SURFACE WATER QUALITY

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Abstract: In this paper we try to study the surface water quality from the Prut drainage basin using of some data from hydrological station and from Barlad-Prut Basin Administration.

Keywords: *eaux de surface, bassin, les facteurs environnementaux*

1.Introduction

Natural resource, water is considered by Framework Directive 2000/60/EC documents as a "heritage" to be protected and preserved as such. Surface water resources amount to about Prut river basin mil.m^3/an 3314 of which 726 are usable mil/m^3/an. This represents about 94% of the total resources of space and consist mainly of the Prut river and its tributaries. Ecological status is expressed as state structure and functioning of aquatic ecosystems and surface waters is represented by the parameters obtained as a result of physical -chemical monitoring, biological and hydromorphological.

2.Global Quality of watershed area of the Prut river basin

Monitoring surface water quality of rivers Prut river basin is achieved by tracking the rapid flow of surveillance and monitoring of physical -chemical indicators, biological and bacteriological. Prut river border study is done based on collaboration with Moldova and Ukraine in august observation points. The best sections available are: Prut - Darabani, Prut - Sivita and Elan - Dimitrie Cantemir. Evaluation of environmental quality has been achieved graded according to standard regarding the classification of surface waters in order to establish the ecological status of water bodies. The main general classification of ecological status has been on for five groups of indicators - the regime of oxygen, nutrients, mineralization, specific toxic pollutants of natural origin and other relevant chemical indicators, by assessing the effect of the indicators weighted based on the average aritmetrice. Characterization of overall quality, level section, is the outcome of the group with the worst situation, not taking into account situations where natural background significantly exceeded the permissible limits, assessed on the basis of analytical data in the sections "controls."
Assessment of chemical status of water was determined in relation to concentrations of hazardous substances and priority / priority hazardous dissolved fraction of heavy metals and organic micropollutants and done in relation to the single for "objective quality.

Water and biota - 2005

Prut river flows from the Carpathian Mountains, the territory of Ukraine and enter our territory north of the city Oroftiana, after having traveled 251 miles to the neighboring country. In 2005 the river was monitored at 11 observation points: Oroftiana, Darabani,

Radauti – Prut, Stefanesti, Ungheni, Prisacani, Dranceni, Bumbata, Oancea and Sivita, Giurgiulesti. In Fig.1 Quality evolution of classes between the years 2003 - 2007, and Fig. 2 Distribution of sections of rivers (km) graded in 2005.

Figure 1 Quality evolution of classes between the years 2003 – 2007

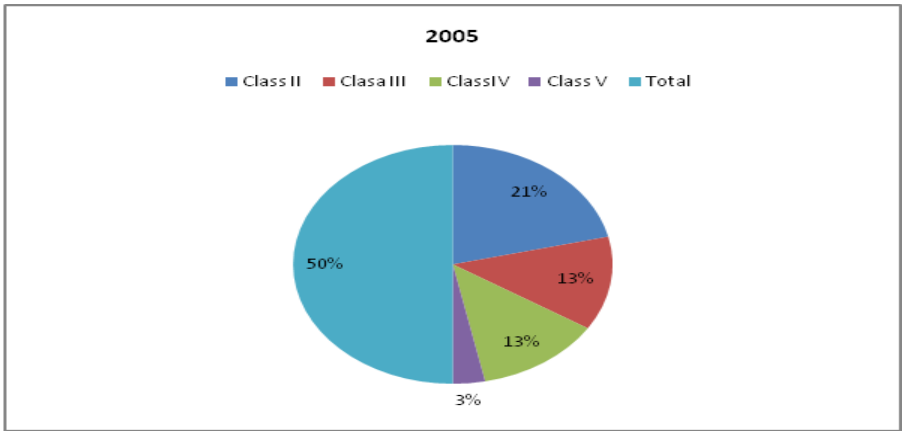

Figure 2 Distribution of sections of rivers (km) graded in 2005

Oroftiana section

Oroftiana section monitoring is the first section located on the Prut river even entered our territory. In this area of monitoring the Prut river is located in a clean water quality class II after most physical-chemical indicators determined. Exemplified by the Fallowing 90% percentile values (Table no. 1)

Table no.1 A different physical - chemical values of Oroftiana section

CBO_5 (mg/ dm^3)	CCO-Mn (mg/dm^3)	CCO- Cr (mg/dm^3)	N-MH_4 (mg/dm^3)	Fixed residue (mg/dm^3)	Cu (µg/dm^3)	Phenols (µg/ dm^3)
7,44	9,51	17,86	0,429	418	16,1	0

Source: Prut – Bârlad Basin Administration

The density of phytoplankton had an average of 271,181 copies / l. The composition of net phytoplankton stand dominance of diatoms (Caloneis amphisbaena, Cyclotella Comte, C. meneghiniana, Cymbella lanceolata, C. ventricosa, Diatomite elongatum, D. vulgaris, Gyrosigma acuminatum, Navicula cryptocephala, N. rhyncocephala, faded Nitzsche, N. sigmoid, viridius Pinnularia, Synedra acus) with which species are found Chlorophylls (Coelastrum microporum, Scenedesmus acuminatus, S quadricauda) and euglenofite (Euglena acus, E. viridis, Trachelomonas hispida). Saprobic index for phytoplankton is 90 percentile value of 2.30 Oroftiana surrounding section II grade quality.

Radauti- Prut section

This section is analyzed qualitatively under the Kyoto Protocol between Romania and Moldova. Physical - chemical characteristics of river water in this area remain the same as those of the first two sections. General class as class II is dictated by the regime of oxygen, nutrients and metals. Exemplified by the following 90 % percentile values (Table no. 2).

Table no. 2 Values of physical -chemical indicators of Radauti – Prut section

CBO_5 (mg/ dm^3)	CCO-Mn (mg/dm^3)	CCO- Cr (mg/dm^3)	N-MH_4 (mg/dm^3)	Fixed residue (mg/dm^3)	Phenols (µg/ dm^3)
7,02	10,93	17,9	0,468	403	6,0

Source: Prut – Bârlad Basin Administration

In Radauti-Prut section bioassays were collected on a quarterly basis for phytoplankton indicator. Phytoplankton density has values between 173 333 copies / l (May) and 720 000 copies / l (August). In terms of taxonomic phytoplankton is dominated by diatoms (Amphora Oval, Caloneis amphisbaena, Cymatopleura solea, Cymbella ventricosa, Gyrosigma acuminatum, Navicula cryptocephala, N. rhyncocephala, faded Nitzsche, N. sigmoid, Synedra acus, S. ulna), followed Chlorophylls (Pediastrum, duplex, Scenedesmus acuminatus, S. quadricauda) and euglenofite (Euglena viridis, Trachelomonas hispida). Mean saprobic index is 2.25, which falls Radauti - Prut section II grade quality.

Ungheni section

This section of the physical - chemical point of view, fall within the class II quality. This classification is based on 90% percentile value for the following indicators (Table no. 3).

Table no. 3 Physical - chemical indicators of values of Ungheni section.

CBO_5 (mg/ dm^3)	CCO- Cr (mg/dm^3)	Fixed residue (mg/dm^3)	Ammonia (mgN/ dm^3)
5,38	17,95	425	0,073

Source: Prut – Bârlad Basin Administration

An exception is the indicator phenols have been elevated in the period from January to March. Compared with 2004 and finds that this section shall maintain the same grade for the group for oxygen and nutrients.

Table no. 4 Indicators values of 2004 - 2005

Indicators	Percentile V (50%)-2004	Percentile V (90%)-2004	Percentile V (50%)- 2005	Percentile V (90%)- 2005
CBO_5	3,3	4,88	2,95	5,38
CCO-Mn	6,3	7,41	6,1	7,52
Fixed residue	292,0	386,0	344	425,5
$N\text{-}MH_4$	0,233	0,341	0,047	0,073
Dissolved oxygen	7,65	6,82	8,1	5,71
Iron	0,26	0,82	1,11	2,35

Source: Prut – Bârlad Basin Administration

In Ungheni section bioassays were collected with monthly frequency of phytoplankton indicator, the indicator phytobenthos and macrozoobenthic semester. Saprobic index had an average of 2.07, grade II quality. Phytobenthos average number density was 3.875 million copies / m^2, saprobic index recorded an average of 2.00 grade II quality. Taxonomic species dominated diamee following: Achnanthes Ianceolata, Cymatopleura, Tabellaria floculosa, Surirella sp. Synedra acus, Cymatopleura solea, Achnanthes minutissima. Phytoplankton had a density of 135 542 copies / l. The saprobic index is 90 percentile value of 2.06, grade II calitate. Global Ungheni section is framed in terms of biological grade II quality.

Prisacani section

General classification section is dictated by the regime of oxygen, nutrients and micropollutants which ranks third-class section of quality.Percentile 90% values for major indicators: CCO-Mn 8.0 mg / dm ^{3}, CCOCr of 26.4 mg / l, 5.04 mg/dm^3 total N, total phosphorus 0.23 mg/dm^3.

In Prisacani section bioassays were taken at monthly frequency for phytoplankton indicator, six monthly for the indicator and macrozoobenthic phytobenthos ichthyofauna and inventory was done in July. Benthic biocoenosis the following species: crustaceans - Crophium sp; Dikerogammarus bispinosus; gammarus fossarum; Diptera - Eukieffriella sp; Tabanus sp; gastropods - Dreissena polymorpha; Heteroptera - NEPA rubra; Oligochaeta - Helobdella stagnalis; Trichoptera - Hydropsyche instabilis, Hydropsyche pellucidula.Saprobic index had an average of 1.96 - CALS quality II. Phytobenthos had an average density of 5.375 million copies / m2 saprobic index had an average of 2.60 Third-grade quality. Taxonimic have dominated: rhynchocephala Navicula, Navicula cryptocephala, Nitzsche faded Kutz, Achnanthes lanceolata, floculosa Tabellaria, Synedra acus, Cymatopleura solea. Phytoplankton density has an average of 272,567 copies / l. Taxonomic species have been identified as follows: Synedra ulna Nitzsche, Caloneis amphisbaena Bory, Cleve, Trachelomonas volvocina Ehrenberg, sigmoid Nitzsche Nitzsche W. Smith, Caudata Euglena Hubner, saprobic index of phytoplankton, 90 percentile value was 2.58 - Class III the quality. Global Prisacani section, in terms of biology is classified as class III quality.

Oancea section

In this Oancea section, Prut river water was placed in first grade quality of toxic substances. Indicators for oxygen, nutrients, salinity and metals indicate class II quality.

Tabel no. 5 Percentile 90% values of key quality indicators were :

Dissolved oxygen (mg/l)	CCO-Mn (mg/l)	CCO-Cr (mg/l)	CBO_5 (mg/l)	Fixed residue (mg/l)	Phenols (µg/ dm^3)	$N\text{-}NH^{4+}$ (mg/l)
7,43	7,32	15,12	4,46	477,5	1,6	0,29

Source: Prut – Bârlad Basin Administration

In Oancea section bioassays were collected on a quarterly basis for phytoplankton indicator, the indicator phytobenthos and macrozoobenthic semester. Phytobenthos was dominated by diatoms:

Achnanthes lanceolata, Gomphonema angustatum, Navicula viridula, Surirella ovata, Amphipleura pellucida, Gomphonema angustatum.

Saprobic index was 2.09 II.a class quality at an average density of 54 600 exemplare/m^2. Biological analysis of phytoplankton taxonomic section outlines the following for this dominant species: Navicula viridula, Gomphonema angustatum, Nitzschia hungarica, Nitzschia intermedia, Synedra vaucharise, navicula rhychocephala, Synedra ulna, chrysooccus rufescens, Trachelomonas volvocina, Euglena hemicromata, Cryptomonas ovata. Saprobic index had an average of 1.97 - second grade quality, and the average density was 157 640 copies / liter. Oancea section as measured by biological classified ste overall grade II quality.

Giurgiulesti section

Physical - chemical indicators of this area, determine a water quality grade II.a as for oxygen, nutrients and metals. The rest of physical - chemical groups of salinity and toxic chemicals that fall in the first grade quality.

Table no. 6 Values of the last two years of comparative indicators

Indicators	Percentile V (50%) - 2005	Percentile V (90%) - 2005
Dissolved oxygen (mg/l)	9,19	7,09
CBO_5(mg/l)	3,29	3,85
CCOMn (mg/l)	6,01	7,47
Fixed residue (mg/l)	387	489
$N\text{-}NH_4$(mg/l)	0,187	0,25
Phenols (µg/l)	1,0	1,2

Source: Prut – Bârlad Basin Administration

The benthic biocoenosis have identified the following species: Dreissena polimorpha, Dikerogammarus haemobaphes fluviatilis Hidropsyche instabilis, Dikerogammarus vilosus, Hydropsyche instabilis.Indicele saprobic environment had a value of 1.85 - first class quality and the average density was 47 copies/ m2.Din qualitatively the phytoplankton association have identified the following species: Navicula viridula, Gomphonema angustatum, hungarica Nitzsche, Nitzsche intermedia vaucharise Synedra, Navicula rynchocephala, Chrysococcus rufescens, Amphipleura pellucida, Trachelomonas volvocina, Scenedesmus quadricauda, Scenedesmus opoliensis , Aphanizomenon flos-aquae.Indicele average was 2.06 saprobic class II calitate.Global, in terms of biomarkers, Giuleşti section is classified in class II quality.

3. Results and discussion

The parameters that give us information on "oxygen system" of the Prut River (CCOMn, CCOCr, BOD_5) give us somewhat contradictory information:

a) after CCOMn values, water quality ranged primarily in the Prut River high quality class, except June 2005 when, because of low rainfall in this period, the amount of organic matter in river water increased greatly;

b) CCOCr and BOD5 values indicate that the Prut river water ranged alternately as both class I and II grade quality. In June 2005 the Prut river water quality was classified as class III, is explained by the reduced amount of precipitation in that period.

c) the amount of oxygen dissolved in the river Prut, throughout the period under review was higher than

permissible limits, indicating an increased activity of acquatic creatures.

d) considering "nutrients group parameters, ie NH4 ammonium ions, nitrite NO2-and NO3-nitrate was found that all three indicators show low levels of their concentrations, well below the limit allowed for high quality class, which indicates a poor farming, below normal in other areas of the River Prut.

Conclusions

Following determinations analyzed the ecological and physical-chemical indicators, namely the Prut River falls in Class I and Class II-quality period 2005 -2008 (Sections Oroftiana, Darabani, Radau-Prut) falls in class Get Quality and (Sections Ungheni Prisecani, Oancea, Giurgiulesti Şivița) fall into the Class IIA-quality. And according to the saprobic index is Class II. The quality.

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