



THE ABUNDANCES OF FLOUNDER (*P.flesus* L.) AND
EELPOUT (*Z.viviparus* L.) IN THE GULF OF GDANSK AREA
ESTIMATED BY SWEEPED AREA METHOD

by



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Abstract

It is a third attempt of abundance estimation of flounder and first attempt in the case of eelpout in the Gulf of Gdańsk (Netzel J. , Kuczyński - 1989 ,1991). Data for this paper were collected during Polish young fish surveys aimed at cod , herring and sprat. During the winter period both species are distributed in the deeper water (flounder from 10 -90 m and eelpout from 30 - 80 m). The following conclusions can be drawn: the flounder in the Gulf of Gdańsk - the year-class 1988 have been one of the most abundant year-class in the investigated period. The subsequent year-classes have been less abundant. Therefore the stock size of flounder in the Gulf of Gdańsk has a decreasing trend. It seems that the year-class 1994 is an abundant one.

In the catches taken during the young fish survey the eelpout was usually represented as single specimen up to the beginning of 80'. Then it started to increase, so we can say that this species is making a large proportion of catch when fishing on the depth from 30 - 80 m .It is assessed that in the western part of the Gulf of Gdansk the biomass is close to 5000 tonnes (Feb 1995).

Introduction

Up to 1988 the Polish young fish surveys were carried out to determine the abundance of year-classes of cod (Netzel-1971,1976,1979), herring and sprat. In this period the flounder bycatch was used as a primary information on abundance and depth distribution of this species.

A first attempt to evaluate the flounder stock size in numbers and its biomass in the region of the Gulf of Gdańsk in was made in 1989, whereas the second attempt took place in 1991 (Netzel J. Kuczyński J. -1989, 1991). From then on, such surveys are carried out annually. The present paper is the third attempt to evaluate the size of stock in number and biomass in the south-western part of the Gulf of Gdańsk. All the calculations are done for the prespawning period, when flounder is mainly distributed off the coast and is migrating towards the spawning areas in Gdańsk Deep. It seems that the chosen period is the best for this type of investigation.

Materials

The herring bottom trawl, type P 20/25, is used since 1978 in the Polish young fish survey of cod, herring and sprat. A detailed description of the trawl was presented in the paper of Schulz and Grygiel-1984. Its theoretical horizontal opening is 10 m, the vertical opening is 4.0 m and the mesh size in codend is 6 mm (bar length). The trawling speed was about 3 knots and the trawling time 30 minutes. The introduction in 1993 to the surveys of new research vessel (r/v "Baltica") required a little modification in the design of net- it was fitted for an larger and more powerful vessel than before.

The region and places of fishing are presented in Fig.1.

The survey area covered the south west part of the Gulf of Gdańsk; hauls were performed at the following four transects:

- I - Puck Bay (depth 20 - 60 m);
- II.- north of Stegna (20 - 100 m);
- III - north-east of the Szwedzka Górká lighthouse (20-100m);

IV - north-east of Władysławowo (20 - 100 m).

Corresponding data on the depth strata surface are given in Table 1.

It should be added that fishing operations were conducted in 10 m depth intervals ; an attempt was made to carry out hauls along the 10 m isobath.

In total 518 hauls were made in which 68.201 flounder specimens were caught. During the biological analysis, otoliths were taken from 900 fish.

In order to calculate the number of fish in a given length class in the whole survey , the following formula was used :

$$N_{(1)} = 116,5 \sum_{i=1}^4 \sum_{j=1}^{d_i} a_{ij} b_{ji} (e) / c_{ij}$$

where:

$N_{(1)}$ - number of fish in a given length class caught in the Gulf of Gdańsk ,

a_{ij} - surface area of zone (NM^2) j in sector i ,

$b_{ij}(1)$ - number of fish from length class (l) caught in zone j ,

c_{ij} - number of zones in sector i .

Summing up the number of fish in each cm length class resulted in total number of flounder in the investigated area. The number of each age group was calculated from the age/length key.

Results.

The results for flounder (in numbers and biomass) are given in Tables 2a and 2b. From that tables it can be seen that the age groups 0, I and II are not fully represented; most probably, the young flounders, during the time of survey, are distributed closer to the coast in the shallower water.

The most abundant year-class is the 1988 one. During the investigation period that year-class had the highest number in

age group from 0 to 3; and during the next three years it has been the second or the third age group in terms of abundance. The next five year classes are much less abundant, especially those from 1990-1992. The year class 1994 can preliminary be taken as an abundant one.

After seven years of investigations we can conclude that this survey is giving a good abundance index of year class abundance.

The flounder stock biomass (Table 2b) was the highest in 1992 and 1993 (2788.5 and 2823.9 tonnes respectively) and it was at much lower level in 1994 and 1995. The much lower catch per unit of effort (cpue) in the commercial fishery in the Gulf of Gdańsk seems to confirm the results of young fish survey.

The results for eelpout are given in Table 3. As mentioned before, during many years eelpouts were represented in the young fish survey catches as single specimens. The bycatch of eelpout started to increase in the second half of 80's. The results of the two last years' surveys seem to show an increase of eelpout stock in the Gulf of Gdańsk (1 148 and 4 782.2 tonnes respectively). In the catches taken during the last surveys the share of eelpout have increased to the level never observed before (since 1962).

References

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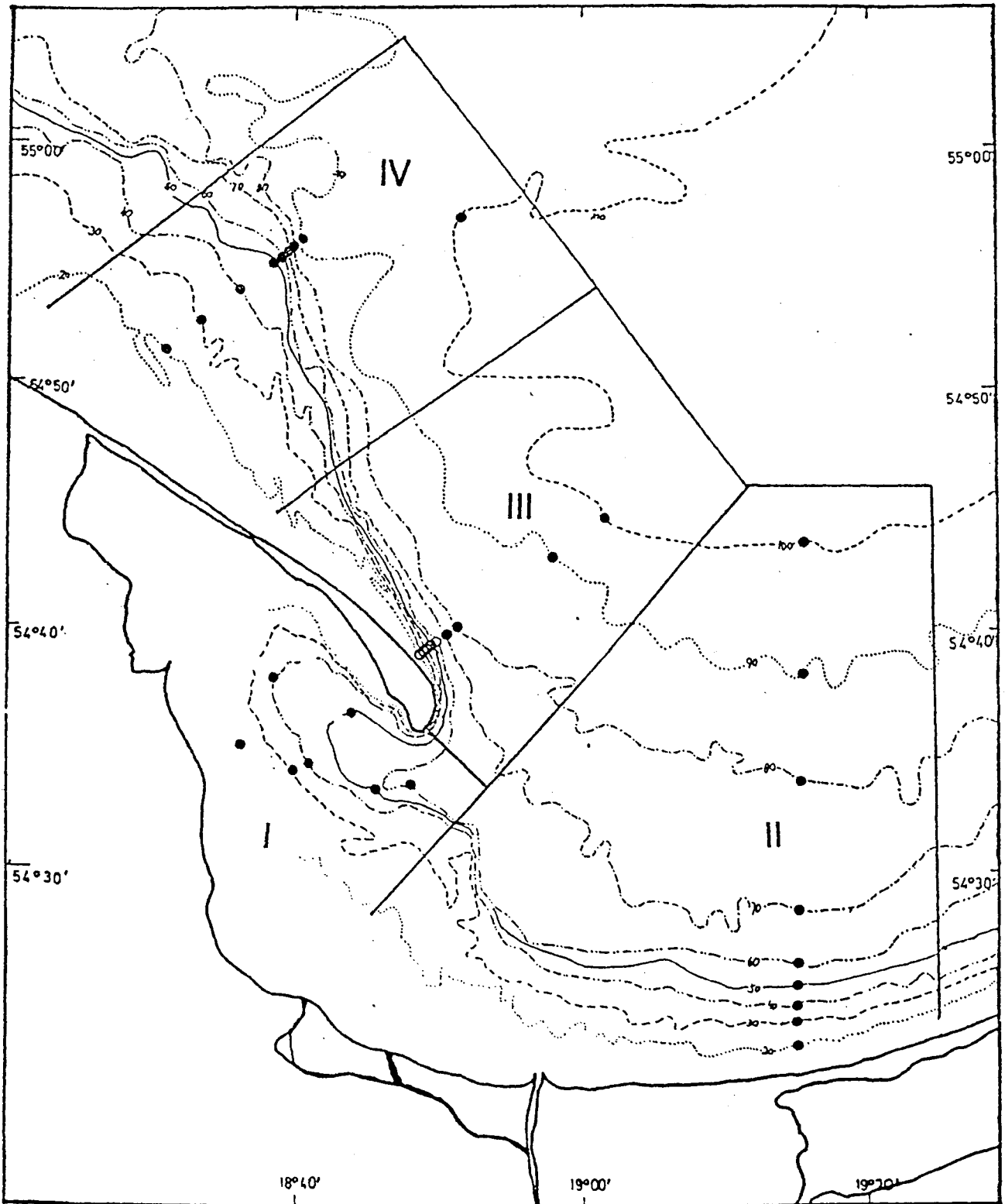


Fig.1. Region and places of catches.

Table 1 . Investigation region and surface of stratas

Depth strata (m)	Surface of stratas Mn^2			
	Puck bay I	Stegna II	Szwedzka G. III	Władysławowo IV
15-25	19.71	20.00	8.64	29.69
26-35	20.25	20.25	0.81	23.31
36-45	9.45	16.47	1.89	13.50
46-55	11.88	19.00	2.70	8.10
56-65	6.75	31.31	4.59	10.53
66-75		100.15	13.50	8.37
76-85		88.76	26.99	13.50
86-95		56.42	35.90	65.60
96-105		45.89	75.86	83.95
Total	68.04	398.25	170.88	256.55

Table 2a. Flounder stock size in numbers and biomass in 1989 - 1995

Age group	Years class				Numbers		
	1988	1989	1990	1991	1992	1993	1994
0	127.3	70.7	10	0.7	0	28.4	114
1	404.9	2018.4	282.4	101.9	1.2	169.8	217.9
2	4556	2191.7	5762.8	1101.8	597.4	1127.3	1777.3
3	3478.6	4173.3	1795.3	11252.1	3614.8	1420.1	1961.7
4	551.2	670.7	687	556.1	1579.6	414	1645
5	62	91	76.6	54.6	3695.8	334.3	461.4
6	8.6	11.7	17.6	22	567	79.6	239.9
7	2.6	7.3	4.4	2.4	62.6	29.4	108
8	2.2	0	5.5	0.6	7.1	7.7	41
Total	9193.4	9235.4	8641.6	13092.2	10125.5	3608.7	6566.2

Table 2b.

Age Group	1989	1990	1991	1992	1993	1994	1995
	Biomass tonnes						
0	0.6	0.4	0.2	0.1	0	0.1	0.2
1	10.5	51.7	12.3	2.8	0.1	3.8	4.6
2	692.6	297.1	734.5	129.2	52.5	117.8	182.4
3	962.4	1174.1	443.4	2425.6	632.3	297	372.5
4	292.2	265.9	242.4	180.1	380.5	125.3	467.6
5	39.8	59.6	41.7	30.3	1238.4	125.5	184.4
6	15.5	8.6	15.8	18.6	270.3	49.1	114.8
7	2.9	8.6	4.3	1.2	39.3	21.8	72.2
8	2.7	0	2	0.6	10.5	10.6	40.1
Total	2019.2	1866	1496.6	2788.5	2623.9	785	1438.8

X-numbers and biomass from the survey data from Dec.- March

Table 3. Eelpout stock size in numbers and biomass 1994 -1995

Age Group	Years			
	1994		1995	
	N	B	N	B
1	6.2	0.01	117.4	1.5
2	1227.3	11.3	2205.9	56.7
3	8767.4	259.6	11119.3	1108.4
4	4518.6	234.3	8966.3	1873.9
5	2774.8	227.5	3047	704.1
6	1106.8	112.3	2187.7	517.3
7	1138.3	253.2	596.8	180.4
8	390.1	51	500.7	289.9
Total	19929.5	1149.21	28741.1	4732.2

B-biomass

N-number of specimen

x-numbers and biomass from the survey data from Dec.-March