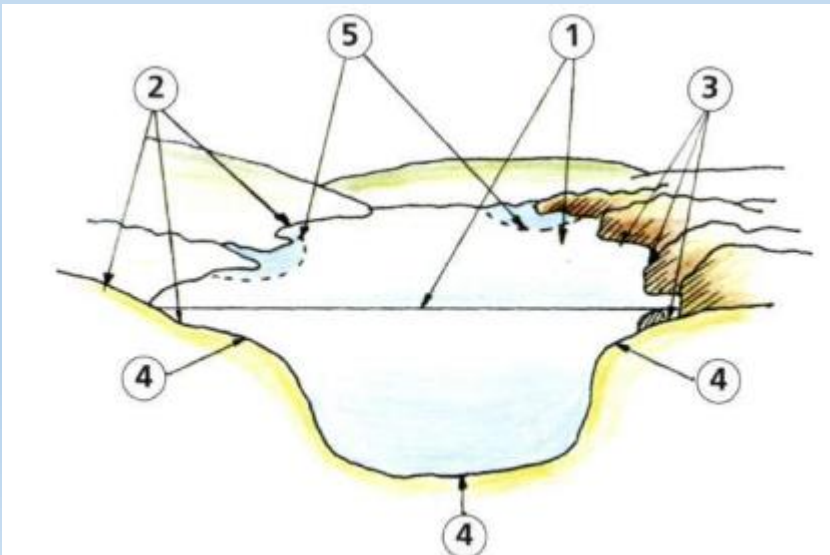


HETEROTROPHIC FLAGELLATES (PROTISTA) OF SANDY COASTLINE AND SUBLITTORAL UNDER THE DNIEPER-BUG ESTUARY INFLUENCE

NIKONOVA S.E

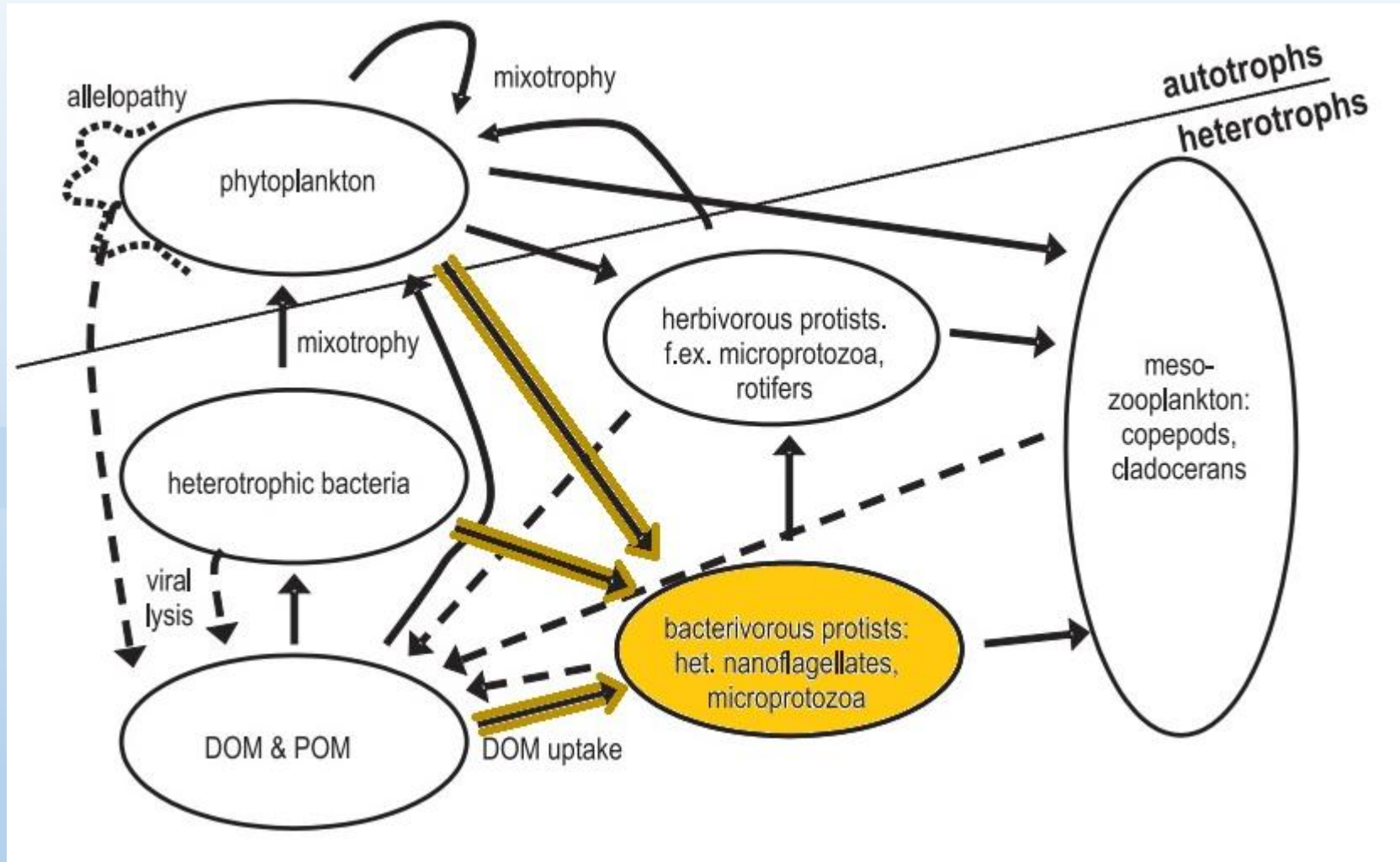
State Institution "Institute of
Marine Biology of the National
Academy of Sciences of Ukraine"

The marginal zones where marine, terrestrial and freshwater communities of organisms come into contact are characterized by a «contour effect»; i.e. high numbers of living organisms. Sandy beaches are an example of the concentration of organisms and detritus. Heterotrophic flagellates play a key role in the processes of destruction and transformation of organic matter in the marine environment and remain the least studied component of aquatic ecosystems. The Black Sea flagellates research began relatively recently (Tikhonenkov, 2006; Nikonova, 2012; Snigireva et al., 2014; Prokina et al., 2017, 2019).



Contour biotopes of the water column (pelagial) at its external boundaries with the atmosphere (aerocontour — 1), sandy beaches (psammocontour — 2), rocky shores (lithocontour — 3), muddy bottom (pelocontour — 4), and river waters (potamocontour — 5) (from Yu. Zaitsev, 1986)

Interactions within the planktonic food web



Solid arrows represent carbon flow and dashed arrows represent release of dissolved organic matter. DOM and POM = dissolved and particulate organic matter. Redrawn with modifications Pauliina Uronen (2007) from Sherr and Sherr (2000).

The purpose of this study is to reveal the characteristics of the active protists species composition, abundance, biomass and size structure of the benthic heterotrophic flagellates in two biotopes (on the water's edge and on the sublittoral on depth of 3 m) and three locations in the zone of river runoff influence.

Samples of sea sediment were collected in April, June, September and November 2017.



Sampling point

- I Cape Adzhiyask (the greatest influence of river masses of the Dnieper and Southern Bug rivers)
- II Grigorievsky Estuary
- III Cape Small Fountain (III) (maximum distance from the mouth of the rivers)

A total of 61 protist species belonging to four eukaryotic supertypes were obtained

- ❖ Excavata – 23 species;
- ❖ SAR (Stramenopiles, Alveolates and Rhizaria) – 20 species;
- ❖ Eukaryota incertae sedis – 2 species;
- ❖ Amoebozoa – 1 species;
- ❖ uncertain systematic position – 15 species.

The greatest number of species belonged to *Euglenida* (22), *Dinophyceae* (7) and *Cercozoa* (5 species).

The communities of the two biotopes

- The coastline flagellates communities – 22 species
- The sublittoral flagellates communities – 45 species

The communities of the coastline flagellates and sublittoral flagellates were distinguished by high specificity, only 6 species (9.7%) were common for two biotopes.

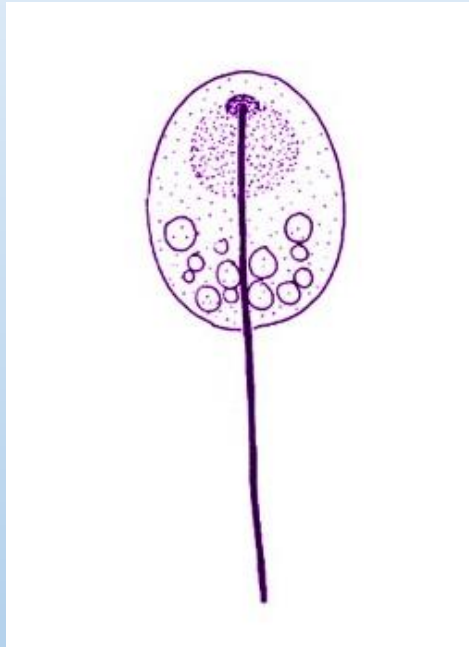
The Sørensen species similarity index calculated for the communities of the sublittoral and coastline flagellates was 0.179.

Common species for two biotopes

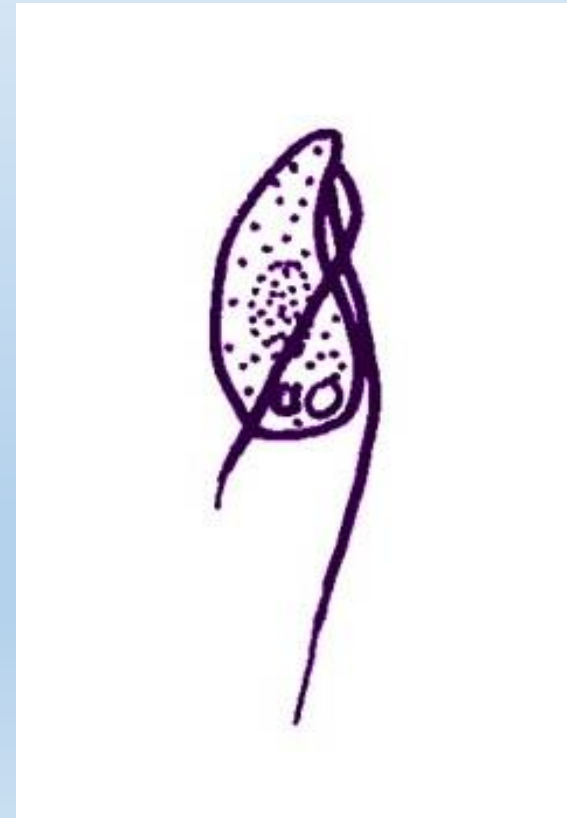
- 1. *Bodo globosus* Stein, 1878



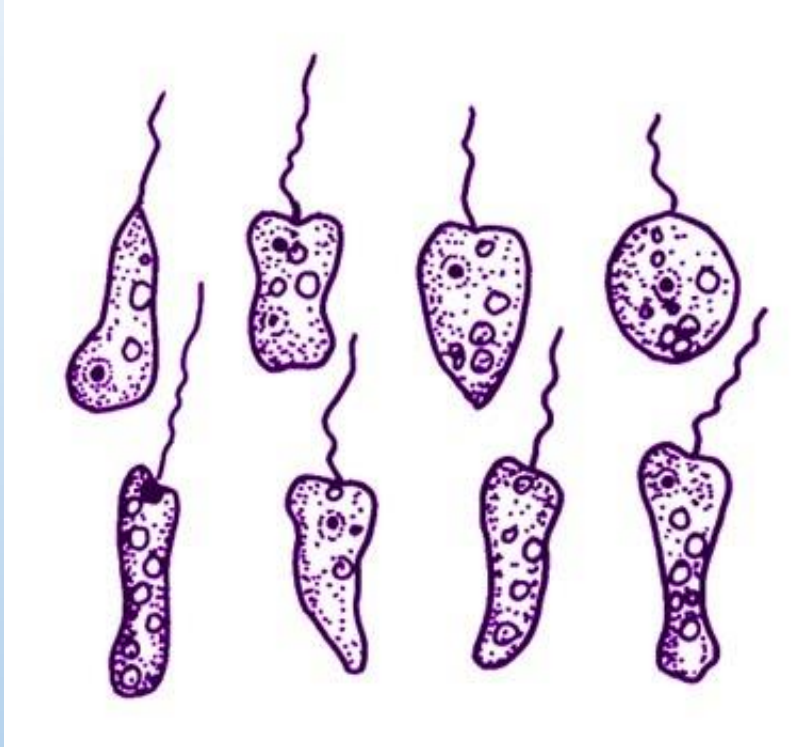
- 2. *Clautriavia cavus*
Lee et Patterson, 2000



- 3. *Colpodella perforans*
(Hollande, 1938) Patterson
& Zöllfel, 1991

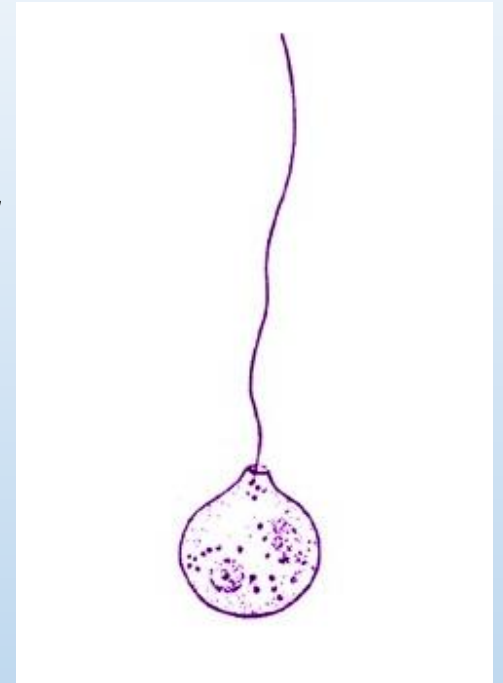
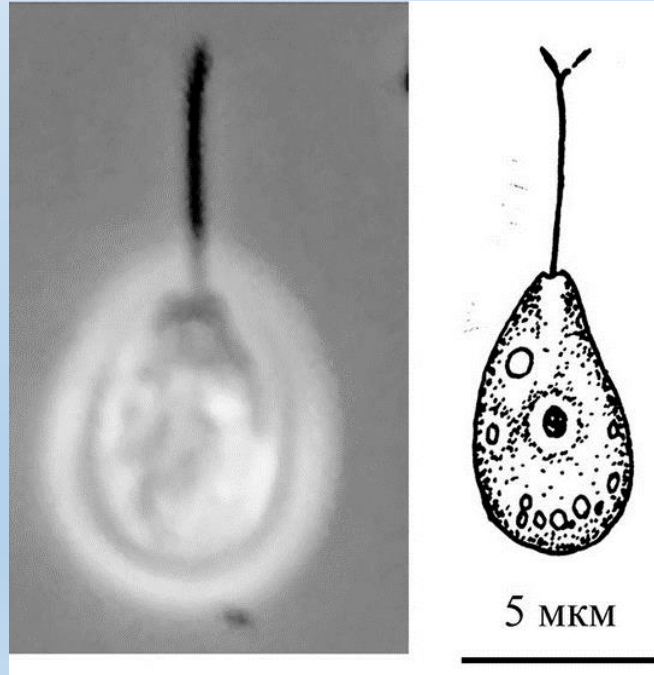


Common species for two biotopes



- 4. *Oikomonas* sp.

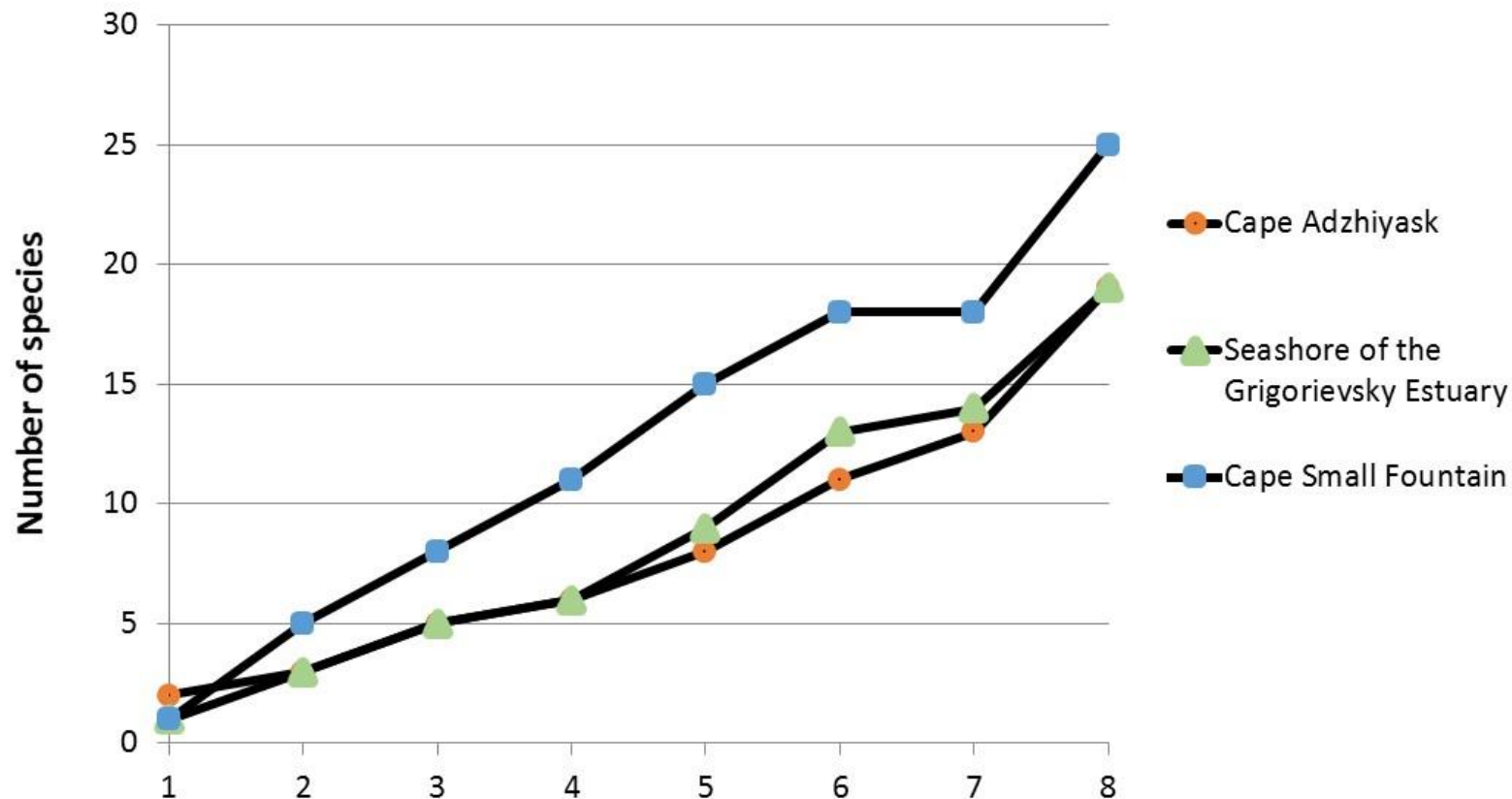
- 5. *Petalomonas micra*
R.E.Norris, 1964



- 6. *Petalomonas pusilla* Skuja, 1948

Spatial distribution of the heterotrophic flagellates

- Cape Adzhiyask – 21 species
- Seashore of the Grigorievsky Estuary – 23 species
- Cape Small Fountain – 31 species



The relationship between the number of species that were found and the number of samples for heterotrophic flagellate communities

Spatial distribution of the heterotrophic flagellates

- Cape Adzhiyask – 21 species
- Seashore of the Grigorievsky Estuary – 23 species
- Cape Small Fountain – 31 species

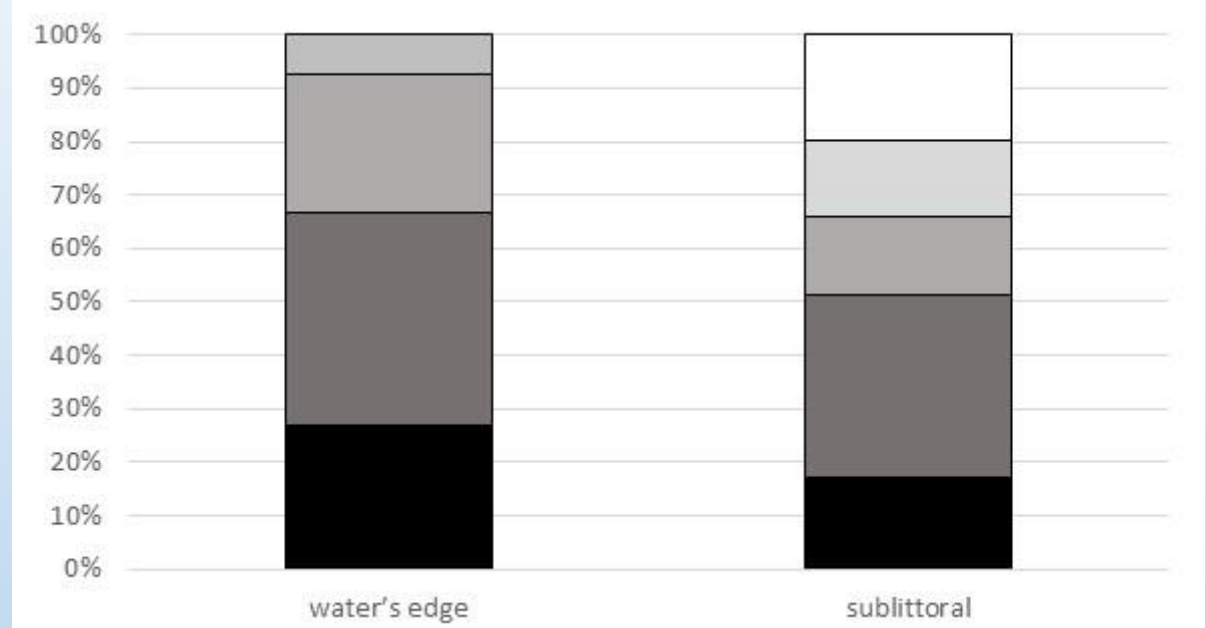
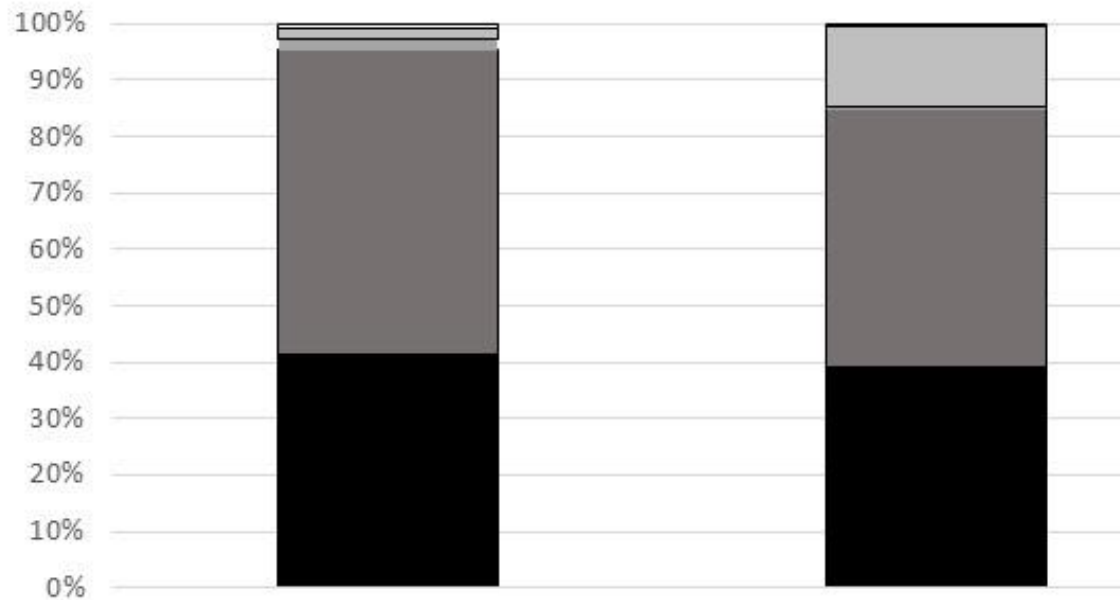
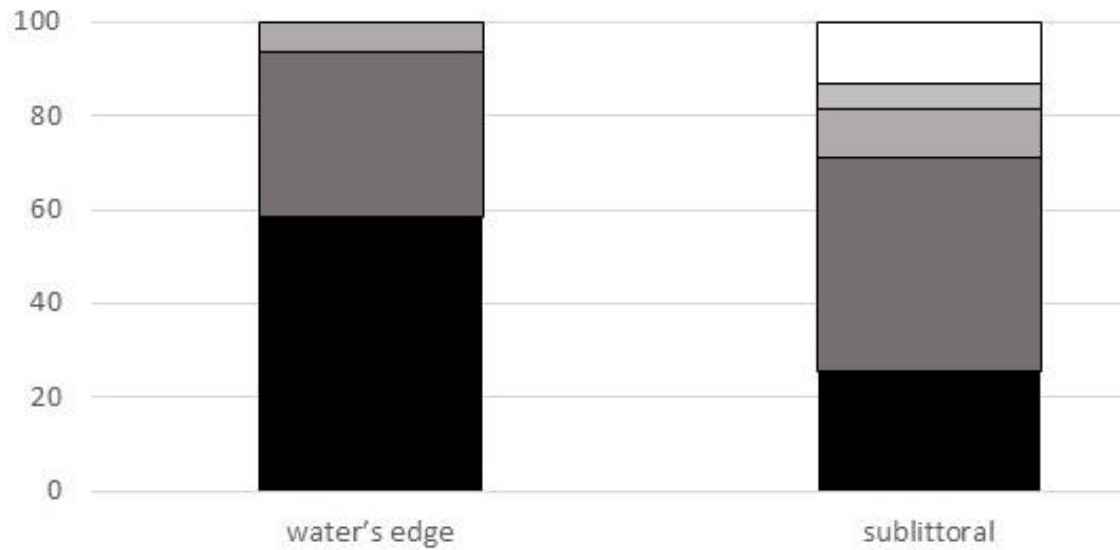
The Sørensen
species similarity
index

	Cape Adzhiyask	Grigorievsk y Estuary	Cape Small Fountain
Cape Adzhiyask	1	0,23	0,12
Grigorievsky Estuary		1	0,15
Cape Small Fountain			1

Number of species, abundance and biomass of the heterotrophic flagellate of investigated biotopes in the the water's edge and sublittoral in the zone of Dnieper-Bug Estuary influence

	Location	Biotope	Number of species	Abundance, ind.·cm ⁻³	Biomass, ·10 ⁻⁶ mg·cm ⁻³
1	Cape Adzhiyask	water's edge	9	39 - 156	2,7 – 11,9
		sublittoral	24	218 - 472	24 - 1005
2	Seashore of the Grigorievsky Estuary	water's edge	10	15 - 425	6 - 336
		sublittoral	16	33 - 1063	4 - 41
3	Cape Small Fountain	water's edge	8	23 - 630	7 - 267
		sublittoral	13	77 - 500	118 - 722
	average	water's edge	9	151	67,6
		sublittoral	17,7	309	262,8

Morpho-structural analysis of flagellates communities



■ ≤ 5 ■ 6-10 ■ 11-15 ■ 16-20 □ ≥ 20

Cape Adzhiyask
seashore of the Grigorievsky Estuary
Cape Small Fountain

ВЫВОДЫ

- River discharge exerts an important influence on the species composition, abundance, biomass and size structure of the benthic heterotrophic flagellates on coastal ecosystems.
- A total of 61 protist species belonging to four eukaryotic supertypes were obtained, the coastline flagellates communities include 22 species, the sublittoral flagellates communities – 45 species.
- In zone of river runoff influence, especially in the coastline, a simplified dimensional structure of flagellates was revealed, where small-celled species prevailed.
- The communities of the flagellates were distinguished by high specificity, 53 species (87 % of the species richness) were only found at ones, suggesting a high degree of heterogeneity of the heterotrophic flagellate community.



Thank you

© Vitaliy Milevich - photo: activejournal.com