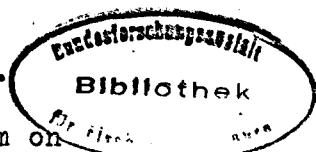


This paper not to be cited without prior reference to the author.



International Council for the
Exploration of the Sea.

Symposium on
"The Biology of early Stages and
Recruitment mechanism of herring."

No. 39. [1968]

"Note on spawning potential, larval abundance
and recruitment in Doggerbank herring".

by J.J. Zijlstra,

Netherlands Institute for Fishery Investigation
IJmuiden, Netherlands.



Two papers to this symposium concern studies on factors affecting recruitment to the Doggerbank stock of North Sea herring. Postuma (paper no.16) found indications that the variation in yearclass strength is partly determined by the temperature on the spawning ground at the time of egg development. Besides, the temperature in the nursery area (coastal zone) was found to be related to yearclass variation. Vilela and Zijlstra (paper no. 15) failed to find a relationship between larval condition in the Doggerbank area and year-class strength. They found, however, indications, that larval abundance could be related to the temperature conditions in the spawning area, an observation which is interesting in the light of the relationship between temperature and recruitment found by Postuma.

This short note serves to provide recent observations on recruitment and larval abundance in the Doggerbank stock, together with data on stock size (spawning potential) and temperature conditions in the spawning area. (table 1).

The note is intended to assist in the discussions concerning the causes of a decline in herring stocks, as the Doggerbank stock shows in recent years, since about 1960, a tendency to decrease in abundance, somewhat similar as occurred in the Downs stock of herring. Data on recruitment, larval abundance, spawning potential and spawning temperature are tabulated in table 1.

Yearclass	(a) Recruitment (R ₃)	(b) larval abundance	(c) Spawning potential	(d) temperature spawning ground.
1957	2.0	232	1.68	13.1° C
1958	12.6	437	1.68	12.4° "
1959	0.7	97	1.49	15.4° "
1960	21.8	137	1.66	12.0° "
1961	6.0	59	1.11	14.5° "
1962	14.1	98	68	13.3° "
1963	7.6	-	1.55	---
1964	(6.1)	52	1.11	13.6° "
1965	--	254	89	11.4° "
1966	--	23	74	13.5° "
1967	--	22	68	12.4° "

Table 1. Doggerbank stock (a). Recruitment as at 3 years of age, numbers (thousands) caught per day fishing by a 500 B.H.P.-trawler (b). Mean larval abundance (numbers x 10⁹) between half September and the end of October, size of larvae under 11 mm (c). Spawning potential, expressed as egg-production of the average catch of ripe herring, per day by a 500 B.H.P.-trawler (numbers x 10⁹) (d). Bottom temperature in the area 54°-55° NL and 1°-2° EL, at 20-30 fathoms depth between half September - half October.

The data in table 1 show that both spawning potential and larval production are declining in the period concerned. In the case of larval production this decline is even more serious than appears from the figures, as the high abundance in 1965 was mainly based on one station with over thousand small larvae.

In the rather short series available recruitment and larval abundance are not related. The data indicate a relationship between larval abundance and spawning potential, the correlation of $r = 0,58$ is probably significant. A non-significant negative correlation ($r = 0,44$) is found between temperature conditions in the spawning area and larval abundance. As found by Postuma, recruitment tends to be related to spawning temperature.