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Preliminary results of selectivity experiments with beam trawls

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ABSTRACT.

Experiments on a beam trawler with "low" horsepower showed no marked differences in selectivity with research carried out in the 60's. Research on beam trawlers with "high" horsepower is planned.

RESUME.

Des expériences sur un chalutier à gaules d'une puissance motrice peu élevée, ont démontré de différences peu significatives en ce qui concerne la sélectivité avec les recherches exécutées dans les années '60. Des études similaires sur des chalutiers à gaules d'une plus forte puissance motrice sont en cours.

INTRODUCTION.

A national programme has been set up to investigate the relationship between selectivity and horsepower in the Belgian beam trawl fishery for soles.

These selectivity experiments will be carried out on three types of vessels with a horsepower in the order of 250,500 and 1200. This paper is dealing with the results on the trawler with the lowest horsepower. The other experiments will take place during the last quarter of this year.

MATERIAL AND METHODS.

Two cruises were made on the commercial vessel Z 12 "SABRINA" of 49,96 gross tonnage, of 285 hp and equipped for beam trawling with beams of 4 metres. No tickler chains were used. The main fishing area is shown on figure 1.

Apart from the different cod-ends no alteration was made to the normal commercial operation of the vessel. In the cod-end four different mesh sizes were used alternatively, viz. 75 mm, 80 mm, 85 mm and 90 mm. The cod-end cover (whole cover) had a mesh size of 63 mm.

The physical properties of the netting used for cod-ends and cover are shown in table 1. Mesh sizes were measured regularly during the experiments with an ICES spring-loaded gauge with an operating pressure of 4 kg. No significant differences in the mesh size due to the operation of the net were found. Some hauls were carried out without a cover to ensure that no masking occurred.

Throughout the experiments the two beam trawls were shot and hauled simultaneously.

The catch of soles of each haul was measured to the nearest cm and rough estimates on the by-catch were made.

RESULTS.

The results of the first cruise are given in figures 2, 3 and 6. During the first 19 hauls with 80 mm on starboard (figure 2) the 50 % length value of 80 mm cod-end was 26.8 cm and the one of 90 mm cod-end was 28.5 cm. During the second part of the cruise when changing the 80 mm gear to the port the corresponding values were somewhat lower, viz. 25.8 cm and 27.2 cm (figur 3). It must be mentioned that during the second half of the cruise weather conditions became worse and the catch of soles decreased substantially mainly in the length classes 23 cm to 26 cm.

The combined selection ogives of the whole trip shows that the 50 % retention length for the 80 mm cod-end reached 26.3 cm and for the 90 mm cod-end 28.1 cm (figure 6). The 80 mm value is similar to the one used in the Coop. Res. Rep. Ser. A.9, 1969 (26 cm) but the 90 mm cod-end value (30 cm) is lower in this study.

The selection factors were 3.2 for the 80 mm cod-end and 3.1 for the 90 mm cod-end. In the Coop. Res. Rep. Ser. A.9 and in the Report of the North Sea Flatfish Working Group 1974 a selection factor of 3.3 was used.

The second cruise concerned the selectivity of the 75 mm and 85 mm cod-end. As in the first experiment the gear was changed from starboard to port half way the trip but this did not substantially alter the results (figures 4 and 5). The 50 % retention length values were 24.5 cm and 24.6 cm for the 75 mm and 27.3 cm and 27.4 cm for the 85 mm cod-end. The overall selectivity ogives of the complete survey resulted in 24.5 cm as 50 % length value for 75 mm cod-end and in 27.5 cm for the 85 mm cod-end (figure 7). Those two values are similar to the ones used in the Coop. Res. Rep. Ser. A.9. with values of 25 cm for 75 mm cod-end and 28 cm for 85 mm cod-end.

The selection factors were in the same order as the ones obtained in the first survey, viz. 3.1 for the 75 mm cod-end and 3.15 for the 85 mm cod-end.

It became obvious as a general conclusion of these two experiments that the selection with a beam trawler with "low" horsepower was similar to the results published in the Coop. Res. Rep. Ser. A.9. As mentioned in the introduction the results of the further experiments on vessels with "high" horsepower may give a definite answer to the problem of horsepower in beam trawl selectivity.

Table 1 - Properties of the netting used for cod-ends and cover.

Codend				
Material	Polyamide multifilament			
R tex	12 200			
Twine construction	Braided			
Braiding	Single twine			
Mesh size (mm)	"75"	"85"	"80"	"90"
Mean	78,47	87,26	81,84	90,32
Range	74-82	82-92	78-87	85-96
N° of measurements	540 (27x20)	540 (27x20)	320 (16x20)	320 (16x20)
Type of mesh gauge	ICES, 4 kg			
Cover				
Material	Polyethylene monofilament			
R tex	12 200			
Twine construction	Braided			
Braiding	Single twine			
Mesh size (mm)	63			

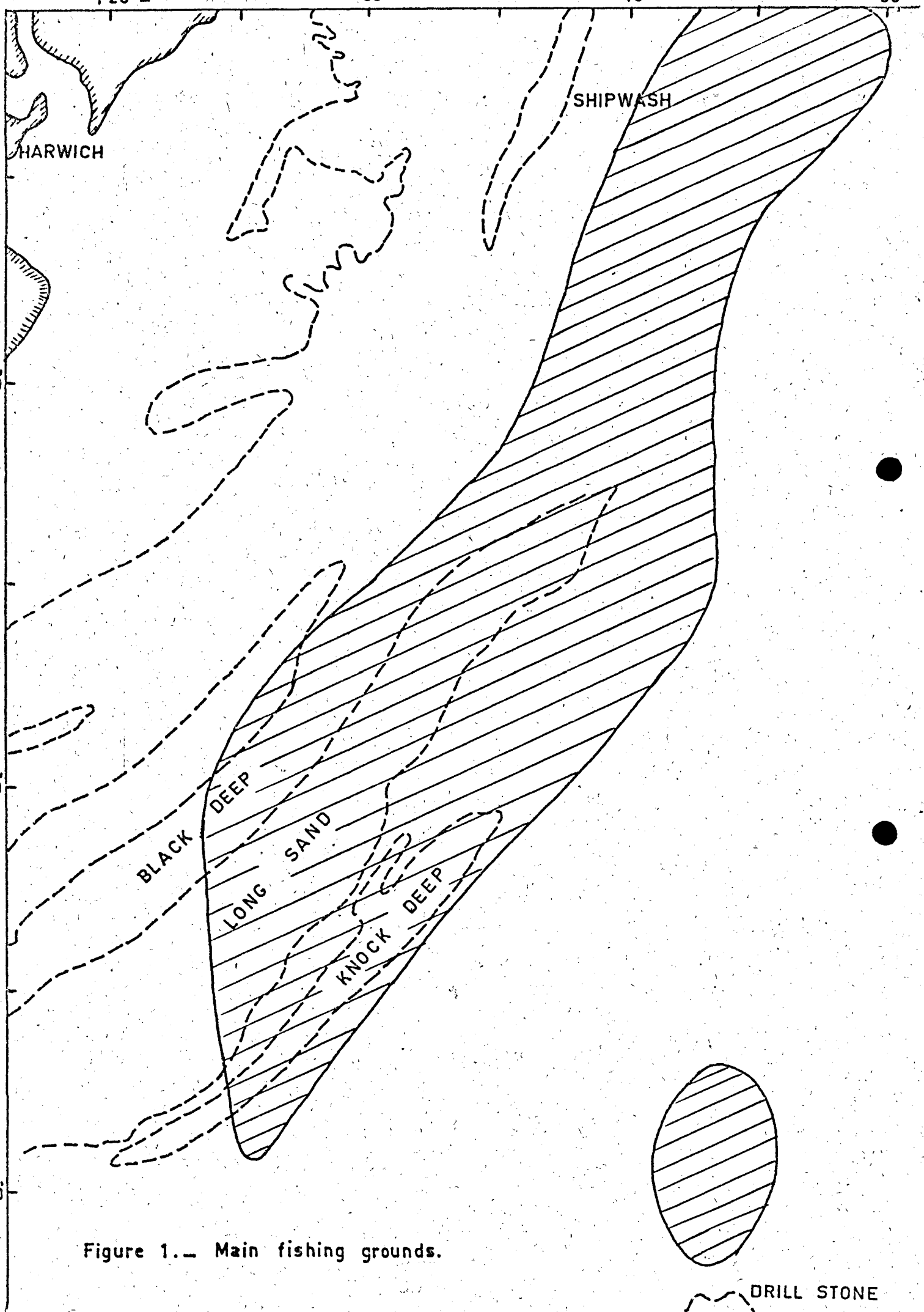

Figure 1.— Main fishing grounds.

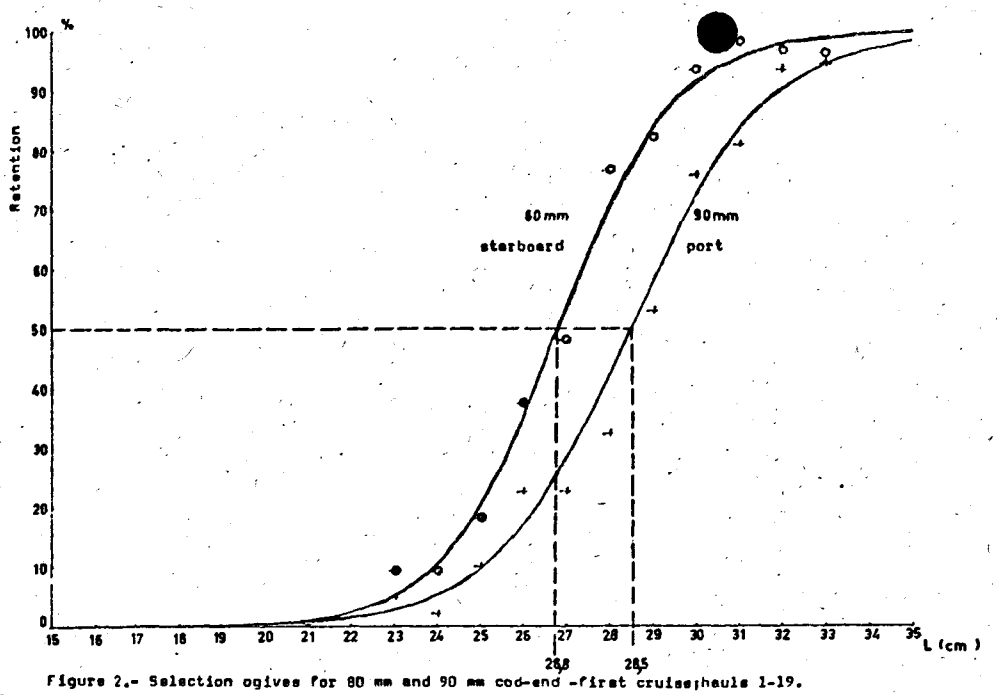

Figure 2.- Selection ogives for 80 mm and 90 mm cod-end -first cruise;hauls 1-19.

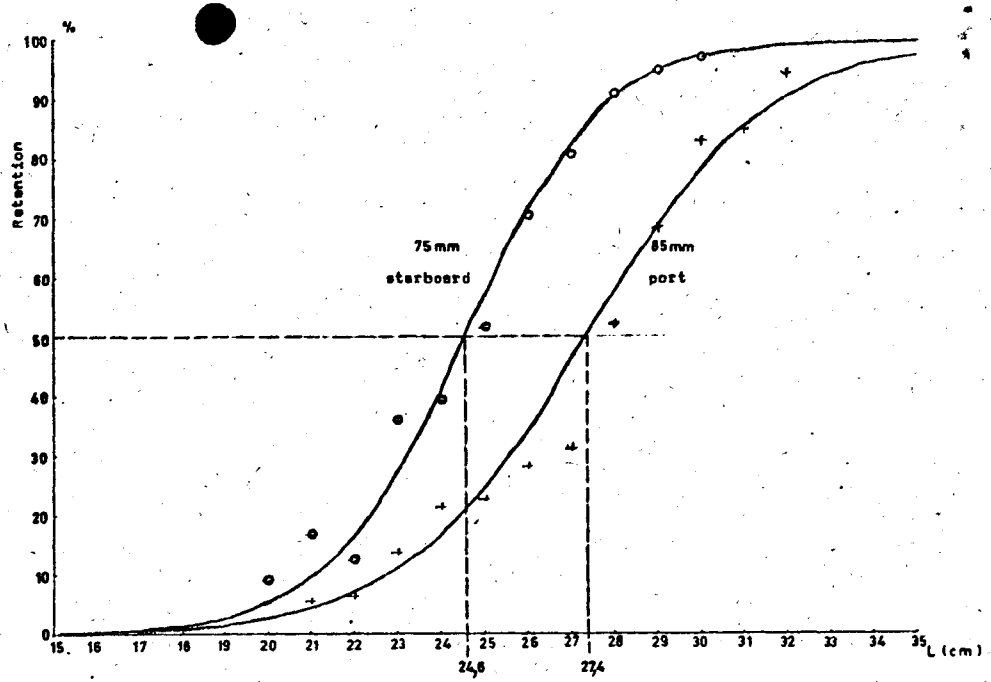

Figure 4.- Selection ogives for 75 mm and 85 mm cod-end - second cruise;hauls 1- 22.

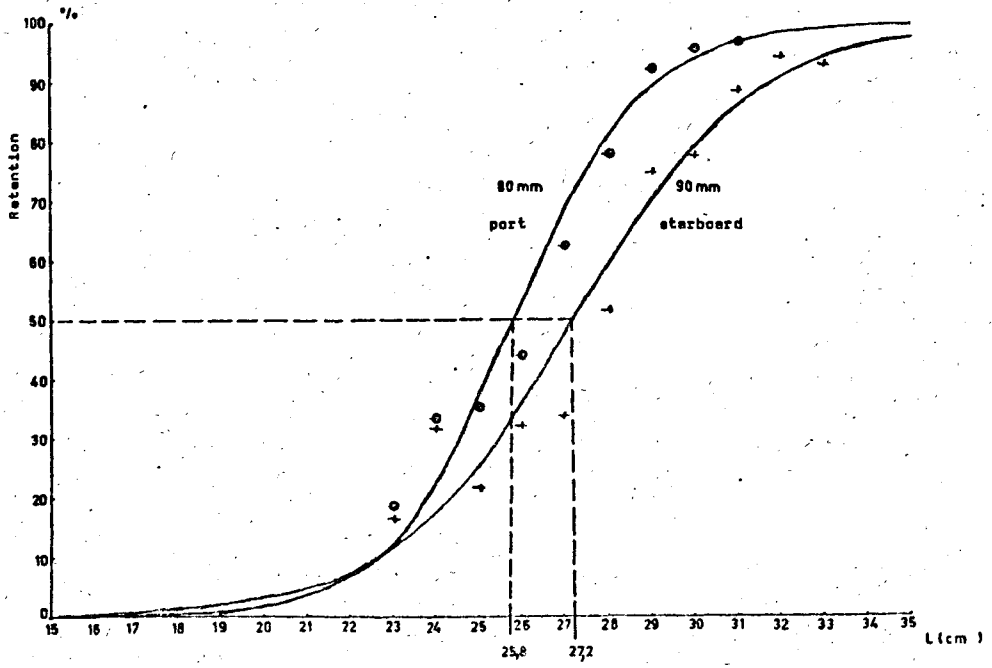

Figure 3.- Selection ogives for 80mm and 90 mm cod-end -first cruise;hauls 20-35.

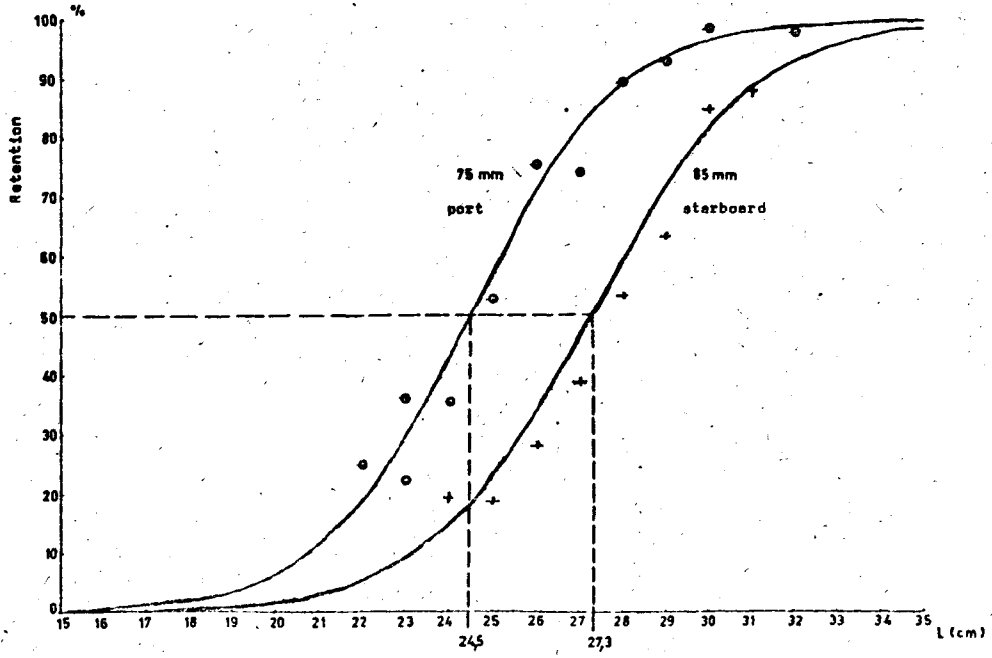

Figure 5.- Selection ogives for 75 mm and 85 mm cod-end -second cruise;hauls 23-40.

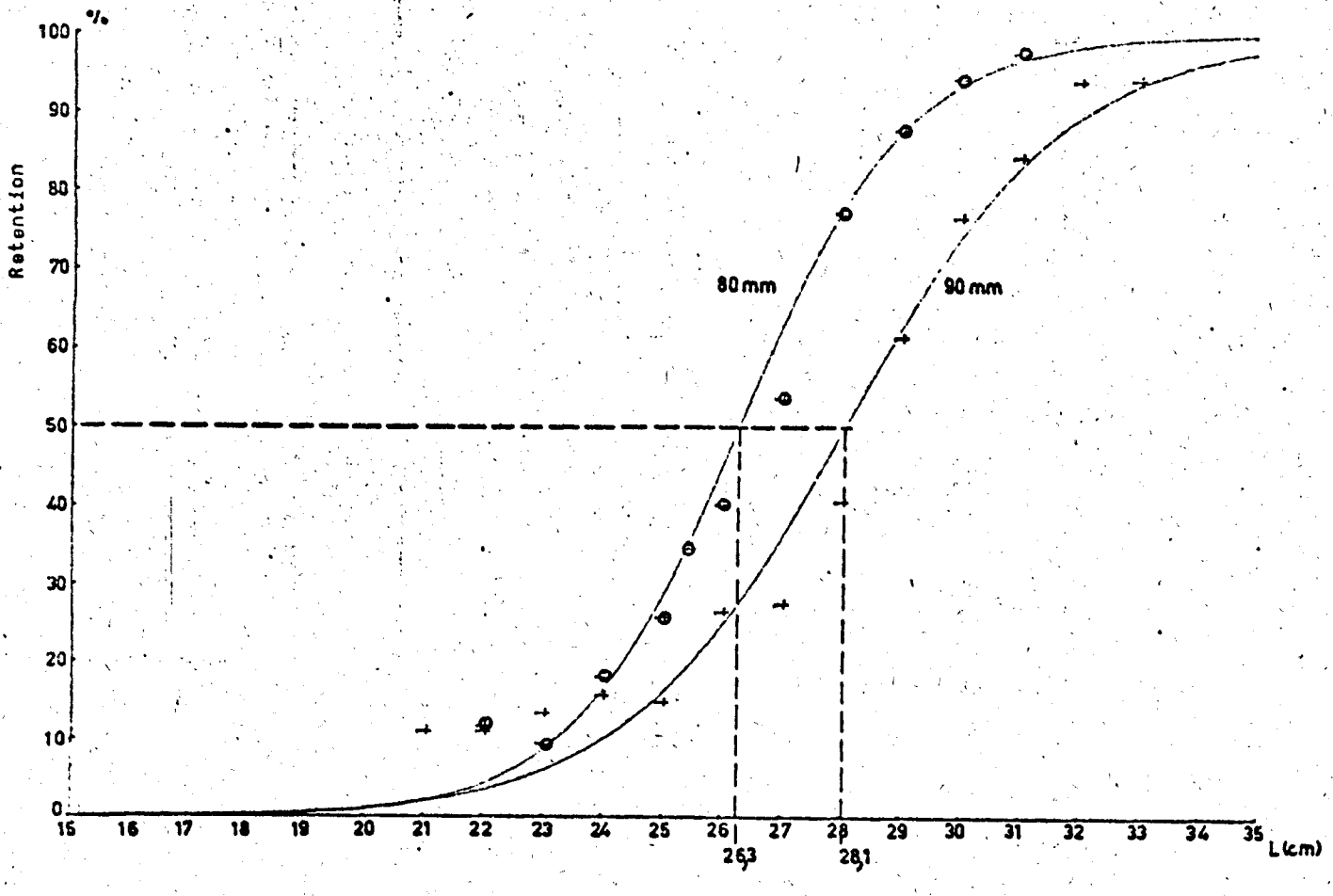

Figure 6.- Selection ogives for 80 mm and 90 mm cod-end - first cruise;hauls conbined.

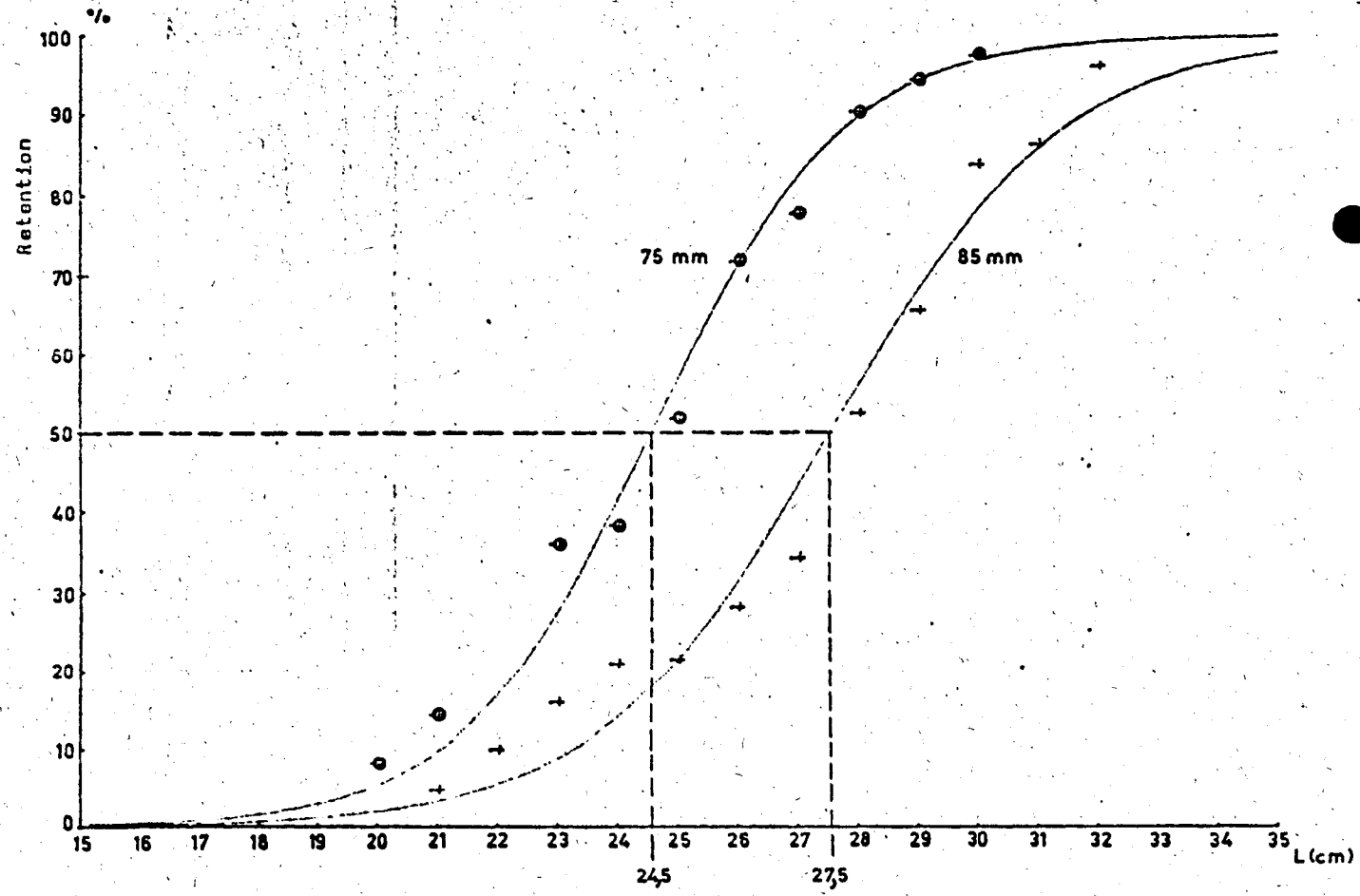

Figure 7.- Selection ogives for 75 mm and 85 mm cod-end - second cruise;hauls combined.