International Council for the Exploration of the Sea

C. M. 1973/F : 32
Demersal Fish (Northern) Committee.

Belgian sole and plaice fisheries in the Irish Sea and Bristol Channel.

by R. De Clerck
Fisheries Research Station, Ostend, Belgium.

INTRODUCTION.

The Belgian sole and plaice fisheries in the Irish Sea and the Bristol Channel can really be called traditional, as they last up to now for almost 50 years. The plaice catches are to be considered as by-catches of the sole fisheries. In recent years the importance of these sole fishing grounds was strongly determined by the productivity of the North Sea sole grounds. In 1964 and 1965 the Irish Sea and the Bristol Channel sole fishery became very important due to the high mortality of sole in the North Sea caused by the severe winter 1963 (Gilis, 1966 ; De Veen, 1965). The record catches in the North Sea from 1966 to 1968 reduced again the significance of the other sole areas. As the very recent decrease in the North Sea sole population might persist for several years to come (Anon. 1973) the Irish Sea and Bristol Channel might be again of increasing importance.

The aim of this study is to analyse for forecasting purposes the characteristics of the sole and plaice populations in these two areas.

RESULTS.

A. Sole.

1. International landings.

The international catch of sole during the period 1955-1972 in the areas VIIa and VIIf are given in figure 1. From 1963 up to now the highest catches were taken by the Belgian fleet. The oscillating character of the Belgian catch-curve however is due to the yearly differences in effort. Since 1971 with a catch of about 500 tons the Dutch beam trawl fleet takes the second place in the international landings, but it must be mentioned that the capture concerns the Irish Sea exclusively.

2. The Bristol Channel population.

2.1. Catch and catch per effort.

The catch, the effort and the catch per unit effort for Belgium during the period 1950-1972 is illustrated in figure 2. Both catch and effort show the same curve indicating a stability in the catches year by

year, which is confirmed by the catch per effort curve. During the last three years the average catch remains on the level of about 11 kg per hour fishing.

2.2. Growth parameters and sex-ratio.

The growth parameters for the years 1970 and 1971 have been calculated from market samples. The results are shown in table 1 and figure 3. The marked difference in the growth pattern becomes apparent when comparing it with the results from the Irish Sea sole population.

The sex-ratio in the catches for the years 1970, 1971 and 1972 shows a majority of males of respectively 67 %, 55 % and 57 %.

2.3. Stock analysis.

The strength of the year-classes for the year 1972 is given in figure 5. Three good year-classes appear viz. the 1963, 1967 and 1969 year-classes.

On the other hand the population consists of different year-classes of equal importance, which is certainly in contrast with , for example, the North Sea stock. (De Veen, 1965). At least 13 % of the population consists of soles older than 10 years. Moreover, soles older than 18 years are not exceptional.

2.4. Z- estimates.

The estimates of the total mortality coefficient are given in table 2. The mortality rate is higher for males. The results are in good agreement with earlier estimates based on the British landings (Holden, 1972).

3. The Irish Sea population.

3.1. Catch and catch per effort.

During the last 10 years two peaks can be noticed in the Belgian catches , viz. during 1964-1965 and during 1969-1972, as shown in figure 4. These maximum levels coincide with the effort curve, proving the fact that the shifting of the Belgian sole fleet to the Irish Sea is closely related to the failure of the North Sea catches. The catch per effort of about 19 kg per hour fishing during the last five years is clearly higher than the output in the Bristol Channel.

3.2. Growth parameters and sex-ratio.

The growth of the Irish Sea sole population is rather slow for both sexes (tabel 1 and figure 3). The growth curve is in good agreement with the results of the experimental Dutch fishing analysis (De Veen en Schaap, 1970). This fact must certainly be taken into consideration if a future increase in the effort in this area should be planned.

Unlike the sex-ratio in the Bristol Channel, the one of the Irish Sea shows during the last three years a majority of 53 % females.

3.3. Stock analysis.

The distribution of the year-classes as calculated from the sampling during 1972 is demonstrated in figure 6. The appearance of several good year-classes (1969, 1967, 1964, 1961, 1959) is one of the characteristics of the Irish Sea sole population. Similar results are found in the study of the Dutch catches (De Veen, 1972). This phenomenon indicates a regularity of the reproduction process in this area.

3.4. Z- estimates.

The total mortality rate in the Irish Sea is slightly higher than in the Bristol Channel, as shown in table 2. These results however differ from the British date (Holden, 1972) giving a much higher value of 0.49 for both sexes mixed.

On the other hand the results of this study are in relative good agreement with the Z- estimates using the catchcurve analysis from the Dutch and Belgian landings. (Holden, 1972). For this reason the figure of 0.34 might be acceptable.

B. Plaice.

1. International landings.

As the fishery activities of the Belgian fleet in both areas are axed on sole, the weight of the Belgian plaice landings is rather unimportant in relation to the international landings. Figure 7 illustrates this fact very well. The U.K. landings are in the order of 85 % of the total landings for 1971, whereas the Belgian share is only 10 %.

2. The Bristol Channel population.

2.1. Catch and catch per unit effort.

The high fluctuations in the catch curve as shown in figure 8 are mainly due to the irregularity of the effort. The catch per effort is generally rather low.

2.2. Growth parameters and sex-ratio.

The growth parameters are listed in table 1 and the growth curve for males and females is illustrated in figure 10. The growth rate of the females is slightly higher than in the Irish Sea.

About 60 % of the 1971 and 1972 catches consists of females.

2.3. Stock analysis.

The density of the different year-classes in the Bristol Channel plaice population for 1972 is given in figure 11 and it may be concluded that the 1969 and 1968 year-classes comprise more than 50 % of the catch. Besides, males older than 8 years are absent from the catches.

2.4. Z- estimates.

The total mortality coefficient - given in table 2 - shows marked difference for both sexes. The mean value is higher than for the sole population in the same area.

3. The Irish Sea population.

3.1. Catch and catch per unit effort.

The catch curve given in figure 9 shows the same trend as for soles in this area (figure 4) showing again yearly fluctuations and close relationsship to the expended effort. On the other hand for lack of information it is not possible to decide whether the fluctuations of the catch per unit effort are due to the influence of earlier year- classes or to the choice of fishing ground.

3.2. Growth parameters.

The differences in growth rate between the Irish Sea and Bristol Channel population, as demonstrated in table 1 and figure 10 are less pronounced as it is the case for the soles.

The females show a majority of about 72 % in the catches of 1971 and 1972.

3.3. Stock analysis.

As shown in figure 12, a gradual reduction in the strength of the year-classes with increasing age is typical in the Irish Sea population. No strong year-classes are appearing, excepting perhaps a reservation for the 1969 year-class which looks promising although not yet fully recruited in 1972.

3.4. Z-estimates.

For the area of the Irish Sea the estimates of Z are rather higher then for the Bristol Channel population.

CONCLUSIONS.

The conclusions of this first approach to gain a better knowledge of the sole and plaice populations in the Bristol Channel and the Irish Sea can be described as follows :

a) For soles :

- The catch per effort is higher in the Irish Sea than in the Bristol Channel.

- The growth is markedly different between males and females. The Irish Sea stock has a very slow growthrate.

- Several good year-classes are appearing in the Irish Sea population, which is not the case in the Bristol Channel population.

- The mortality rate is sligthly higher in the Irish Sea.

b) For plaice :

- The catch per effort is rather low in both areas.

- There seems to be a different growth pattern in both areas and for both sexes.

- The good year-classes 1969 and 1968 in the Bristol Channel are not reflected in the catch composition of the Irish Sea.

- The mortality rate is very high in the Irish Sea compared to the mortality in the Bristol Channel.

REFERENCES.

Anon. 1973. Report of the Flatfish Working Group, ICES, Demersal Fish (Northern) Committee, 1973.

De Veen, J. On the strength of year-classes in soles. ICES, C.M. 1965, Near Northern Seas Committee, no 62.

De Veen, J. en Schaap, S. Biologische opmerkingen bij het kotterprojekt Ierse Zee 1970. Visserij, 23, 6, 1970

De Veen, J. Enkele opmerkingen over het vissen op tong in de Ierse Zee. Visserij, 25, 4, 1972.

Gilis, Ch. Invloed van de strenge winter 1962-1963 op de Belgische tongvangst. Z.W.I. Verhandeling Oct. 1965.

Holden, M.J. A preliminary assessment of the state of the sole stocks in the Irish Sea and the Bristol Channel. ICES, C.M. 1971/F : 18.

Holden, M.J. A further assessment of the state of the sole stocks in the Irish Sea and the Bristol Channel. ICES, C.M. 1972/F : 22.

Table 1 - Growth parameters for the sole and plaice populations in the Irish Sea and the Bristol Channel for the years 1970 and 1971.

Area	Species		♂			♀		
			K	L∞	to	K	L∞	to
Bristol Channel	Sole	1970	0.24	35.9	-1.26	0.22	42.2	-1.89
		1971	0.16	36.9	-2.72	0.28	40.5	-0.40
Irish Sea	Sole	1970	0.45	29.0	-0.63	0.34	38.1	+1.06
		1971	0.59	30.7	+0.97	0.32	39.9	+1.61
Bristol Channel	Plaice	1970	0.07	46.3	-10.40	0.13	54.6	+0.05
		1971	0.31	37.2	-2.32	0.11	55.5	+0.12
Irish Sea	Plaice	1970	0.25	37.8	-3.58	0.46	42.7	-0.51
		1971	0.31	37.2	-2.32	0.11	55.5	-2.47

Table 2 - Average Z-estimates using the method of the total martality coefficient for each pair of years for each age and for each sex. (Period 1970-1972).

Species	Area	♂	♀
Sole	Bristol Channel	0.30	0.23
	Irish Sea	0.34	0.25
Plaice	Bristol Channel	0.39	0.21
	Irish Sea	0.46	0.34

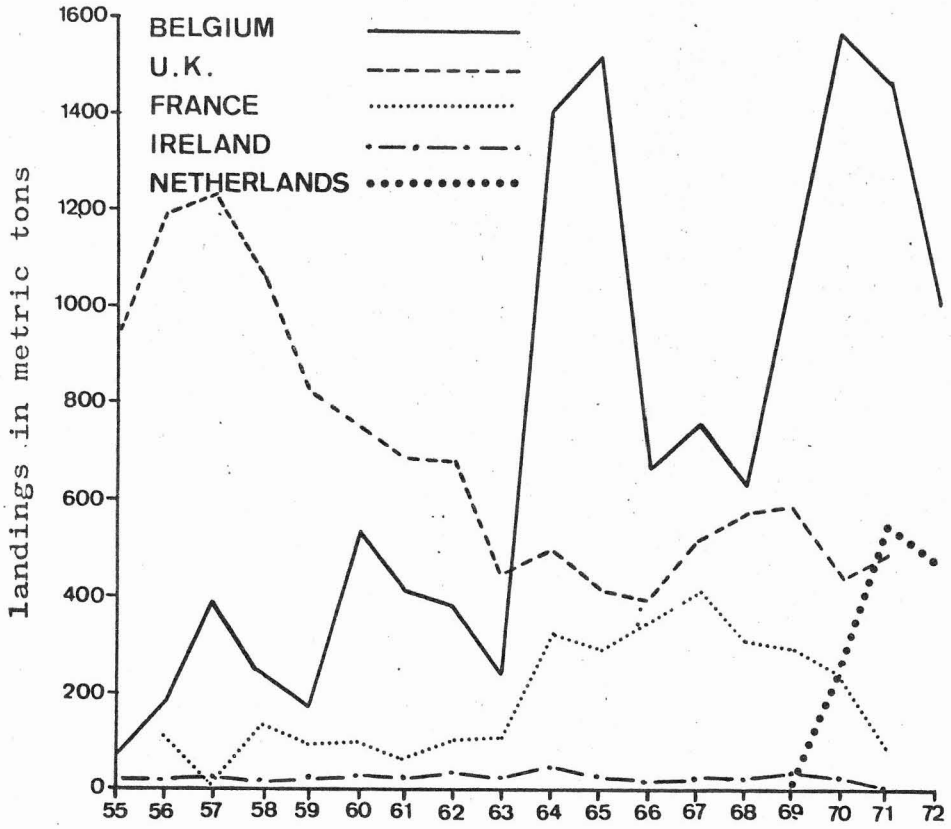


Figure 1 - The international landings of sole in regions VIIa and VIIf (Bulletin Statistique).

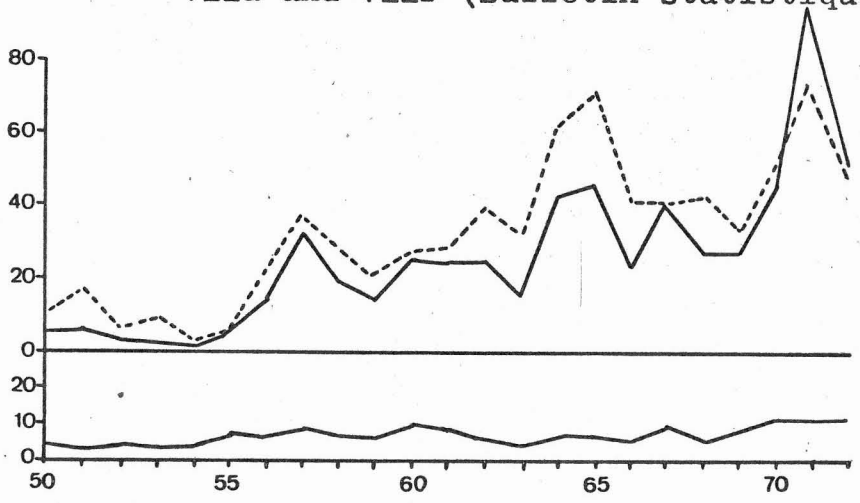


Figure 2 - The Belgian catch data of sole in the Bristol Channel

upper side : ———— catches in 10,000 kg

--------- hours fishing in thousands

under side : ———— catch in kg per hour fishing

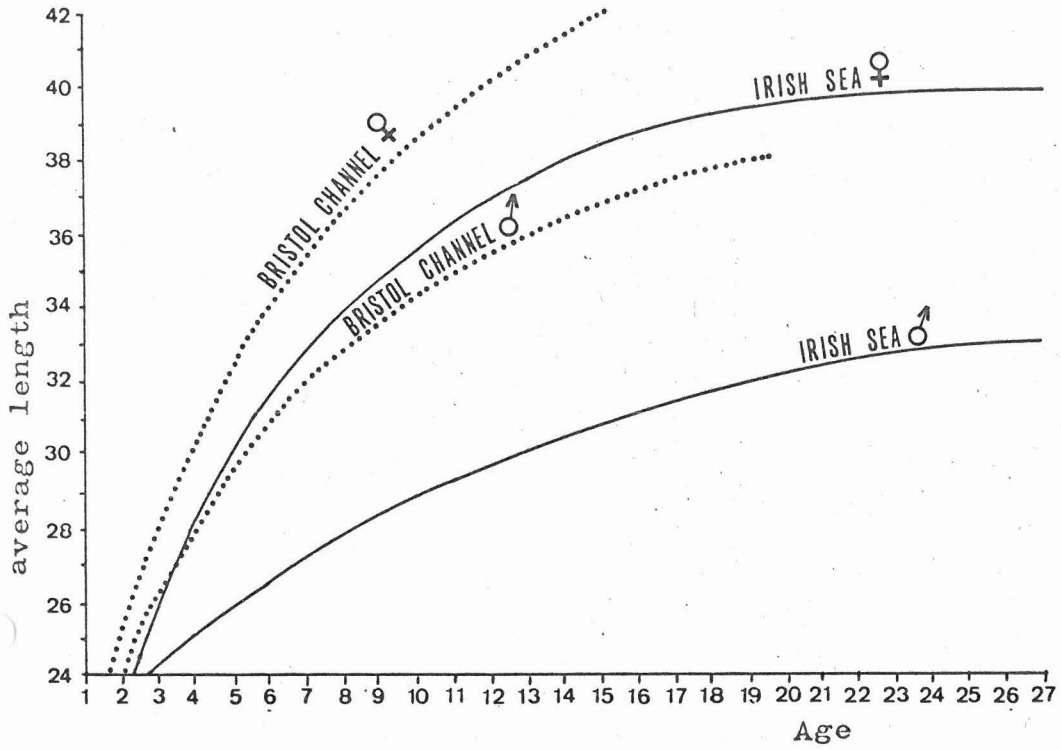


Figure 3 - The growth curves for soles in the Irish Sea and the Bristol Channel.

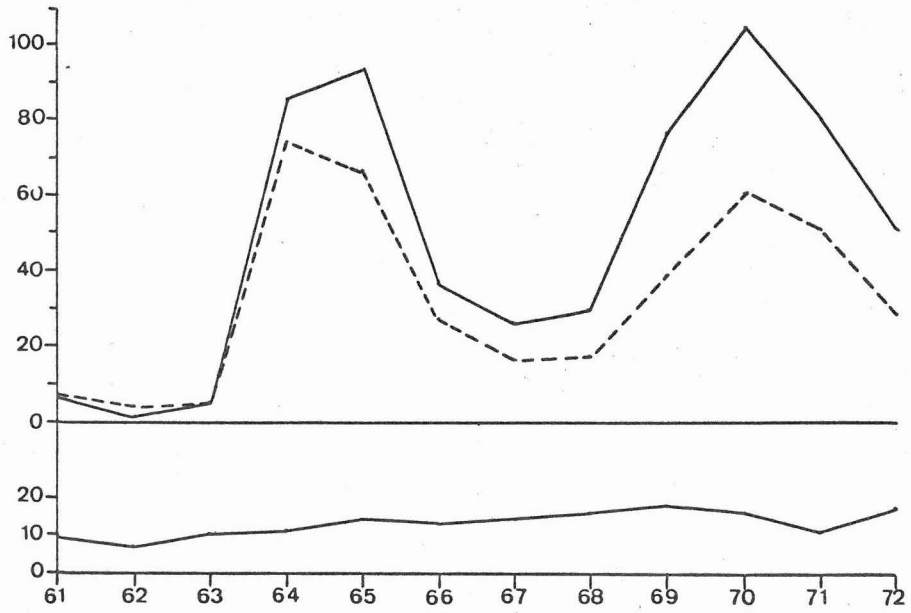


Figure 4 - The Belgian catch data of sole in the Irish Sea

upper side : ———— catches in 10,000 kg

-------- hours fishing in thousands

under side : ———— catch in kg per hour fishing

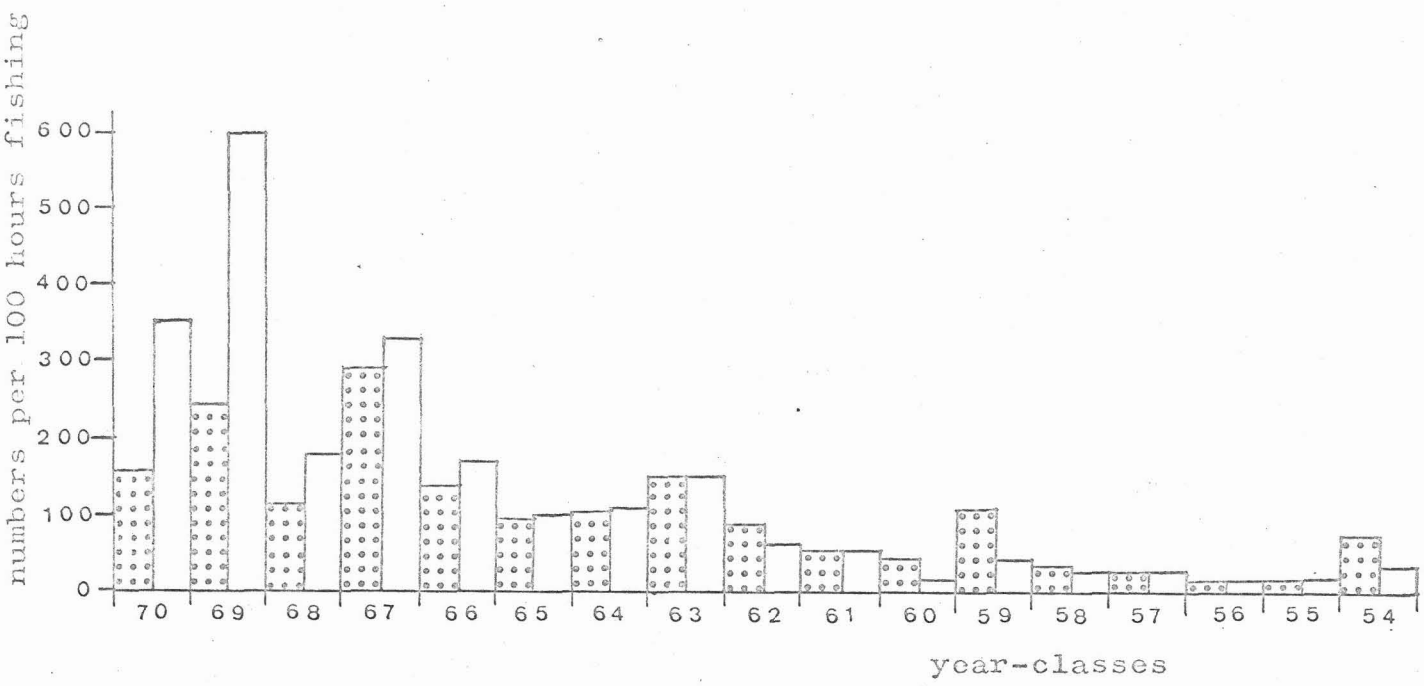


Figure 5 - The stock analysis of sole in the Bristol Channel during 1972.

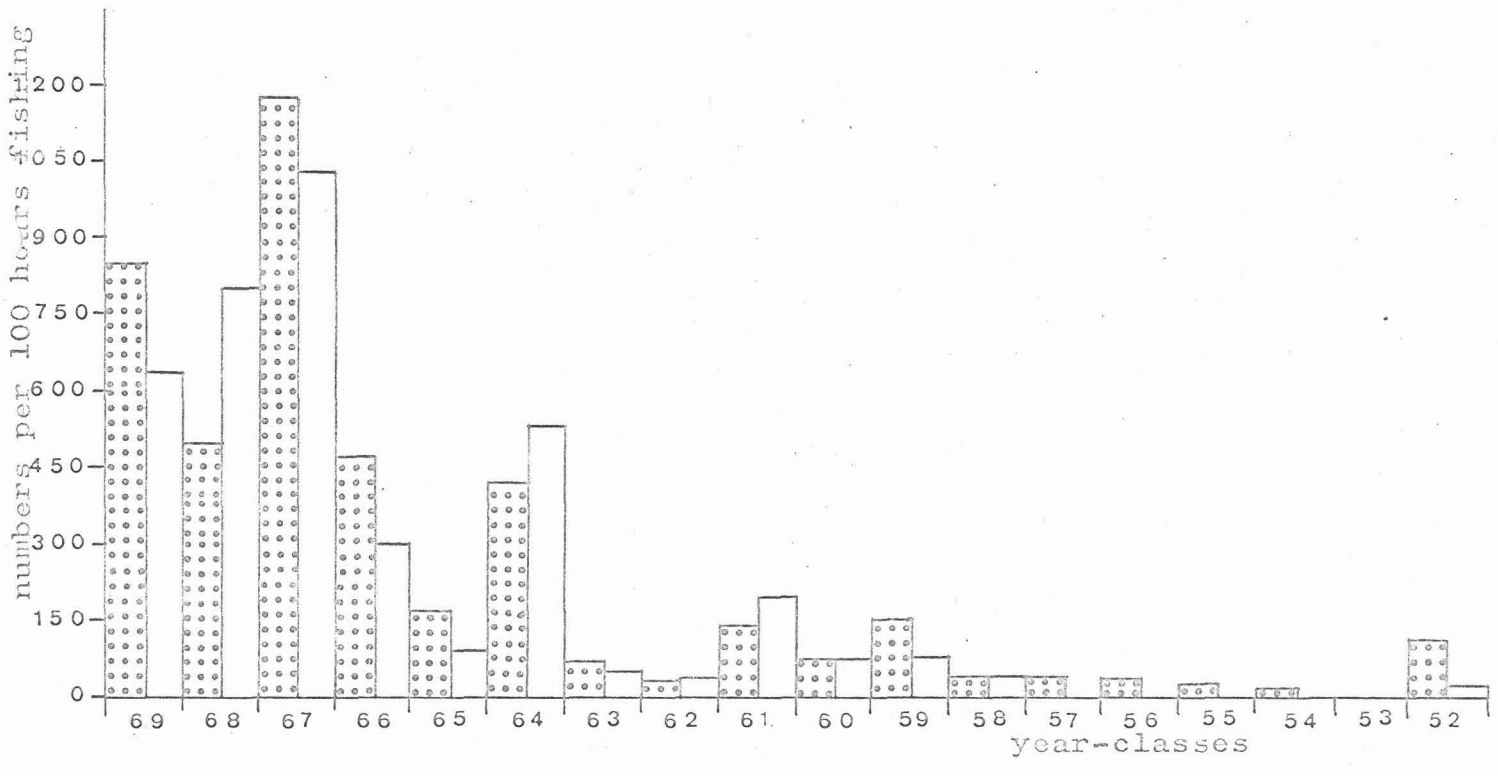
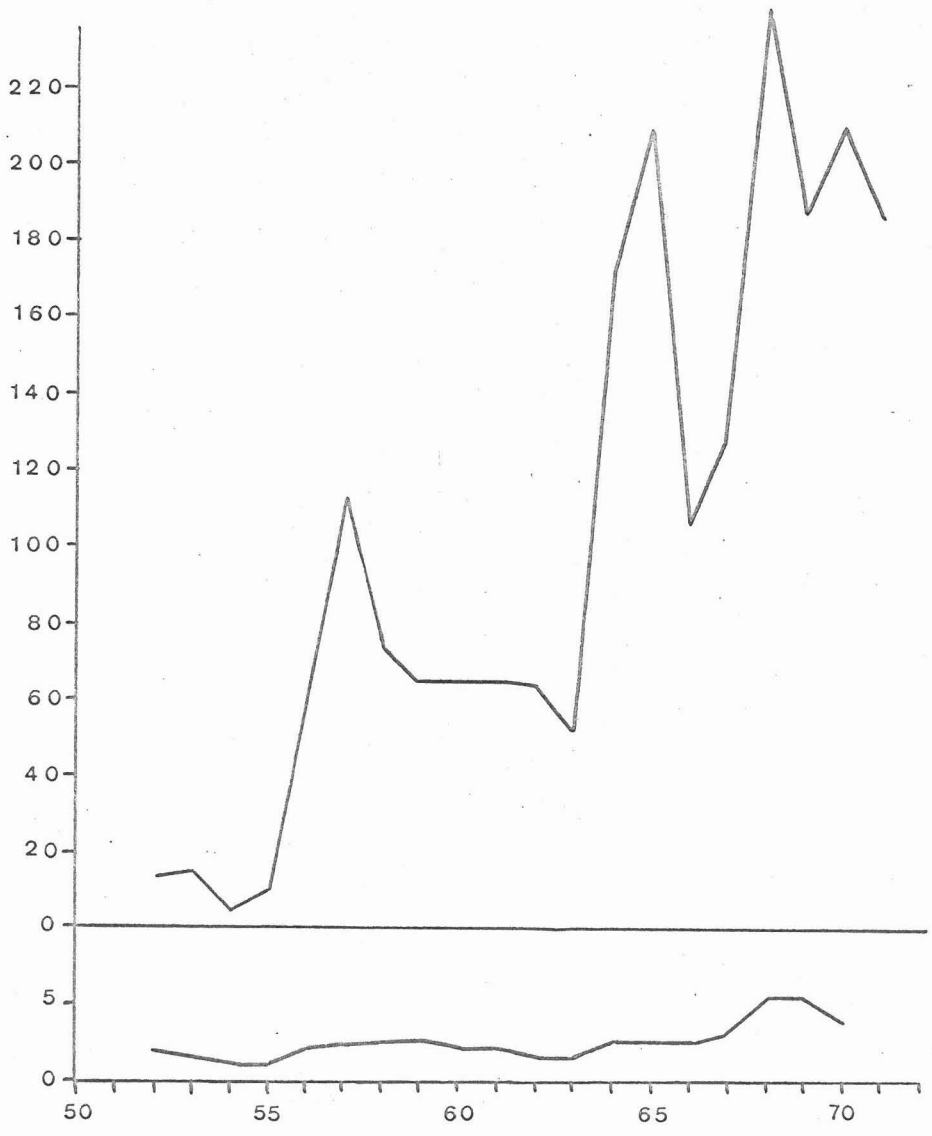


Figure 6 - The stock analysis of sole in the Irish Sea during 1972.

Figure 7 - The international landings of plaice in regions VIIa and VIIf

Figure 8 - The Belgian catch data of plaice in the Bristol Channel
upper side : catches in tons
under side : catch in kg per hour fishing



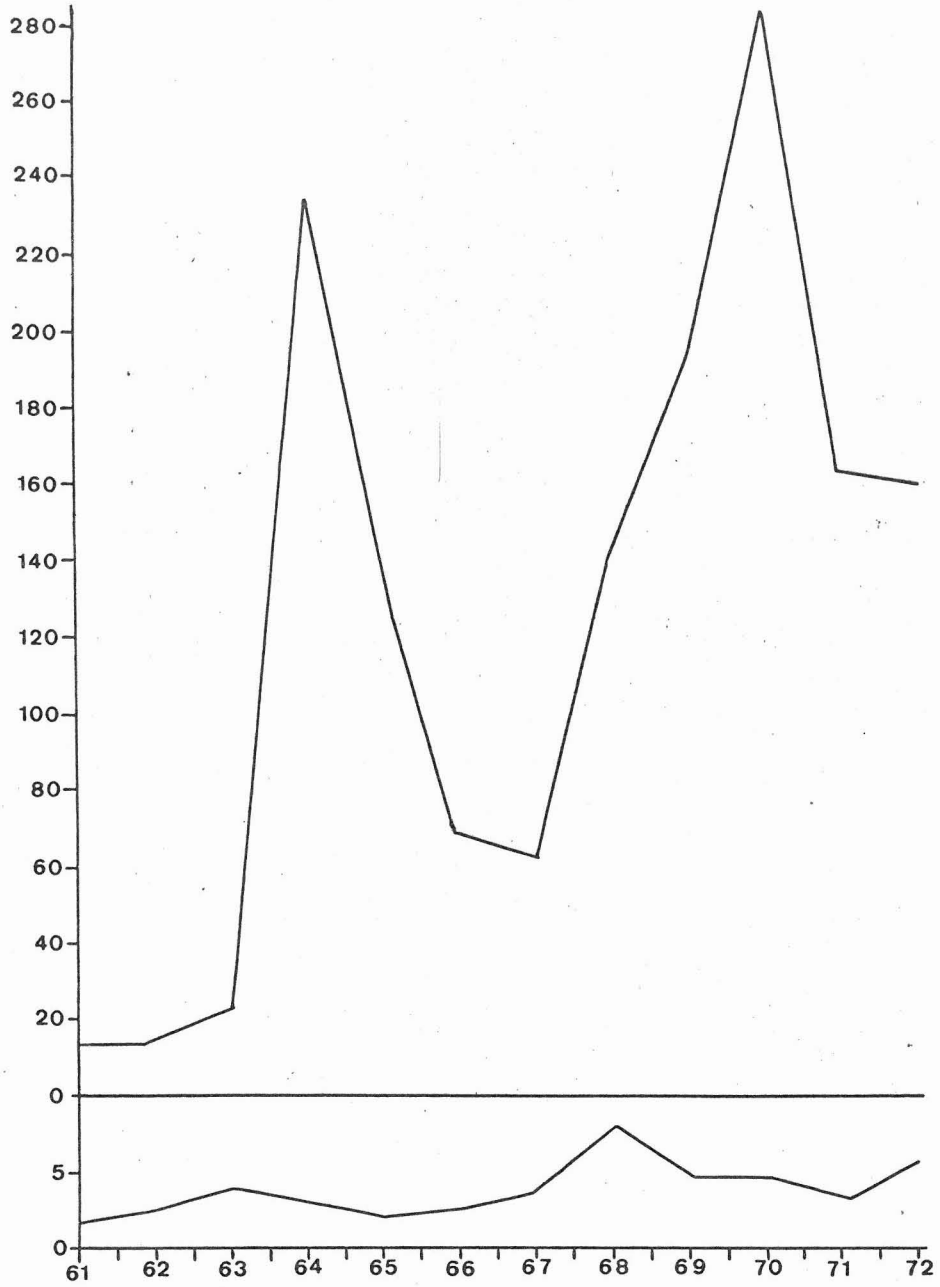


Figure 9 - The Belgian catch data of plaice in the Irish Sea
upper side : catches in tons;under side : catch in kg per h.f.

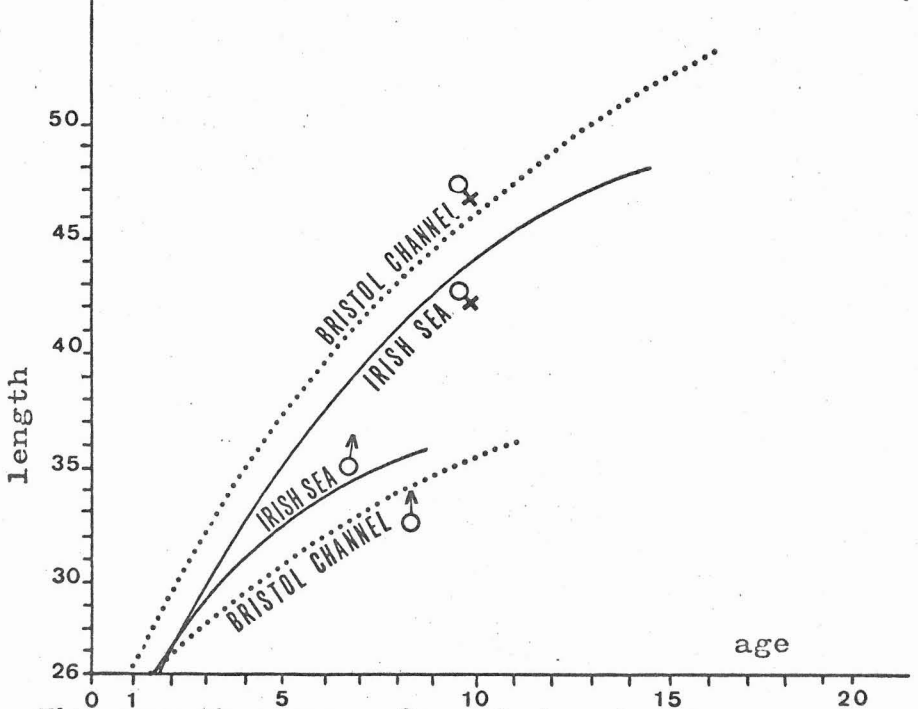


Figure 10 - The growth curves for plaice in the Irish Sea and Bristol Ch.

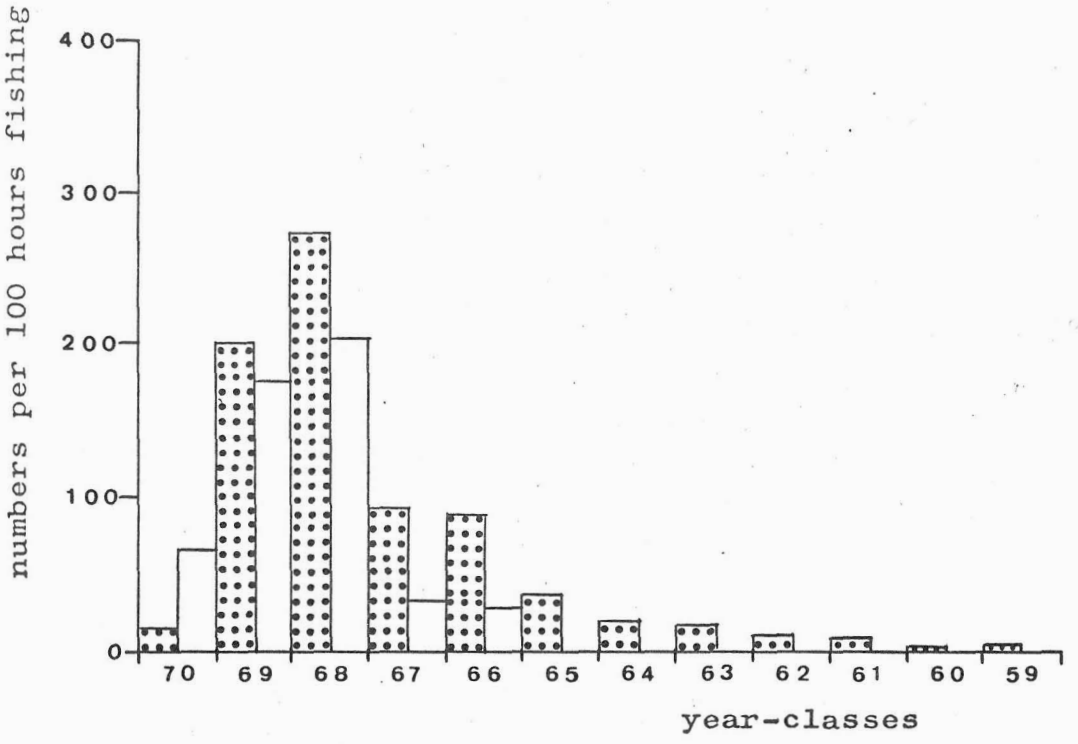


Figure 11 - The stock analysis of plaice in the Bristol Channel during 1972.

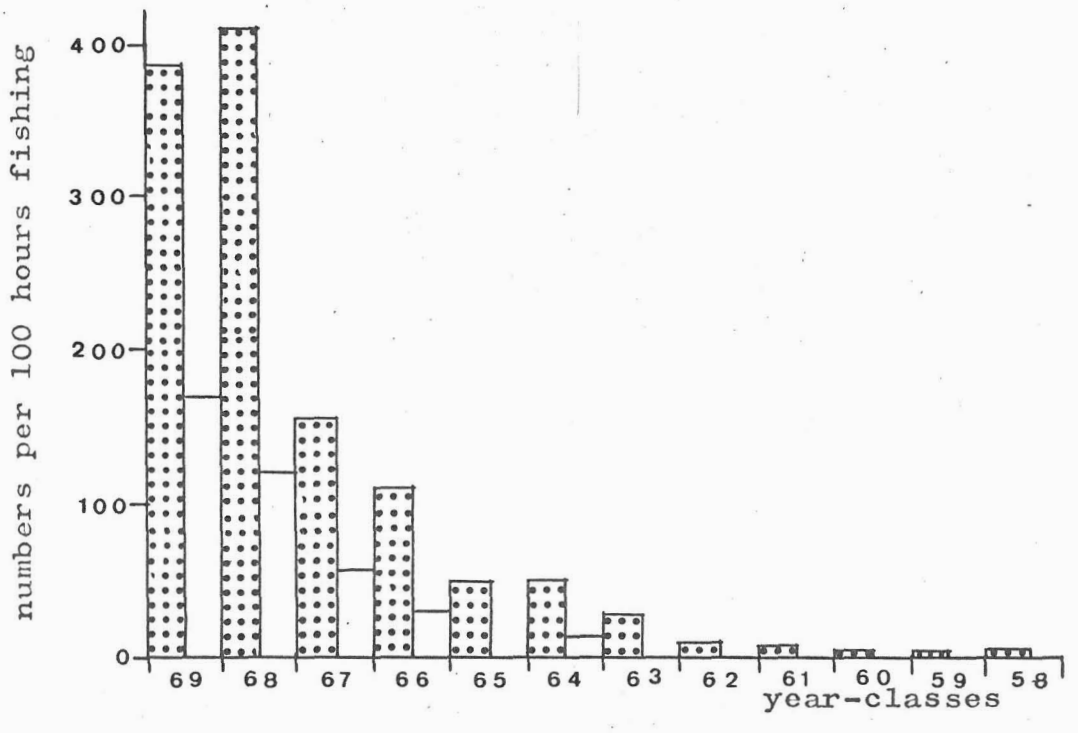


Figure 12 - The stock analysis of plaice in the Irish Sea during 1972.