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An Attempt of Comparison of Fishing Power of Polish Trawlers Operating in the North Sea

by

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For the estimation of the general fishing effort of the Polish fishing fleet in the North Sea and its changes in particular years it was necessary to express such fishing effort in comparable, uniform units. The present analysis is an attempt to compare fishing power and to calculate the relative fishing power of the Polish trawling vessels, operating in the North Sea. It is the introductory analysis based on the materials obtained in 1959. This year was chosen because it was the last year in which the Polish vessels still used manilla trawls. Trawls made of synthetic fibres were introduced later, and not simultaneously on all vessels, and this might have handicapped the comparison of results.

The present analysis is based on the comparison of the catch per effort of all Polish ships which operated in the North Sea. At the first stage of investigations the groups of vessels, which essentially differ among themselves in fishing power, were established. The vessels were subject to division into groups according to the following criteria:- type, tonnage, engine power and kind of propulsion and the kind of trawl used. The following groups were brought forward:

Steam trawlers:

I. Trawlers B10 (613-670 GRT, 1000-1200 HP, trawl 80')
II. Trawlers B14 (650-680 GRT, 800 HP, trawl 80')
III. Old, non-typical trawlers (308-581 GRT, 600-1000 HP, catching in general with trawls of 72' - 80% and 80' - 20%; at first two sub-groups were distinguished with respect to their tonnage, engine power and the size of trawl used - probably stronger and weaker ones, but no essential differences were found between them).

Motor-powered drifter trawlers:

IV. Series B17 (183-185 GRT, 300 HP, trawl 63')
V. Series B17-Z (183-185 GRT, 390 HP, trawl 63')

Motor-powered cutters:

VI. Cutters 24 m (74-106 GRT, 210-225 HP)

The comparison of catch per effort in the above six groups has been carried out in 4 variants:

Variant A: The catches within an approximate time and in an approximate fishing area. The analysis was based on daily reports of fishing companies. As an "approximate time" was taken a period of one month and as an "approximate fishing area" about 6 statistical squares (such an area was justified by the reason that masters did not point out any accurate geographical positions in their reports, showing instead the names of fishing grounds, such as "Fladen", or even only "Middle part of Norwegian Deep").

Variant B: Monthly catch per effort data, irrespective of fishing ground, on the basis of daily fishing reports.

Variants A and B are referring solely to herring catches, which is the main object of the Polish fisheries. The analysis was carried out in the months, in which the catches of this species exceeds 70% of the total landings (in 1959 - 7 months, i.e., May - November).

Variant C: Monthly catch per effort data, irrespective of fishing ground, based on the amounts landed for each vessel and calculated for the same 7 months as in Variants A and B.

Variant D: Yearly catch per effort, taken from owners' computations, for each of the vessels.

The comparison in Variants C and D is based on the total landings, irrespective of species.

In all cases catch per effort was obtained for one fishing day, in the Variants A and B also per one haul. Besides, from the calculation of average fishing time in hours in a day in each of the areas an attempt was made to assess indirectly the catch per effort for 1 haul-hour.

The results obtained in all variants for each group of vessels was compared with the respective results for the group of vessels, which was considered as a standard one. For such a group the trawlers of series B14 have been accepted in Polish fisheries for the following reasons:

1. The vessels, not being very old, are quite numerous in exploitation (since 1961 used by deep-sea fishing companies);

2. They use only trawls all year through.

The coefficients of the fishing power have been calculated so that the catch per effort for each group of vessels was divided by the catch per effort of the standard group of vessels, and then the mean weight values from the results thus obtained were calculated.

The following coefficients were obtained:-

	Number of days	Hauls	Time - h
Trawlers B 14	1	1	1
Trawlers B 10	1.16	1.04	1.06
Old trawlers	0.91	0.76	0.87
Drifter trawlers B 17[x)]	0.54	0.68	0.65
Drifter trawlers B 17 - Z[x)]	0.70	-	0.79
Cutters	0.47	-	0.47

x) The coefficients for the drifter trawlers for 1959 are not very characteristic. In that year another owner took possession of them. They were separately transferred in succession through all the season and most probably this caused some disturbance in the regular fishing cycle, i.e., decreasing their catch per effort.

During the work the following was noted:-

1. Evidently the most reliable unit for determination of actual fishing effort in trawl fisheries is one fishing hour. Analysing the coefficients of fishing power per 1 haul - hour we find that it is to a considerable degree connected with the type of vessel and the power of the engine. The latter relation is, however, different for the various types and thus, e.g., in the group of trawlers, an increase in engine power by 25 - 50% increases respectively the fishing power by about 6%, while in the group of the drifter trawlers an increase in engine power by 30% raises the fishing power by more than 20% (in both cases with the same tonnage and fishing gear). The possible explanation is that the trawlers, being provided with more powerful engines, usually do not use all the power in trawling.

2. For the calculation of fishing effort in the earlier years we shall find only the data for number of fishing days. Daily coefficients take different values to those for one fishing hour, whereas the relation between them seems to be rather characteristic. There appears to exist some relation between number of trawling hours in a day and the type of vessel. In the example of comparison of both series of trawlers (B 10 and B 14) we may note that though the fishing power of trawlers B 10, expressed in the coefficient per one haul-hour, is only slightly different to the fishing power of trawlers B 14 (about 6%), still the differences in the daily average catch per effort increase up to about 16%. This may possibly be attributed to the difference in sea values of both series (the ships of series B 10 have higher sea value), which may prolong an average work-day.

3. The coefficients for trawlers, calculated from Variant A (in the approximate time and area) as well as from Variant B (irrespectively of fishing ground) are for both cases almost identical (the difference not exceeding 0.01), which may be due to the uniformity in the information service of the Polish fisheries. The same comparison for drifter trawlers shows greater differences. These vessels operate in different areas than the standard fishing craft.