

The Presence of Cod Spawning at a small Depth (25-60 m)
in the Southern Part of the Bornholm Basin

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The investigations on ecology of spawning cod in the Bornholm Basin carried out by various authors have shown that the most suitable salinity for its spawning is oscillating within the limits of 13-16 ‰ (Kändler, 1944), the temperature within 3-7° (Kändler, 1938); (Poulsen, 1931), (M. Berner, 1956) and oxygen content not dropping below 1 ml/l (J. Elwertowski, 1954), (M. Berner & R. Schemainda, 1957). Such conditions normally prevail in the bottom layers of the Bornholm Basin or over its slopes.

In the investigations carried out in the years 1955-1960 we found a number of cod (their gonads in stage VI and VII of Maier's scale) spawning beyond the Deep - in the southern part of the Basin at a depth of 25-60 m (Figure 1), where the ecological conditions were certainly different from those of the bottom layers, in which the main spawning of the cod takes place. The number of individuals found there was about 13.0% of the whole stock present in this part of the Bornholm Basin. This might point to the fact that a portion of the cod stock in the Bornholm Basin is spawning in the shallower waters of its southern part. A similar phenomenon has also been observed in the Gdańsk Bay (Chrzan, 1951).

Cod spawning at depths of 25-60 m in the southern part of the Bornholm Basin was found in the period from March till November. Their frequency in the particular months of the years subject to investigations was different, as may be seen from Table 1.

Most of the spawning cod is found in the period from May till August. In the shallower waters they appear usually later than in the deeps (Stanek, 1958, 1956). The ratio of both sexes of cod and the course of their spawning were in general similar to such ratio of sexes and the spawning of cod in the deeps (Chrzan, 1951), (Stanek, 1956), i.e. in the first stage of spawning there were males in considerable excess, while towards the final stage the number of females increased.

In order to check for particular years the intensity of the spawning of cod in the shallower waters of the southern part of the Bornholm Basin only the observations made in June and July were taken into consideration, i.e. the months in which the highest number of spawning individuals in this area was usually recorded (Figure 2). The number of cod starting to take part in the spawning was oscillating from 2.9% to 29.4% of the total amount of cod investigated in those waters. Most of these individuals were observed in 1958 and least in 1957. The spawning females made on an average 11.2% of the total number of spawning cod (maximum 16.4%).

The hydrographic investigations proved that in 1958, when most of the cod, spawning beyond the deep, were found, the salinity and temperature of the water in the central part of the Bornholm Basin were lower (Glowinska & Wojnicz, 1961) than in the other years (Filarski, 1955, 1959).

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Table 1. The percentage of cod spawning at a depth of 25-60 m in the southern part of the Bornholm Basin in particular months of the years 1955-1960

(x = a gap in the investigations)

Year	Sex	M o n t h s											
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1955	♂	-	-	-	-	17.6	6.2	x	x	4.1	-	-	-
	♀	-	-	-	-	2.2	0.9	x	x	2.0	1.5	-	-
	♂ + ♀	-	-	-	-	19.8	7.1	x	x	6.1	1.5	-	-
1956	♂	-	-	-	x	x	5.6	9.4	1.3	0.5	2.5	-	-
	♀	-	-	0.8	x	x	-	2.2	-	1.1	1.0	-	-
	♂ + ♀	-	-	0.8	x	x	5.6	11.6	1.3	1.6	3.5	-	-
1957	♂	-	-	-	x	1.3	2.8	3.4	-	x	-	-	-
	♀	-	-	-	x	-	-	-	2.0	x	0.5	-	-
	♂ + ♀	-	-	-	x	1.3	2.8	3.4	2.0	x	0.5	-	-
1958	♂	-	-	-	-	x	x	35.6	15.0	8.6	-	3.1	-
	♀	-	-	-	-	x	x	8.0	2.0	4.1	1.4	-	-
	♂ + ♀	-	-	-	-	x	x	43.6	17.0	12.7	1.4	3.1	-
1959	♂	-	-	-	6.5	2.4	22.5	0.9	0.5	-	-	-	-
	♀	-	-	-	-	1.0	0.9	3.7	0.5	-	-	-	-
	♂ + ♀	-	-	-	6.5	3.4	23.4	4.6	1.0	-	-	-	-
1960	♂	-	-	-	x	6.4	10.4	7.0	1.9	-	-	-	-
	♀	-	-	-	x	-	0.8	-	0.5	-	-	-	-
	♂ + ♀	-	-	-	x	6.4	11.2	7.0	2.4	-	-	-	-
Mean	♂	-	-	-	2.2	6.9	9.5	12.6	3.7	1.0	0.4	0.5	-
	♀	-	-	0.1	-	0.8	0.5	2.8	1.0	1.4	0.7	-	-
	♂ + ♀	-	-	0.1	2.2	7.7	10.0	15.4	4.7	2.4	1.1	0.5	-

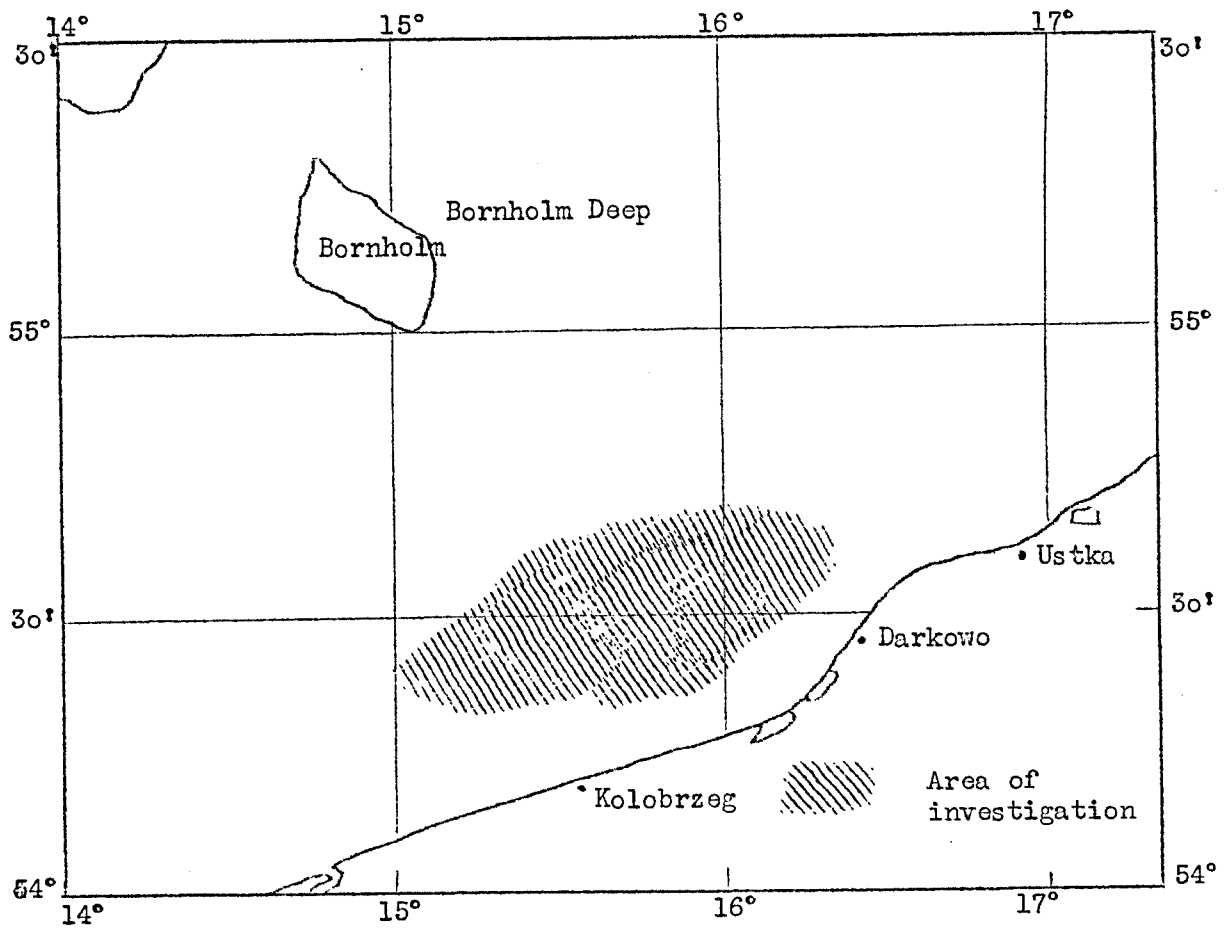


Figure 1. The chart of areas of investigations of cod spawning in the southern part of the Bornholm Basin.

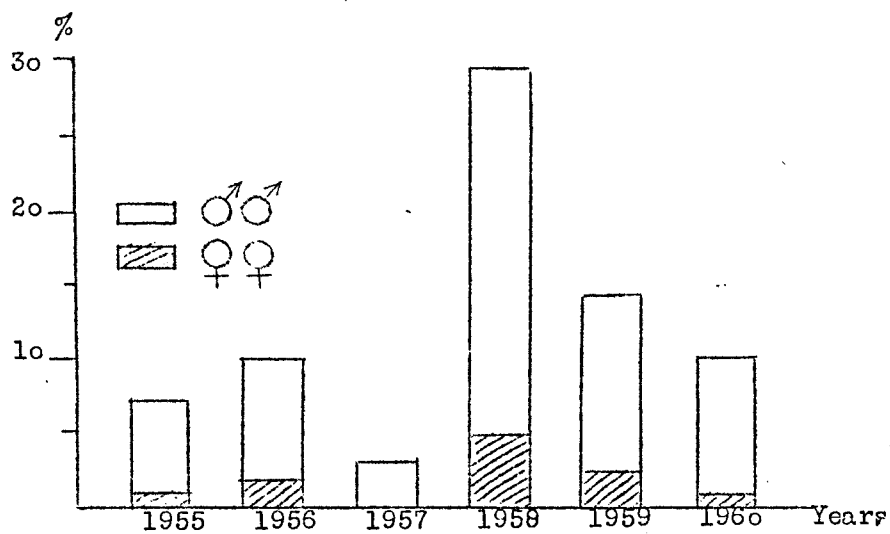


Figure 2. The percentage of cod spawning at a depth of 25-60 m in the southern part of the Bornholm Basin in June and July in the years 1955-1960.