Communications

Specificity of the Baltic macrophytobenthos

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The structure and productivity of the ecosystem is very important in the whole investigations of the Baltic Sea. The benthic algae play an essential role in the effect of primary production on the shelf. The scarcity of species and a comparatively low production of macrophytobenthos in the Baltic Sea can be explained by the processes of formation of algoflora and by recent conditions of its existence. The Baltic Sea is a young, brackish and closed water body with the strong anthropogenic influence (Hällfors, Niemi, 1981).

The bibliography concerning the macrophytobenthos in the Baltic Sea is not rich. However, there are several areas where the investigations have a long tradition, and the knowledge of flora is good:

– the gulf of Gdańsk (Lakowitz, 1907; Bursa *et al*, 1939, 1948; Kornaś *et al*, 1960; Pliński, 1982; Pliński, Florczyk, 1984),
– west Baltic – Swedich coast (von Wachenfeldt, 1975),
– Danish islands (Christensen *et al*, 1985),
– German coast (Overbeck, 1965; Schwenke, 1969; Pankow *et al*, 1971),
– north Baltic – Swedish coast (Du Rietz, 1932; Waern, 1952; Jansson, 1974; Wallentinus, 1976),
– Finnish coast (Ravanko, 1968; Hällfors *et al*, 1975),
– the Gulf of Finland (Trei *et al*, 1987).

The list consists only some examples, full bibliography could be much longer.

The recent marine flora at green, brown, and red algae (that is, the algal groups forming the marine macrophytobenthos) in the Baltic Sea is distinguished by a low number of species and by the decline of this number with a decreasing salinity eastwards to northwards. About 350 species are noticed in the Baltic flora but only 110 species no farther than the Danish Straits and it is the correct number of proper Baltic macroflora.

The benthic flora of the Danish Straits seems to be similar to the marine flora of the British Islands in terms of the species composition and the structure of

biogeographical elements, where the boreal – Atlantic species and also the Mediterranean ones are predominant. It is a typically Celtic flora. The flora of the other part of the Baltic has a cool water character. The species occurring there are boreal – Arctic forms, which are typical of the temperate climate flora. The disappearance of marine species is only slightly compensated for by brackish- and fresh-water species (van den Hoek and Donze, 1967).

Many of marine algae growing in the Baltic Sea exhibit a gradual reduction in size with a decreasing salinity. Along with size reduction, a reduction in the reproductive cycle is noticed. Most of red algae lose their ability to form sexual reproductive organs, and reproduce by asexual spores or vegetatively. There is a lack of information on the reproductive cycle for a majority of brown and green algae.

The creation of marine Baltic flora has begun 10 thousand years ago. The influence of each geological stage has impressed a stamp on it. The cool and salty Yoldia Sea, the fresh-water Ancylus Lake, then warm and salty Litorina Sea, and finally cool and brackish contemporary Baltic resulted in the to-day flora. The flora of the Litorina Sea was most abundant and similar to the Celtic vegetations, yielding together one entirety. The species composition typical of the present Danish flora was characteristic of the whole Baltic at that time. The contemporary Baltic flora resembles that living in the time of the Litorina Sea. As a result of cooling and freshing the sea water, this modification gave the post-Litorina stage in the history of the Baltic flora. At that time coolish and eurybiotic species were more adopted to changeable conditions than the Celtic forms. At present it is difficult to state which species are relicts of this or other stage in the evolution of the Baltic Sea. None the less, one can say that many of cool-water species, which are predominant in the vegetation communities and which grow in masses in the low salinity conditions now, date back to the Yoldia stage. Similarly, one can suppose that the original freshwater species, which grow in extremely fresh water conditions in the sea, have existed there since the time of Ancylus Lake stage. Thus, the marine Baltic macroflora is young and allochthon and has been formed on the basis of Celtic flora during the ecological evolution in which only eurybiotic and cool-water forms could survive till now and compose the contemporary flora (Kornaś, Medwecka-Kornaś, 1950).

The structure of the benthic phytocoenosis in the Baltic Sea is simple: the lack of differentiation, scarcity of species, many annual forms, predominance of one-species communities with a large range of occurrence. It means that such phytocoenosis has an unstable character and not achieved the climax stage. It is possible that the Baltic flora during further evolution will become still simpler than now.

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