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SELECTIVE PROCESSES IN THE SKREI FISHERIES.

By G. Sætersdal.

A study of the various selective processes in the fisheries for skrei on the Norwegian coast is at present being made. A few of the preliminary results are related here because it seems necessary to take them into account when planning future research and sampling on this fish population.

In the Lofoten fishery several types of selection has long been known both to fishermen and biologists. Thus gear selections both as regards sex and size of the fish are found, and there is a geographical segregation of fish sizes as well as one related to the time of the season.

But only approximately half of the total yield of the skrei fisheries is brought ashore in Lofoten. The other half derives from the coastal banks outside and to the north of Lofoten. When analysing the available length data of skrei from these different fishing grounds some main features of variation became apparent.

Between trawl-caught fish on the outer banks and skrei taken on long lines inside the Lofoten Islands a consistent difference of fish size was found. Table 1 shows the ratios of the mean frequency distributions of trawl / Lofoten for the years 1954-57. In fig. 1 the $\log_e$-values of these ratios are plotted. There is seen to be a reasonably good fit of these points to a straight line showing that selection is taking place over the whole of the size range 50-114 cm. According to the samples this range covers about 99 per cent of the fish sizes in both these fisheries. The data from the period 1950-53 give a very similar result cfr. fig. 1.

This difference in fish size is not caused by different selectivities of the two types of gears involved. Comparisons with purse seine catches have shown that the fish size on long lines is, if anything, smaller than the true mean of the Lofoten fish. A trawl selection which result in a predominance of small fish is possible, but rather unlikely. However, some length data are available from Norwegian long-lining on the Senja Banks north of Lofoten, where the most important trawling grounds in Region II a are found. Comparison with skrei from Lofoten

shows the same main difference of size as that between trawl catches from these grounds and Lofoten fish cfr. table I and fig. 1. Thus we may conclude that this selection is related to a geographical segregation of fish sizes.

In these analysis the ratios for the fish of sizes 50-64 cm are seen to lie above the straight lines which give the best fit to the points representing the larger fish sizes. This may be due to the presence of a population of small (immature ?) fish on the outer grounds, which is not represented at all in Lofoten.

A consistent size difference is also found between the English and German market sampling data cfr. table I and fig. 1. This could be due to a different geographical distribution of the fisheries of the two nations, but no information is available to show whether any such difference exists. However, there appears to be a difference in the distribution on the time of the season of the German and English skrei fisheries as shown by the following data of the landings of cod from region II a (per cent):

	Jan.	Feb.	March	Apr.	May
Germany 1953/56	11.0	34.0	32.4	19.5	3.2
England 1955/58	7.2	50.4	31.4	11.0	

This difference may ecplain the higher proportion of small-sized fish taken by the German trawlers, because the relative abundance of small fish is highest in the latter half of the season. The segregation with time is usually a very marked one, as shown by two examples of ratios of frequencies of fish size in March to those in February, one from the Senja Banks and one from Lofoten cfr. table I and fig. 2. Analysis of the spawning zones of otoliths have shown that there is generally also an increase of the relative abundance of first time spawners towards the end of the season.

These main features of selectivity in the skrei fisheries suggest that:

a) a more detailed statistical division of region II a is needed,

b) sampling for length and age should be carried out throughout the season and should if possible be weighted by data of catch per unit effort or by catch data,

c) special sampling for maturity stage and number of spawning rings would be valuable.

Further information on the various forms of selection and their causes is also required. It is thought that marking experiments can be helpful here, and a joint Anglo-Norwegian marking program has already been planned for the coming season.

Table I. Ratios of length frequencies of skrei. Data of English and German trawlers from Region II a. Norwegian long line data from Lofoten and Senja Banks.

	Eng. trawlers		Germ. tr.	Senja B.	March 1950	
	Lofoten l-line		Engl. tr.	Lofoten	February 1950	
cm	1954/57	1950/53	1950/56	1948/51	Lofoten	Senja B.
50-54	5.25	19.00	1.08	23.00	5.50	1.05
55-59	5.14	19.63	1.46	11.50	10.83	1.98
60-64	4.93	9.31	1.27	6.83	8.52	3.29
65-69	2.78	3.87	1.37	3.49	8.45	2.73
70-74	1.93	2.41	1.18	2.44	3.25	2.26
75-79	1.25	1.68	1.02	1.82	2.49	1.64
80-84	1.00	0.99	0.89	1.28	1.31	0.99
85-89	0.71	0.82	0.83	0.88	0.81	0.61
90-94	0.61	0.55	0.70	0.64	0.70	0.36
95-99	0.54	0.41	0.84	0.50	0.48	0.25
100-104	0.43	0.41	0.62	0.48	0.55	0.29
105-109	0.22	0.21	0.74	0.39	0.51	0.36
110-114	0.22	0.08		0.33	0.59	0.40
115-119					0.77	0.61
120-124					1.30	0.50
125-129					1.35	

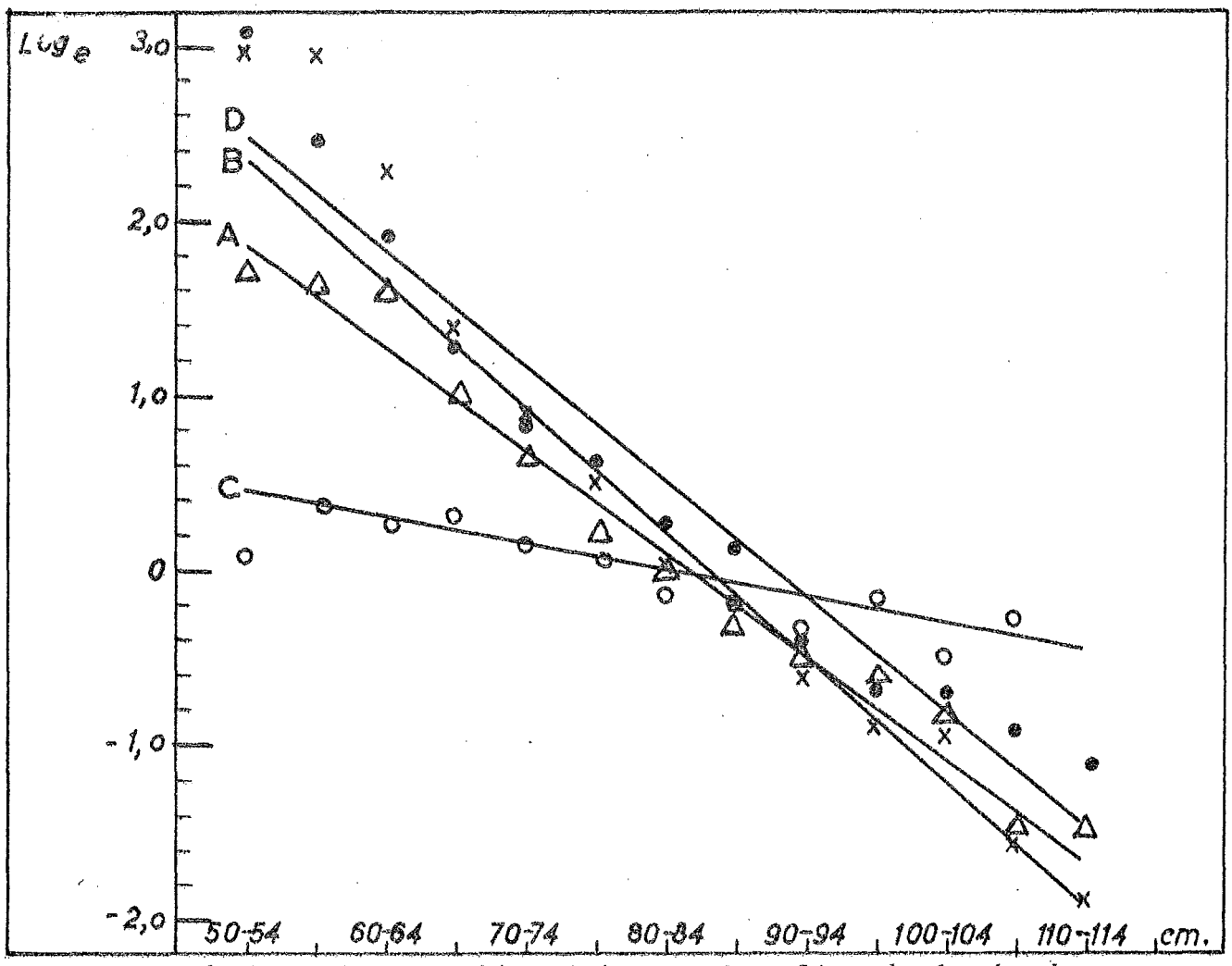

Figure 1. $\log_e$ of ratios of length frequencies. Lines by freehand.
- A: English trawlers Region II a / Long-line Lofoten. 1954-57.
- B: " " " " " 1950-53.
- C: German trawlers / English trawlers Region II a. 1950-56.
- D: Senja Banks / Lofoten. Long-line 1948-51.

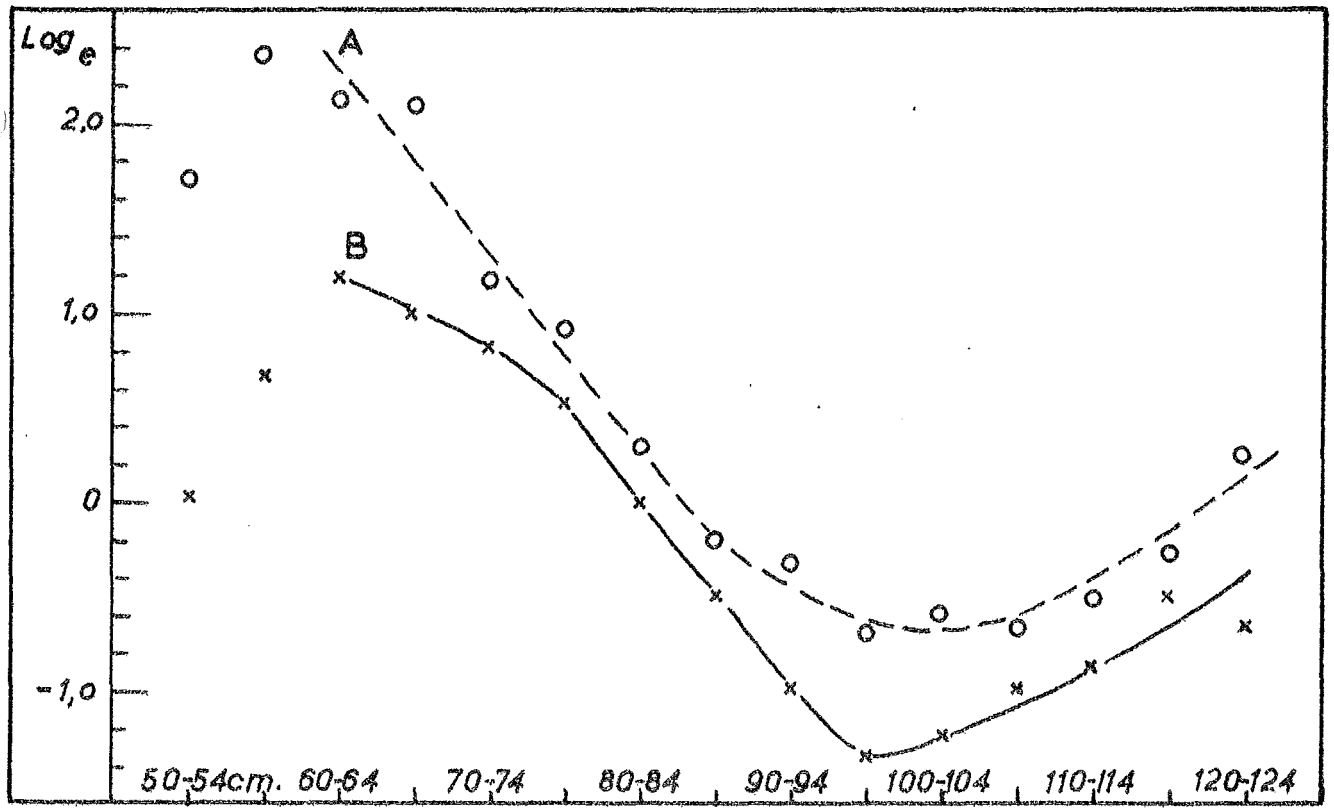

Figure 2. $\log_e$ of ratios of length frequencies March/February 1950.
- A: Sørvågen, Lofoten.
- B: Gryllefjord, Senja Banks.