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PROGRAM DE COOPERARE TRANSFRONTALIERĂ

Project:
Resources pilot centre for cross-border preservation of the aquatic biodiversity of Prut River MIS ETC 1150

THE FIFTH REPORT, September – December 2013

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GA4: PRUT RIVER INVESTIGATION

D1. Site hydrobiological study (including fish sampling) performed across and alongside Prut River from the entry into the Romanian territory to the confluence with Danube River

D.1.1 The monitoring of the structural and functional characteristics of the main aquatic organisms communities inhabiting the River Prut

Bacterioplancton. Within the project continued the quantitative researches of the total bacterioplancton and saprophytic bacteria, as well as the quality of the Prut River water according to a range of microbiological indices. It was found that in 86 cases during the period of observation the total number of bacteria has varied in the range 0.9-8.5 million cells/ml. Only in October, at some stations of the investigated river sector, this parameter amounted to 11.3 million cells/ml (Sculeni), 15.4 million cells/ml (Leuseni), 69.0 million cells/ml (Braniste), and even 97.2 million cells/ml (Criva). It is supposed that these extreme values are linked with penetration into the river of non-active terrigenous microflora during torrential rains (Fig. 1).

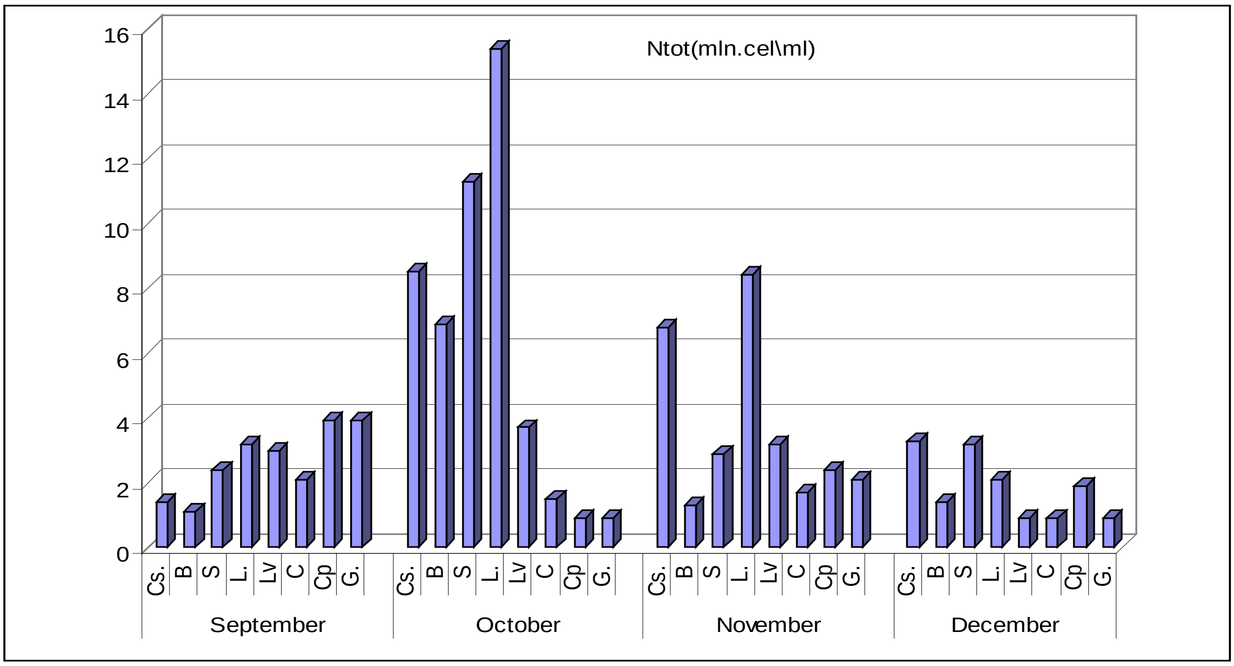


Fig. 1 Dynamics of total number of bacteria in the Prut River in September-December of 2013, million cells/ml *(Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti)*

As regards the development of saprophytic microflora, it was found that this parameter varied in the diapason of 0.13-4.96 thousand cells/ml (Fig. 2) with few exceptions (Cislita-Prut, October). The curve of development of saprophytic bacteria is similar to those of other periods of investigations in 2013.

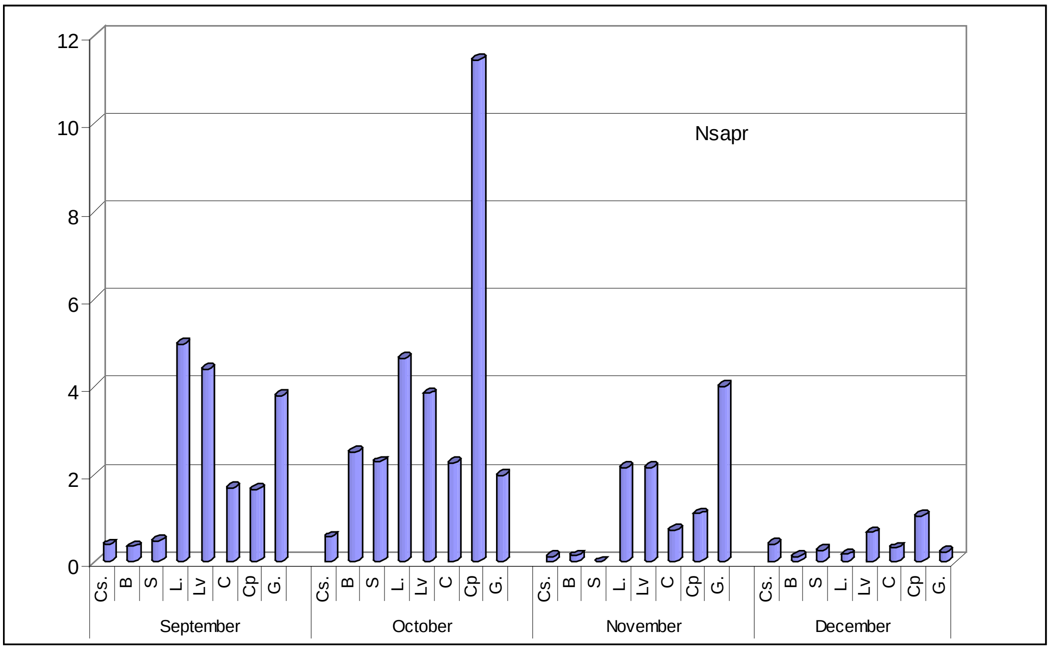


Fig. 2 Dynamics of number of saprophytic bacteria in September-December of 2013, thousand cells/ml *(Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti)*

Assessment of water quality was carried out in accordance the *Regulation on environment quality requirements for the surface waters* (approved by Government Decision № 890 on 12.11.2013, pu blished in Monitorul Oficial al Republicii Moldova № 262-267 on 22.11.2013, art. № 1006). Taking in account the total number of bacteria (Ntot) and number of saprophytic bacteria (Nsapr), the water quality in the investigated area of the Prut River, in most of cases, should be characterized as "good" and "moderately-polluted".

In parallel, the water quality was evaluated according to the bacterium index, proposed by Ambrazene (1984). In connection with this index or coefficient (K=Nsapr/Ntot, %), in 72% of cases the water of the Prut River corresponded to the category "clean" (K less than 0.07%), in 19% of cases – "satisfactorily clean" (K up to 0.16%), in 6% of cases – "moderately polluted" (K up to 0.35%) and in 3% of cases – "heavily polluted" (K up to 1.0%).

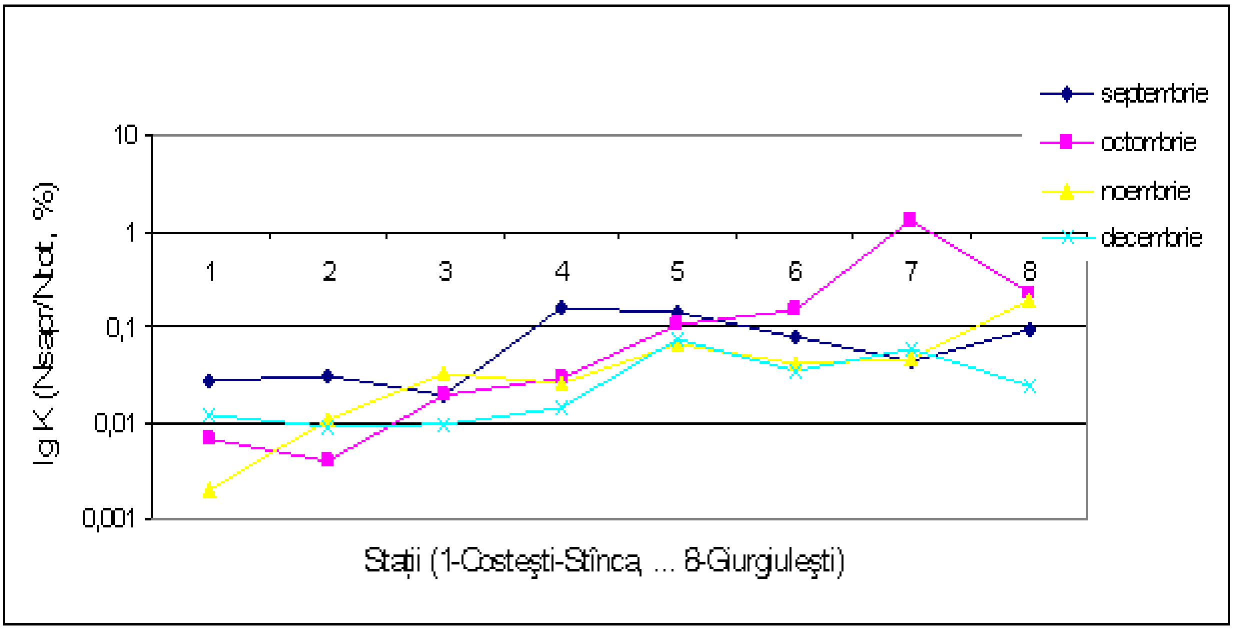


Fig. 3 Water quality according to the bacterial index (K=Nsapr/Ntot, %) in investigated sector of the Prut River, September-December of 2013

Concerning the indicators of physiological activity of bacterioplancton, in particular the bacterial destruction (R), it was found a large variability - from 0 to 5.16 cal/l in 24 hours. In general, during the period of study, the highest rates were characteristic for Giurgiulesti station - 2.26 (0.01-5.16) cal/l in 24 hours. The quantitative analysis of bacterial production revealed a high variability – 0.01-3.48 cal/l in 24 hours. At the same time, in most cases, they not exceeded 1 cal/l in 24 hours that indicated unfavorable conditions for the development of bacterioplancton during investigation period (Table 1).

Table 1 Dynamics of bacterial production (P, cal/l in 24 hours)/destruction (R, cal/l in 24 hours) in September-December of 2013

Station	Month			
	September	October	November	December
Costesti-Stinca, lower sector	0.15/0,73	0.01/0,01	0.2/1,02	0.09/0,97
Braniste	0.01/0,01	0.11/1,12	0.32/1,02	0.3/3,12
Sculeni	0.27/0,	0.51/0,77	0.1/1,0	0.1/1,01
Leuseni	0.15/0,11	1.97/1,10	0.01/0,01	0.63/0,26
Leova	0.38/1,55	0.85/2,11	0.19/1,51	0.01/0,07
Cahul	0.23/1,06	0.08/0,07	0.25/0,01	1.14/0,44
Cislita-Prut	0.58/1,79	0.48/1,30	0.01/0,01	3.48/2,78
Giurgiulesti	0.85/5,16	0.15/1,51	0.33/2,37	1.41/0,01

It was conducted a classical quantitative analysis of biodiversity of specialized groups of microorganisms participating at different stages of circuit of the main elements in water of the Prut River by highlighting their involvement in the processes of degradation and transformation of different chemical forms.

There were investigated the most important specialized groups of microorganisms from the circuit of nitrogen, carbon, phosphorus, and also microbial destruction of toxic compounds (phenols) and heavy biodegradable compounds (petroleum products). To note that specialized physiological groups of microorganisms are involved in the conversion of different forms of chemical elements, causing the existence of assimilable forms for biocenotic components and ensures the balance between reduction and oxidation conditions in the environment.

Circuit of nitrogen. This circuit is made of numerous decomposing, mineralizing and autotrophic bacteria. Among the investigated groups that of ammonifying bacteria was the most well represented numerically. They ranged from 50 cells/ml to 7000 cells/ml. The comparison of investigation stations by their highest values of the intensity of ammonification process revealed that Cislita-Prut station is placed on the top of the list and it is followed by Leuseni, Giurgiulesti, Leova and Cahul stations (Fig.5).

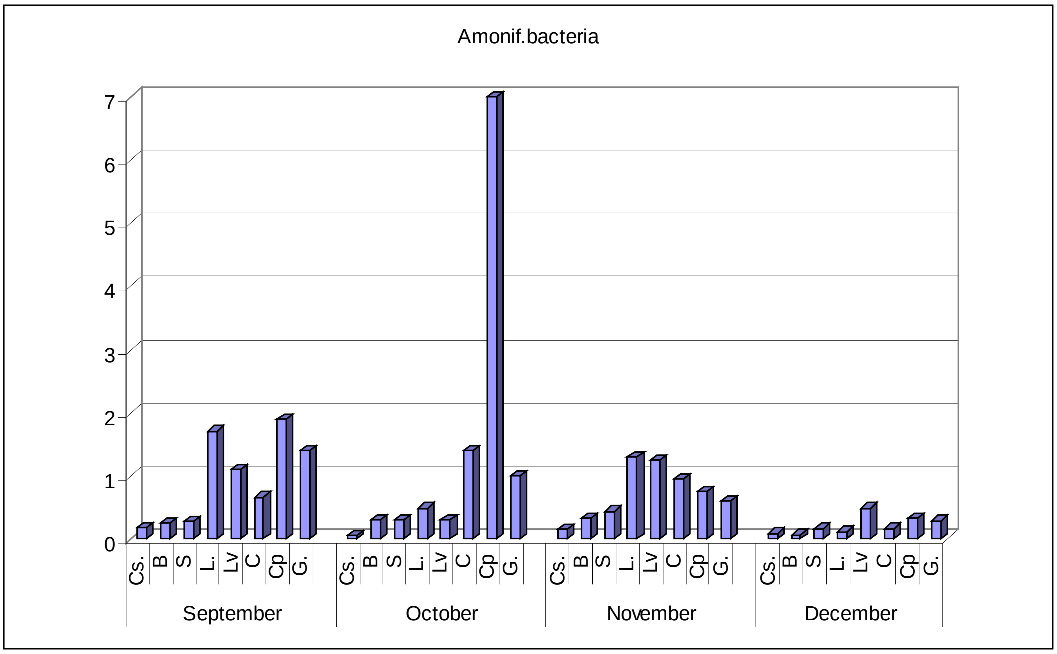


Fig. 5 Number of ammonifying bacteria in the Prut River in September-December of 2013, thousand cells/ml *(Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti)*

In Costesti-Stinca reservoir the amonification process is greatly diminished. The average number of ammonifying bacteria during the investigation period was equal to 116 cells/ml. According to the *Regulation on e nvironment quality requirements for the surface waters*/ *Regulamentul cu privire la cerinţele de calitate a mediului pentru apele de suprafaţă* (Government Decision № 890 on 12.11.2013, published in Monitorul Oficial al Republicii Moldova № 262-267 on 22.11.2013, art. № 1006), the sanitary-hygienic state of reservoir referred to the class I of quality (very good).

With regard to the average values of the number of ammonifying bacteria, the water of the Prut River referred to the class II of quality (good). It is worth to mention that sometimes the water quality at some stations (e.g. Giurgiulesti, September) referred to the class III (moderately polluted), the number of ammonifying bacteria reaching 7.0 thousand cells/ml.

Nitrification is the least represented as the number of microorganisms in the water of the river and reservoir. Number of nitrifying bacteria varies between units and tens of cells/ml. This is explained by the fact the nitrifying bacteria have a very slow growing and their metabolic activity is suppressed by the presence of organic substances. The average values for the period of investigation ranged from 1 cell/ml (Braniste) up to 6 cells/ml (Giurgiulesti).

Denitrification is running as a heterotrophic and aerobic process and it is more intense in the case of abundance of substrate (NO3), an appreciable amount of oxidized soluble organic matter, neutral pH and the water temperature of 20 °C . Depending on these parameters, the number of denitrifying bacteria has varied in large limits during the period of investigation - from 8 cells/ml in Costesti-Stinca reservoir to 880 cells/ml at Leova station (Fig.6). To mention that the period of investigation was characterized by low water temperatures.

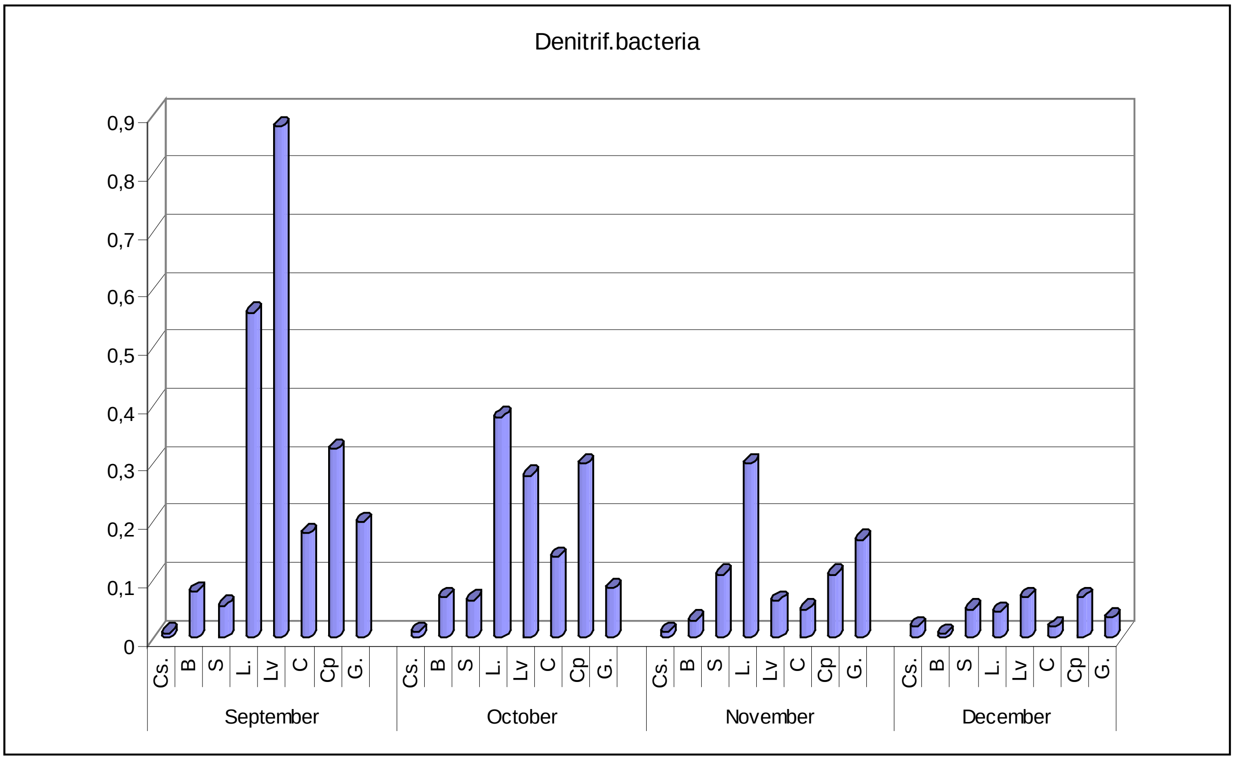


Fig. 6 Intensity of denitrification in the Prut River in September-December of 2013, thousand cells/ml *(Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti)*

Nitrogen fixation is a process, which compensates the loss of nitrogen via denitrification. Two groups of microorganisms take part in this process: *Azotobacter sp.* – undertakes the nitrogen fixation in aerobic conditions and *Clostridium pasteurianum* – opposite, is active in anaerobic conditions.

The number of nitrogen aerobic fixing bacteria is low in all investigated samples – it varied from 0.6 cells/ml to 14 cells/ml. The nitrogen anaerobic fixation is better represented – the number of nitrogen anaerobic fixing bacteria oscillated from 8 cells/ml to 28 cells/ml, the highest values being registered at Cahul, Cislita-Prut and Giurgiulesti stations.

Circuit of carbon. Two groups of microorganisms - amylolytic and cellulosolytic - were investigated from this circuit. Ecological function of amylolytic microorganisms is hydrolysis of one of the most soluble carbohydrates – starch, present in vegetal remains from the water layer. Quantitative distribution of this group of microorganisms has a very various dynamics, determined mainly by allochthonous and autochthonous organic matter. Thus, their variation limits are 19-4320 cells/ml (Fig.7). To note that in the river sector Leova-Cahul the process of amylolysis is 2-4 times more intense in comparison with other river sectors and 9 times more intense in comparison with Costesti-Stinca reservoir.

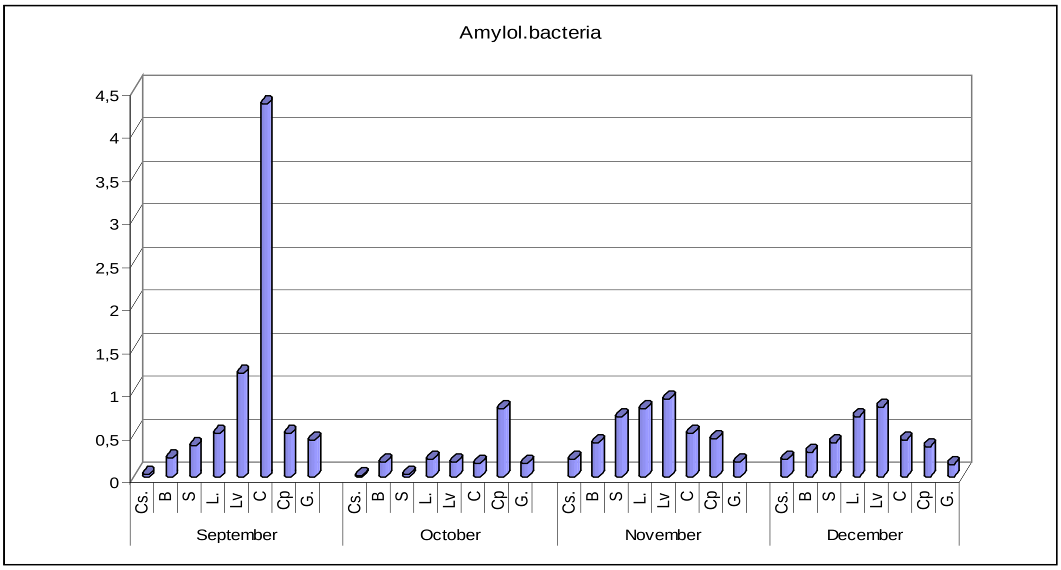


Fig. 7 Density of amylolytics in the Prut River in September-December of 2013, thousand cells/ml *(Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti)*

Cellulosolytic bacteria ranged from 5 cells/ml to 100 cells/ml in Costesti-Stinca reservoir and from 2 cells/ml to 800 cells/ml in different river sectors. The development of these bacteria is dependent on the presence of cellulose, derived mostly from the superior aquatic vegetation. Depending on abundance and activity of cellulosolytic bacteria, the investigated stations formed the following row: Leova, Cahul, Cislita-Prut, Braniste and Costesti-Stinca reservoir.

Circuit of phosphorus. The phosphate mineralizing bacteria were investigated and their non-uniform quantitative distribution was revealed. The density of phosphate mineralizing bacteria is very low in the water of Costesti-Stinca reservoir (5-100 cells/ml), the mean value being 40 cells/ml (Fig.8). Higher values were registered at Leova (180-280 cells/ml, mean value - 222 cells/ml), Cislita-Prut (180-600 cells/ml, mean value - 305 cells/ml), and Giurgiulesti stations (40-850 cells/ml, mean value - 302 cells/ml).

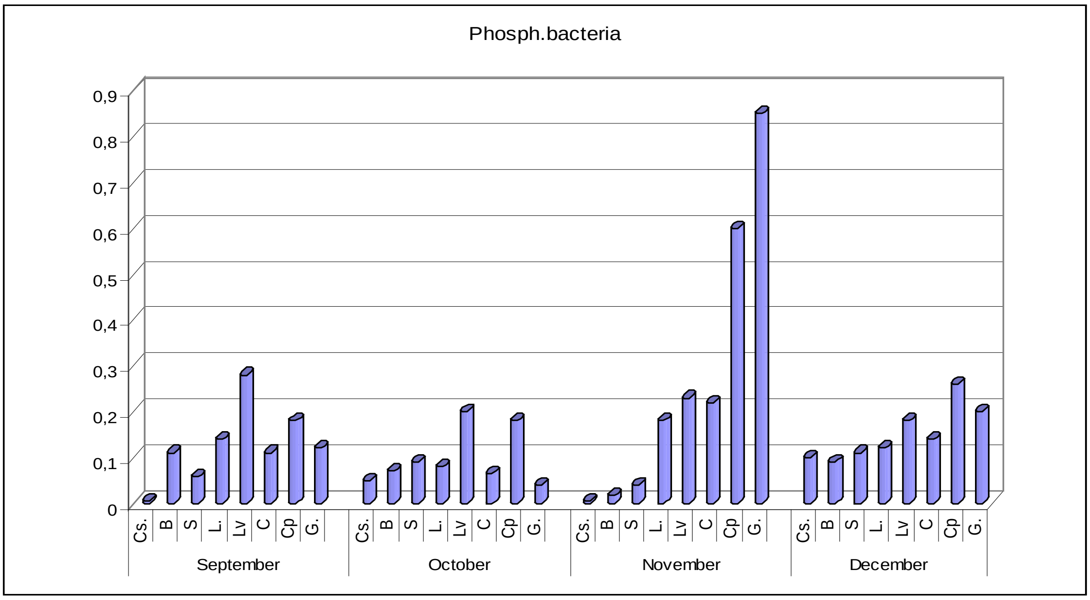


Fig. 8 Dynamics of the density of phosphate mineralizing bacteria in the Prut River in September-December of 2013, thousand cells/ml *(Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti)*

Microbial decomposition of toxic compounds (phenols) and heavy biodegradable compounds (petroleum products). Phenol penetrates into the water of the Prut River with waste waters and, also, naturally as result of the decomposition of submerged macrovegetation. The circuit of the phenol compounds occurs in several phases: accumulation of phenol complex compounds in living organisms (biota), their decomposition by microorganisms to phenols and subsequently to carbon dioxide and water. Microorganisms use carbon from phenols as a source of nutrition and energy. The density of phenolytic bacteria in the Prut River ranged from 13 to 230 cells/ml and from 70 to 95 cells/ml (mean value – 84 cells/ml) in Costesti-Stinca reservoir, which indirectly indicates the river pollution with phenols. According to the classification of water quality on the base of density of phenolytic bacteria (Kopilov, Kosolapov, 2008), the water of Costesti-Stinca reservoir referred to the class of quality 2a and 2b (clean and fairly clean) and the Prut waters – to the class 3a and 4b (sufficiently clean and moderately polluted).

The largest quantity of petroleum products find access into studied aquatic ecosystems with rain water from urban and rural territories, and also with waste waters. Biodegradation of petroleum substances is performed by a specialized group of microorganisms called petrolytic bacteria, which are able to oxidize the petrol, to use petrol hydrocarbons as source of energy and carbon. Petrol degradation is performed by different asporogene bacteria, fungi, yeasts and proactinomicetes. Variation limits of petrolytic bacteria content in water of the Prut River and Costesti-Stinca reservoir during the period of investigation were large - 50-1700 cells/ml (Fig. 9).

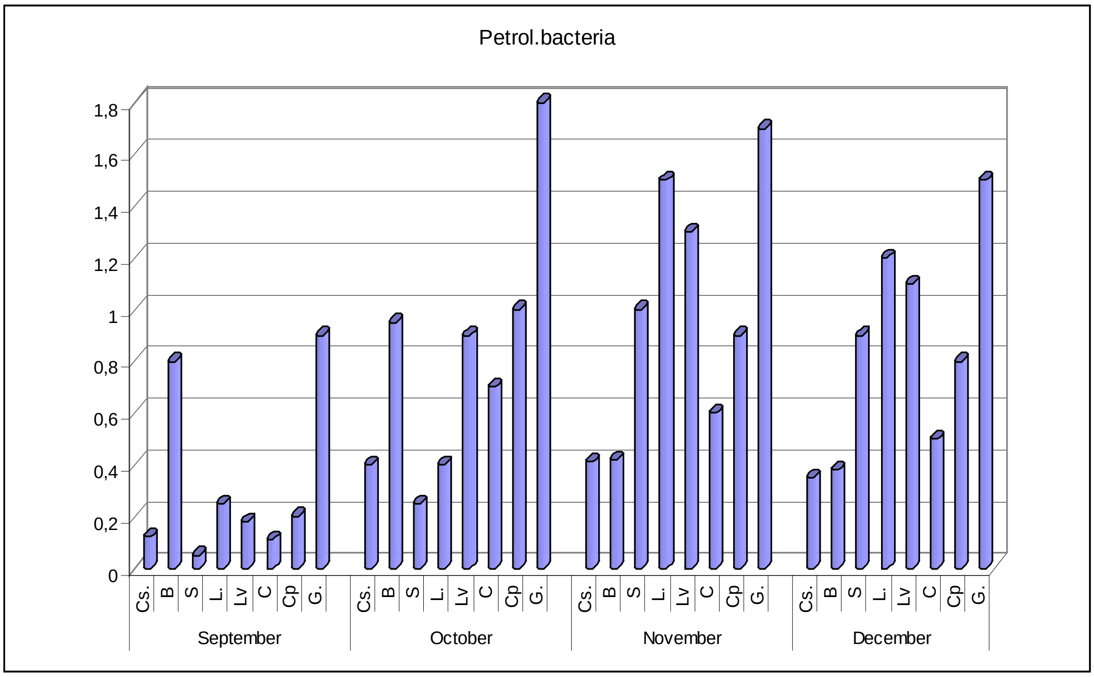


Fig. 9 Density of petrolytic bacteria in the Prut River in September-December of 2013, thousand cells/ml *(Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti)*

The density of petrolytic bacteria mostly depends on the degree of water pollution with petroleum substances (Kopilov, Kosolapov, 2008). According to the classification of water quality on the base of density of petrolytic bacteria (Kopilov, Kosolapov, 2008), water of Costesti-Stinca reservoir and similar the water of the Prut River, referred to the class of quality 4a (moderately polluted). Notably, in the Prut River at Sculeni, Leova, Cahul, and Giurgiulesti stations, where spots of petroleum substances often appear on the surface of water, the density of petrolrezistent bacteria counts 1500-1800 cells/ml (Fig.8) and the water quality corresponds to the class 5a (very polluted).

Conclusions. By analysing the total bacterioplancton and physiological groups of microorganisms, the level and nature of pollution of waters of the Prut River and Costesti-Stinca reservoir and their hygienic state were assessed. Thus, in accordance with the density of saprophytic bacteria the water of Costesti-Stinca reservoir is of class of quality I (very good). The river water corresponds to the class of quality II (good). It is important to stress that sometime the water quality at some stations, as example, Leuseni and Leova in September, referred to the class of quality III (moderately polluted), the density of saprophytic bacteria reaching up to 4.960 and, respectively, 4.4 thousand cells/ml. In October at Cislita-Prut station the density of saprophytic bacteria increased up to 11.44 thousand cells/ml, waters being of the class of quality V (very polluted).

Phytoplankton. In autumn of 2013 the phytoplankton of the Prut River was represented by 83 species and intraspecific taxa of algae, of which: *Cyanophyta* - 12, *Chrisophyta* - 1, *Bacillariophyta* – 38, *Euglenophyta* - 7, *Dinophyta* -1, and *Chlorophyta* - 24. Cyanophyte, bacillariophyte and chlorophyte algae dominated the composition of phytoplankton both in the Prut River and Costesti-Stinca reservoir. In the last the phytoplankton was more divers in the upper sector (Badragii Noi station), with a higher share of the species *Synechocystis aquatilis* Sanv., *Aphanizomenon flos-aquae* (L.) Ralfs and *Oscillatoria planctonica* Wolosz. – all cyanophyte algae. The phytoplankton of the Prut River was more divers in the Braniste-Leuseni sector in September, with the dominance of species *Aphanizomenon flos-aquae* (L.)Ralfs, *Oscillatoria planctonica* Wolosz. and *Merismopedia tenuissima* Lemm. and in the Leuseni-Cahul sector in October, with the dominance of species *Merismopedia tenuissima* Lemm., *Aphanizomenon flos-aquae* (L.) Ralfs and *Crucigenia tetrapedia* (Kirchn.) W.et G.S.West.

The density of phytoplankton in autumn months of 2013 ranged 0.33-22.62 million cells/l in the Prut River and 0.39-18.69 million cells/l in Costesti-Stinca reservoir (Fig.10), and the biomass ranged 0.51-8.13 g/m^3 in river and 0.52-10.51 g/m^3 in reservoir (Fig.11).

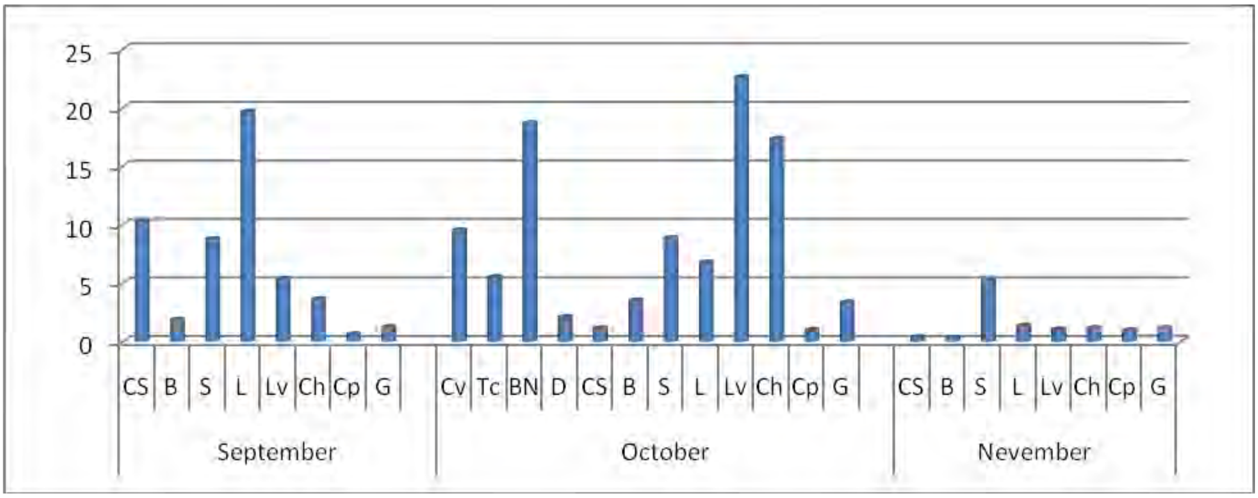


Fig. 10 Phytoplankton density (N-million cells/l) in Costesti-Stinca reservoir (BN- Badragii - Noi, D - Duruitoarea, CS – lower sector) and the Prut River (Cv - Criva, Tc-Tetcani, B -Braniste, S - Sculeni, L - Leuseni, Lv - Leova, Ch - Cahul, Cp - Cislita-Prut, G - Giurgiuleşti) in September-November 2013

Higher values of phytoplankton density were set down in September at Leuseni station and in October at Badragii-Noi, Leova and Cahul stations. They were due of intense development of species *Oscillatoria planctonica* and *Aphanizomenon flos-aquae* at Badragii-Noi and Cahul stations and of green alga *Crucigenia tetrapedia* at Cahul station. The values of phytoplankton density decreased considerable in November, oscillating in limits 0.33-1.39 million cells/l, with one exception – at Sculeni station it was equal to 5.29 million cells/l.

In autumn period the values of phytoplankton biomass varied usually in the range 0.51-3.43 g/m^3, in October being higher at Criva (6.19 g/m^3), Badragii-Noi (10.51 g/m^3) and Leova

(8.13 g/m^3) and in November – at Cislita-Prut (6.24 g/m^3).

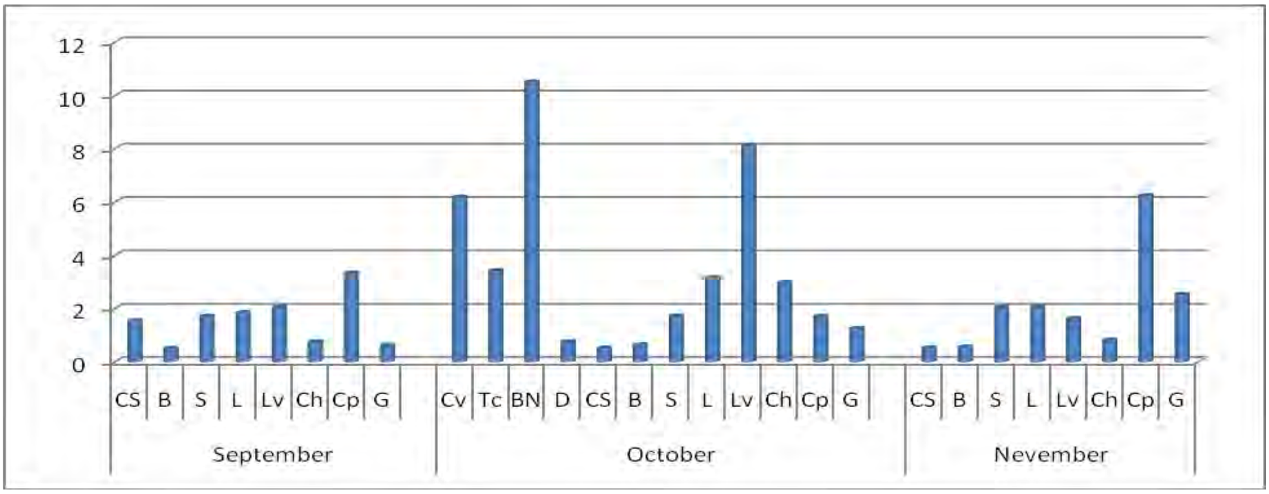


Fig. 11 Phytoplankton biomass in Costesti-Stinca reservoir (BN- Badragii - Noi, D - Duruitoarea, CS – lower sector) and the Prut River (Cv - Criva, Tc-Tetcani, B -Braniste, S - Sculeni, L - Leuseni, Lv - Leova, Ch - Cahul, Cp - Cislita-Prut, G - Giurgiuleşti) in September-November of 2013

In September-November of 2013 the values of primary production in the Prut River were placed in the diapason 0.11-2.33 gO_2/m^{-2} 24h, the highest values being registered at Criva, Braniste, Sculeni and Leova, and the lowest – at Leuseni, Cahul, Cislita-Prut and Giurgiulesti (Fig.12). In Costesti-Stinca reservoir the production processes run with the intensity of de 0.33 - 3.15 g O_2/m^2 24h, and the destruction processes – of 28.44-198.2 g O_2/m^{-2} 24h.

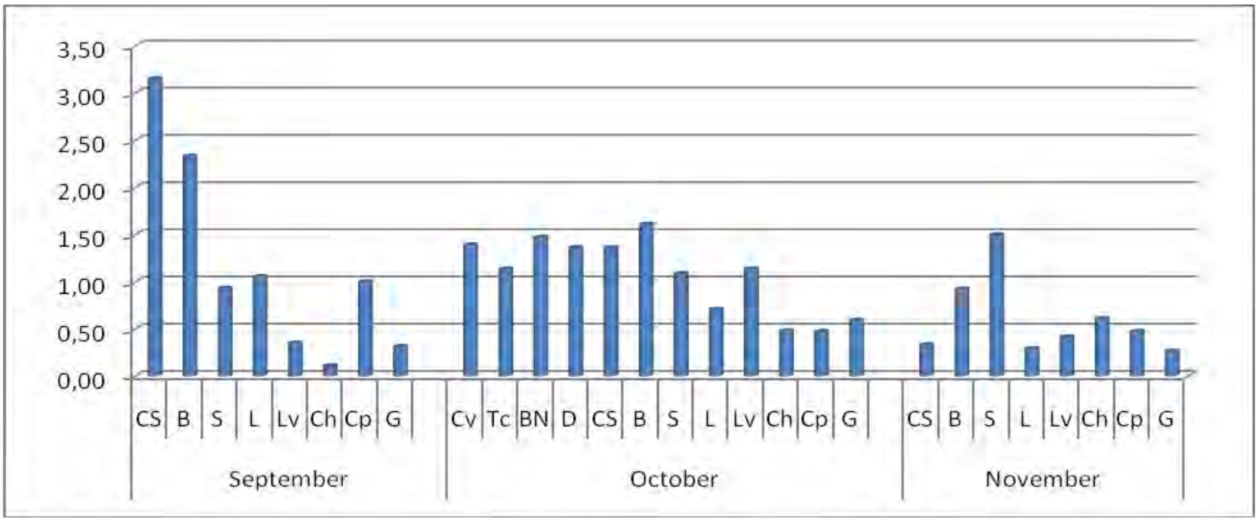


Fig. 12 Dynamics of phytoplankton primary production (A- gO^2/m^{-2} 24h) in Costesti-Stinca reservoir (BN- Badragii - Noi, D - Duruitoarea, CS – lower sector) and the Prut River (Cv - Criva, Tc-Tetcani, B - Braniste, S - Sculeni, L - Leuseni, Lv - Leova, Ch - Cahul, Cp - Cislita-Prut, G - Giurgiuleşti) in September-November of 2013

In November the values of primary production declined evidently in comparison with those recorded in September and October, first ascending from Costesti-Stinca to Sculeni, then decreasing in the lower sector of Prut River. In the last one the values varied within 0.27-0.61 g O_2/m^{-2} 24h.

In autumn the values of destruction of organic substances exceeded considerable those of phytoplankton primary production at most of investigated stations from the Prut River, ranging 0.24-14.64 gO_2/m^{-2} 24h, and the highest figures being recorded at Sculeni, Leuseni, Cahul and

Giurgiulesti in September and October (Fig.13). In the last autumn month the intensity of destruction of organic substances diminished a lot, its values oscillatind within 0.24-6.62 gO_2/m^{-2} 24h. In Costesti-Stinca reservoir the values of destruction of organic substances were also higher in September and October (28.44-198.2 gO_2/m^{-2} 24h), rising up from upper to lower sectors. In December they notably went down, being equal to 5.43 gO_2/m^{-2} 24h in the lower sector of reservoir.

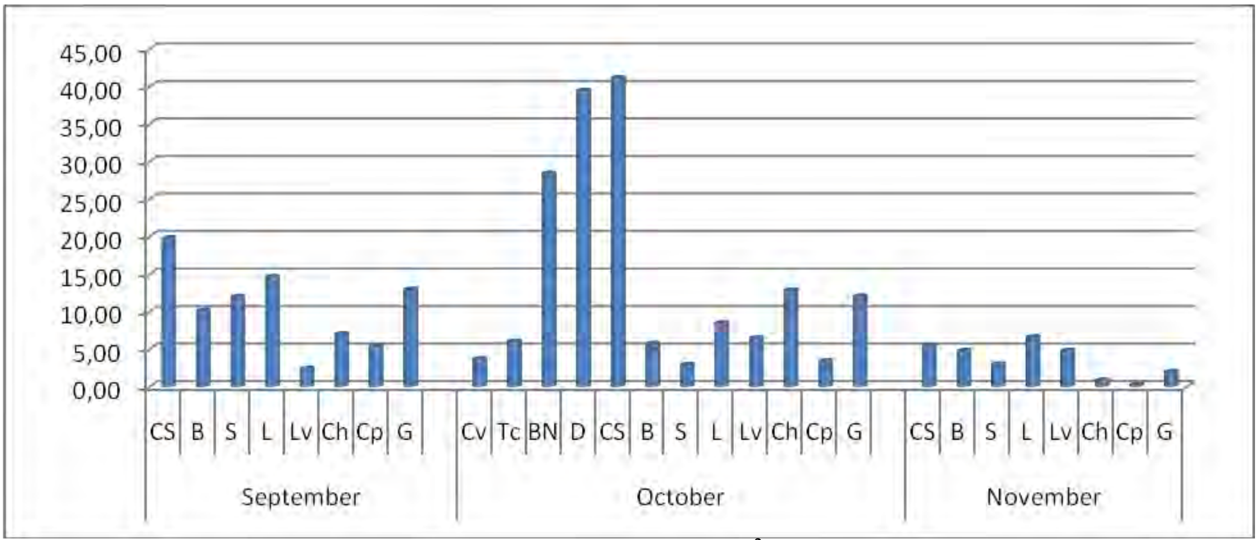


Fig.13 Dynamics of destruction of organic matter (R- gO_2/m^{-2} 24h) in Costesti-Stinca reservoir (BN-Badragii - Noi, D - Duruitoarea, CS – lower sector) and the Prut River (Cv - Criva, Tc-Tetcani, B - Braniste, S - Sculeni, L - Leuseni, Lv - Leova, Ch - Cahul, Cp - Cislita-Prut, G - Giurgiuleşti) in September-November of 2013. *Note*: the values of destruction of organic matter in the lower sector of Costesti-Stinca reservoir in September were diminished by ten times.

In autumn period the A/R ratio less than 1 was characteristic for all investigated stations in both the Prut River and Costesti-Stinca reservoir, proving that the destruction processes run faster than production ones. The unique exception was made at Cislita-Prut station in November , when the value of phytoplankton primary production (0.47 gO^2/m^{-2} 24h) exceeded the value of destruction of organic matter (0.24 gO^2/m^{-2} 24h), and the ration A/R reached 1.97.

In the first winter month, December, the density of phytoplankton remained quite low at most stations with values within 0.26-1.29 million cells/l, higher figures being registered only at Leuseni (9.62 million cells/l) and Leova (4.59 million cells/l), where were recorded significant amounts of species *Oscillatoria planctonica, Aphanizomenon flos-aquae* and *Merismopedia tenuissima* (Fig. 14).

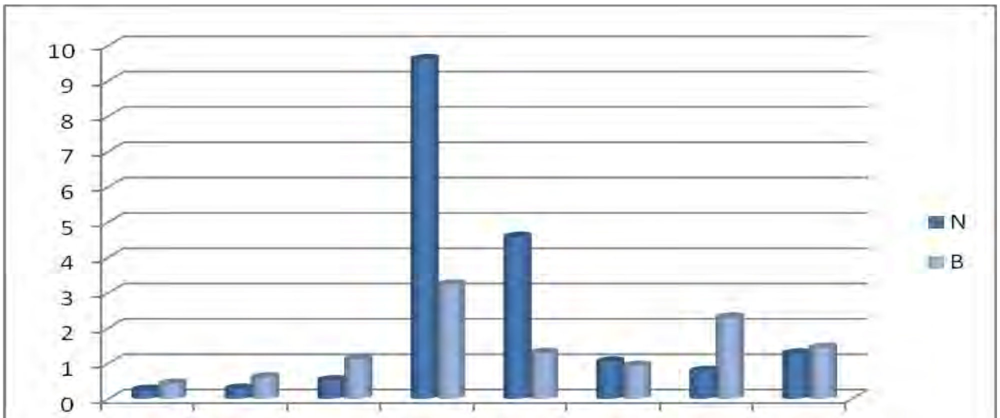


Fig.14 Phytoplankton density (N-million cells/l) and biomass (B-g/m^3) in Costesti-Stinca reservoir (CS – lower sector) and the Prut River (B -Braniste, S - Sculeni, L - Leuseni, Lv - Leova, Ch - Cahul, Cp - Cislita-Prut, G - Giurgiuleşti) in December of 2013

The phytoplankton biomass, composed mainly by bacillariophyte algae, recorded values within 0.43-1.12 g/m^3 in the lower sector of Costesti-Stinca reservoir and Middle Prut. In Lower Prut the values of phytoplankton biomass were higher, ranging 0.94-3.24 g/m^3, with higher values at Leuseni and Cislita-Prut.

Zooplancton. In the samples collected in September-December of 2013 were identified 40 taxa of zooplancton hydrobionts: 13 – *Rotatoria* (32.5%) and 27 – *Crustacea*: 11 - *Cladocera* (27.5 %), 16 - *Copepoda* (40.0%). The taxonomic richness of zooplankton community is presented in Table 2 and also corresponding zone of saprobity.

Table 2 List of zooplankton taxa in the Prut River in September-December of 2013

Group	Species/Taxonomic group	Zone of saprobity	Group	Species/Taxonomic group	Zone of saprobity
Rotatoria	*Ascomorpha ecaudis*	o	*Copepoda*	*Mesocyclops crassus*	β
Rotatoria	*Asplanchna priodonta*	$o - \beta$	*Copepoda*	*Mesocyclops dybowskii*	$o - \beta$
Rotatoria	*Asplanchna sp.*	-	*Copepoda*	*Mesocyclops leuckarti*	o
Rotatoria	*Brachionus calyciflorus*	$\beta - \alpha$	*Copepoda*	*Mesocyclops oithonoides*	-
Rotatoria	*Brachionus diversicornis*	β	*Copepoda*	*Metadiaptomus asiaticus*	-
Rotatoria	*Brachionus quadridentatus*	β	*Copepoda*	*Microcyclops bicolor*	o
Rotatoria	*Brachionus sp.*	-	*Copepoda*	*Nauplii Copepoda*	-
Rotatoria	*Cephalodella catellina*	$o - \beta$	*Copepoda*	*Paradiaptomus alluaudi*	-
Rotatoria	*Euchlanis dilatata*	$o - \beta$	*Copepoda*	*Tropocyclops prasinus*	-
Rotatoria	*Keratella quadrata*	$\beta - o$	*Cladocera*	*Alona quadrangularis*	$o - \beta$
Rotatoria	*Lecane levistyla*	$o - \beta$	*Cladocera*	*Bosmina longirostris*	$o - \beta$
Rotatoria	*Notholca squamula*	$o - \beta$	*Cladocera*	*Chydorus globosus*	o
Rotatoria	*Synchaeta oblonga*	β	*Cladocera*	*Chydorus sp.*	-
Copepoda	*Acanthocyclops viridis*	$o - \beta$	*Cladocera*	*Chydorus sphaericus*	β
Copepoda	*Copepodit Calanoida*	-	*Cladocera*	*Daphnia hyalina*	o
Copepoda	*Copepodit Cyclopoida*	-	*Cladocera*	*Macrothrix laticornis*	β
Copepoda	*Cyclops sp.*	-	*Cladocera*	*Moina macrocopa*	α
Copepoda	*Eucyclops serrulatus*	β	*Cladocera*	*Moina micrura*	β
Copepoda	*Macrocyclops sp.*	-	*Cladocera*	*Pleuroxus sp.*	-
Copepoda	*Mesocyclops asiaticus*	-	*Cladocera*	*Pleuroxus unicatus*	$o - \beta$

More than 60% of identified taxa are indicator organisms. The analysis of zooplankton species abundance as function of saprobity zone (Fig.15) revealed that the indicators of o–β-mesosaprobic and β-mesosaprobic zones dominated in aquatic ecosystem of the Prut River in September-December of 2013.

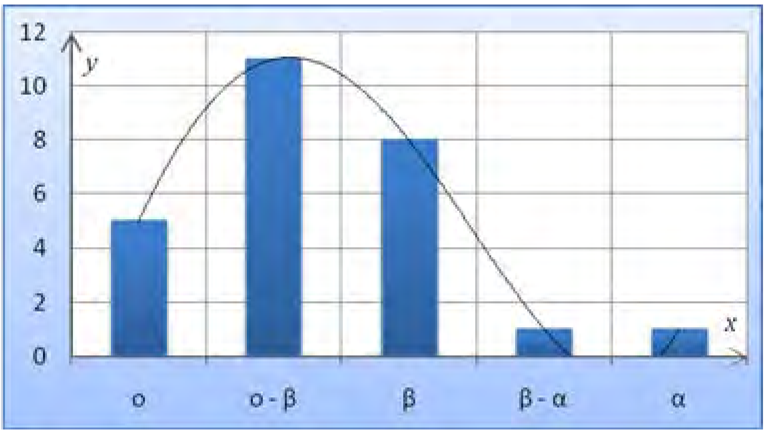


Fig. 15 Relationship between the zooplankton species abundance (y-axis) of the Prut River and the saprobity (x-axis) of aquatic ecosystem

The analysis of structure of zooplankton community from the Prut River consisted of calculation of a range of parameters and biocenotic indices: frequency, density, biomass, production, and saprobic index. Frequency (F) represents the number of samples in which a species (ps) is detected, in relation to the total number of quantitative samples: F% = (ps/Pt) · 100. The frequency of occurrence and species richness along the Prut River are presented in Tab. 3 and Fig. 16.

Table 3 Frequency (*F*, %) of taxa occurrence in zooplankton community of the Prut River (September – December of 2013)

Taxon	Number of samples where taxon was detected												p_s	*F*, %
	Cr*	Tt	BN	DN	Cs	Br	Sc	Ls	Lv	Ch	CP	Gr		
Ascomorpha ecaudis					1						1		2	5.7
Asplanchna priodonta												1	1	2.9
Asplanchna sp.							1				1		2	5.7
Brachionus calyciflorus	1			1					1				3	8.6
Brachionus diversicornis												1	1	2.9
Brachionus quadridentatus										1	1		2	5.7
Brachionus sp.								1		1	1	2	5	14.
Cephalodella catellina											1	1	2	5.7
Euchlanis dilatata			1					1				1	3	8.6
Keratella quadrata	1						1						2	5.7
Lecane levistyla				1									1	2.9
Notholca squamula									1				1	2.9
Synchaeta oblonga								1	1				2	5.7
Acanthocyclops viridis										1	1		2	5.7
Copepodit Calanoida					1								1	2.9
Copepodit Cyclopoida			1	1	2		2	1	2		1	1	11	31.
Cyclops sp.				1	1							1	3	8.6
Eucyclops serrulatus											2	2	4	11.
Macrocyclops sp.											1		1	2.9
Mesocyclops asiaticus					1	1							2	5.7
Mesocyclops crassus				1	2	1	1			1	1		7	20.
Mesocyclops dybowskii						1							1	2.9
Mesocyclops leuckarti					1	1	1						3	8.6
Mesocyclops oithonoides			1			1							2	5.7
Metadiaptomus asiaticus					1								1	2.9
Microcyclops bicolor					1								1	2.9
Nauplii Copepoda	1	1	1	1		1	1	2	3	1	3	4	19	54.
Paradiaptomus alluaudi										1			1	2.9
Tropocyclops prasinus									1	1		1	3	8.6
Alona quadrangularis												1	1	2.9
Bosmina longirostris	1				1	1							3	8.6
Chydorus globosus											1		1	2.9
Chydorus sp.									1		1		2	5.7
Chydorus sphaericus						2							2	5.7
Daphnia hyalina					1								1	2.9
Macrothrix laticornis											1		1	2.9
Moina macrocopa										1			1	2.9
Moina micrura											1		1	2.9
Pleuroxus sp.				1									1	2.9
Pleuroxus unicatus					1	1							2	5.7
Species abundance at the sampling sites:	**4**	**1**	**4**	**7**	**14**	**10**	**7**	**6**	**10**	**8**	**18**	**16**		

* Cr - Criva, Tt – Tetcani, BN – Badragii Noi, DN - Duruitoarea Nouă, Cs - Costesti-Stinca, Br - Braniste, Sc -

Sculeni, Ls - Leuseni, Lv - Leova, Ch - Cahul, CP – Cislita-Prut, Gr - Giurgiulești

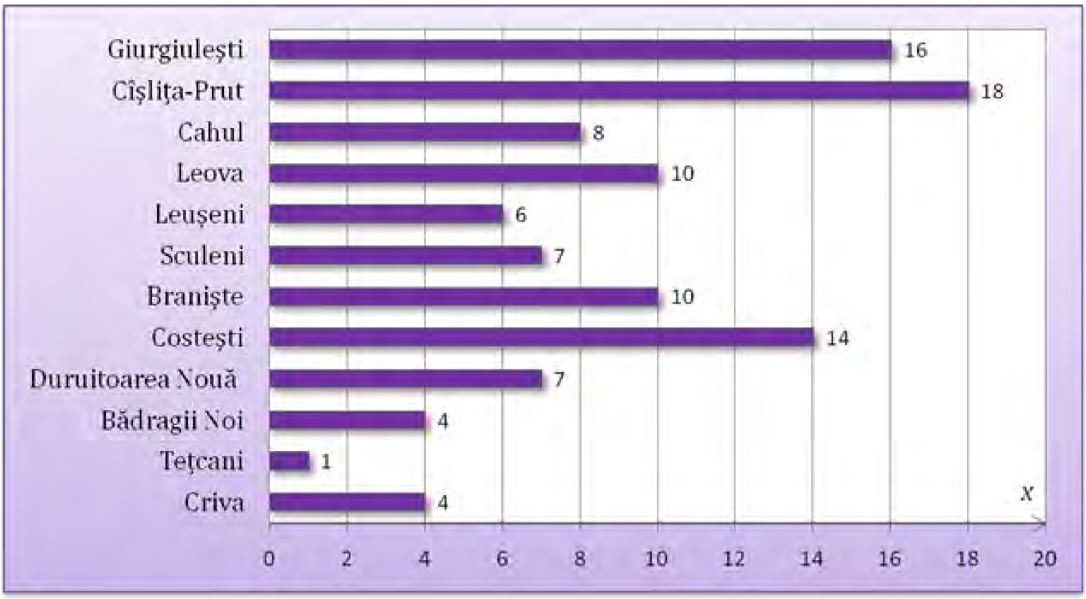


Fig. 16 Zooplankton species abundance (*x*-axis) at the sampling sites of the Prut River in September - December of 2013

The highest species diversity was registered in Costesti-Stinca reservoir next to the dam and also in the Prut River, lower sector, at Cislita-Prut and Giurgiulesti and the lowest – in the Prut River, middle sector, at Criva, Tetcani and Badragii Noi stations.

The dominant species from those three main taxonomic groups of zooplankton – *Rotatoria*, *Copepoda* and *Cladocera* – according to their frequency of occurrence (*F,* %) in zooplankton samples collected from the Prut River are presented in Fig. 17 - 19.

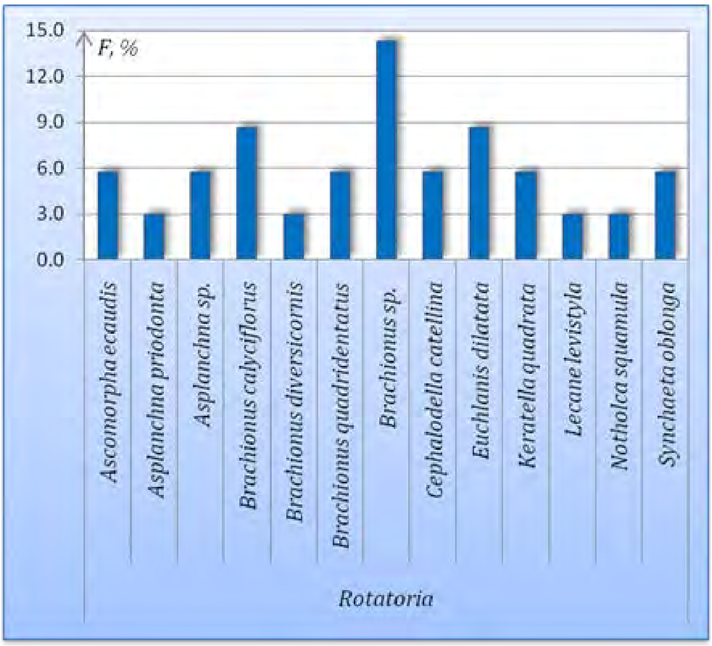


Fig. 17 Ranking of the identified taxa of *Rotatoria* in function of their frequency of occurrence (*F,* %) in zooplankton samples from the Prut River

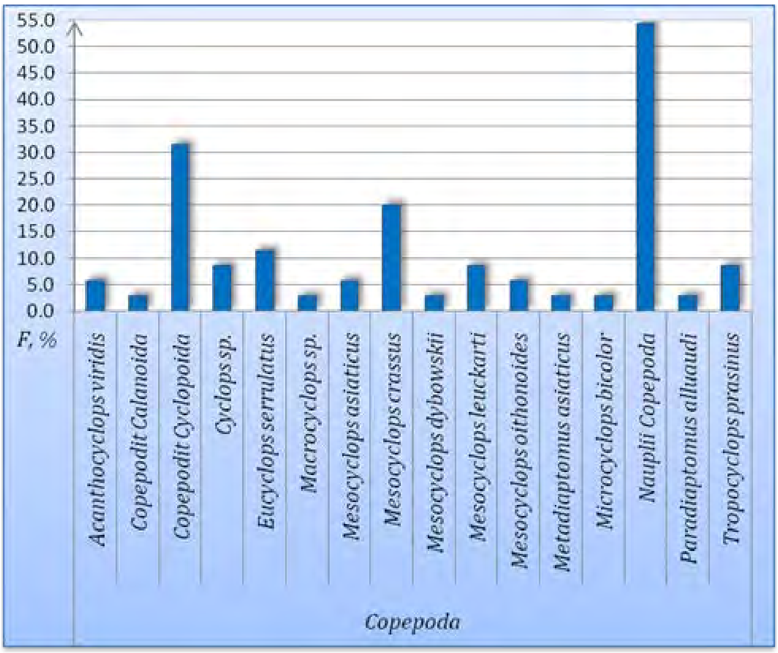


Fig. 18 Ranking of the identified taxa of *Copepoda* crustacean in function of their frequency of occurrence (*F,* %) in zooplankton samples from the Prut River

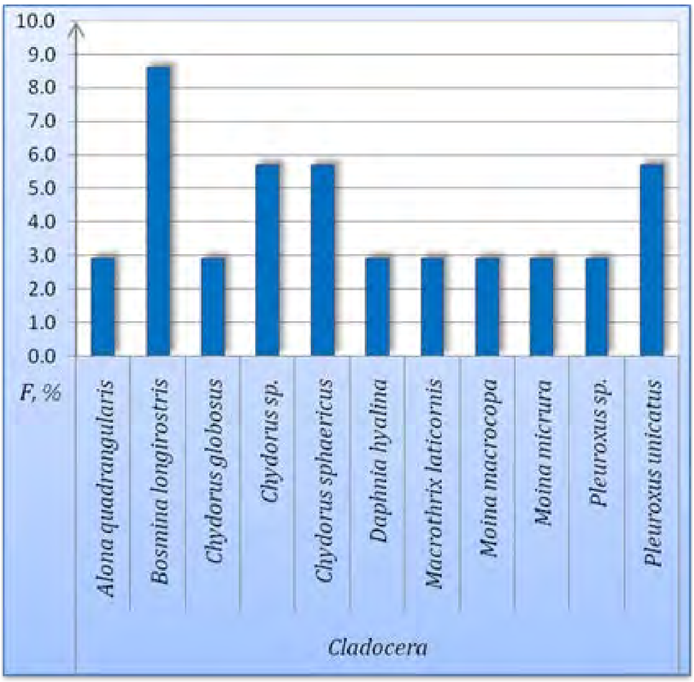


Fig. 19 Ranking of the identified taxa of *Cladocera* crustacean in function of their frequency of occurrence (*F,* %) in zooplankton samples from the Prut River

As it results from the above figures, the dominant complex of zooplankton in investigated stations of the Prut River comprises of: larval stages (naupliar and copepodid) of the order *Cyclopoida* and species of genera *Brachionus*, *Euchlanis* (rotifers), *Mesocyclops* (copepods), *Chydorus*, *Bosmina, Moina, Pleuroxus* (cladocerans). The figures 20-22 are pictures of hydrobionts obtained in the process of taxa identification. The laboratory equipment "Axio Imager. 2" (ZEISS), equipped with camera and computer for processing and storage of graphic objects, was used.

Fig. 20 *Chydorus sphaericus*

Fig. 21 Head and rostrum of *Ch. sphaericus*

Fig. 22 Identification features of *Copepoda* crustaceans*:* caudal branch with distal setae

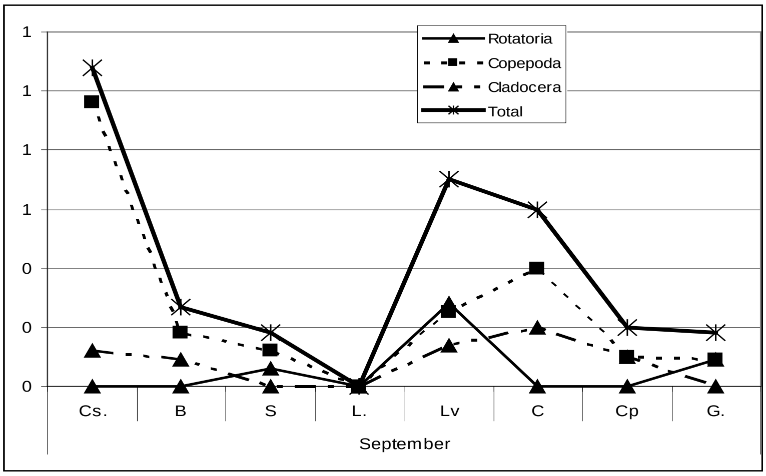
Functional characteristics (density, biomass, production) of the main groups of zooplancton from the Prut River are given in Table 4.

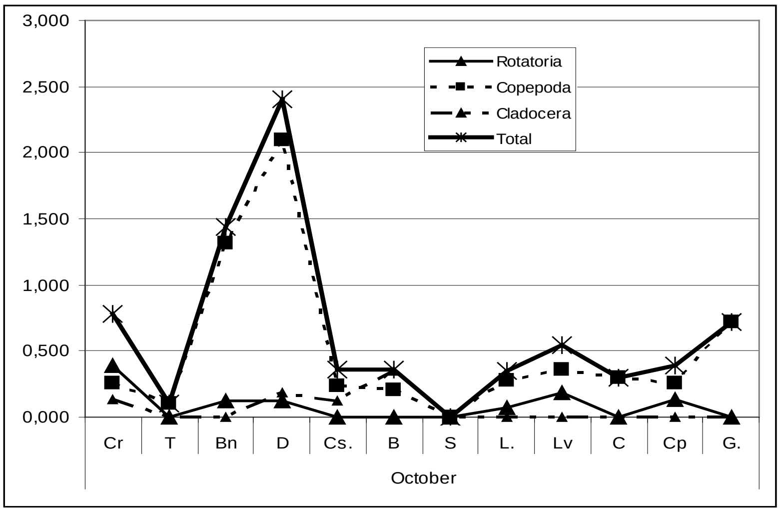
Table 4 Dynamics of density (N, ind/m^3), biomass (B, mg/m^3) and production (P, mg/m^3) of zooplankton in the Prut River, September - December of 2013

Station	*Rotatoria*			*Copepoda*			*Cladocera*			Total		
	N	B	P	N	B	P	N	B	P	N	B	P
Prut River, September												
Costesti-Stinca	0	0	0	960	19.320	2.8992	120	2.040	0.1734	1080	21.360	3.0726
Braniste	0	0	0	180	4.500	0.0675	90	1.530	0.1224	270	6.030	0.1899
Sculeni	60	0.024	0.0038	120	3.720	0.3452	0	0	0	180	3.744	0.3490
Leuseni	0	0	0	0	0	0	0	0	0	0	0	0
Leova	280	0.056	0.0039	280	0.560	0.0280	140	0.700	0.0553	700	1.316	0.0872
Cahul	0	0	0	400	9.400	0.1730	200	20.000	2.6000	600	29.400	2.7730
Cislita-Prut	0	0	0	100	1.250	0.0200	100	10.000	1.2500	200	11.250	1.2700
Giurgiulesti	90	0.018	0.0014	90	1.620	0.0810	0	0	0	180	1.638	0.0824
Prut River, October												
Criva	390	0.429	0.1271	260	0.520	0.0260	130	2.210	0.1326	780	3.159	0.2857
Tetcani	0	0	0	100	0.200	0.0100	0	0	0	100	0.200	0.0100

Badragii Noi	120	0.024	0.0014	1320	21.600	0.6102	0	0	0	1440	21.624	0.6116
Duruitoarea N	120	0.144	0.0437	2100	44.460	4.2942	180	1.440	0.1008	2400	46.044	4.4387
Costesti-Stinca	0	0	0	240	6.240	0.7278	120	0.960	0.0576	360	7.200	0.7854
Braniste	0	0	0	210	9.450	0.1134	350	2.380	0.1428	360	11.830	0.2562
Sculeni	0	0	0	0	0	0	0	0	0	0	0	0
Leuseni	70	0.014	0.0007	280	4.760	1.0472	0	0	0	350	4.774	1.0479
Leova	180	0.360	0.1062	360	5.310	0.4568	0	0	0	540	5.670	0.5630
Cahul	0	0	0	300	6.300	0.0702	0	0	0	300	6.300	0.0702
Cislita-Prut	130	0.104	0.0062	260	2.535	0.0528	0	0	0	390	2.639	0.0591
Giurgiulesti	0	0	0	720	7.920	0.1296	0	0	0	720	7.920	0.1296
Prut River, November												
Braniste	0	0	0	100	4.500	0.0360	200	1.000	0.0420	300	5.500	0.0780
Sculeni	0	0	0	180	4.740	0.4146	0	0	0	180	4.740	0.4146
Leuseni	240	0.480	0.0528	120	0.240	0.0060	0	0	0	360	0.720	0.0588
Leova	0	0	0	150	2.550	0.4080	0	0	0	150	2.550	0.4080
Cahul	90	0.180	0.0288	0	0	0	0	0	0	90	0.180	0.0288
Cislita-Prut	880	0.374	0.0458	2420	35.310	1.8887	440	2.200	0.0660	3740	37.884	2.0005
Giurgiulesti	1260	2.268	0.3200	8680	82.460	4.1160	280	7.000	0.2100	10220	91.728	4.6460
Prut River, December												
Costesti-Stinca	120	0.024	0.0024	3000	128.280	2.0064	120	7.800	0.1560	3240	136.104	2.1648
Braniste	0	0	0	910	7.410	0.0449	0	0	0	910	7.410	0.0449
Sculeni	170	1.445	0.1012	340	0.680	0.0068	0	0	0	510	2.125	0.1080
Leuseni	180	0.720	0.0792	540	1.080	0.0270	0	0	0	720	1.800	0.1062
Leova	640	1.408	0.0666	160	0.320	0.0032	0	0	0	800	1.728	0.0698
Cahul	140	0.280	0.0238	140	8.680	0.0260	0	0	0	280	8.960	0.0498
Cislita-Prut	120	0.024	0.0004	600	1.200	0.0120	120	4.200	0.0126	840	5.424	0.0250
Giurgiulesti	720	2.610	0.1890	1080	5.940	0.0324	180	3.960	0.1188	1980	12.510	0.3402

The obtained data reflect both seasonal cycles of development of main groups of zooplankton and trophicity of investigated water courses, which is determined by a range of factors (e.g. hydrological regime, food resources, biological and anthropic pollution). In September-December of 2013 z ooplankton demonstrated the highest density, biomass and production in Costesti-Stinca reservoir (September, December), at Badragii Noi and Duruitoarea Noua (October), Cislita-Prut (November) and Giurgiulesti (November, December) stations (Fig. 23-26).





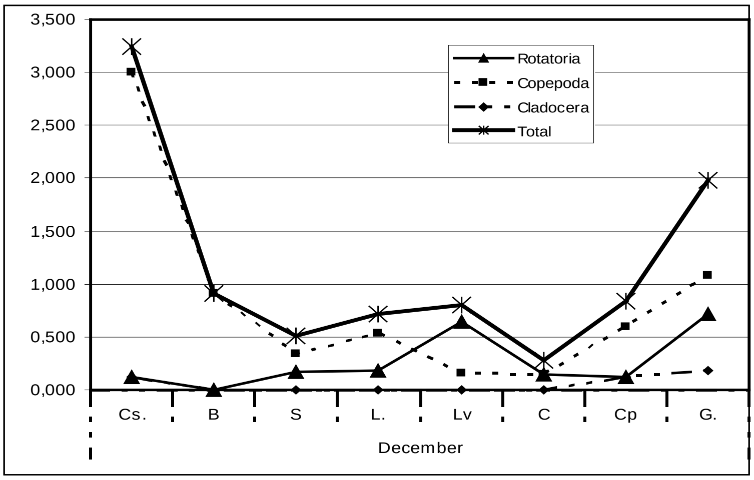


Fig. 23 - 25 Fluctuation of density (N, thousand ind./m^3) of the main groups of zooplankton community along the Prut River

The density of total zooplankton (N_{tot}), as a separate parameter, is not normally used to evaluate the trophicity of aquatic ecosystems. It is always used with the parameter biomass of total zooplankton (B_{tot}). The increase of hydrobiont biomass indicates the increase of troficity of the water body. Troficity of the Prut River ecosystem is presented in the Table 4, where the classes of troficity are marked with different colours: blue – oligotrophic, green – oligo-mesotrophic and yellow – mesotrophic classes.

According to the values of $B_{tot,}$ all investigated zones of the Prut Prut in September - December, with the exception of sample from Costesti-Stinca reservoir in December, should be considered as oligotrophic aquatic systems. According to the values of $N_{tot,}$ troficity class of the Prut River at Costesti-Stinca (September, December), Badragii Noi and Duruitoarea Noua (October), Cislita-Prut (November) and Giurgiulesti (December) is determined as oligo-mesotrophic, but at Giurgiulesti in November – as mesotrophic.

The reasons for appearance of differences in estimation of trophicity zone could be different. One of them may appear in the situation when the high abundance of hydrobionts is determined by rotifers, whose individual weight is very low. Errors may appear during the calculation of functional features of zooplankton: individual weights of hydrobionts (due to their microscopic size), specific production (P/B coefficient) and its correlation to different temperature regimes of aquatic ecosystems. In order to improve the feasibility of results of biomonitoring, it is recommended to use not only one, but several biological indices, for example, *trophicity index* (Methodological guidelines for sampling, processing and analysis of hydrobiological samples of water and bottom sediments, 2008). The value of index (E) characterizes the trophic class of the water body (Tab.5).

Table 5 Estimation of trophic class of the water body

$E = K \cdot (x + 1) / (A + V) (y + 1)$, where:	Value of index, E	Trophic class of the water body
E – assessment of trophicity of the water body	< 0.2	*oligotrophic*
K – number of *Rotatoria* species	0.2 < E < 1.0	*mesotrophic*
A – number of *Copepoda* species	1.0 < E < 4.0	*eutrophic*
V – number of *Cladocera* species	> 4.0	*hypereutrophic*
x – number of mesoeutrophic species		
y – number of oligo-mesoeutrophic species		

According to the Table 5, firstly the values of *K, A, V, x* and *y* should be determined, secondly, the trophicity index should be calculated, and at the last, the trophic class of the water body should be nominated (Tab.6).

Table 6 Example of assessment of trophic class of water body

K	A	V	x	y	E
13	16	11	7	11	0,32
Conclusion on trophic class of the water body:					*mesotrophic*

Carried out investigations allowed calculating the saprobic index. Its fluctuations in the ecosystems of the Prut River is presented in Figure 26.

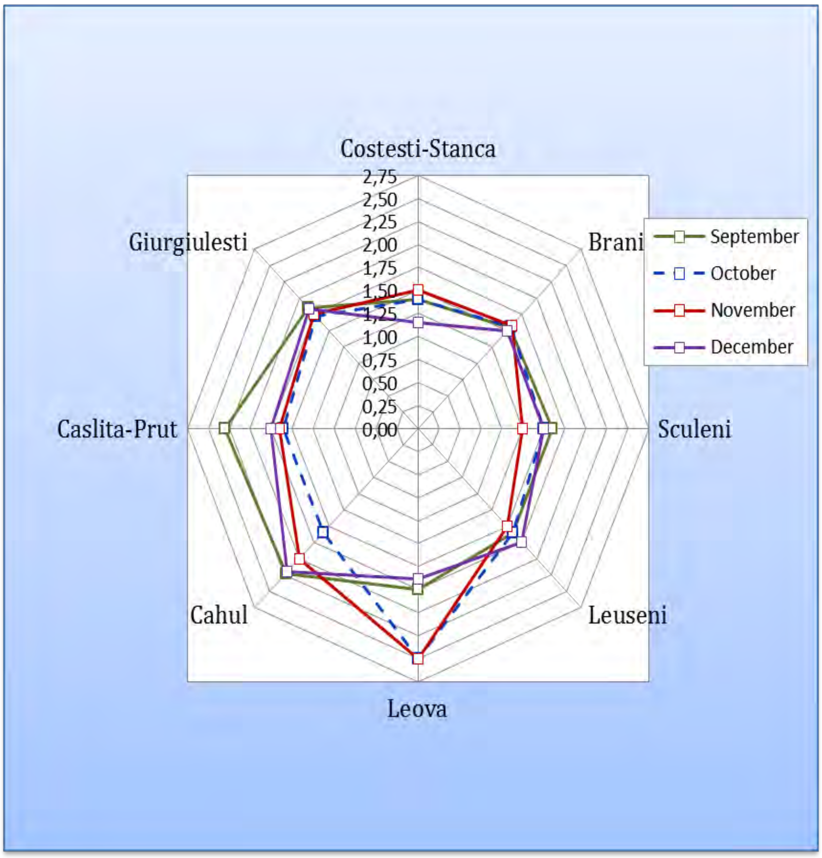


Fig. 26 Fluctuations of saprobic index at monitorized sites of the Prut River (September-

December, 2013)

Assessment of the ecological state of the water body with the use of indicator hydrobionts is considered statistically significant if the sample contains no fewer than 12 indicator species with the total frequency of their occurrence in samples not less than 30. This requirement has not been satisfied for all samples, thus the assessment of the ecological state of the water body should be made not only on the base of indicator species of zooplankton, but only in combination with other hydrobiological and hydrochemical parameters.

Zoobenthos. Species composition, structural characteristics of macrozoobenthos and the results of bioindication of water quality at each station were studied.

There has been observed a reduction of the density of zoobenthos without molluscs, of total zoobenthos and the biomass of zoobenthos without molluscs (Fig. 27-29) downstream the Prut River.

The highest values of density were registered at Braniste station: zoobenthos without molluscs - 17134 ind./m^2 and total zoobenthos - 17654 ind./m^2 (Tab. 1), a significant contribution being brought by *Eukiefferiella longicalcar* (K.) (Si=1.35) - 2080 ind./m^2 and *Simuliidae* - 1920 ind./m^2 (Si=1.15).

The highest values of zoobenthos total biomass were registered at Criva – 6844.36 g/m^2. To note that 6805.6 g/m^2 of this value were the share of *C.crassa.*

The lowest values of density were recorded at Costesti-Stinca, Cislita-Prut, and Giurgiulesti stations - 3- 40 ind./m2. The lowest values of total biomass were registered at Giurgiulesti – 0.08 g/m^2 and Costesti-Stinca stations – 0.221 g/m^2 (Tab. 7).

Table 7 Density (ind./m^2) and biomass (g/m^2) of zoobenthos of the Prut River, September – December of 2013

Sampling station	Date	Zoobenthos without molluscs ind/m^2	Zoobenthos without molluscs, g/m^2	Total zoobentos, ind./m^2	Total zoobentos, g/m^2
Costesti-Stinca	No sampling	-	-	-	-
Braniste	24.09.2013	4640	1.28	4880	55.12
Sculeni	24.09.2013	6322	6.739	6682	30.139
Leuseni	25.09.2013	10293	12.033	10373	2524.433*
Leova	25.09.2013	8322	5.928	8402	8.008
Cahul	26.09.2013	1124	4.1775	1124	4.1775
Cislita-Prut	26.09.2013	81	0.082	201	364.41
Giurgiulesti	26.09.2013	2560	2.96	2600	5.64
Criva	17.10.2013	7600	19.52	8240	6844.36*
Tetcani	17.10.2013	1160	8	1920	58.28
Badragii Noi	17.10.2013	840	8.04	840	8.04
Duruitoarea Noua	17.10.2013	3360	3.8	3360	3.8
Costesti-Stinca	22.10.2013	87	0.2345	92	0.5285
Braniste	22.10.2013	14960	15.04	17840	288.88
Sculeni	22.10.2013	3722	8.6942	6322	449.8942
Leuseni	23.10.2013	1765	1.224	1765	1.224
Leova	23.10.2013	1642	1.814	1762	1452.114*
Cahul	24.10.2013	687	64.4767	687	64.4767
Cislita-Prut	24.10.2013	403	0.6555	563	233.2355
Giurgiulesti	No sampling	-	-	-	-
Costesti-Stinca	No sampling	-	-	-	-

Braniste	26.11.2013	14841	17.2455	15481	26.2055
Sculeni	26.11.2013	14161	21.549	15481	206.789
Leuseni	27.11.2013	4484	6.055	4484	6.055
Leova	27.11.2013	5722	4.994	5762	486.354
Cahul	28.11.2013	402	1.543	402	1.543
Cislita	28.11.2013	372	0.452	452	9.892
Giurgiulesti	28.11.2013	0	0	40	2.96
Costesti-Stinca	16.12.2013	3	0.007	5	0.221
Braniste	16.12.2013	17134	39.578	17654	136.778
Sculeni	16.12.2013	4801	13.045	6481	319.845
Leuseni	17.12.2013	2484	1.499	2484	1.499
Leova	17.12.2013	3962	3.767	3962	3.767
Cahul	18.12.2013	2722	3.949	2722	3.949
Cislita-Prut	18.12.2013	6	0.051	86	14.371
Giurgiulesti	18.12.2013	120	0.08	120	0.08

*Note: * This value was divided to10 in Figure 31.*

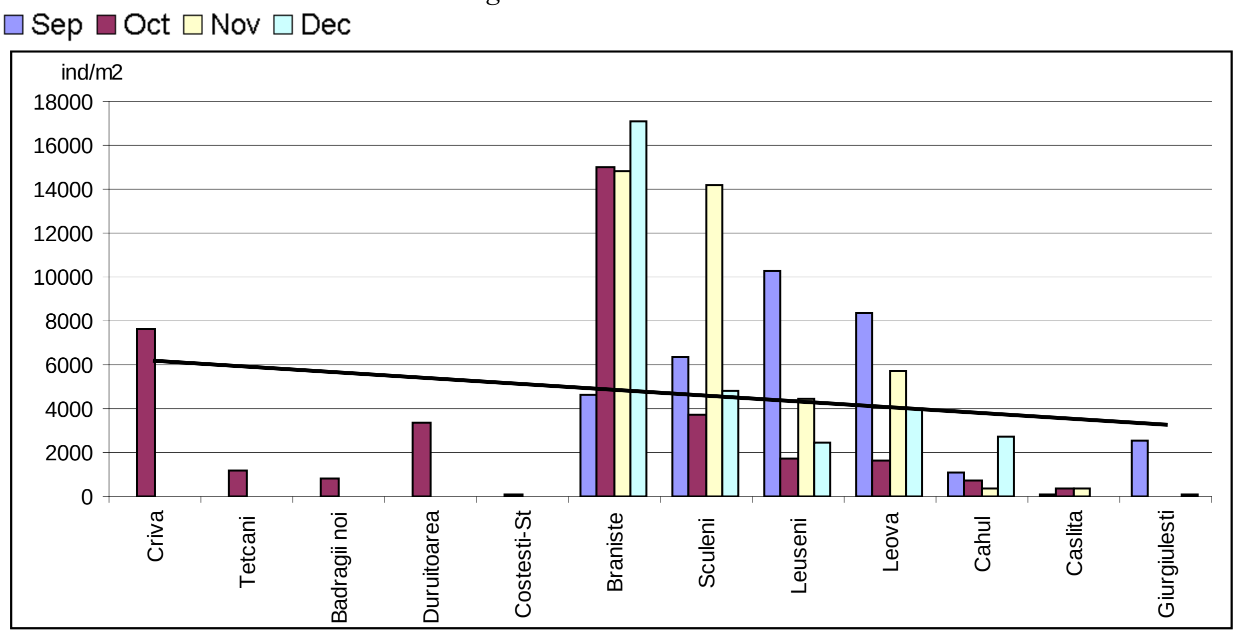


Fig. 27 Density (ind/m^2) of zoobenthos without molluscs of the Prut River, September – December of 2013

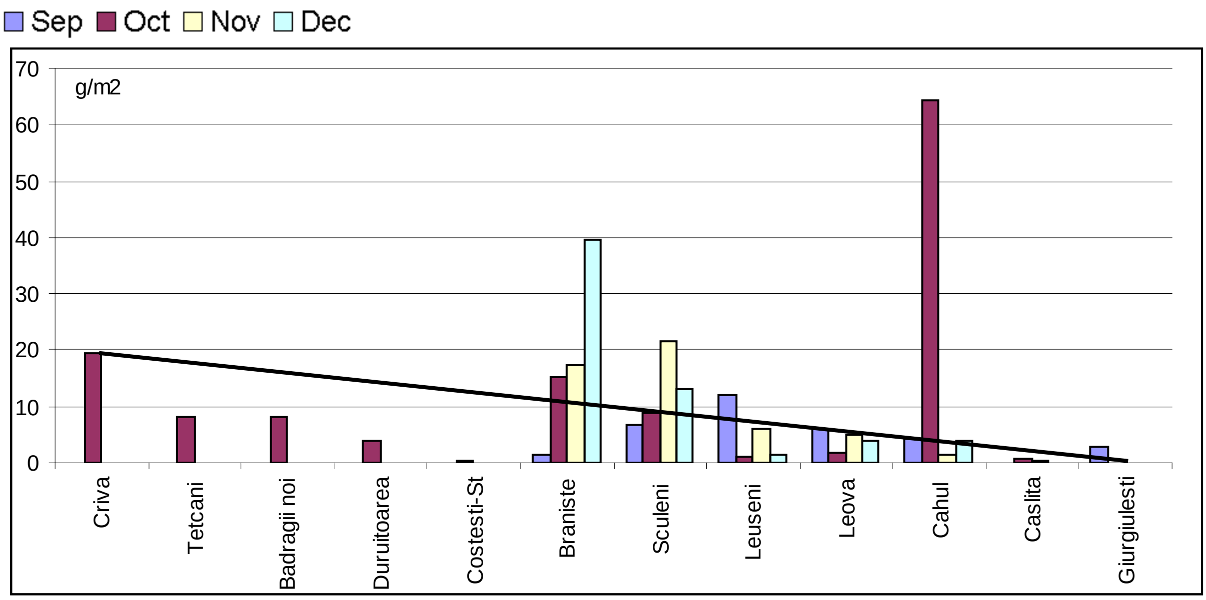


Fig. 28 Biomass (g/m²) of zoobenthos without molluscs of the Prut River, September – December of 2013

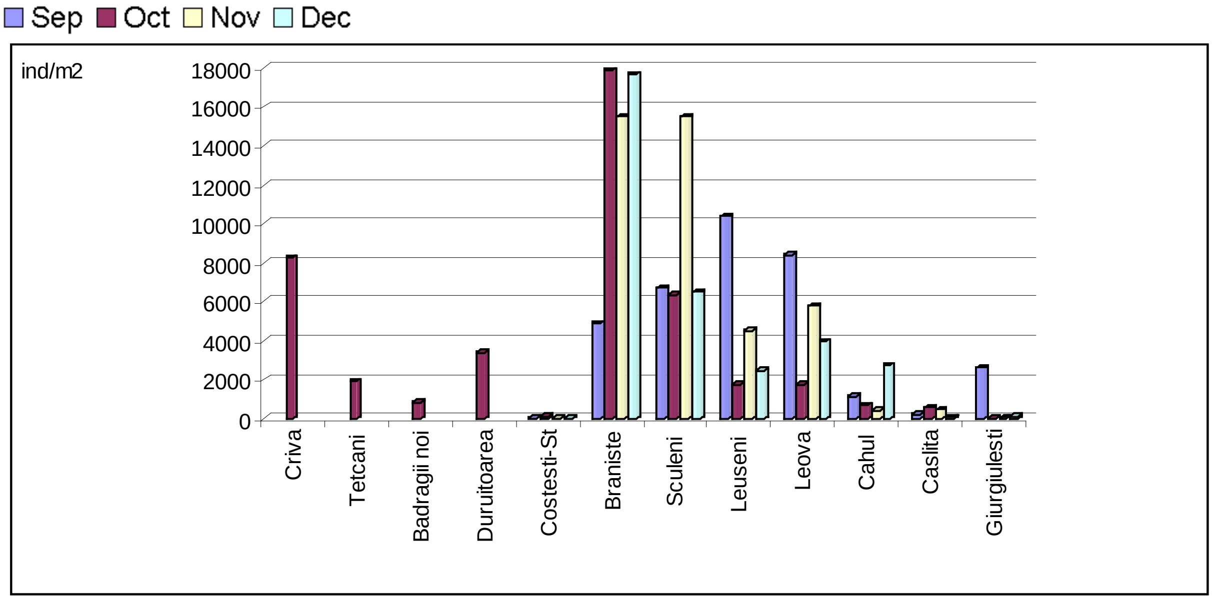


Fig. 29 Density (ind/m²) of total zoobenthos of the Prut River, September – December of 2013

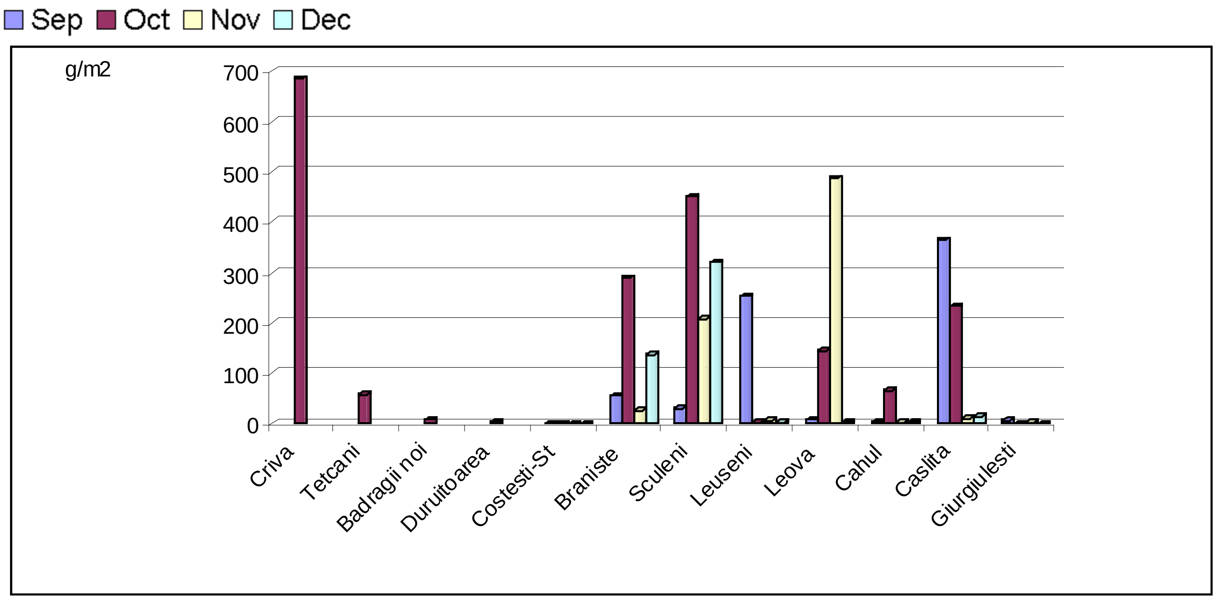


Fig. 30 Biomass (g/m²) of total zoobenthos of the Prut River, September – December of 2013. *Note: the values for Leuseni in September and for Criva and Leova and October were diminished by ten times.*

In September the highest values of biomass of total zoobenthos were found at Leuseni – 2524.433 g/m², of which 2521.4 g/m² consisted of bivalve molluscs. Such high biomass was recorded also in October at Criva – 6844.36 g/m², with the contribution of bivalves of 6805.6 g/m² and at Leova – 1452.114 g/m² and, respectively, 1232.5 g/m² (Fig. 30).

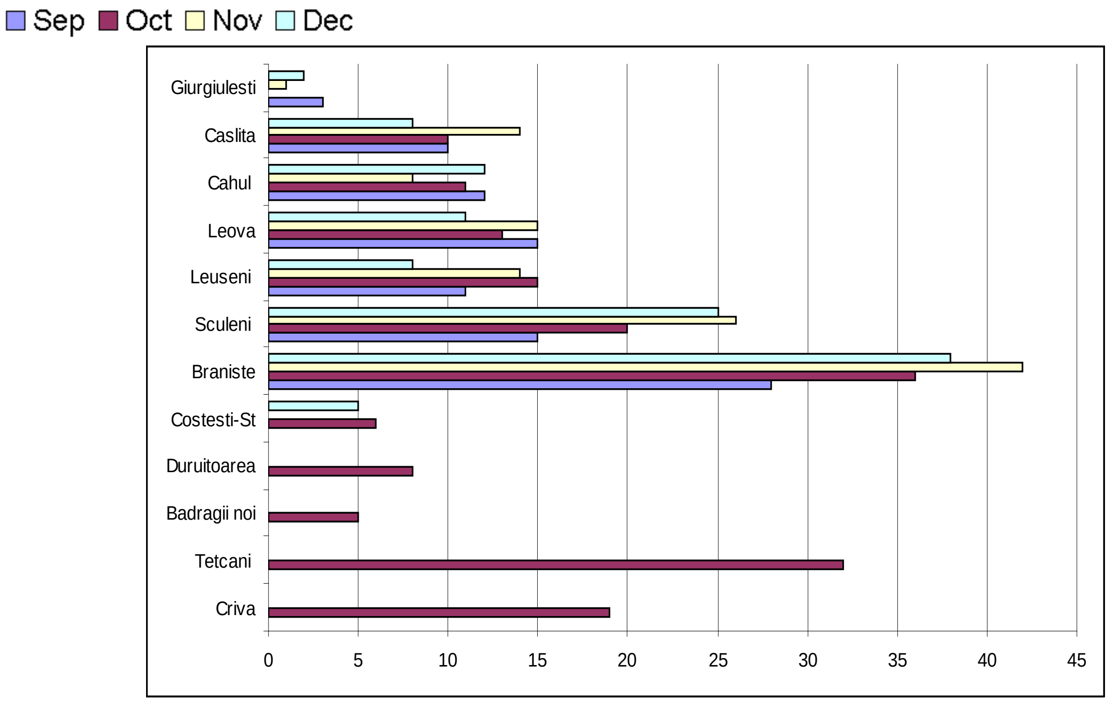


Fig. 31 Taxa number of zoobenthos of the Prut River, September – December of 2013

The number of species at each sampling site differed significantly, for example in November - from 2 at Giurgiulesti up to 42 at Braniste stations (Fig. 31).

The highest number of rare species, as in summer time, has been remarked at Tetcani and Braniste stations, and among them are *Theodoxus transversalis* (Pfeiffer, 1828), *Pisidium moitesserianum* (Paladilhe, 1866), *Ephemera vulgata* (Linnaeus, 1758), *Anabolia furcata* (Brauer, 1857), species of *Simuliidae.* In December at Braniste station a very high density of *Simuliidae* was registered - 1920 ind./m^2

Theodoxus transversalis (Pfeiffer, 1828) is a rare species included in Red List of the International Union for Conservation of Nature (IUCN). Only empty shells of this species were occasionally registered in the previous decade, but in summer and autumn of 2013 alive individuals were met at Tetcani. This is an important fact for monitoring and preservation of *T. transversalis,* since each population of this rare species and, respectively, their habitats, need protection.

Also, there have been registered species, which are characteristic for clean zones of aquatic ecosystems: at Tetcani – 7 species of *Ephemeroptera* and 3 species of *Trichoptera,* at Braniste - 6 species of *Ephemeroptera* and 10 species of *Trichoptera.*

It is worth to mention that in model stations the value of EPT index (*Ephemeroptera, Trichoptera, Plecoptera*) ranges within 13-15 species.

It is becoming evident the negative influence of invasive species collected in the Prut River, for example, at Cislita-Prut station the invasive species *Corbicula fluminea* (Müller, 1774) with 40-200 ind./m^2 formed 40-46% of zoobenthos total density, but at Criva station *Crassiana crassa* – native bivalve reofile mollusc - with 440 ind/m^2 formed only 5% of zoobenthos total density.

In order to assess the water quality, the Pantle-Buck saprobic index and Zelinka-Marvan saprobic index were calculated, using the individual saprobities and balance of indicator species. The values of saprobic index calculated by different methods (Fig. 32) showed evident similarities.

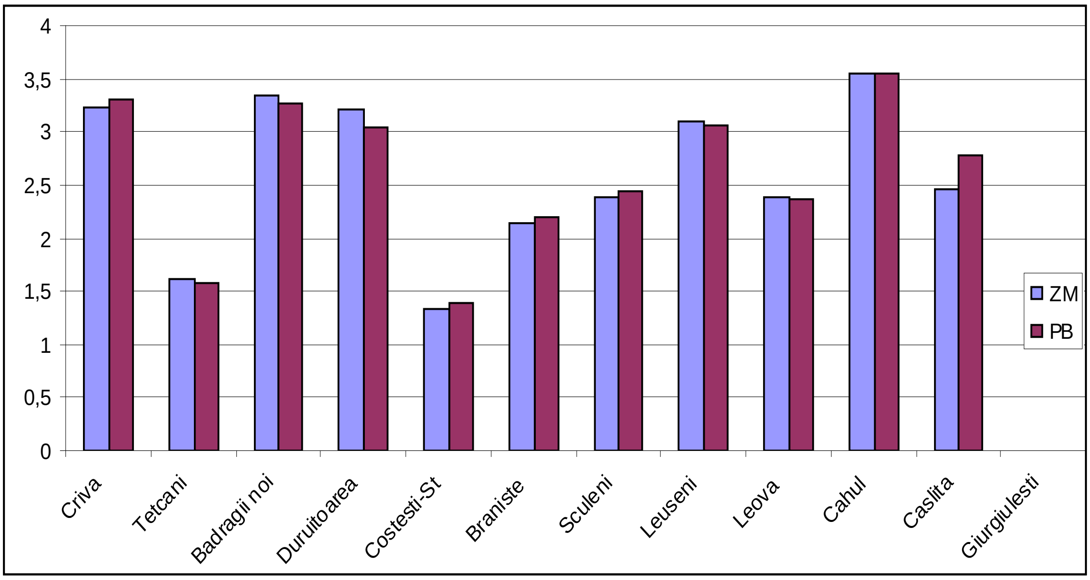


Fig. 32 Saprobic index calculated by Pantle-Buck (PB) and Zelinka-Marvan (ZM) systems, the Prut River, September-December 2013

Saprobic indices varied from 1.571 at Tetcani sampling station, which corresponds to the class I "high" and up to more than 3.2 - (3.214-3.556) at Criva, Badragii Noi, Duruitoarea Noua and Cahul, which corresponds to the V "bad" class of water quality. Saprobic index at Braniste station was equal to 2.146 (Zelinka-Marvan system) and 2.198 (Pantle-Buck system), which belongs to the class II "good" of water quality, at Sculeni corresponded to the III and at Leuseni - to the IV class, respectively.

Table 8 Water quality class along the Prut River, September-December 2013 (with italic are marked the stations with the number of indicator species of saprobity less than 10)

Station	Indication of Water Quality Class	Station	Indication of Water Quality Class
Criva	V	Sculeni	III
Tetcani	I	Leuseni	IV
Badragii Noi	*V*	*Leova*	*III*
Duruitoarea Noua	*V*	*Cahul*	*V*
Costesti-Stinca	*I*	*Cislita-Prut*	*IV*
Braniste	II		

D.1.2 Qualitative and quantitative characterization of fish populations, aiming at preserving their biodiversity

In addition to the human factor that obviously changed the status and structure of ichthyocenoses from the Republic of Moldova, a significant influence of the unstable weather conditions is observed last time. In these circumstances are favored species that can adapt quickly to new conditions or those that are able in time to migrate to other habitats, which can offer necessary resources and conditions of survival.

The scientific control fishing in the hydrological basin of the Prut River during 2005-2014 have revealed significant changes in the structure of ichthyocenoses and populations of various fish species.

1. After the major floods of 2008 and 2010 the entire hidrographic network of Moldova was „invaded" by Asian ciprinides (*Hypophthalmichthys molitrix* (Valenciennes, 1844), *Hypophthalmichthys nobilis* (Richardson, 1845), *Ctenopharyngodon idella* (Valenciennes,

1844)) and culture races of common carp (*Cyprinus carpio* (Linnaeus, 1758)), which have penetrated from the damaged fishery households (Tab. 9).

Table 9 Average share (%) of Asian ciprinides and culture carp in scientific control fishing (stationary net Ø 50 mm) in the Lower Prut

Nr.	Species	River bed of Lower Prut	
		1996-1997 (Usatii M., 2004)	2011
1	*Hypophthalmichthys molitrix* (Valenciennes, 1844)	0.6	30.05
2	*Hypophthalmichthys nobilis* (Richardson, 1845)	-	3.7
3	*Ctenopharyngodon idella* (Valenciennes, 1844)	-	5.2
4	*Cyprinus carpio* (Linnaeus, 1758)	2.0	6.7
5	Other species	97.4	54.35

2. A partial interpenetration of piscicolous zones along the Prut River was observed. In Costesti-Stinca reservoir was registered a significant increase in the share of such rheophilic species as *Barbus barbus* (Linnaeus,1758), *Squalius cephalus* (Linnaeus, 1758), *Chondrostoma nasus* (Linnaeus, 1758) and *Vimba vimba* (Linnaeus, 1758). If in 1996-1998, according to data of Usatii M. (2004), in the upper sector of the reservoir (Corpaci station) these species were reaching insignificant values of realtive density (e.g., *Chondrostoma nasus* (Linnaeus, 1758) - 0.6%, *Squalius cephalus* (Linnaeus, 1758) - 0.6%, *Vimba vimba* (Linnaeus, 1758) – 3.0 %, and *Barbus barbus* (Linnaeus,1758) was, in general, absent in captures), then now they often become eudominant (over 10.0%), with a higher share in autumn and spring (Fig. 33).

Currently *Barbus barbus* (Linnaeus,1758) became an ancillary (C2) species for all sectors of Costesti-Stinca reservoir, even in the lower sector, and its share in stationary net Ø 20 mm can reach in average 8.95%.

Moreover, some fish farmers and also inspectors of Estate Fishery Service stated that in the reservoir after the floods of 2010 have been captured representatives of *Salmonidae*, *Acipenseridae* (species *Acipenser ruthenus* (Linnaeus, 1758)) and *Gadidae* (species *Lota lota* (Linnaeus, 1758)) families.

Major floods of 2008 and 2010 have caused not only the interpenetration of piscicolous zones of a lotic ecosystem, but also the exchange of representatives between various ecosystems. Thus, *Gymnocephalus baloni* Holcík & Hensel penetrated form the Danube into the Prut River, where it formed numerous populations in Manta and Beleu lakes. Also, *Esox lucius* (Linnaeus,1758) and *Leuciscus idus* (Linnaeus, 1758) migrated from the delta area of the Danube into the Lower Prut, but *Lepomis gibbosus* (Linnaeus, 1758), as invasive species, went up till the dam of Costesti-Stinca reservoir, building particularly numerous populations in some flooded areas (e.g., Braniste station). *Perccottus glenii* (Dybowski, 1877) with high waters has spread from the tributaries of the Prut River into the whole hydrographic network. In the riverbed of Middle Prut, in addition to the rheophilisation processes of ichthyofauna after flooding, an evident increase of share of some euritope generalist species, such as *Perca fluviatilis* (Linnaeus, 1758), *Esox lucius* (Linnaeus,1758) and *Carassius gibelio* (Bloch, 1782) was observed. It is assumed that their spreading upstream Costesti-Stinca reservoir is a relatively "young" process (according to the model of flooded zones), linked partly with the negative processes of appearance of colmated habitats with abundant aquatic vegetation (alluvial deposits in areas with lower flow).

Fig. 33 In the upper sector of Costesti-Stinca reservoir the share of rheophilic fish species after the floods of 2010 can reach high values: up to 16.29% at *Vimba vimba* and 17.03 % at *Chondrostoma nasus*

Previously Popa L. (1976) mentioned that *Esox lucius* (Linnaeus, 1758) and *Carassius gibelio* (Bloch, 1782) (allogeneic invasive species) were common only in lakes and swamps of the Lower Prut, being encountered only sporadically in the riverbed.

3. Penetration and establishment of representatives of other piscicolous zones (and other ecosystems) can have in time a constant effect only if they will find in new biotopes their characteristic habitats for reproduction and growth. Removing of heavy colmated layers on some sectors contributed to a substantial improvement of conditions for breeding of some lithophile fish species: *Barbus barbus* (Linnaeus,1758), *Squalius cephalus* (Linnaeus, 1758), *Chondrostoma nasus* (Linnaeus, 1758), *Vimba vimba* (Linnaeus, 1758), *Aspius aspius* (Linnaeus, 1758), etc. As result, last time it is remarked the increase of the share of young age groups of these species in the Prut riverbed and in Costesti-Stinca reservoir, moreover, *Squalius cephalus* (Linnaeus, 1758) and *Gobiidea,* which previously were relatively rare species, have become common representatives for the tributaries of Middle Prut (Vilia, Larga, Racovat, Draghiste, Lopatnic).

In particular, for the first time during project implementation, fish capture was performed on Romanian side of Costesti-Stinca reservoir (October) next to the dam. Six gillnets were used with aperture of 10 to 50 mm, and a length of 50 m (Fig. 34). They were exposed overnight (for12 hours). The results of fish identification and biometrics are presented in the Table 10.

Fig. 34 Gillnet fishing, Costesti-Stinca reservoir, Romanian side, October of 2013

Table 10 Worksheet of fish fauna sampling in Costesti-Stinca reservoir (11.11.2013), location: N 47° 55' 36,2" E 27° 08' 53,5"

No.	Species	No. of specimens	Length (mm)	Weight(g)
1	*Alburnus alburnus* L. 1758	4	125	18
2	*Aspius aspius* L. 1758	1	460	904
		1	510	1078
		1	510	1270
3	*Cyprinus carpio* L 1758	1	90	12
4	*Scardinius erytrophthalmus* L. 1758	1	190	77
		1	185	65
		1	230	145
		1	240	174
		1	260	212
		1	240	160
		1	185	70
5	*Stizostedion lucioperca* L. 1758	1	135	16
6	*Perca fluviatilis* L. 1758	1	200	123
		1	210	112
		5	90	10
7	*Gymnocephalus cernua* L.1758	1	80	7

Also, project team carried out the identification of the fish caught simultaneously by a commercial fishermen, who used trawl and gills (Fig.35). The results are put together in Table 11.

Fig.35 Commercial fishing with trawl on Costesti-Stinca reservoir, Romanian side, October of 2013

Table 11 Diversity of fish captured by trawl, Costesti-Stinca reservoir, Romanian side, October of 2013

No.	Species	No. of specimens
1	*Esox lucius*	2
2	*Aspius aspius*	10
3	*Barbus barbus*	2
4	*Carassius gibelio*	1
5	*Cyprinus carpio*	9
6	*Chondrostoma nasus*	5
7	*Abramis brama*	79
8	*Abramis sapa*	2
9	*Scardinius erytrophthalmus*	34
10	*Vimba vimba*	11
11	*Hypophthalmichthys molitrix*	2
12	*Ctenofaringodon idella*	1
13	*Stizostedion lucioperca*	23
14	*Perca fluviatilis*	3
15	*Silurus glanis*	1

Five species are common for both lists (Table 10-11): *Aspius aspius, Cyprinus carpio, Scardinius erytrophthalmus, Stizostedion lucioperca* and *Perca fluviatilis*. It is important to note that in Costesti-Stinca reservoir four species provide the commercial catch share: *Aspius aspius, Stizostedion lucioperca, Abramis brama* and *Scardinius erithrophthalmus*. In general, the state of fish fauna in Costesti-Stinca reservoir - a heavily modified water body, should be treated separately, especially because it was not the subject of a detailed study during last years.

D.1.3 River Prut hydrochemical characteristics investigation

Field samples collection and their chemical analyses were performed according to established methods in hydrochemistry and hydrobiology (Abakumov, 1983; Semenov, 1977). Dissolved oxygen was determined by iodometric method, which was adapted to ISO 5813:1993; this method includes the fixation of samples directly in the field.

Content of hydrocarbonate ($HCO3^-$) and carbonate ($CO3^{2-}$) ions or alkalinity was determined by titration classical method, which also corresponds to ISO 9963-1:1994 and 9963-2:1994. Chlorides were investigated by silvermetric titration method in accordance with ISO 9297:1989. Sulphate ion concentration (SO_4^{2-}) was determined by gravimetric method using barium chloride according to ISO 9280:1990. Determination of calcium and magnesium total content or water hardness, as well as of calcium ions was carried out by complexometric EDTA-titrimetric method (ISO 6059:1989 and 6058:1984). Content of magnesium ions (Mg^{2+}) was calculated as the difference between hardness values and content of calcium ions. In the case of sodium and potassium ions, the method of Semenov (1977) was used, but some samples were analysed by atomic absorption method - ISO 9964-2:1993.

Nutrients ($N\text{-}NH_4^+$, $N\text{-}NO_2^-$, $N\text{-}NO_3^-$, mineral P) were investigated by using classical spectrometric methods, which complies to a range of standards: ISO 7150-1:1984, ISO 6777:1984, ISO 7890-3:1988, ISO 6878:2004.

Chemical composition. Investigations have shown that in autumn and first month of winter of 2014 the dissolved oxygen content was relatively satisfactory for hydrobiont development, its concentration ranging within 8.11 and 13.39 mg/l, or 83.2 to 112 % of saturation at a water temperature of 1.4 – 18.0°C, these values being favourable for hydrobiont development (Table 12).

The values of biochemical (CBO_5) consumption of oxygen varied within 1-2.72 mgO_2/l (Tab. 12). Thus, according to the *Regulation on environment quality requirements for the surface waters,* the content of dissolved oxygen and the values of biochemical consumption of oxygen indicated the class of water quality II.

The indicators of the content of easily degradable organic compounds (CCO_{Mn}, mgO_2/l) and of more persistent organic compounds (CCO_{Cr} , mgO_2/l), which, in fact, are determined via the volume of oxygen used for mineralization of this compounds, were analyzed. It was revealed that according to the values of CCO_{Mn} the water referred to the classes of quality I-III, but according to the values of CCO_{Cr} - to the classes of quality III-IV (Table12). There was found a medium correlation between CCO_{Mn} and CCO_{Cr}, which proved a low intensity of self-cleaning processes (Fig.36). The last affirmation is proved, also, by low values of self-cleaning coefficient – in 90% of cases it was lower 0.06 (Fig.37).

Table 12 Dynamics of dissolved oxygen (O_2, mg/l), biochemical (CBO_5, mgO_2/l) and chemical consumption of oxygen by manganese (CCO_{Mn}, mgO_2/l) and chromium (CCO_{Cr} , mgO_2/l) in the waters of the Prut River and Costesti-Stinca reservoir, September - December of 2013

Station	t,°C	O_2 mg/l	CBO_5 mgO_2/l	CCO_{Mn}M mgO_2/l	CCO_{Cr} mgO_2/l
September 2013					
Costesti-Stinca reservoir, next to the dam	17.8	9.16	1.00	8.28	26.2
Braniste	17.2	9.17	1.12	9.88	33.03
Sculeni	16.5	9.52	1.06	8.2	34.14
Leuseni	16.8	8.93	1.40	13.5	42.88
Leova	17.0	8.85	1.45	13	42.88
Cahul	18.0	9.05	1.53	14.92	51.29
Cislita-Prut	17.7	8.41	1.83	14.04	44.46

Giurgiulesti	18.2	8.11	1.78	14.52	58.75
October 2013					
Criva (Prut River)	15.3	9.61	2.47	15.58	70.8
Tetcani (Prut River)	15.2	10.35	2.30	12.26	46.92
Badragii Noi (Costesti-Stinca reservoir, upper sector)	15.4	11.38	2.72	11.85	43.24
Duruitoarea Noua (Costesti-Stinca reservoir, middle sector)	15.8	11.15	1.09	10.69	35.88
Costesti-Stinca reservoir, lower sector	14.2	9.94	1.59	13.67	54.28
Braniste	14.1	10.08	1.42	13.84	50.6
Sculeni	13.3	10.71	1.18	14.83	82.8
Leuseni	13.4	9.99	1.98	8.2	27.6
Leova	14.4	9.79	2.44	5.63	34.96
Cahul	14.2	9.44	2.18	15.16	60.72
Cislita-Prut	14.9	9.07	1.57	12.26	42.32
Giurgiulesti	14.8	9.49	1.43	11.52	38.64
November 2013					
Costesti-Stinca reservoir, lower sector	11.0	10.66	2.06	13.03	44.3
Braniste	9.2	10.57	1.22	13.47	60.7
Sculeni	10.7	10.74	1.37	14.87	43.39
Leuseni	8.8	10.37	1.62	9.21	26.07
Leova	8.6	10.55	2.01	9.61	32.45
Cahul	6.9	10.36	1.99	7.36	17.5
Cislita-Prut	6.9	10.29	1.77	8.73	26.7
Giurgiulesti	7.0	10.17	1.95	9.13	26.98
December 2013					
Costesti-Stinca reservoir, lower sector	3.8	12.13	1.58	4.82	25.37
Braniste	3.7	12.07	1.47	4.48	23.62
Sculeni	3.0	12.67	1.52	3.69	26.77
Leuseni	2.0	12.93	1.66	13.96	56.7
Leova	1.6	13.34	1.79	11.87	46.37
Cahul	1.4	13.39	2.10	5.61	27.12
Cislita-Prut	1.4	13.35	1.93	8.3	33.25
Giurgiulesti	1.8	13.09	1.86	8.56	36.75

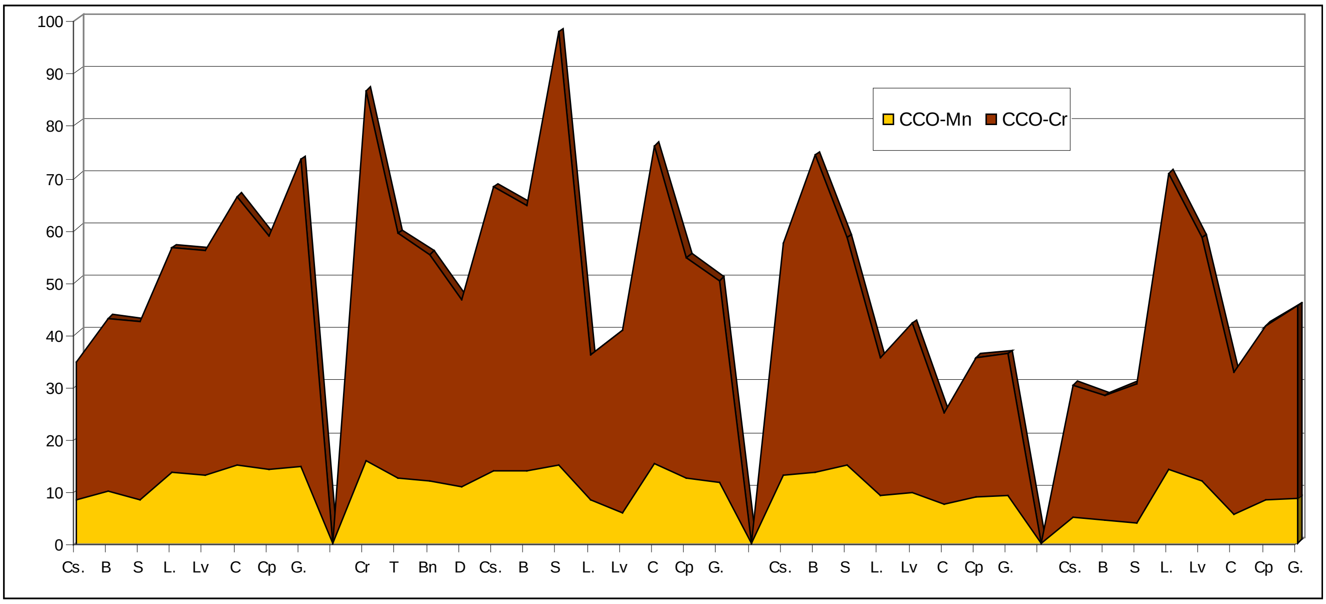


Fig. 36 Dynamics of the chemical consumption of oxygen by manganese (CCO_{Mn}, mgO_2/l) and chromium (CCO_{Cr}, mgO_2/l), in the waters of the Prut River and Costesti-Stinca reservoir, September - December of 2013 *(Cr- Criva, T- Tetcani, Bn-Badragii Noi, D- Duruitoarea Noua, Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul, Cp - Cislita-Prut, G-Giurgiulesti)*

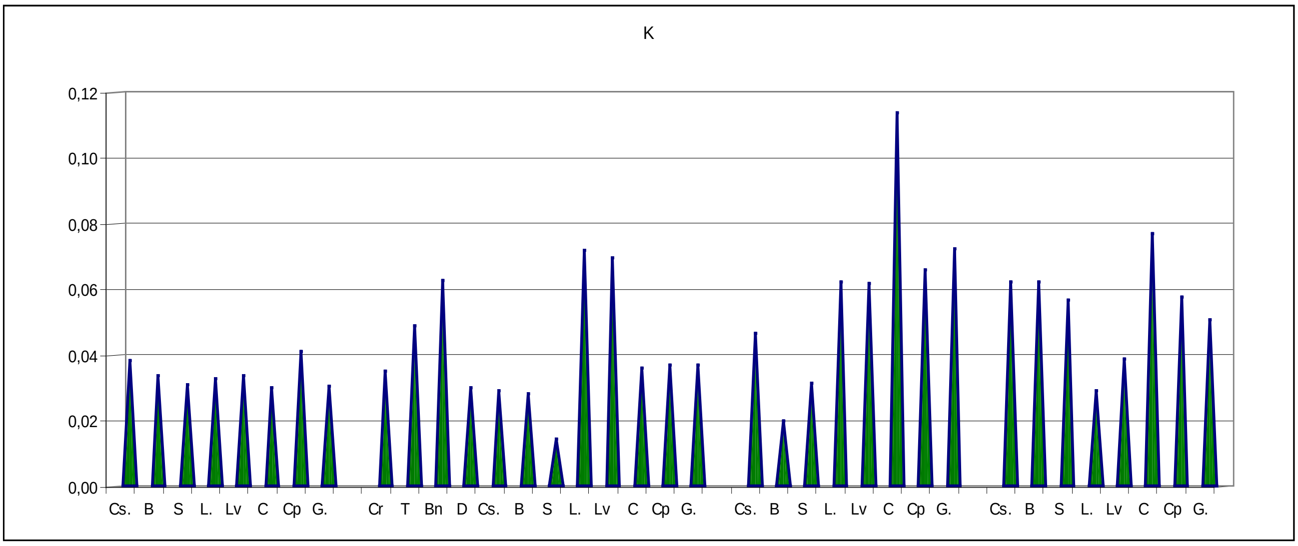


Fig. 37 Dynamics of self-cleaning capacity of waters (CBO_5/CCO_{Cr}) in the Prut River and Costesti-Stinca reservoir, September - December of 2013 *(Cr - Criva, T- Tetcani, Bn - Badragii Noi, D - Duruitoarea Noua, Cs - Costesti-Stinca reservoir, lower sector, B - Braniste, S- Sculeni, L - Leuseni, Lv - Leova, C-Cahul , Cp - Cislita-Prut, G - Giurgiulesti)*

Suspensions. The quantity of suspensions in the Prut River varied in a quite large diapason - from 1.2 m g/l to 140.4 mg/l. The dynamics of suspensions in the Prut River is highly dependent on its right tributary – Bahlui River, which provokes the increase of their content by ten times in the Prut River on the Leuseni - Cislita-Prut sector. At Giurgiulesti station, in the zone of small water speed, the most of suspensions are stored in silts (Table 13).

Table 13 Dynamics of mineral (S_{min}), organic (S_{org}) and total (S_{total}) suspensions in Costesti-Stinca reservoir and the Prut River, September- December of 2013, mg/l

Station	S_{min}	S_{org}	S_{total}
September 2013			
Costesti-Stinca reservoir, lower sector	2	0.4	2.4
Braniste	1.2	0.8	2
Sculeni	2.8	1.2	4
Leuseni	64.8	7.6	72.4
Leova	123.6	16.8	140.4
Cahul	81.8	11.8	93.6
Cislita-Prut	164.5	18.5	183
Giurgiulesti	126	13.6	139.6
October 2013			
Criva (Prut River)	4.4	0.4	4.8
Tetcani (Prut River)	5.6	2	7.6
Badragii Noi (Costesti-Stinca reservoir, upper sector)	12.4	2	14.4
Duruitoarea Noua (Costesti-Stinca reservoir, middle sector)	7.8	1.8	9.6
Costesti-Stinca reservoir, lower sector	7.5	3	10.5
Braniste	0.25	1.5	1.75
Sculeni	0.8	0.4	1.2
Leuseni	27.6	6.8	34.4
Leova	46.4	0.8	47.2
Cahul	35.4	4.4	39.8
Cislita-Prut	87.8	9.2	97
Giurgiulesti	44.8	2.4	47.2
November 2013			
Costesti-Stinca reservoir, lower sector	2.0	0.4	2.4
Braniste	1.0	0.8	1.8
Sculeni	1.6	0.0	1.6
Leuseni	5.6	2.6	8.2
Leova	18.4	5.2	23.6
Cahul	20.6	3.4	24.0
Cislita-Prut	48.6	5.0	53.6
Giurgiulesti	30.2	4.2	34.4
December 2013			
Costesti-Stinca reservoir, lower sector	1.4	0.2	1.6
Braniste	1.2	0.4	1.6
Sculeni	1.0	0.2	1.2
Leuseni	3.2	0.8	4.0
Leova	4.2	4.6	8.8

Cahul	9.6	1.4	11.0
Cislita-Prut	29.4	1.8	31.2
Giurgiulesti	15.8	1.2	17.0

It is important to note that the increase of suspension content up to 80-100 mg/l provokes the suppression of development of planktonic organisms in the Prut River.

Mineralization and main ions. The mineralization of investigated waters in September-December of 2013 oscillated between 377 mg/l (Costesti-Stinca, September) and 702 mg/l (Leova, October), having and obvious tendency to increase along the Prut River (Table 14).

Table 14 Dynamics of hydrogen carbonate, sulfate, chloride, calcium, magnesium, sodium and potassium ions and mineralization in the waters of the Prut River and Costesti-Stinca reservoir, September-December of 2013, mg/l

Station	HCO_3^- $+CO_3^{2-}$	SO_4^{2-}	Cl^-	Ca^{2+}	Mg^{2+}	Na^++K^+	Mineralization
September 2013							
Costesti-Stinca	161.7	84.8	28.9	54.1	15.2	32	376.7
Braniste	154.1	94.6	28.5	54.1	13.4	37.5	382.2
Sculeni	158.7	102.1	30.3	54.1	15.8	39.3	400.3
Leuseni	210.5	144.8	35.3	55.1	21.3	74	541.0
Leova	195.3	185.2	42.7	56.1	18.9	97.8	596.0
Cahul	190.7	136.2	40.2	57.1	26.1	52.3	502.6
Cislita-Prut	192.2	129.2	37.1	55.1	18.9	64.8	497.3
Giurgiulesti	195.3	116	37.6	54.1	19.5	59.3	481.8
October 2013							
Criva	218.1	128.8	34.4	92.2	14.6	35.8	523.9
Tetcani	219.7	121.8	33.0	90.2	17.0	29	510.7
Badragii Noi	216.6	125.5	32.6	86.2	18.8	30.8	510.5
Duruitoarea Noua	155.6	79.4	23.7	53.1	15.8	23	350.6
Costesti-Stinca	158.7	102.9	26.6	56.1	15.2	36	395.5
Braniste	158.7	98.8	25.5	56.1	15.8	31.8	386.7
Sculeni	170.9	107.0	26.2	60.1	15.2	38	417.4
Leuseni	238	149.4	33.3	60.1	26.1	70	576.9
Leova	274.6	198.3	34.4	58.1	29.8	106.3	701.5
Cahul	236.5	218.9	35.8	61.1	28.6	101	681.9
Cislita-Prut	228.8	207.8	36.5	60.1	28.0	95	656.2
Giurgiulesti	228.8	201.2	35.8	60.1	26.8	93.8	646.5
November 2013							
Costesti-Stinca	231.9	107	26.6	60.1	13.4	67	506.0
Braniste	228.8	110.3	26.2	60.1	13.9	65.8	505.1
Sculeni	225.8	119.3	26.9	60.1	15.8	66	513.9
Leuseni	268.5	116	31.6	60.1	20.7	75	571.9
Leova	271.5	134.1	33.3	60.1	21.9	84.5	605.4
Cahul	274.6	148.1	34	60.1	22.5	92.3	631.6
Cislita-Prut	274.6	160.5	37.6	64.1	25.5	90	652.3
Giurgiulesti	288.6	156.4	37.9	62.1	24.3	98.8	668.1

December 2013							
Costesti-Stinca	177	104.5	26.9	64.1	11.6	42	426.1
Braniste	177	109.5	27.1	64.1	15.2	37.3	430.2
Sculeni	180	82.7	30.1	65.1	15.8	24.3	398.0
Leuseni	216.6	140.7	37.2	63.1	23.7	60.8	542.1
Leovo	205.9	123.5	33.5	67.1	21.3	55.5	506.8
Cahul	210.5	144.4	33.9	65.1	21.3	60.3	535.5
Cislita-Prut	225.8	121	33.9	65.1	23.7	49.5	519.0
Giurgiulesti	213.6	128.8	34.1	65.1	23.1	49.8	514.5

In most cases, the water of the Prut River referred to the hydrogen carbonate class, group of calcium, type II, accordingly to classification of Alekin, but in September of 2013 on t he sector Leuseni-Leova and in October-November on sector Leova-Giurgiulesti the class of water changed: from the hydrogen carbonate class, group of calcium, type II to the hydrogen carbonate class, group of sodium and sulfate class group of sodium type II (Fig.38, 39).

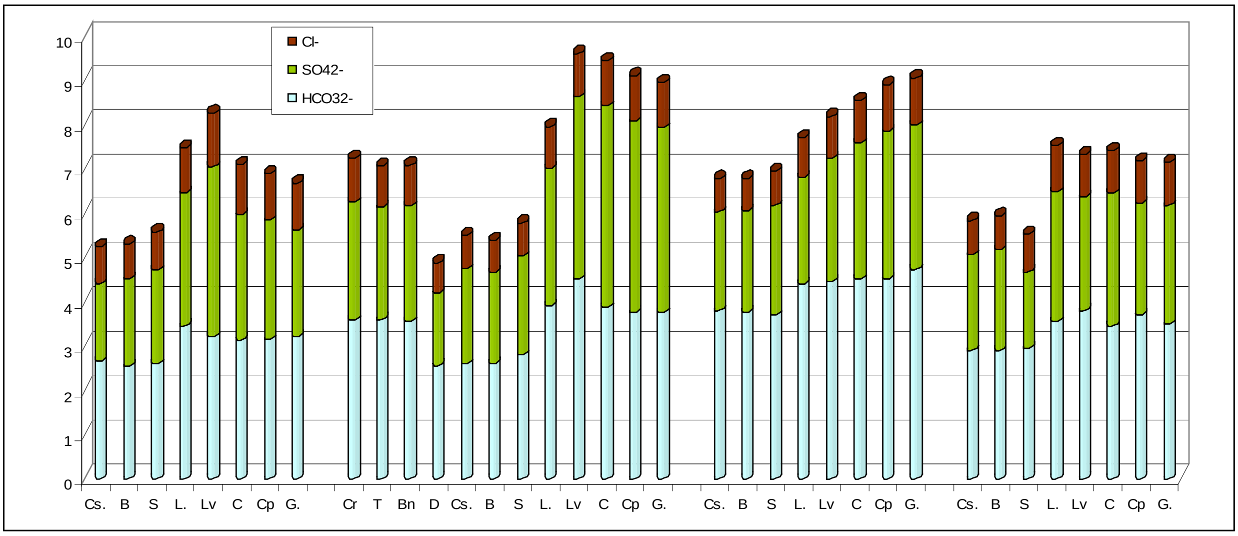


Fig. 38 Dynamics of hydrogen carbonate, sulfate and chloride ions in Costesti-Stinca reservoir, and the Prut River in September-December of 2013 *(Cr- Criva,T- Tetcani, Bn-Badragii Noi, D- Duruitoarea Noua, Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti),* mg-ecv/l

It is known that the correlation between cations and anions is a basic indicator in the determining of surface water stability. The modification of water class reveals the existence of pollution or the water metamorphosis under the influence of some major factors.

The Prut waters, taking in account the composition of main ions, corresponded to the requirements on quality, which must be met by drinking water, and waters used in pisciculture and aquaculture.

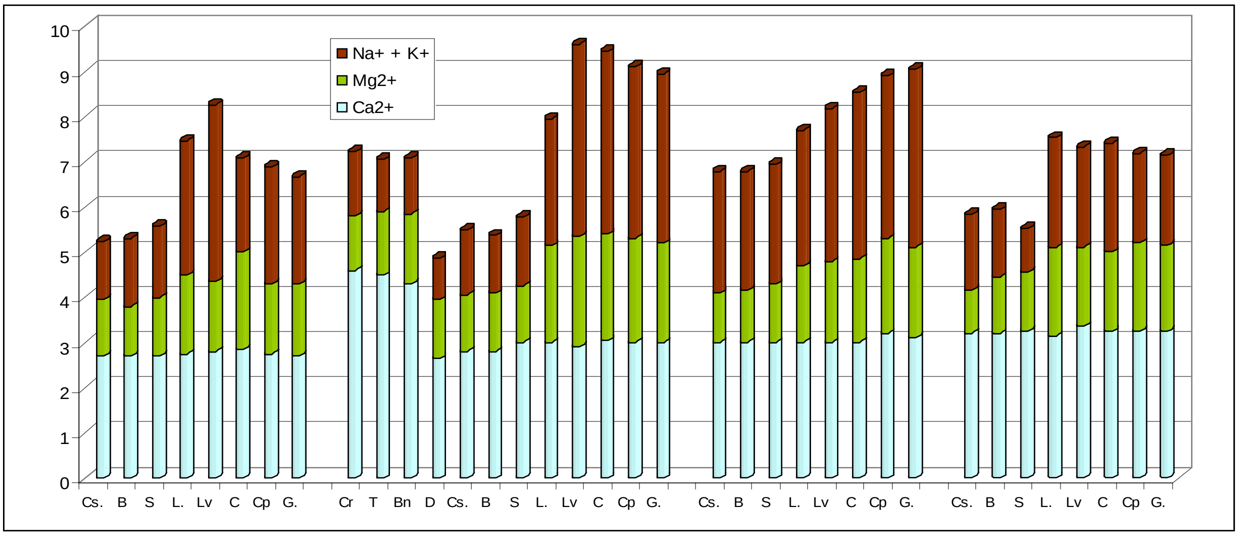


Fig. 39 Dynamics of calcium, magnesium, sodium and potassium ions in Costesti-Stinca reservoir and the Prut River in September-December of 2013 *(Cr- Criva,T- Tetcani, Bn-Badragii Noi, D- Duruitoarea Noua, Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti),* mg-ecv/l

Nutrient substances. The content of nutrients is one of the most important indicators of water quality, which determines both the development of several aquatic organisms, as well as trophicity level, intensity of production-destruction processes of aquatic ecosystems. The dynamics of nitrite nitrogen and of nitrite nitrogen corresponded to waters of classes of quality I-II, of ammonium nitrogen – to classes II-III and of total nitrogen – to classes I-III. It was registered that in most of cases the concentrations of mineral nitrogen on Leuseni-Giurgiulesti sector exceed by 2-3 times those on Costesti-Sculeni sector (Table 15).

Table 15 Dynamics of concentrations of ammonium (N-NH_4), nitrite (N-NO_2) and nitrate nitrogen (N-NO_3), of mineral (Nmin), organic (Norg) and total (Ntot) nitrogen in the waters of the Prut River and Costesti-Stinca reservoir, September-December of 2013, mg/l

Station	N-NH_4	N-NO_2	N-NO_3	Nmin	Norg	Ntot
September 2013						
Costesti-Stinca	0.35	0.06	0.773	1.183	0.226	1.409
Braniste	0.309	0.049	0.822	1.18	0.026	1.206
Sculeni	0.306	0.039	0.752	1.097	0.431	1.528
Leuseni	0.343	0.044	1.134	1.521	2.739	4.26
Leova	0.361	0.05	1.558	1.969	0.006	1.975
Cahul	0.376	0.039	1.446	1.861	4.247	6.108
Cislita-Prut	0.573	0.06	1.268	1.901	3.514	5.415
Giurgiulesti	0.621	0.067	1.462	2.15	2.93	5.098
October 2013						
Criva	0.417	0.057	0.443	0.917	0.903	1.82
Tetcani	0.421	0.041	0.52	0.982	0.503	1.485
Badragii Noi	0.528	0.044	0.447	1.019	0.462	1.481
Duruitoarea Noua	0.495	0.048	0.324	0.867	0.301	1.168
Costesti-Stinca	0.383	0.041	0.309	0.733	0.471	1.513

Braniste	0.387	0.038	0.309	0.734	0.011	0.745
Sculeni	0.369	0.035	0.298	0.702	0.029	0.731
Leuseni	0.487	0.045	0.595	1.127	0.96	2.682
Leova	0.372	0.039	0.591	1.002	1.671	3.264
Cahul	0.294	0.036	0.729	1.059	0.234	1.293
Cislita-Prut	0.376	0.044	0.577	0.997	3.714	4.711
Giurgiulesti	0.354	0.054	0.599	1.007	2.22	3.227
November 2013						
Costesti-Stinca	0.46	0.024	0.55	1.234	0.071	1.305
Braniste	0.34	0.014	0.55	0.904	0.27	1.174
Sculeni	0.22	0.009	0.6	0.829	0.045	0.874
Leuseni	0.07	0.035	1.28	1.385	0.262	1.647
Leova	0.47	0.029	1.55	2.049	0.698	2.747
Cahul	0.07	0.029	1.38	1.479	1.124	2.603
Cislita-Prut	0.2	0.031	1.28	1.511	0.893	2.404
Giurgiulesti	0.19	0.027	1.18	1.397	0.871	2.268
December 2013						
Costesti-Stinca	0.02	0.011	0.5	0.531	0.503	1.034
Braniste	0.09	0.007	0.52	0.617	0.472	1.089
Sculeni	0.02	0.003	0.55	0.573	0.438	1.011
Leuseni	0.12	0.018	1.28	1.418	0.076	1.494
Leovo	0.08	0.015	1.38	1.475	0.378	1.853
Cahul	0.15	0.011	1.28	1.441	0.897	2.338
Cislita-Prut	0.13	0.015	1.38	1.525	0.982	2.507
Giurgiulesti	0.12	0.015	1.49	1.625	0.076	1.701

The dynamics of mineral, organic and total phosphorus is presented in the Figure 40.

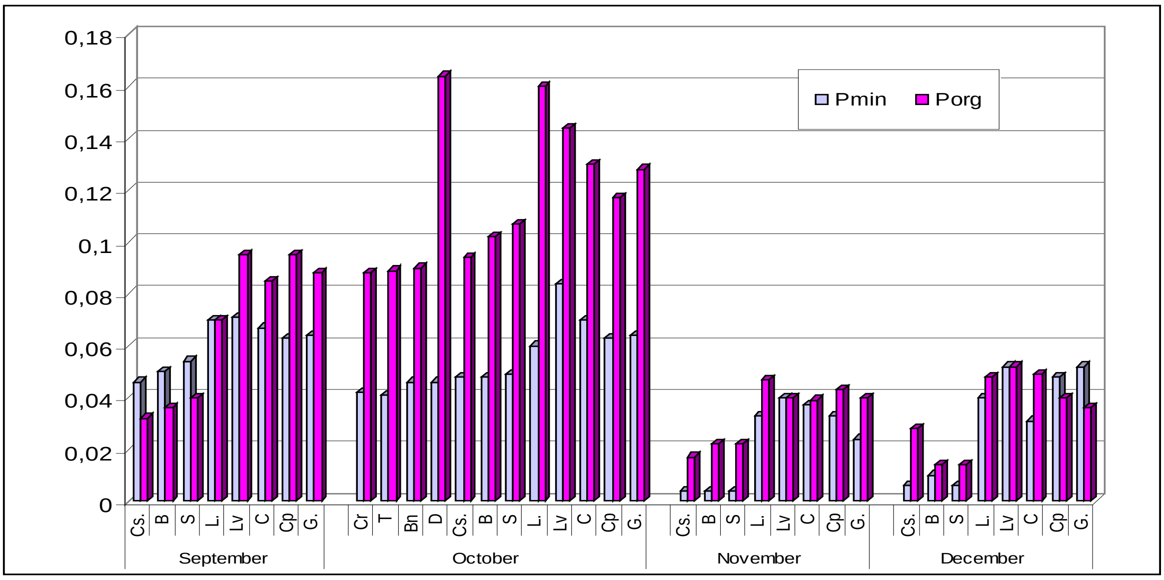


Fig. 40 Dynamics of mineral (Pmin) and organic (Porg) phosphorus in Costesti-Stinca reservoir and the Prut River in September-December of 2013 *(Cr- Criva,T- Tetcani, Bn-Badragii Noi, D- Duruitoarea Noua, Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti),* mg P/l

It is worth to mention that in September of 2013 in the Prut River - Leova-Giurgiulesti sector - and in October of 2013 the concentrations of organic phosphorus were higher than those of mineral phosphorus. In November-December of 2013 the decrease of phosphorus concentrations was obvious. The concentrations of mineral ant total phosphorus in water of the Prut River corresponded to the classes I- II of quality.

Silicon is a nutritive element, whose content is strongly related to the development of *Bacillariophyta* algae. Its concentrations during September-December of 2013 ranged from 0.7 to 2.8 mgSi/l (Fig.41).

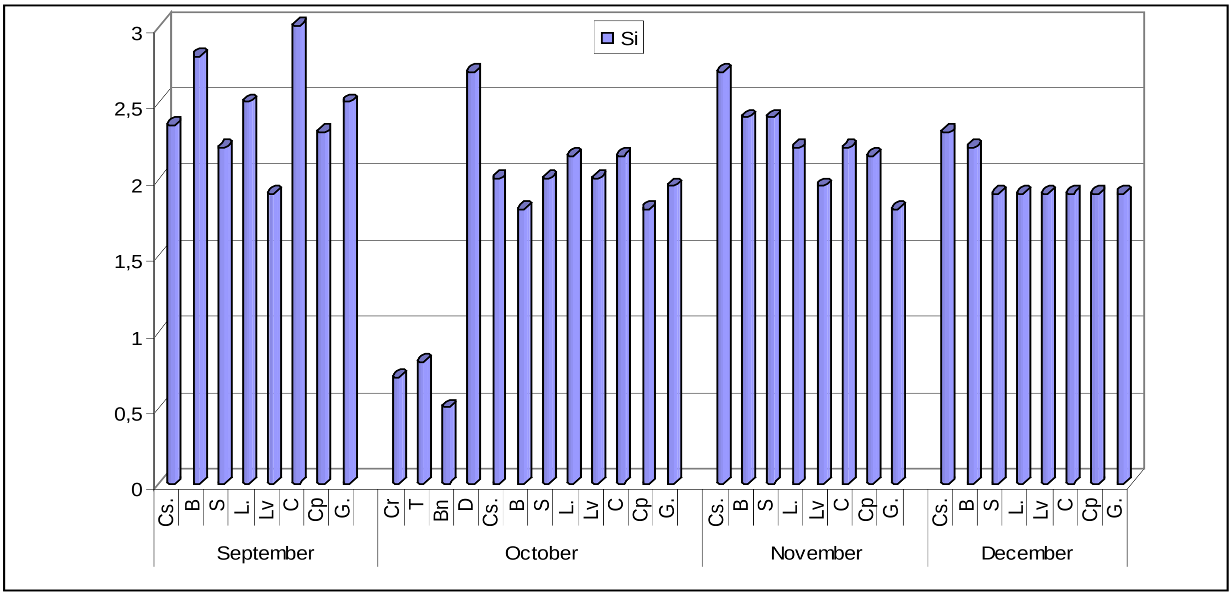


Fig. 41 Dynamics of silicon in Costesti-Stinca reservoir and the Prut River in September-December of 2013 *(Cr- Criva,T- Tetcani, Bn-Badragii Noi, D- Duruitoarea Noua, Cs- Costesti-Stinca reservoir, lower sector, B- Braniste, S- Sculeni, L-Leuseni, Lv- Leova, C-Cahul , Cp-Cislita-Prut, G- Giurgiulesti),* mg Si/l

As conclusion, in most cases for investigation period, the waters of Prut River were satisfactory for hydrobionts development, but the concentrations of suspensions, nutritive elements were not always favorable for planktonic organism development. However, in general the Prut River waters met the requirements for multifunctional aquatic ecosystems (which may serve as source of drinking water, as well as of water for irrigation, pisciculture and aquaculture).

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