

## Macrozoobenthic communities present state in Varna and Beloslav Lakes adjacent to Black Sea

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Beloslav and Varna lakes were fresh - water firths with a little flow into Black sea up to 1909 when after digging a channel between the sea and Varna lake its salinity rose considerably (8 - 13‰). Further there were a number of changes in this lakes as a result of human activity as follows: 1923 - the channel between the two lakes was dug; 1954 - the first plants in the Devnya chemical industrial complex were built: 1968 - "Varna" Thermo - electric power station and its harbour were put into operation; 1974 - "Varna - West" harbour was opened; 1976 the second Varna lake - sea channel was dug. In fact since 1970 the Beloslav lake - Varna lake - Varna bay zone has been an area exposed to the cascade - like west - east influence of anthropogenic factors and the lakes have become a buffer - zone holding pollution back. So they have completely lost their self - purification ability and their salinity is almost the same as that of the sea water (15 - 16‰ at present).

Numerous faunistic and biocoenological investigations in the lakes have been carried out in different periods (VALKANOV, 1935; CASPERS, 1951; KANEVA - ABADJIEVA, 1957; KANEVA - ABADJIEVA *et al.*, 1967). From the last 25-30 years there haven't been data about the benthic zoocoenoses therefore in 1990-91 the present investigations were carried out. From 7 sampling stations in the Beloslav lake and 15 stations in Varna lake were taken samples by Birdge - Ekman grab (0.44 m<sup>2</sup>)(Fig. 1). The data obtained were used for determining the communities structure, calculating Shannon - Weaver's information index H and combined K-dominance curves for species abundance/biomass comparison too (ABC method) (WARWICK *et al.*, 1987).

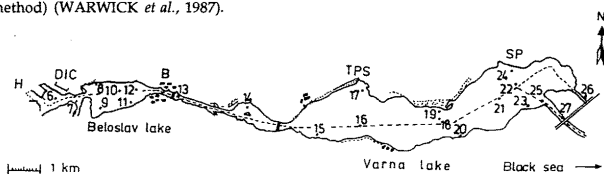


Fig.1. Sampling stations location in Beloslav and Varna lakes  
H - "Varna-West" harbour; DIC - Devnya industrial complex;  
B - Beloslav town; TPS - "Varna" Thermo-electric power station; SP - Varna town sewage plant.

A total of 7 species and groups are registered in the Beloslav lake, out of which 3 Annelida (*Nereis diversicolor*, *Melinna palmata*, *Oligochaeta*), 3 Crustacea (*Gammarus subtypicus*, *Pontogammarus sp.*, *Palaemon elegans*) and *Chironomidae larvae*. The greatest number of species are established in summer (5), while in the rest of the seasons they are 2. The mean density, formed preliminary of *Ch. larvae* (96.8%) is highest in summer (29321 ind.m<sup>-2</sup>); in spring and winter it is 7155 and 10697 respectively. The mean biomass composed mainly of *Ch. larvae* too (95.5%) is highest in winter (38.8 g.m<sup>-2</sup>) and lowest in summer (11.52) in accordance with the dominant organisms development cycle specificity. H index (calculable only in two stations - 8 and 12) is extremely low - average 0.05. According to the ABC graphplots the macrozoobenthic communities are "grossly polluted" in st.8 and "moderately polluted" in st.12 in summer. A typical phenomenon here is the presence of two types of strongly destructed zoocoenoses: 1/ totally lacking living organisms - dead zones; 2/ monospecies zoocoenoses. The western part of the lake is a dead zone throughout the year (st.6). It is reduced gradually to east where monospecies coenoses are established in the southern coastal zone and fairway, while along the northern coast a weak trend of improvement of macrozoobenthic communities status is to be observed.

A total of 45 macrozoobenthic species and groups out of which 17 Vermes, 12 Crustacea and 12 Mollusca are registered in the Varna lake. Vermes prevail in density - from 94.0% in winter to 71.2% in summer. The mean density is highest in spring (8449 ind.m<sup>-2</sup>) composed mainly of *Nereis diversicolor*, *Nereis succinea*, *Polydora ciliata* and *Oligochaeta* and lowest in autumn (2194). Maximum annual density is registered in the almost singular monospecies zoocoenosis situated in the 1st lake sea channel zone (st. 26) - 15658 (*Capitomastus minimus*) and the minimum (88) - in the fairway zone west of the Varna town sewer discharge (st. 22) Vermes prevail in the biomass too (60.4%) excluding the zone in front of and in the second lake - sea channel where Mollusca dominate (67.3%) (*Cunearca cornea*, *Mytilus galloprovincialis*, *Rapana thomasiana*). In the last zone the maximum biomass is registered (2272.8 g.m<sup>-2</sup>) while the minimum biomass zone (0.145) coincides with that of the minimum density.

The information index H varies between 0.55 in autumn to 1.1 in summer. It is lowest (0.25) in the minimum density and biomass area and highest (1.72) - in the second lake - sea channel. There are two dead zones throughout the year in this lake - in front of "Varna" TPS (st. 17) and in front of the town sewage plant (st. 24). In almost all the other stations the H-index is extremely low - from 0.2 to 1.0; the ABC graphplots configuration characterizes some communities as "moderately polluted" and other as "grossly polluted" depending on the season. "Unpolluted" are only two zones - farrest from the dead zones (st. 14 and st. 19) whose H - index is 1.6.

### Conclusions

1/ Most critical is the zoobenthic coenoses status in the Varna and Beloslav lakes in autumn when the dead zones are 8.

2/ Totally lacking living macrozoobenthic organisms throughout the year are those areas exposed to industrial and sewage pollution.

3/ The presence of "unpolluted" communities in separate limited zones allow us to consider that a certain stabilization and gradual restriction of the zoobenthos is possible after restriction or stopping the pollution.

### REFERENCES

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