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Seasonal Dynamics of the Testate Amoebae Fauna (Protozoa: Arcellinida and Euglyphida) in Durankulak Lake (Northeastern Bulgaria)

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Abstract: The seasonal dynamics of diversity, abundance and dominant structure of the testaceans in Durankulak Lake have been studied. The data showed that from January to October the species abundance increased gradually and reached average 3280 specimens/cm^3. The greatest taxonomic diversity was observed in summer (49 species) and the smallest diversity was registered in winter (33). The results of the study showed that the maximum of the species richness and abundance varied in different stations and seasons – from 8 to 30 species and from 210 to 8310 specimens/cm^3. From a total of 26 dominant species, only 2 had a high relative significance throughout the year – *Trinema enchelys* and *Euglypha rotunda*. Eight species grow significantly and were established as dominants only in some seasons. These are: *Trinema lineare*, *Centropyxis platystoma* and *Difflugiella oviformis* in winter, *Corythionella georgiana* in spring, *Corythionella georgiana*, *Difflugia minuta*, *Euglypha acanthophora* and *Microchlamys patella* in summer and *Cyphoderia ampulla* and *Microchlamys patella* in autumn.

Key words: Testate amoebae, Durankulak Lake, diversity, abundance, seasonal dynamics

Introduction

An important trend in ecological studies of testate amoebae is investigation of the seasonal and annual changes in community structure. Research in this area provide more accurate data about preferences for the environment requirements of separate species, their distribution in different habitats and allow to be make more certain conclusions about their role in natural ecosystems. The authors Laminger (1971), Babitskiy (1985), Schönborn (1992a, 1992b), Vikol (1990) and Foissner (1994) revealed different aspects of the ecology of testaceans in freshwater basins such as annual production, annual change in density and biomass, number of generations per year, mortality rate and more. An object of study is as well the dynamics of the diversity and the abundance of the species and the influence of different physicochemical environmental factors on it. Investigating testate amoebae fauna in different reservoirs Moraczewski (1962, 1965, 1967), Jax (1992), Schönborn (1992a, 1996), Vikol (1992), Mazei and Tsyganov (2007), showed that the number of taxa and distribution of species in freshwater ecosystems has its own specificity and are determined by particular abiotic and biotic factors. However, the data of patterns of seasonal dynamics of testate amoebae communities in lakes remain still fragmentary and incomplete.

The purpose of this paper is to analyze the seasonal changes in the taxonomic diversity, abundance and dominant structure of testate amoebae in Durankulak Lake – one of the natural lakes of the firth type on the West coast of Black Sea. Along with Lake Shabla-Ezeretz it is the only coastal firth on Bulgarian Black Sea coast which is preserved in a completely natural state.

Materials and Methods

The materials were taken from five localities in Durankulak Lake in 2010. It is a shallow firth, which covers the coastal lowlands of some deep dry valleys, located in the utmost North-eastern part of Bulgaria (28° 33’ 43’’ E, 30° 40' 30" N). Durankulak Lake can be defined as a reservoir with varying eutrophic and hypertrophic characteristics, depending on the amount of biogenic elements and organic matter in its waters. Its regime is characterized by periods of high water in spring months (average monthly maximum in May), and periods of low water in summer and autumn months (average monthly minimum in October). In the littoral zone it is overgrown with aquatic vegetation – *Phragmites australis*, *Typha angustifolia*, *Typha latifolia* and *Shoenoplectus triqueter* (Georgiev 1998). The study sites were located in different sampling stations (Fig. 1).

The samples were collected four times a year (in January, April, August and October) of bottom sediments from the littoral zone of the lake at a depth of 0.5 to 1.0 m. Approximately 100 cm^3 of the surface sediment was collected from each site. The material was fixed *in situ* with 4% formaldehyde and examined in the laboratory. For each sample, five preparations of 0.1 cm^3 of the sediment was studied after homogenization. The number of the species found in it was calculated in specimens/cm^3. For the purposes of quantitative and qualitative analysis testate amoebae were observed with an optical microscope Amplival.

The relative significance was used to determine the dominant structure of testacean communities. The dominance was calculated by the formula: $D = n/N \times 100$, where n is the number of the specimens of every species and N is the total number of all specimens. All species were divided into 4 groups, according to the 4-grade classification of Tischler (1955): subrecedent – with relative significance < 1%; recedent – with relative significance 1-2%; subdominant – with relative significance 2-5%; dominant – with relative significance > 5%.

Statistical analysis was carried out using software STATISTICA 6.

Results and Discussion

A total of 80 testate amoebae belonging to 19 genera were found in Durankulak Lake in the present study. The list of taxa, their abundance, relative significance (D) and seasonal distribution in different stations of the lake are presented in Table 1. Only seven or 8.8 % of the species were established throughout the year. These are *Difflugia pristis, Euglypha rotunda, E. tuberculata, Microchlamys patella, Tracheleuglypha acolla, Trach. dentata* and *Trinema enchelys*.

Seasonal dynamics of the diversity and abundance

The seasonal changes in testate amoebae community at different stations of the lake had some particular characteristics and showed different trends (Fig. 2). So, maximal number of species were marked in summer in stations 2 (30 taxa) and 3 (18), in autumn in stations 4 (18) and 5 (15), or species richness remains constant from January to August – station 1 (by 14 taxa) and decreases in October. The abundance peaks were occurred in spring in stations 1 (1930 specimens/cm^3) and 5 (5870 specimens/cm^3) or autumn in stations 2 (8130 specimens/cm^3), 3 (3930 specimens/cm^3) and 4 (3490 specimens/cm^3). At station 4 there was a greater species richness and abundance not only in October, but in January, compared with that in April and August. In our opinion, this trend is due to the strong development of different types of algae observed in the station during the cold period.

Summarizing the received data for the lake as a whole, it can be said that the greatest taxonomic diversity was observed in the August (49 species) and the smallest – in January (33) (Fig. 3). The biggest species diversity in the summer is caused by the appearance of many species with a low population density, which not observed in the other seasons. Only in summer 17 species were observed. These are *Arcella hemisphaerica f. undulata, A. rotundata*, *Centropyxis elongata, Cryptodifflugia compressa, Cyclopyxis kahli, Difflugia acuminata, D. cylindrus, D. dragana, D. elegans, D. lanceolata, D. lacustris, D. oblonga, D. parva, D. pauli, D. sarissa, D. ventricosa* and *Difflugiella patinata*. By comparison, only in winter and spring were found by 7 species,

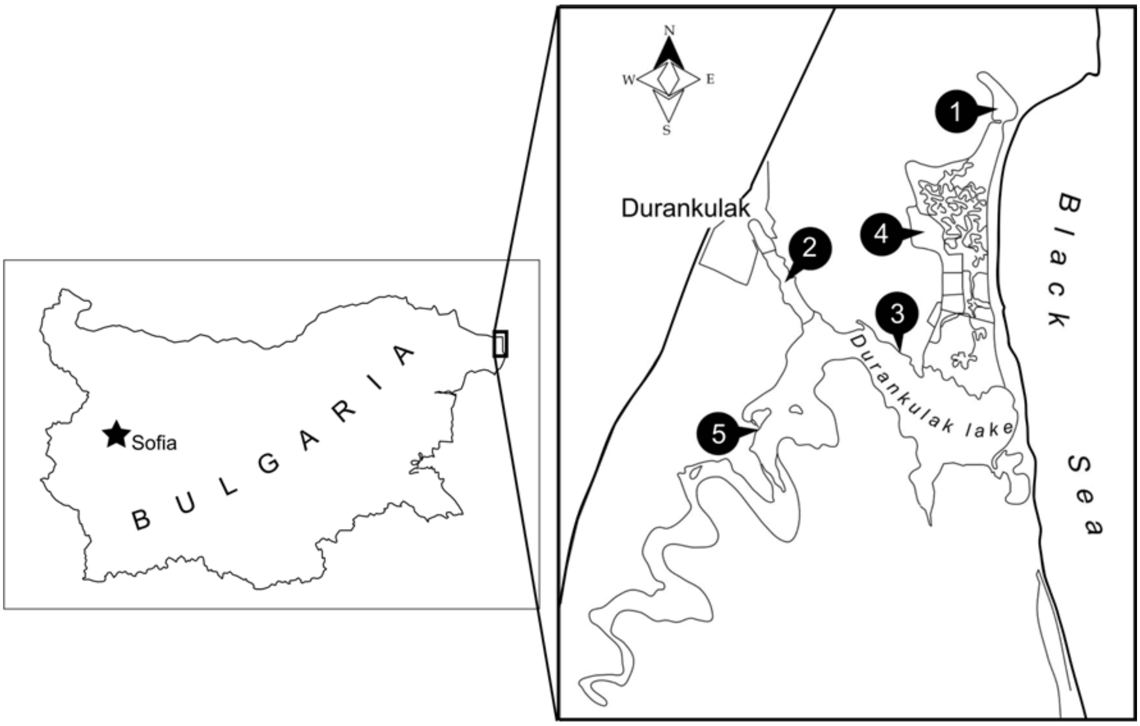

Fig. 1. Map of the Durankulak Lake and location of the sampling sites.

and only in autumn – 5 (Table 1). The species, which were established only in one season represent 45% of all identified species in the lake. Their relative significance varies between 0.02% and 0.54% and they belong to the group of recedent.

The abundance of testate amoebae in the lake was the lowest in January (average 2014 specimens/cm^3), then gradually increased and reached its peak in October – average 3280 specimens/cm^3 (Fig. 3). The relatively high abundance in autumn, although the number of species during this season is lower than in summer and spring, can be explained by the fact that in this period some species develop significantly. For example, *Euglypha rotunda* and *Microchlamys patella* are present in testate amoebae communities throughout the year, but have the highest population density in autumn (average 866 specimens/cm^3 and 272 specimens/cm^3 respectively). *Cyphoderia ampulla* was also found with a significant number of individuals (average 400 specimens/cm^3) in October.

The results of the study and analysis show that the peak in development of testate amoebae in Durankulak Lake varied in different stations and seasons and is associated with the availability of optimal conditions for them.

Such significant fluctuation in the species richness and abundance in separate seasons has been observed in other lakes as well. In a study of Lake Mamri, Moraczewski (1962) indicated that the maximum number of individuals, living in the benthal was reached at the end of September and October. The same author (Moraczewski 1967), studying the seasonal dynamics of testate amoebae fauna of Lake Zegzre, found in some of the surveyed stations great diversity of species in spring, which was considerably greater than that in summer and autumn. In a study of dynamics of testate amoebae fauna in several small ponds Jax (1992) registered a clear trend of increased number and biomass of testate amoebae in winter and early spring. Investigating the reservoirs of Dniester river basin Vikol (1992) found that in some types of biotopes the number of testate amoebae increased from spring to summer and then fell again in autumn. The maximal abundance the author registered in spring and autumn. Serafimov *et al.* (1995) indicated that the largest species diversity of testate amoebae in two quarry lakes of Sofia district is established during the summer and the beginning of the autumn. Analyzing the dynamics of testate amoebae community in a sphagnum bog (Middle Volga region, Russia) from May to September Mazei and Tsyganov (2007) received different results. In some of the surveyed stations they found high values of species abundance in July-September, in other

Table 1. List of taxa and their abundance, relative significance (D) and seasonal distribution in different stations of the Durankulak Lake.

Taxa	January					April					August					October					D
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
Arcella discoides Ehrenberg, 1843	-	-	10	-	-	-	-	-	-	-	-	10	-	-	-	-	10	-	-	-	0.06
A discoides v. scutelliformis Playfair, 1917	-	-	-	-	-	-	10	-	-	230	-	60	-	-	-	-	-	-	-	-	0.60
A.gibbosa v.mitriformis Deflandre, 1928	-	-	-	-	-	-	40	-	-	-	-	10	-	-	-	-	-	-	-	-	0.10
A. hemisphaerica Perty, 1852	-	-	-	-	-	-	80	-	-	-	-	150	-	10	-	10	-	410	-	-	1.31
A. hem. f. undulata Deflandre, 1928	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	0.02
A. rotundata Playfair, 1917	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	0.02
Centropyxis aculeata (Ehrenb., 1830) Stein, 1857	-	-	-	-	-	-	-	20	-	-	-	-	-	-	10	20	30	50	170	10	0.61
C. aerophila Deflandre, 1929	10	-	-	-	-	10	-	10	-	-	-	-	-	-	-	20	-	-	100	-	0.30
C. aerophila v. sphagnicola Deflandre, 1929	-	-	-	-	-	40	-	-	10	-	-	-	-	-	-	-	-	-	-	-	0.10
C. cassis (Wallich, 1864) Deflandre, 1929	-	-	-	20	-	-	-	10	-	-	-	-	-	-	-	40	-	-	-	-	0.14
C. cassis v.spinifera Playfair, 1917	-	-	-	-	-	-	-	90	-	-	-	-	-	-	-	-	-	40	10	-	0.28
C. constricta (Ehrenberg, 1841) Deflandre, 1929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	0.04
C. delicatula Penard, 1902	-	-	-	-	-	-	-	-	-	-	-	170	-	-	-	-	20	-	10	20	0.44
C. ecornis (Ehrenb., 1841) Leidy, 1879	-	-	-	-	-	-	-	-	-	-	10	-	10	-	-	-	10	-	-	-	0.06
C. elongata (Penard, 1890) Thomas, 1959	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	0.02
C. hirsuta Deflandre, 1929	-	-	-	-	-	-	-	20	-	-	-	-	-	-	30	-	-	10	-	-	0.12
C. laevigata Penard, 1890	10	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04
C. minuta Deflandre, 1929	-	-	-	-	-	-	-	-	-	20	-	-	10	-	-	-	-	-	-	-	0.06
C. platystoma (Penard, 1890) Deflandre, 1929	10	90	20	370	120	-	60	-	-	-	-	-	60	-	-	-	-	-	-	-	1.45
C. sylvatica (Defl., 1929) Bonnet & Thomas, 1955	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	0.02
Corythionella georgiana Nicholls, 2005	-	-	-	-	-	-	-	590	-	-	-	-	-	730	-	-	-	-	40	80	2.86
Cryptodifflugia compressa Penard, 1902	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	0.02
Cyclopyxis eurystoma Deflandre, 1929	10	10	-	-	-	30	80	10	10	30	30	-	-	10	-	-	-	-	-	-	0.44
C. kahli Deflandre, 1929	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	0.04
Cyphoderia ampulla (Ehrenb., 1841) Leidy, 1870	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	2000	-	4.00
Difflugia acuminata Ehrenberg, 1838	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	0.02
D. acutissima Deflandre, 1931	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	0.02
D. ampullula Playfair, 1918	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	30	-	-	0.08
D. cylindrus (Thomas, 1954) Ogden, 1983	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-	-	-	-	-	-	0.08
D. dificilis Thomas, 1954	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	10	20	0.08

Table 1. Continued.

Taxa	January					April					August					October					D
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
D. dragana Ogden & Zivkovic, 1983	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	0.02
D. elegans Penard, 1890	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	0.02
D. glans Penard, 1902	-	20	-	-	-	-	-	-	-	1370	-	-	-	-	-	-	-	-	-	-	2.76
D. globularis (Wall., 1864) Leidy, 1877	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06
D. globulosa Dujardin, 1837	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
D. gramen Penard, 1902	-	-	-	-	-	30	-	-	-	160	-	30	30	-	430	-	-	-	20	-	1.39
D. lacustris (Penard, 1899) Ogden, 1983	-	-	-	-	-	-	-	-	-	-	40	210	20	-	-	-	-	-	-	-	0.54
D. lanceolata Penard, 1890	-	-	-	-	-	-	-	-	-	-	30	70	-	-	-	-	-	-	-	-	0.20
D. levanderi Playfair, 1918	-	80	-	-	-	-	30	-	-	-	-	-	-	-	-	30	-	-	-	-	0.28
D. lithophilla (Penard, 1902) G.-L. & Thomas, 1958	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	0.04
D. lobostoma Leidy, 1879	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	0.02
D. lucida Penard, 1890	-	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04
D. manicata Penard, 1902	-	50	-	-	-	-	-	10	-	60	-	-	-	-	-	10	-	-	-	10	0.28
D. microstoma (Thomas, 1954) Ogden, 1983	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160	0.37
D. minuta Rampi, 1950	-	-	-	-	190	-	-	-	-	-	-	-	1180	-	-	-	-	-	-	30	2.78
D. oblonga Ehrenberg, 1831	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	0.02
D. parva (Thomas, 1954) Ogden, 1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	0.02
D. pauli Ogden, 1983	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	0.04
D. petricola Cash, 1909	-	-	-	-	-	10	-	-	-	-	-	20	-	-	-	-	-	-	-	-	0.06
D. pristis Penard, 1902	-	-	-	-	200	-	20	-	40	-	-	-	340	-	-	30	-	70	-	20	1.43
D. pulex Penard, 1902	-	-	30	-	350	-	50	-	280	-	-	-	-	-	-	-	-	240	70	30	2.08
D. sarissa Li Sun Taï, 1931	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	0.04
D. stoutii Ogden, 1983	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	0.04
D. ventricosa Deflandre, 1926	-	-	-	-	-	-	-	-	-	-	-	50	10	-	10	-	-	-	-	-	0.14
Difflugiella angusta Schönborn, 1965	-	-	-	-	-	60	40	20	10	250	-	-	-	-	-	-	-	40	-	10	0.86
D. horrida Schönborn, 1965	-	-	-	-	-	-	-	-	-	-	-	30	80	-	-	-	10	-	140	-	0.52
D. oviformis Bonnet &Thomas, 1955	70	-	140	290	120	-	40	-	50	-	-	-	-	-	-	-	90	-	-	-	1.59
D. patinata Schönborn, 1965	-	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-	-	-	-	0.08
D. pusilla Playfair, 1918	-	40	-	80	-	-	-	-	-	-	-	10	10	-	-	-	-	90	-	-	0.46
Euglypha acanthophora (Ehr., 1841) Perty, 1849	-	-	-	-	-	10	-	-	-	-	-	1760	-	-	-	-	-	30	-	-	3.56

Table 1. Continued.

Taxa	January					April					August					October					D
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
E. filifera Penard, 1890	-	-	-	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22
E. rotunda Wailes, Penard, 1911	50	270	510	320	930	170	-	190	-	-	70	720	170	-	20	-	4330	-	-	-	15.41
E. tuberculata Dujardin, 1841	-	50	100	100	-	-	-	-	30	-	-	570	-	-	10	-	170	310	30	-	2.72
E. tuberculata minor Taranek, 1881	-	-	-	-	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.40
Euglyphella delicatula Valkanov, 1962	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
Microchlamys patella (Cl. & Lach.,1885) Cockerell,1911	30	150	50	110	100	50	80	20	10	70	80	820	50	10	20	10	380	780	30	160	6.00
Paraquadrula irregularis (Arc., 1877) Deflandre,1932	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
Phryganella hemisphaerica Penard, 1902	50	-	30	-	10	-	-	-	-	-	10	10	40	20	10	-	-	-	60	30	0.54
Phr. paradoxa Penard, 1902	-	-	-	-	-	-	-	-	-	-	-	80	-	-	-	-	30	-	-	-	0.22
Plagiopyxis declivis Thomas, 1955	10	100	-	-	40	110	150	180	-	30	20	-	-	30	10	-	-	-	-	-	1.35
Pl. minuta Bonnet, 1959	10	-	-	-	-	-	-	10	-	-	40	-	-	-	10	-	-	-	-	-	0.14
Psammonobiotus linearis Golemansky, 1970	-	10	-	-	-	-	-	-	-	-	-	-	450	-	-	-	-	430	190	40	2.23
Pseudodifflugia compressa Schulze, 1874	-	-	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04
Schaudinnula arcelloides Awerintzew, 1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	0.02
Tracheleuglypha acolla Bonnet & Thomas, 1955	-	40	100	80	70	-	-	-	30	20	20	50	-	-	-	-	30	70	140	-	1.29
Tracheleuglypha dentata Deflandre, 1938	-	60	100	-	100	-	-	-	-	20	-	20	10	-	-	-	100	40	-	-	0.89
Trinema complanatum Penard, 1890	20	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06
Tr. enchelys (Ehrenb., 1838) Leidy, 1878	1000	460	660	560	80	1190	640	340	350	3590	1040	1560	340	20	50	10	2920	1290	450	10	32.93
Tr. lineare Penard, 1890	10	240	290	380	-	10	-	-	-	-	10	-	-	-	-	-	-	-	-	-	1.87
Tr. lineare v.truncatum Chardez, 1964	70	20	70	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.44
Total species	**14**	**17**	**15**	**16**	**12**	**14**	**15**	**17**	**10**	**13**	**14**	**30**	**18**	**8**	**12**	**11**	**13**	**16**	**18**	**15**	
	33					**40**					**49**					**38**					
Abundance (specimens/cm³)	**1360**	**1720**	**2130**	**2550**	**2310**	**1930**	**1340**	**1560**	**820**	**5870**	**1450**	**6530**	**2860**	**840**	**620**	**210**	**8130**	**3930**	**3490**	**640**	

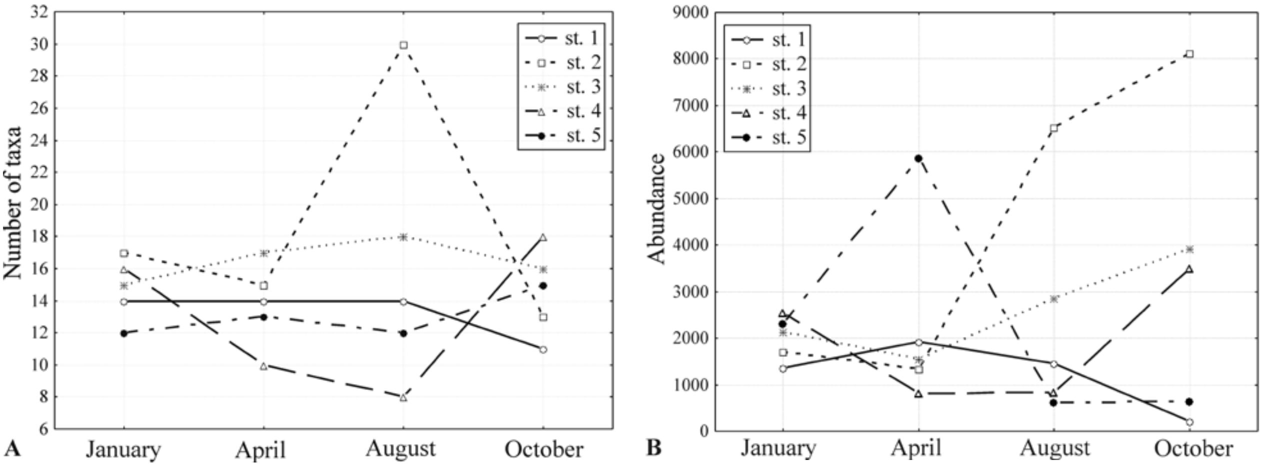

Fig. 2. Seasonal dynamics of the species' diversity (**A**) and abundance (specimens/cm^3) (**B**) of testate amoebae in studied stations.

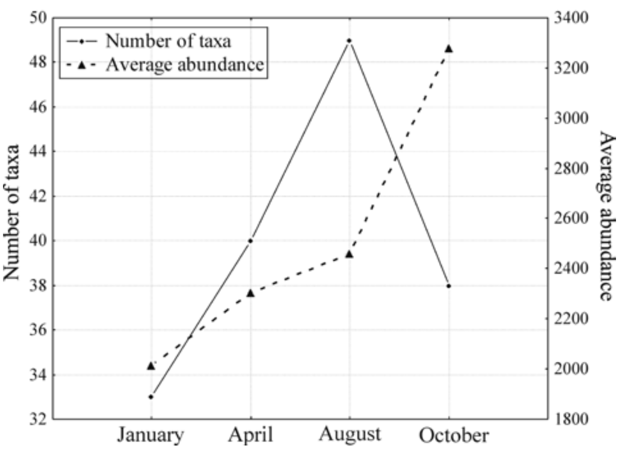

Fig. 3. Seasonal dynamics of the species' diversity and average abundance (specimens/cm^3) of testate amoebae in Durankulak Lake.

stations – high number at the beginning of the season, and yet in other – absence of clear tendencies in abundance dynamics. The greatest number of species was found in August.

Seasonal dynamics of the dominant structure

The results of analyses of seasonal dynamics of the dominant structure at different stations are represented in Fig. 4. Our investigation showed that there are seasonal changes in the dominant species complex. In Station 1 eleven species were dominants. *Trinema enchelys* was dominant from January to August. Dominants, but with significantly lower relative significance were also *Euglypha tuberculata v. minor*, *Euglypha rotunda* and *Plagiopyxis declivis* in April and *Microchlamys patella* – in August. Because of the small number of specimens established in October, a half (6) of all found species here were dominant – *Centropyxis cassis*, *Difflugia levanderi*, *D. pristis*, *Centropyxis aculeata*, *C. aerophila* and *C. constricta*. In Station 2, ten species formed the dominant structure. *Tr. enchelys* was dominant throughout the year, *E. rotunda* prevailed in January, August and October, *M. patella* – in January, April and August, *Pl. declivis* – in January and April. The species *Trinema lineare* and *Centropyxis platystoma* were dominant only in January, *Arcella hemisphaerica* and *Cyclopyxis eurystoma* – in April, and *Euglypha acanthophora* and *E. tuberculata* – only in August while in the other seasons were not found. In Station 3, *Tr. enchelys* dominated throughout the year again. *E. rotunda* occurred from January to August, and during the three seasons was dominant. In January, a high relative significance had *Tr. lineare*. *Corythionella georgiana* and *Pl. declivis* developed greatly in April, and *Difflugia minuta*, *D. pristis* and *Psammonobiotus linearis* – in August. In autumn it was established the most dominant, which ordered by reducing their relative significance were *M. patella*, *Ps. linearis*, *Arcella hemisphaerica*, *E. tuberculata* and *Difflugia pulex*. In Station 4 nine species were dominants. *Tr. enchelys* prevailed in January, April and October. *Tr. lineare*, *C. platystoma*, *E. rotunda* and *Difflugiella oviformis* formed dominant complex in January, *Difflugia pulex* prevailed in April. *Corythionella georgiana* predominated only in August and *Cyphoderia ampulla* prevailed in October. In Station 5 there were 6 dominant species in January, with *E. rotunda* being the one with the most significant presence. The other

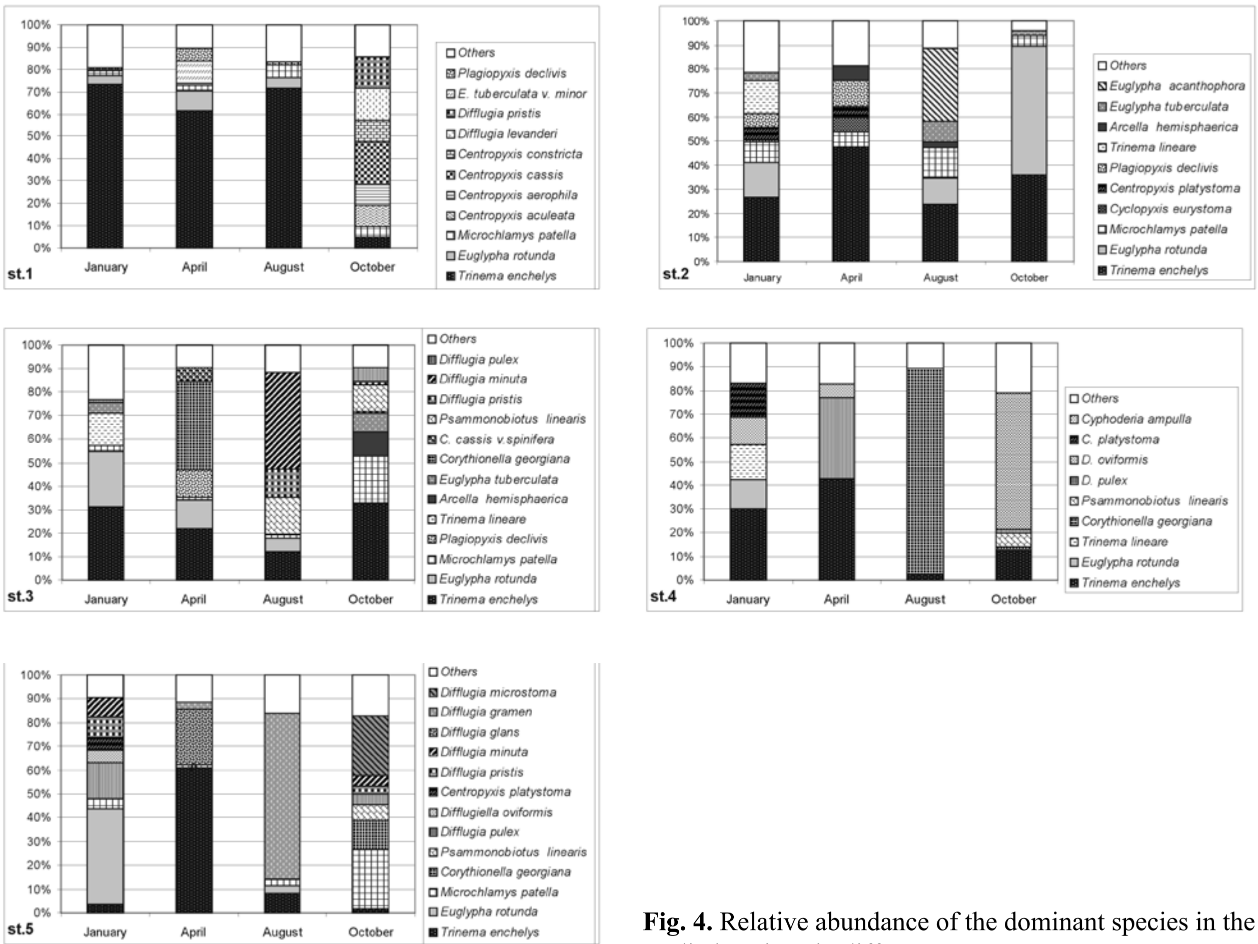

Fig. 4. Relative abundance of the dominant species in the studied stations in different seasons.

5 species – *Difflugia pulex, D. minuta, D. pristis, Difflugiella oviformis u Centropyxis platystoma* were either not found or were found with very few specimens in the other 3 seasons. *Tr. enchelys* and *Difflugia glans* were most prominent in April. In August over 69% of the specimens belonged to one species – *D. gramen*. In October the dominance was distributed among 5 species, with *M. patella*, *Difflugia microstoma* and *Cor. georgiana* being the most significant. The same species were not found or were present with insignificantly small numbers in the other seasons.

From a total of 26 dominant species found in different stations and seasons, only 2 had a high relative significance throughout the year. These were *Trinema enchelys*, which dominated in all stations in the spring and whose abundance was maximal in April, and *Euglypha rotunda* – with maximum number of specimens observed in October. After that the number of specimens of the latter slightly decreased, but remained significant throughout the winter, when the species prevailed in most (80%) of the stations. Eight species grow significantly and were established as dominants only in some seasons. Thus, in winter *Trinema lineare*, *Centropyxis platystoma* and *Difflugiella oviformis* also became dominant, and the same happened to *Corythionella georgiana* in spring. The highest number of dominants was found in summer when *Corythionella georgiana*, *Difflugia minuta*, *Euglypha acanthophora* and *Microchlamys patella* also became dominant. In autumn, a significant growth was registered in *Cyphoderia ampulla* and *Microchlamys patella*. Many species developed intensively only in some stations and in different seasons. For the rest of the time they were present in testate amoebae communities, but with insignificant abundance. These were *Difflugia pristis* – dominant in January at Station 5, in August at Station 3 and in October at Station 1; *Euglypha tuberculata* dominant in April at Station 2 and in October at Station 3; *A. hemisphaerica* – in August at Station 3 and in October at Station 2; *Psammonobiotus linearis* – in August at Station 3 and in October at Stations 3, 4 and 5; *D. pulex* – in

January at Stations 4, 5 and in October at Station 3; *Plagiopyxis declivis* – in January at Station 2 and in April at Stations 1 and 2; *C. platystoma* – in January at Station 2 and in April at Stations 1 and 2; *D. glans* – in April at Station 5; *D. microstoma* dominant in October at Station 5.

The studies of the dynamics of dominant species complexes of testate amoebae in freshwater reservoirs in different seasons are scanty. Investigating several small ponds, Moraczewski (1965) registered a lack of a clear and constant dominant structure in the studied stations, which he explained with the significant fluctuation of water level in different seasons. Later, in Lake Zegzre, Moraczewski (1967) again observed a consistent change in the dominant species throughout the year and explained it with the lack of a stable community of testate amoebae in the stations. Mazei and Tsyganov (2007) found that a characteristic feature of seasonal changes in different biotopes in a sphagnum bog is replacement of species composition. The present research also showed that in the studied stations of Durankulak Lake the dominance is not clearly expressed and the dominant structure is not uniform – in different seasons testate amoebae communities are dominated by different species.

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