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The zoobenthos of several lakes along the Northern Bulgarian Black Sea Coast

[Das Zoobenthos einiger Strandseen an der nördlichen bulgarischen Schwarzmeerkünste]

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With 1 table

Schlagwörter: Zoobenthos, Bulgarien, Schwarzes Meer, Strandsee, Feuchtgebiet

The zoobenthos of a group of protected wetlands has been found to consist of 67 taxa at species level and several more at higher level. The data obtained from Durankulak swamp, and the lakes Shabla and Ezerets are the most complete published so far and are an expression of the changes occured. Data from Orlovo marsh and the lagoon Shabla touzla are published for the first time.

1 Short description of the lakes and sampling methods

Durankulak swamp and Orlovo marsh. Durankulak is a closed firth nearby the sea with advanced eutrophication, with depth of some 4 m. The water is fresh - salinity is about 0,3 ‰ The average hardness of 17 °dH put it in the group of hard waters. Northwards the lake is connected with a large flooded area, the Orlovo marsh, with depth of 1.5 m. It is myxooligohaline, with salinity of 1.9 ‰ and highly hard water with °dH = 27.2.

Shabla and Ezerets. Both lakes are deep closed firths with depth of up to 8.5 m. They are joined by an artificial canal and are located along the sea shore.. Their salinity is very low: 0.56 ‰ in Shabla and 0.78 ‰ in Ezerets, i.e. nearly freshwater. Both lakes belong to the group of hard waters with hardness of 20.6 °dH and 6.7 °dH respectively.

Shabla tuzla This lake is a shallow lagoon nearby the sea with depth of 0.8 m. In the past it was really a hyperhaline water body with salinity over 100 ‰. Afterwards, for a period of about 20 years, a spring with warm mineral water has been mouthed in the lake and performed it into a myxohaline one with salinity of 4-5 ‰ during this study. The water is harder (°dH = 24) due to the greater magnesium content.

Samples were taken out by bottom dredge from seven points in the open part of the lakes. Qualitative faunistic samples were also collected by handnet along the shore from sandy and muddy bottom, periphyton on stones and higher water vegetation. Regular sampling was performed nine times from all of the lakes

from July 1995 to October 1996. Afterwards, additional random samples were collected during next two years.

2 Previous studies

CARAUSU (1943) reported 7 species of amphipods from Shabla lake; one of them from Durankulak. Three of these species, *Iphigenella shablensis, Pontogammarus robustoides* and *Dikerogammarus villosus* are pontocaspian relicts. In his study on the chironomid fauna of the coastal lakes TSVETKOV (1955) reported 17 species from Durankulak and 16 from Shabla lake. Later he found predominantly small crustaceans in the microbenthos of both of the lakes (TSVETKOV 1958). VALKANOV (1954) and MARINOV (1964) pointed out the polychaet worm *Hyppania invalida* as very abundant in Shabla lake. According to KANEVA-ABADJIEVA and MARINOV (1967) the zoobenthos of Durankulak consisted of Oligochaeta, Chironomidae and Corophiidae, while in Shabla and Ezerets lakes they found the bottom fauna was composed by Tubificidae (incl. *Limnodrilus* sp), the polychaet worm *Hyppania invalida,* the zebra mussel *Dreissena polymorpha,* two species of Chironomidae, and *Chaoborus* sp. KOVACHEV and UZUNOV (1981) studied the structure of the macroinvertebrate community in Durankulak, and especially on the Oligochaeta from the same lake, UZUNOV (1983) reported 27 species. Recently, STOICHEV (1996a, 1996b) reported from Shabla lake 6 species of free-living nematods, and 13 species of Chironomidae respectively. The newest information about the zoobenthos of Shabla and Ezerets (STOICHEV 1998) concerns the known species of Nematoda, Chironomidae and Crustacea. There is a lack of recent information about the benthos of Durankulak, while the Orlovo marsh and the lagoon Shabla Touzla have not been studied so far.

3 Qualitative composition of the zoobenthos

The species composition of the zoobenthos in the group of studied basins is considerably diverse, consisted by Mollusca, Hirudinea, free living Nematoda, Crustacea and many aquatic insects. This faunistic complex is typical for water bodies in advanced degree of eutrophication. The species found and their distribution at the different basins are shown on Table 1. A well expressed difference exists in the distribution of the bottom fauna according to the character of the sediments. In the open parts of the lakes, where the bottom is consisted of muddy sediments, Oligochaeta and Nematoda, Chironomidae and *Chaoborus* larvae are the typical inhabitants and qualitatively the zoobenthos is poorer. On the other hand, the substrata along the shore are more diverse: stony and sandy bottom and the higher plants are habitats of Crustacea, Mollusca, insect larvae of several groups. On isolated sandy spots Crustacea are found. A special case is the single finding of the polychaet worm *Hyppania invalida* in Shabla lake, that was very abundant in the past. This species obviously will disappear from

this lake, as very limited sandy spots on the bottom have remained. Instead, large deposition of organic mud allowed the abundant development of *Chaoborus*. Despite the favourable muddy bottom in Durankulak, chaoborid larvae do not occur there because of the smaller depth.

Tab. 1: Species composition and distribution at sites. mp = macrophytes, sd = sandy bottom, sl = sludge, mud, st = stones

Taxon	Durankulak swamp	Orlovo marsh	Shabla Lake	Ezerets Lake	Tuzla Lagoon
BRYOZOA					
Plumatella repens LINNAEUS			mp		
Plumatella fruticosa ALLMAN			st		
TRICLADIDA					
Dendrocoelum lacteum (O. F. MÜLLER)		mp			
GASTROPODA					
Planorbis planorbis (LINNAEUS)		mp, st		mp,st	
Physa acuta DRAPARNAUD		mp,st			
Acroloxus lacustris (LINNAEUS)		mp	mp	mp	
Galba palustris (O. F. MUELLER)	mp				
Radix auricularia (LINNAEUS)	mp,st				
Radix ovata (DRAPARNAUD)			mp	mp	
Theodoxus fluviatilis (LINNAEUS)	mp,st		mp,st	mp,st	
BIVALVIA					
Dreissena polymorpha (PALLAS)	sd		sd	sd	
NEMATODA					
Enoploides fluviatilis MICOLETZKY	sl		sl		
Monochus truncatus BASTIAN	sl		sl	sl	
Dorylaimus stagnalis DUJARDIN	si		sl	si	
Eudorilaimus carteri (BASTIAN)	si		si	si	
Laymldorus flavomaculatus (LINSTOW)	si	sl			
Prodesmodora circulata (MICOLETZKY)	sl		si	sl	
POLYCHAETA					
Hyppania invalida GRUBE				sl,sd	
OLIGOCHAETA					
Tubifex tubifex MUELLER	sl		sl	sl	
Limnodrilus udekemlanus CLAPAREDE			sl	si	
Stylaria lacustris (LINNAEUS)	sl		sl	sl	
Branchiura sowerbyi BEDDARD				sl	
HIRUDINEA					
Placobdella costata (FR. MUELLER)	mp				
Hemiclepsis marglnata (O. F. MUELLER)	mp	mp		mp	
Glossiphonia complanata (LINNAEUS)		mp			
Helobdella stagnalis (LINNAEUS)	mp				
Haemopis sanguisuga (LINNAEUS)	mp				
Hirudo medicinalis LINNAEUS	mp				
Erpobdella octoculata (LINNAEUS)	mp,st				
HYDRACARINA g. sp.					sl

Taxon	Durankulak swamp	Orlovo marsh	Shabla Lake	Ezerets Lake	Tuzla Lagoon
CRUSTACEA					
Astacus astacus (Linnaeus)			sd,sl		
Astacus leptodactilus Eschscholz	sd,sl		sd,sl	sd,sl	
Limnomysis benedeni Czerniavsky	sl,st	sl,st		sl,st	
Asellus aquaticus (Linnaeus)	mp	mp	mp		
Idothea baltica basteri Audouin	sd			sd	
Corophium curvispinum Sars	sd,sl	sd,sl	sd,sl	sd,sl	
Chaetogammarus tenellus major Carausu	st,mp		st,mp		
Chaetogammarus ischnus Stebbing	st,mp			st,mp	
Pontogammarus robustoides (Grimm)	st,mp		st,mp		
Dikerogammarus villosus Sovinsky	st,mp			st,mp	
Dikerogammarus haemobaphes Eichwald	st,mp		st,mp	st,mp	
Iphigenella shablensis (Carausu)			st,mp		
Orchestia bottae Edwards				sd,mp	
Gammarus sp	sd				
EPHEMEROPTERA					
Cloeon dipterum (Linnaeus)		mp			
Caenis luctuosa (Burmeister)		mp		mp	
Caenis robusta Eaton	mp				
Caenis horaria (Linnaeus)	mp	mp			
Centroptilum luteolum (Mueller)		mp			
ODONATA g. sp.	mp	mp	mp	mp	mp
HETEROPTERA					
Notonecta glauca Linnaeus	mp				
Sigara lateralis (Leach)				mp	mp
Nepa cinerea Linnaeus				mp	
COLEOPTERA g. sp.	mp	mp		mp	mp
LEPIDOPTERA					
Nymphula nymphaeta (Linnaeus)					sl
DIPTERA					
Ephydra sp	sl	sl			sl
Stratiomys longicornis (Scopoli)				sl	
Chaoborus crystallinus (De Geer)			sl	sl	
Chironomus riparius Meigen	sl	sl	sl	sl	
Chironomus gr. plumosus	sl	sl			
Chironomus salinarius Kieffer		sl			sl
Cryptochironomus gr defectus	st		st	st	
Glyptotendipes gripekoveni (Kieffer)	mp		mp		
Glyptotendipes glaucus (Meigen)	mp		mp	mp	
Polypedilum nubeculosum (Meigen)		st,sl	st,sl	st,sl	
Dicrotendipes nervosus (Staeger)	mp	mp		mp	
Endochironomus tendens (Fabricius)	mp				
Cricotopus ornatus (Meigen)	mp			mp	
Cricotopus silvestris (Fabricius)				st,mp	
Ceratopogonidae g. sp.		sl		sl	sl

Probably, the presence of the river crayfish *Astacus astacus* together with the lake crayfish *Astacus leptodactilus* seems somewhat questionable. However, among the material from Shabla and Ezerets lakes there have been checked specimens with short massive helicerae with equal length and twice shorter than those of *Astacus leptodactylus*. More attention should be also paid to the several relict amphipods *Iphigenella shablensis*, *Pontogammarus robustoides* and *Dikerogammarus villosus*, which are important from conservation point of view.

The zoobenthos of the Orlovo marsh and the lagoon Shabla touzla is considerably poorer than the other lakes; in the Shabla touzla aquatic insect larvae were found only. They both have strongly expressed tendency towards hypertrophy. They are shallow waterbodies with considerable deposition of biogenic sludge, with presence of hydrogen sulphide. An additional special condition in both is the salinity that gives them the character of myxo-oligohaline waterbodies.

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