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THE REPRODUCTIVE ADAPTATION OF MARINE TELEOSTS TO WATER  
OF LOW SALINITY

By

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The euryhaline teleost the flounder, (Platichthys flesus), is distributed in areas with salinity down to 5-7 ‰. The Finnish flounder population is living under such extreme conditions, the salinity fluctuating from year to year between 5 and 7 ‰ (Segerstråle 1965). The population is reported to be very unstable (Järvi 1932).

For Norwegian flounder it has been found that the minimum salinity for successful fertilization is about 11 ‰, but only few eggs are fertilized in this salinity (Solemdal, unpublished data). This limit corresponds well to a drastic reduction in the time of activity of the spermatozoans.

In 1969 fertilization experiments were carried out on flounder eggs at Tvärminne Zoological Station, Finland, in May and the beginning of June 1969. The salinity was very low this year, 5.1-5.3 ‰.

In Table 1 (top) are given the results of several fertilization experiments carried out in seawater from Bergen, 35 ‰, and seawater from Tvärminne. Within an experiment the temperature was the same. Temperatures between 4.5 and 9°C were used for different experiments.

The sperm was stirred for restricted periods, 10 or 30 seconds, in a restricted volume of water.

As seen from the table a very low % of the eggs are fertilized in seawater from Tvärminne. In fact, only 1 of 10 experiments showed a fertilization % higher than 3. The neutral buoyancy of eggs fertilized in 35 and 5 ‰ is very similar.

In Table 1 (middle and bottom) are given the results of some fertilization experiments with salinities between 5 and 10 ‰. Both experiments show

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a drastic reduction of fertilized eggs in salinities below  $7^{\circ}/\text{oo}$ . The results corresponds well to the reduction in time of spermatozoan activity in salinities between 7 to  $5^{\circ}/\text{oo}$ .

#### SUMMARY

- 1) The reproductive capacity of the flounder (Platichthys flesus) is adapted to water of salinities higher than about  $6^{\circ}/\text{oo}$ . Year to year variations in salinity slightly below this value have drastic effects on the success of fertilization.
- 2) The time of spermatozoan activity seems to be the limiting factor for the reproduction in waters of salinity lower than  $6^{\circ}/\text{oo}$ .

#### REFERENCES

- Järvi, T.H., 1932. Die Flunderfischerei in Finnland.  
Rapp. P.-V. Reun. Cons. perm. int. Explor. Mer. 78: 1-5.
- Segestråle, S., 1965. On the salinity conditions off the south coast of Finland since 1950, with comments on some remarkable hydrographical and biological phenomena in the Baltic during this period. Comment. biol. 28: 5-28.

Table 1. Eggs of flounder (Platichthys flesus) from Tvärminne, Finland.  
 % of eggs fertilized in different salinities, all other factors  
 kept constant.

Salinity during fertilization, ‰	% fertilization, mean	Range, %	Neutral buoyancy, ‰ salinity	No. of experiments
35	40.2	12.6-91.5	20.8	9
5.1-5.3	4.4	0.0-36.3	18.0	10
35	15.2		19.8	1
9.7	14.4		20.5	1
7.2	7.5		20.2	1
5.2	1.1		-	1
35	91.5			1
8	94.6			1
7	87.8			1
5.2	36.3			1