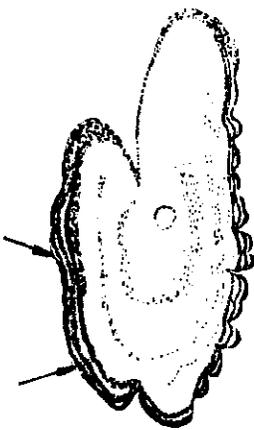


b-1963-IV

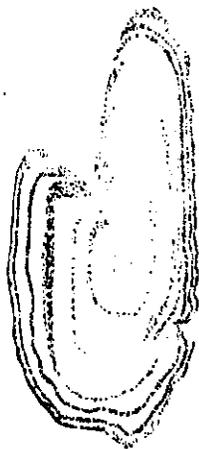


c-1962-V

d-1961-VI



e-1960-VII



f-1959-VIII

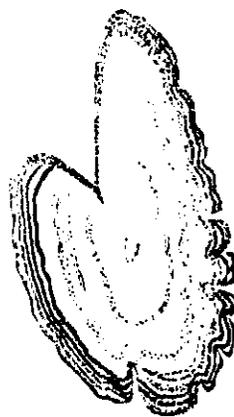


Fig. 1 Otoliths of herrings of different year-classes and age-groups. The arrows show the opaque places.

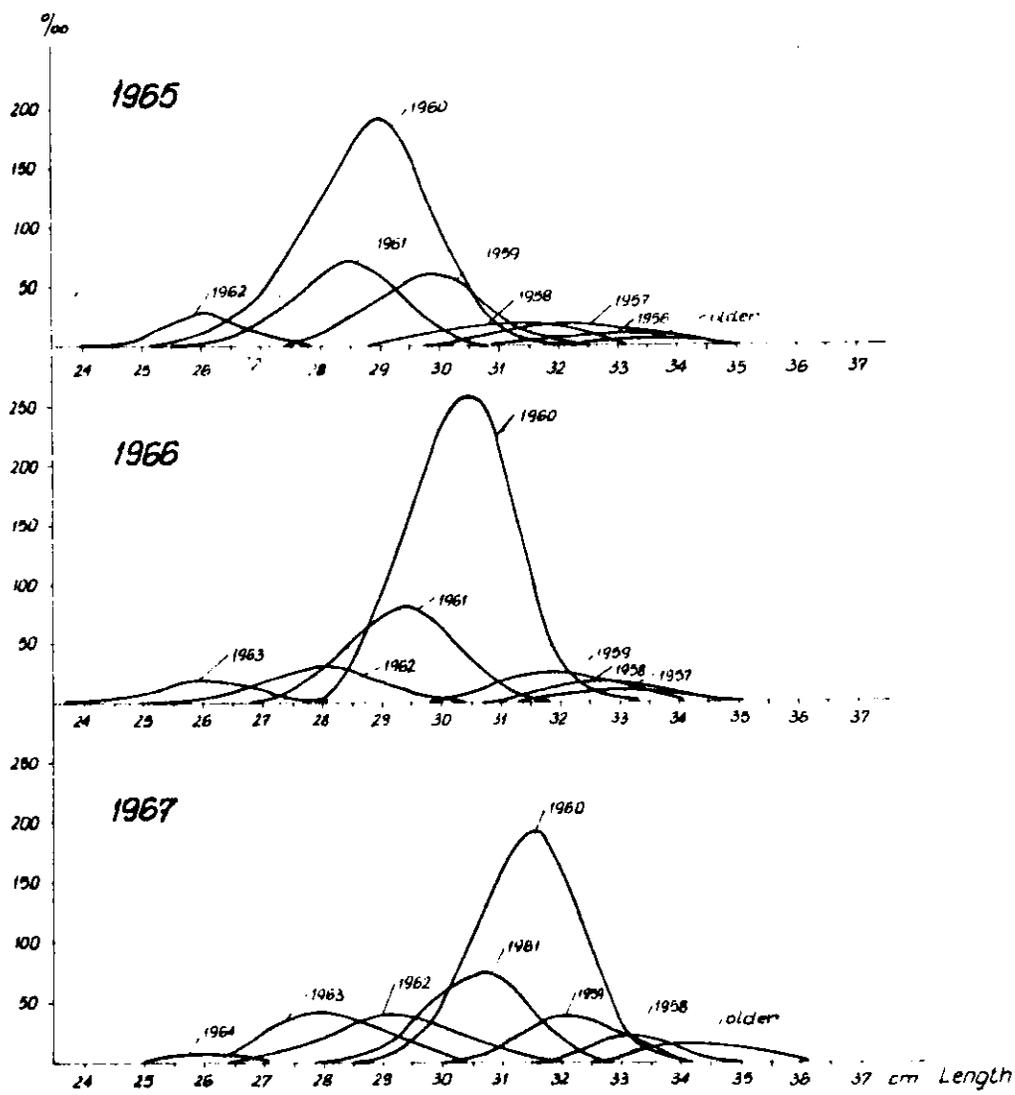


Fig. 2. Curves of different year-classes and their Length of herring caught in 1965-1967.

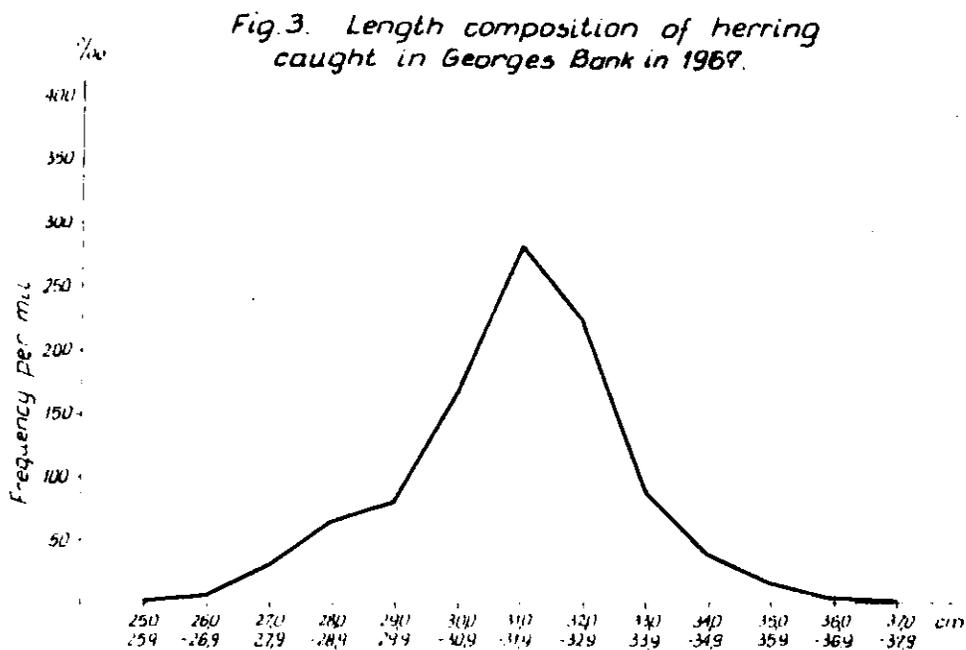


Fig. 3. Length composition of herring caught in Georges Bank in 1967.

Fig. 4. Age - composition of herring caught in 1967.

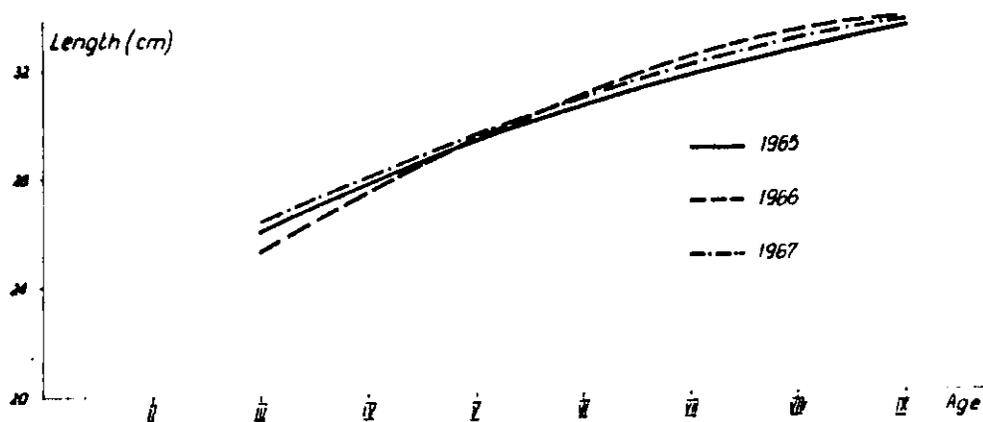
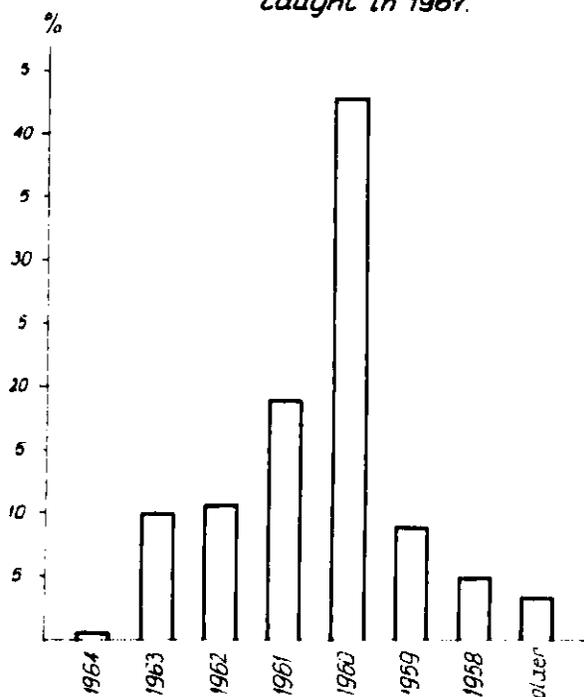


Fig. 5. Growth rate of herring.

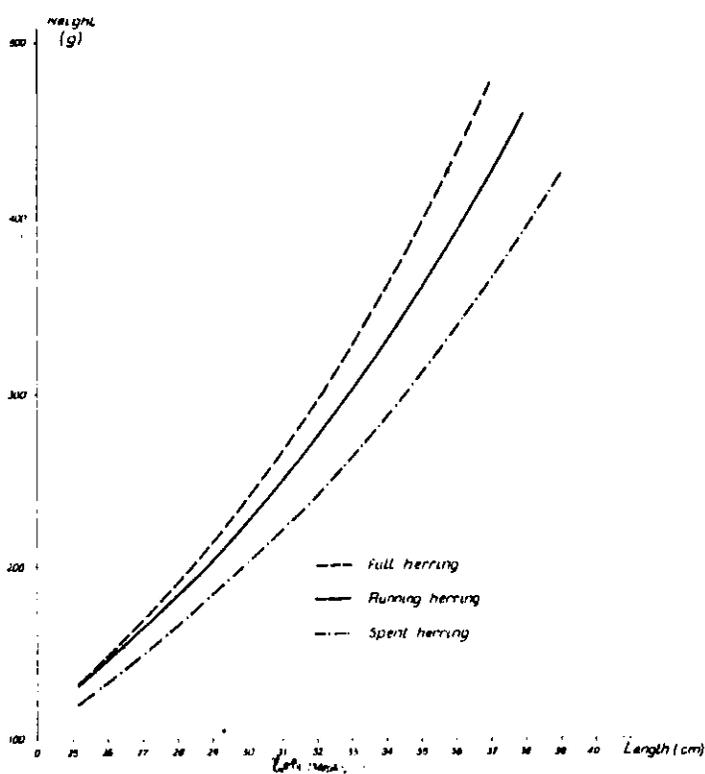


Fig. 6. Relation of length and weight of herring in different stage of maturity