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Gear Selectivity in the Labrador shrimp fishery

by

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ABSTRACT

Selectivity of Sputnik shrimp trawls with 40 and 31 mm codends were compared for similar dates and depths in the Northern Hopedale Channel off Labrador. Mean (50%) selection sizes were 18.7 and 11.5 mm respectively. Reduction in mesh size from the present 40 mm could result in a considerable increase in the catch of smaller animals. Since the discarding of undersized shrimp is a problem in this fishery, reductions in mesh size are not advisable.

RESUME

Nous avons comparé la sélectivité des chaluts à crevettes "Sputnik" de poches de 40 et 31 mm à des dates et profondeurs semblables dans le secteur nord du chenal Hopedale, au large du Labrador. La taille moyenne (50 %) de sélection fut de 18,7 et 11,5 mm respectivement. Une maille plus petite que les 40 mm présentement en vigueur pourrait entraîner une augmentation considérable des petits animaux dans les prises. Le rejet à la mer des petites crevettes est déjà un problème dans cette pêcherie. Une réduction de la grandeur des mailles n'est donc pas à conseiller.

INTRODUCTION

Carlsson and Smidt (1978) determined that codend mesh sizes from 40 to 44 mm (stretched) were most appropriate for shrimp (Pandalus borealis) since they provide adequate catch rates without necessitating considerable discard of the smaller animals. In December, 1976, ICNAF accepted the recommendation for a 40 mm mesh size regulation in the West Greenland shrimp fishery.

Some vessels with experience in the Davis Strait were chartered in the developing Labrador fishery in the late 1970's. The gear most commonly employed was the Sputnik 1800 trawl with codend mesh size around 40 mm. This type of gear remains the standard for this fishery.

This study examines the limited data available for Sputnik shrimp trawl selectivity in the Labrador fishery and considers the effects of changes in the existing mesh sizes.

METHODS AND MATERIALS

Selectivity of the typical gear used in the commercial fishery was determined using length frequency samples from a research survey in July, 1980 and from commercial samples. It was assumed that the 13 mm liner in the research codend did not permit any appreciable escapement of smaller animals. The period of July 16-19 was compared for both data sources in depths greater than 422 m in the northern Hopedale Channel. These dates represent the common fishery period for both gears and depths greater than 422 m and confines the comparison to the zone of commercial activity. Percents at each length[1] (Fig. 1) were then compared up to the points where the data coincide i.e. 100% retention in the commercial gear. A total of 4391 shrimp were measured from the research sampling and 4416 from commercial.

[1] Oblique carapace length measured to the nearest 0.5 mm.

Data on the selectivity of a Sputnik 1600 shrimp trawl with a codend mesh size of 31 mm (stretched) were collected during the research cruise in July, 1980. A 3 mm cover was used over the codend to collect the animals which passed through. Ten half-hour tows were made with this gear and proportions retained at length were calculated using all samples appropriately adjusted. A total of 5943 shrimp was measured.

RESULTS AND DISCUSSION

Comparative data on selectivity of various trawls and mesh sizes (Labonté and Fréchette, 1978) show that the expected mean (50%) selection length for a 40 mm mesh is just over 17 mm (carapace length). No detailed selectivity study has been made for the Sputnik shrimp trawl used in the Labrador fishery but comparison of length frequency data from commercial and research gears for similar times, areas and depths can give a rough estimate for the 40 mm codend mesh size (Fig. 1 and 2). The resulting mean selection size, $\sim$18.7 mm, compares reasonably well with both the above approximation and the estimate of 18.6 mm for a 38 mm mesh (Labonté and Fréchette, 1978). The latter value was calculated for a Yankee 41 shrimp trawl and differences in design may account for the apparent increase in mean selection size.

Selectivity for a 31 mm codend used with the Sputnik 1600 trawl (Fig. 2) shows a more knife edge pattern with 50% retention occurring around 11.5 mm. (Both curves were fitted by eye.) Although these computations can only be interpreted in the most general terms due to paucity of data, it appears that any reduction in mesh size from the present 40 mm could result in a considerable increase in the catch of smaller animals. In view of historic discarding practices in this fishery (Parsons et al., 1981a) and a recent interest in

larger sizes of Pandalus montagui in the Hudson Strait-Ungava Bay areas (Parsons et al., 1981b) a decrease in mesh size would not appear advisable P. montagui is smaller than P. borealis but the virgin fishery provides an accumulation of the older, larger animals. As these become reduced in number the proportions of discarded animals will increase.

No information is available which shows how catch rates are affected by mesh sizes greater than 40 mm. Such an increase might reduce the discard problem but in doing so might also reduce overall catch rates to unacceptable levels.

If selectivity of the present commercial gear is adequately reflected in Fig. 2, then smaller (younger) shrimp should not be adversely affected due to present levels of fishing pressure, especially since the fleet generally prefers depths where relatively few small animals are found.

The concept of selectivity measured in the traditional manner (i.e. escapement through the codend) has been recently considered by the International Commission for the Exploration of the Sea (ICES). Reports indicate that selection of shrimp occurs in different parts of the net and that the hanging of the mesh in the side panels also effects selectivity (Redant, 1980; Thorsteinsson, 1980). Both these factors may be operating when comparing the Sputnik trawls. The 1600 and 1800 models are essentially the same (i.e. mesh size, foot gear, headline) but more meshes are present in the bellies of the latter. In addition the anterior portions of both nets have larger mesh (up to 80 mm) where selectivity patterns may vary.

On the other hand, Sakhno and Sadokhin (1980) report that around 95% of the shrimp escape through the codend and conclude that studies on trawl selection are, therefore, simplified since experiments can be confined to the codend.

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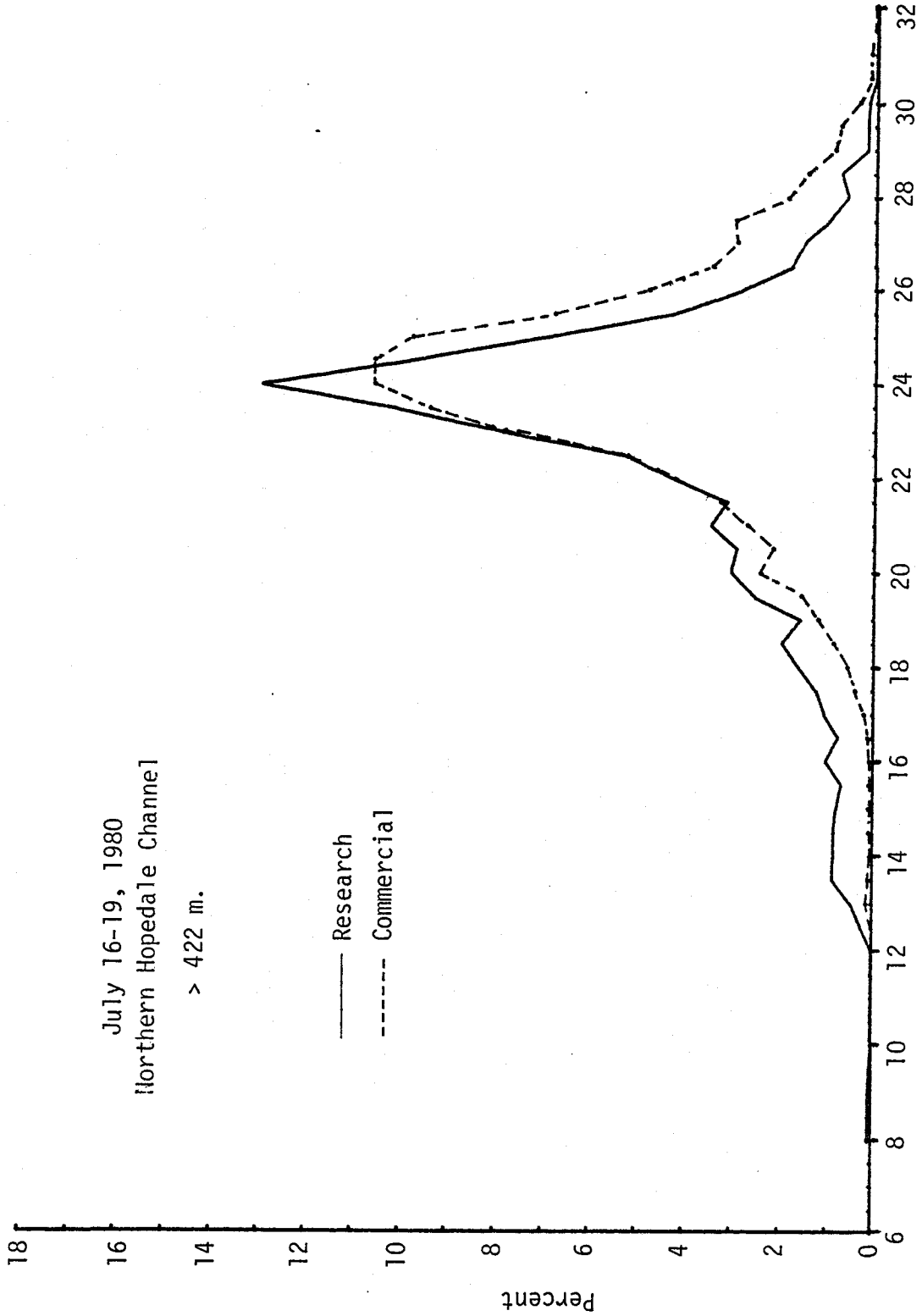

Fig. 1. Comparative research and commercial length frequencies.

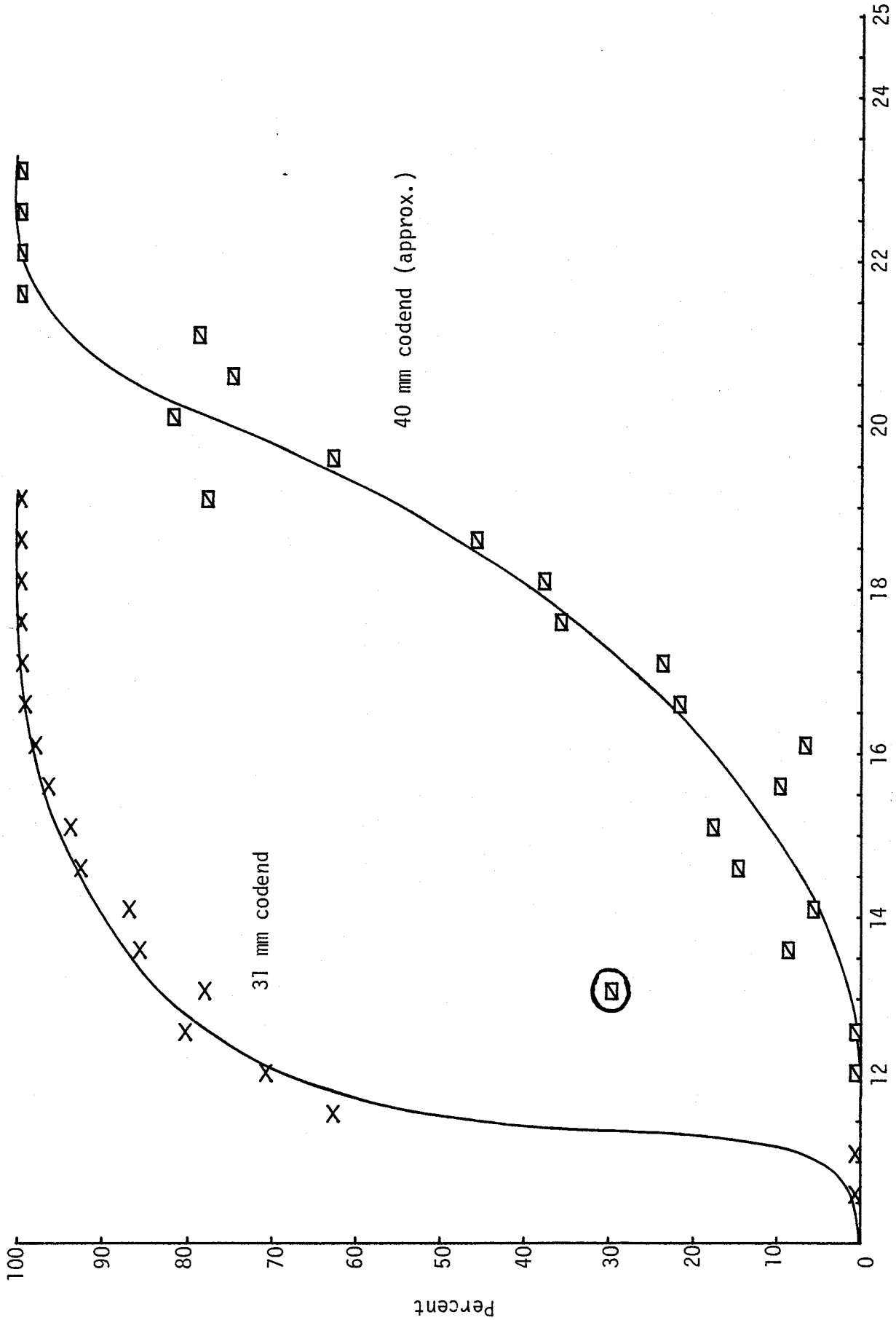

Fig. 2. Selection ogives for two codend mesh sizes.