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Plankton Committee

To the question on the influence of currents
on the distribution of zooplankton in the Baltic Sea

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ANNOTATION

Sur la base de l'analyse de la dynamique de l'abondance
du *Oithona similis* Claus de plusieurs années (1960-1974) et du
déplacement des masses d'eau dans les régions particulières de
la mer Baltique il est montré l'influence du courant de fond
sur le transfert du plancton des régions méridionales de la mer
vers les régions orientales.

(Voir tabl.1, bibl.5).

L'influence des courants d'eau sur la répartition et la
formation des communautés planctoniques, surtout océaniques,
est connue (voir 1-3 et autres). Mais en ce qui concerne la
mer Baltique, la question n'est pas bien étudiée.

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

International Council for
the Exploration of the Sea

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To the question on the influence of currents
on the distribution of zooplankton in the
Baltic Sea

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The influence of currents on distribution and forming of plankton communities, especially oceanic, is known (1-3 and many others). As far as the Baltic Sea is concerned, this question is not studied enough.

For the studies on the influence of deep-water current connected with the transportation of more salt North Sea waters from southern parts of the sea to northern seasonal dynamics of Oithona similis Claus abundance for the period 1960-1974 and dynamics of water regime for some period was investigated. Oithona was considered as indicative organism of North Sea waters in the Eastern Baltic. Oithona belongs to the ecological complex of everythermal species with higher optimum of salinity, more than 7-8 ‰. With the decrease of salinity from the south to the north upper limits of its distribution are reduced. This is caused by the fact that salinity suitable for its life is preserved in the middle and deep layers of the Eastern and Northern Baltic. So, to the west off Bornholm Oithona is met from the surface to the bottom, in Bornholm Deep ma-

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ximum abundance* is observed at the depth 50-90m, in the Southern Gotland - at the depth 80-100m (more seldom 120m), in the Central Gotland - 80-120m, in Fårö Deep - 100-150m. Simultaneously Crustacean abundance decreases (Table 1).

Maximum limits to a great extent coincide with the boundaries of the active deep layer. According to the data of Kaleis M. (4) rather constant water shift in the north-eastern direction is observed in the active deep layer which is situated in Bornholm Deep on the average at the depth 50-75m, in Gotland Deep - 80-130m, in Fårö Deep - 100-120m. After entrance through Darser and Drogden rapids Kattegat waters will reach Bornholm Deep in 2-3 months, the southern part of Gotland Deep in 5-6 months, Fårö Deep - in 8-9 months.

Oithona doesn't reproduce itself in the Eastern Baltic apparently because of low salinity. The absence of nauplia and younger copepodites in zooplankton samples from this area testifies to this. So, the increase of its abundance in Gotland Deep may occur because of the transference of organisms from the southern area.

Considerable increase of Oithona abundance in the Central Gotland and in some years in Fårö Deep was observed in 1961, 1964, 1967, 1972 and 1974 (Table 1). The presence of fresh North Sea waters in the Central Gotland was observed during the same years.

Thus, during the years of active water exchange with North Sea carrying-out of plankton organisms by deep-water current from the southern part of the Baltic Sea to the eastern and north-eastern is observed. Obviously, other species inhabiting the deep-water layer are carried out together with Oithona, e.g. Pseudocalanus which differing from Oithona makes daily vertical migrations to the upper water layer. However, its reverse carrying-out in the southern direction apparently does not occur, because the total surface current usually also has eastern and north-eastern direction. (5)

Therefore it may be supposed that in the years of active

* Outside "maximum" Oithona abundance is rather low, and only some individuals are met in eastern and northern areas.

water exchange plankton of the deep-water zone in the eastern area of the Baltic Sea is partially formed with the help of plankton from the southern area.

References.

1. Bogorov V.G. Plankton of the world ocean. - "Nauka", 1974, M., 320p.
2. Vinogradov M.E., Voronina N.M. Some peculiarities of zooplankton distribution in the northern part of the Indian Ocean. - Trudy of the Oceanological Institute of the Academy of Sciences of the USSR, 1962, v.58, 80-113.
3. Vinogradov M.E., Voronina N.M. Distribution of plankton in the waters of equatorial currents of the Pacific Ocean. - Trudy of the Oceanological Institute of the Academy of Sciences of the USSR, 1965, v.71, 22-59.
4. Kaleis M.V. Some peculiarities of Kattegat waters movement within the Baltic Sea. - Sbornik BaltNIIRH, 1970, Iss.7, Riga, 3-10.
5. Sarkisyan A.S., Stashkevich A., Kovalik Z. Diagnostic calculation of summer circulation of Baltic Sea waters. - "Oceanologiya", 1975, v.15, Iss.6, 1002-1009.

Summary

The influence of deep-water current on the transference of plankton from southern areas of the sea to eastern areas is shown on the base of the analysis of long-term (1960-1974) dynamics of Oithona similis Claus abundance and the shift of water masses in some areas of the Baltic Sea.

Table 1, Bibliogr. 5 ref.

Table 1.

Sta-	1960			1961*			1962			1963		
tions:	V	VIII	X	V	VIII	X	V	VIII	X	V	VIII	X
3	no data(n.d.)			no data			19700	26700	n.d.	3528	2488	1875
6	no data			no data			228	n.d.	20	10	0	190
8	4	17	10	50	636	575	160	150	40	15	0	0
9	4	0	12	5	300	115	91	0	20	0	0	0

Sta-	1964*			1965			1966			1967*		
tions:	V	VIII	X	V	VIII	X	V	VIII	X	V	VIII	X
3	8725	2833	n.d.	6333	2486	1966	2700	83	3228	28	567	3825
	14	225	250	20	40	n.d.	78	n.d.	1	20	200	n.d.
8	35	230	340	90	160	6	65	20	1	25	2	110
9	25	6	70	16	5	10	60	0	0	10	0	10

Sta-	1969*		1970			1972*			1973		1974*	
tions:	V	X	V	VIII	X	V	VIII	X	V	VIII	V	VIII
3	500	667	2470	37	346	1058	n.d.	n.d.	1041	2786	1625	3781
6	0	46	12	67	40	0	1200	60	83	67	273	n.d.
8	10	40	12	0	8	0	77	360	10	40	n.d.	95
9	0	10	6	n.d.	n.d.	n.d.	n.d.	20	n.d.	0	n.d.	0

Note: the mark * indicates years when the presence of fresh North Sea waters in the Central Gotland was observed (the data of Oceanographic Laboratory, BaltiIRI).

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