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ECOLOGICAL STATUS OF THE BERHECI RIVER AND CHINEJA RIVER ACCORDING TO THE REQUESTS OF WATER FRAMEWORK DIRECTIVE

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Keywords: *Biological monitoring, the Berheci River, the Chineja River, Water Framework Directive*

INTRODUCTION

The Water Framework Directive (WFD) expands the scope of water protection to all waters and sets clear objectives that a "good ecological status" must be achieved for all European waters by 2015 and that water use be sustainable throughout Europe. This new overarching system is quite timely as Europe is water resources are facing increasing pressures. There is no time like the present to tackle the challenges and help secure our water resources for today and for future generations.

Article 8 of the Directive establishes the requirements for the monitoring of surface water status, groundwater status and protected areas. Monitoring programmes are required to establish a coherent and comprehensive overview of water status within each river basin district. The programmes have to be operational at the latest by 22 December 2006, and must be in accordance with the requirements of Annex V.

The objective of surface water bodies monitoring is to establish a classification of all water stations into one of five quality classes or to attribute one of five ecological status (table 1).

A water monitoring network shall be designed and operated to provide information on impacts and status of water bodies and assess any change resulting from programmes of measures undertaken in River Basin Plan.

The WFD implementation will require comparability of data and information but at present only general criteria on methods and procedures have been defined. One of these methods are presented in this paper.

MATERIAL AND METHOD

To evaluate the rivers ecological status, we utilise the Pantle-Buck method, that requires the following steps:

1. to establish the species' list for the monitored biological group;
2. to attribute, for each species identified, a saprobe category. Depending on this saprobe category, a saprobe value is attributed to each species (s_i):
3. to set the absolute frequency for macroinvertebrates and the relative frequency for phytoplankton and epiphyton, for each species identified. Depending on this frequency, a frequency coefficient for species (h_i) is attributed to each species;
4. to calculate saprobe indice (S):

$$S = \frac{\Sigma\ (s_i \times h_i)}{\Sigma\ h_i} \qquad (1)$$

S is between 1and 4

5. to frame the monitored river in one of the five quality classes or to attribute one of five ecological status:

Table 1. The five quality classes and theier ecological status

Saprob indice (S)	Colour code (Quality class)	Alteration degree	Ecological status
1,8	Blue (I)	no, or only very minor, evidence of distortion	High Ecological Status (HES)
2,3	Green (II)	low levels of distortion resulting from human activity	Good Ecological Status (GES)
2,7	Yellow (III)	biological quality elements differ moderately	Moderate Ecological Status (MES)
3,2	Orange (IV)	major alteration from their type specific values	Poor Ecological Status (PES)
>3,2	Red (V)	severe alteration from their type specific values	Bad Ecological Status (BES)

The Berheci river, situated within the Low Siret River basin and the Chineja river, situated within Low Prut River basin was monitored in 2003-2004 according to the requests of WFD, in two stations for each river (table 2 and table 3).

Table 2. The characterization of monitored stations for the Berheci River and the Chineja River

River /Station	Station characterization				
	Distance of spring/ Total lenght	Substrat	River typology	Floow typology	H water / L water
Berheci/ Bosia	31 km / 88 km	sand	linear	fast	10 cm/ 2,5 m
Berheci/ Berheci	84 km / 88 km	sand-clay	linear	fast	20 cm/ 3 m
Chineja/ Beresti	4 km / 73 km	sand	linear	fast	5 cm / 2,5 m
Chineja/ Fartanesti	41 km / 73 km	sand-silt	sinuous	slow	10 cm / 9 m

Table 3. The frequency of sampling for each station for the Berheci River and the Chineja River

River /Station	Sampling frequency					
	2003 year		2004 year			
Berheci/ Bosia	may	aug.		apr.	aug	
Berheci/ Berheci	may	aug.		apr.	aug.	
Chineja/ Beresti	may	aug.	febr.	apr.	aug.	nov.
Chineja/ Fartanesti	may	aug.	febr.	apr.	aug.	nov.

RESULTS AND DISCUSSIONS

The investigating of three biological group phytoplankton (table 4, 7), epiphyton (table 5, 8) and macroinvertebrates (table 6, 9) show the followings: taxonomic structure, the saprobe category of each species and finally the calculated saprobe indice (S).

Table 4. The phytoplankton analysis for the Berheci River in 2003 and 2004

Data / Station	Taxonomic structure	(S)
May 2003 / St$_1$	*Navicula sp., α; Gomphonema angusta-tum,o; Scenedesmus armatus, β; Frustulia vulgaris, o; Synedra acus, β; Synedra vaucharise,β; Tetraedron caudatum; Amphipleura pellucida, β;Achnanthes lanceolata, o- β*	1,86
Aug 2003 / St$_1$	*Achnanthes minutisima, o-β; Achnanthes lanceo-lata, o-β; Amphora ovalisvar. gracilis,o-β; Rhizosolenia longiseta, o;Strombomonas gibbe-rosa, β; Navicula viridula, α; Synedra acus, β*	2,0
May 2003 / St$_2$	*Synedra acus, β; Amphypleura pellucida, β; Nitzschia palea, α; Trachelomonas sp., β; Navicula gastrum, β; Synedra ulna, α Navicula viridula, α; Caloneis amphisbaena, β- α; Nitzschia acicularis, α; Synedra vaucharise,β; Gompho-nema angusta-tum,o; Tetraedron sp., β; Amphipleura pellucida, β; Aphanizomenon flos-aquae,β- α*	2,27
Aug 2003 / St$_2$	*Achnanthes minutisima, o- β; Rhizosolenia longiseta, o; Synedra acus, β; Euglena geniculata, α-p; Euglena tartrica, o; Caloneis bacillumo-β;Scenedes-mus acuminatus ,β;Pseudanabaena cate-nata, α-p; Artrospira major, α; Scenedesmus abundans, β; Amphora ovalisvar. gracilis,o- β; Navicula hynchocephala, α*	2,36
Febr 2004 / St$_1$	*Navicula sp., α; Crysococcus rufescens, o-β; Cryptomonas pyrenoidifera,o-β; Rhizosolenia longiseta, o; Coconeis placentula, α; Rhoicospehenia curvata,β; Cymatopleura solea,β;Frustulia ulgaris, o;Navicula ryptocephala, α Trachelomonas olvocinopsis, β*	2,02
Apr. 2004 / St$_1$	*Nitzschia acicularis, α; Diatoma elongatum, o- β; Cyclotella comta, o; Cryptomonas marrsonii, o-β; Cryptomonas pyrenoidifera,β; Chroomonas caudata, β- α; Navicula viridula, α; Surirella sp, β; Rhodomonas lacustris, β*	2,12
Aug. 2004 / St$_1$	*Achnanthes lanceolata, β Synedra vaucharise, β;Navicula sp., β- α; Synedra acus, β;Hantzschia amphioxya, α; Monomorphina pyrum, β; Coconeis placentula, α; Nitzschia acicularis, α*	2,25
Nov. 2004 / St$_1$	*Navicula viridula, α; Nodularia spumigena, β;Navicula cryptocephala, α;Cymbella microcepha-la, β; Caloneis amphisbaena, β- α; Tabellaria fenestrate varintermedia, o- β; Synedra vaucharise, β*	2,3
Febr 2004 / St$_2$	*Nitschia acicularis, α; Synedra acus, β; Nitzschia palea, α Synedra vaucharise, β; Navicula gastrum, β; Aphanizomenon flos-aquae, β- α; Caloneis amphisbaena, β- α; Amphipleura pellucida, β; Cryptomonas pyrenoidiferaβ;Trachelomonas sp., β*	2,31
Apr. 2004 / St$_2$	*Nitzschia longissima f. parva, β; Navicula viridula, α; Nitzschia acicularis, α; Cyclotella sp., β; Achnanthes minutissima, o- β; Synedra vaucharise, β; Frustulia rhomboides, β; Synedra ulna, α; Navicula gracilis, o- β; Cymatopleura solea, β- α*	2,28
Aug. 2004 / St$_2$	*Scenedesmus opoliensis, β; Nitzscia longissima f. parva,β; Pseudanabaena catenata, α-p; Navicula lanceolata, β; Surirella striatula, β; Cocconeis placentula, α; Pinnularia subcapitata, o; Nitzschia acicularis,α; Scene-desmus armatus, β Navi-cula viridula, α; Synedra acus, β; Chorella protothecoides, p- α*	2,68
Nov. 2004 / St$_2$	*Navicula crucicula, β; Synedra ulna, β; Navicula viridula, α; Surirella ovata var. crumena,β; Cryptomonas rostrata, o-β;Gyrosigma cuminatum,β;Cymatople-ura solea, β- α; Gomphonema olivaceum, α*	2,32

Table 5. The epiphyton analysis for the Berheci River in 2003 and 2004

Data / Station	Taxonomic structure	(S)
Aug 2003 / St$_1$	*Achnanthes lanceolata, β; Rhizosolenia longiseta, o; Navicula viridula, α; Strombomonas ibberosa, β; Euglena acus, β Scenedesmus armatus, β; Cymbella ventricosa, α; Cymatopleura solea, α Synedra vaucharise, β*	2,06
Aug 2003 / St$_2$	*Achnanthes minutissima, o- β; Synedra acus, β; Euglena geniculata, α-β;Euglena tartrica, o; Amphora ovalis var. gracilis, o- β; Scenedes-mus acuminatus β; Pseudoanabaena catenata, α-p; Arthro-spira major, α*	2,54
Apr 2004 / St$_1$	*Rhodomonas lacustris, β; Nitzschia acicularis, α; Cryptomonas marsonii, o- β; Chroomonas caudata, β- α; Surirella sp., β; Synedra vaucha-rise,β Navicula iridula, α*	2,34
Aug 2004 / St$_1$	*Synedra acus, β; Achnanthes lanceolata, β Neidium sp., α; Coconeis placentula,α; Mono-morphina pyrum, β; Scenedesmus armatus, β; Cymatopleura solea, β-α Euglena acus, β-α; Tetraedron caudatum, β*	2,39

Apr 2004 / St 2	*Nitzschia longissima f. parva, β; Cyclotella sp., β; Cryptomonas pyreno-idifera, β, Navicula viri-dula, α;Euglena spirogi-ra, o-β; Aphanizmenon flos-aquae β – α; Tabellaria floculosa, o*	2,21
Aug 2004 / St 2	*Surirella striatula, β; Nitzschia longissima f. parva β;P seudanabaena catenata, α-p; Navicula viridula, α; Coconeis placentula, α; Scenedes-mus armatus,β,Scenedes-mus opoliensis, β; Frus-tulia spirogyra,o-β; Cryptomonas pyrenoidifera, β*	2,39

Table 6. The macroinvertebrates analysis for the Berheci River in 2003 and 2004

Data / Station	Taxonomic structure	(S)
Apr 2003 / St 1	*Dikerogammarus sp., β; Calopterix splendens, o-β Heptagenia sp., β; Helobdella sp. B-α*	2,0 6
Aug 2003 /St 1	*Dikerogammarus sp., β; Heptagenia sp., β Glossiphonia sp., β-α*	2,1 6
Apr 2003 / St 2	*Heptagenia sp., β Erpobdellidae sp., β Glossiphonia sp., β-α; Hydropsyche modesta, o-β; Hydropsyche instabilis, o ; Platycnemis sp., α; Dikerogammarus villosus, β; Centroptroptilum sp., β*	1,8 7
Aug 2003 / St 2	*Hydropsyche instabilis, o ; Platycnemis sp., α; Glossiphonia sp, β-α ; Dikerogammarus villosus, β*	2
Apr 2004 / St 1	*Dikerogammarus haemobaphes fluviatilis, β; Hydropsyche instabilis, o-β; Heptagenia sp., β; Erpobdella sp., β-α; Tipula sp., α-p ; Aphelocheirus aestivalis, β; Donacia crassipes,o-β*	1,6 5
Aug 2004 / St 1	*Nepa cinerea, o- β; Notonecta sp., β Dikerogammarus haemobaphes fluviatilis, β; Hydropsyche sp., o- β; Calopteryx splendens, o- β; Lymnea columella, β Ephemera sp., o-β; Erpobdella sp., β-α Helodes minutus, o-β*	1,7 7
Apr 2004 / St 2	*Dikerogammarus haemobaphes fluviatilis, β; Hydropsyche instabilis, o ; Erpobdella sp., β-α; Potamanthus luteus β;Dikerogammarus villosus, β*	1,6 5
Aug 2004 / St 2	*Nepa cinerea, o-β; Erpobdella sp., β-α Calopteryx splendens, o-β; Platycnemis sp., α; Heptagenia sp., β; Hydropsyche modesta, o-β;Centrophylum sp., β*	2,0 3

Table 7. The phytoplankton analysis for the Chineja River in 2003 and 2004

Data / Station	Taxonomic structure	(S)
13 may 2003/ St.1	*Synedra acus, β; Navicula viridula, α ; Synedra vaucharise, β; Amphypleura pellucida,β; Trachelomonas stokesiana, β Phacus pusillus, β-α; Euglena geniculata, p-α; Euglena intermedia, o-α*	2.41 2.41
6 aug/ 2003 St.1	*Synedra vaucharise, β; Tabellaria fenestrata var. intermedia, o-β; Trachelomonas rugulosa, β; Navicula gastrum, β; Achnanthes minutissima, o-β; Navicula rhynchocephala, α ; Navicula cryptocephala, α; Oscillatoria fragilis, α*	2,53
13 may/ 2003 St.2	*Euglena variabilis, β-α; Synedra acus, β Synedra ulna, α; Amphypleura pellucida,β Euglena pisciformis, β-α; Navicula viridula, α ; Euglena geniculata, p-α*	2,5
6 aug/ 2003 St.2	*Tabellaria flocculosa, o; Navicula viridula, α ;(Chrysophyta) Chrysococcus ornatus, o Synedra vaucharise, β; Trachelomonas stokesiana, β;(Chrysophyta) Chromulina rosanofii, o; Achnanthes minutissima, o-β Achnanthes lanceolata, β*	1,91
5 feb./ 2004 St.1	*Achnanthes lanceolata, β; Ochromonas ludibunda, β; Aphanizomenon flos-aquae, β-α; Amphora ovalis var. gracilis, o-β; Navicula gracilis, o-β; Cymatopleura solea, β-α; Hantzschia amphyoxia, α; Synedra acus, β; Cocconeis hustedtii, β-α; Pinnularia apendiculata, o; Navicula atomus, β*	2,03
23 aprilie/ 2004 St.1	*Surirella brightwellii, β; Achnanthes minutissima, o-β; Amphypleura pellucida,β Synedra vaucharise, β; Euglena caudata, p-α; Synedra ulna, α; Gomphonema angustatum, o; Navicula gracilis, o-β Navicula viridula, α*	2,20
18 aug/ 2004 St.1	*Caloneis Bum, α; Phacus pseudonordstedtii, β-α; Neidium productum, o; Trachelomonas stokesiana, β; Stauroneis pseudosubebtusoides, β; Chroomonas caudata, β-α; Navicula seminulum, α Euglena caudata, p-α; Hantzschia amphyoxia, α; Surirella ovalis, β Navicula excelsa, α ; Stauroneis agrestis, β; Monomorphyna pyrum, β; Achnanthes delicatula, β; Cocconeis amphisbaena, β-α Trachelomonas armata, β*	2,28
9 nov. 2004/ St1.	*Phacus pusillus, β-α; Euglena intermedia, o-β; Synedra vaucharise, β; Synedra acus, β; Amphypleura pellucida,β; Neidium dubium, β; Euglena proxima, p-α; Navicula viridula, α ; Diatoma vulgare, o-β*	2,20
5 feb. 2004/ St.2	*Neidium productum, o; Caloneis amphysbaena, β-α; Nitzschia palea, α Aphanizomenon flos-aquae, β-α; Synedra acus, β; Achnanthes lanceolata, β; Amphypleura pellucida,β; Pinnularia apendiculata, o; Gyrosigma acuminatum, β Hantzschia amphyoxia, α*	2,04
23 apr. 2004/ St.2	*Pinnularia microstauron, o; Cocconeis placentula, α, Hantzschia amphyoxia, α; Navicula rhynchocephala, α, Neidium sp., o; Synedra ulna, α; Nitzschia acicularis, α Navicula gastrum, β; Achnanthes minutissima, o-β, Caloneis amphysbaena, β-α; Euglena limnophila, o-β, Navicula cryptocephala, α*	2,23
18 aug. 2004/ St.2	*Caloneis Bum, α; Phacus pseudonordstedtii, β-α, Neidium productum, o; Trachelomonas stokesiana, β; Stauroneis pseudosubebtusoides, β; Chroomonas caudata, β-α; Navicula seminulum, α; Euglena caudata, p-α Hantzschia amphyoxia, α; Surirella ovalis, β Navicula excelsa, α ; Stauroneis agrestis, β Monomorphyna pyrum, β; Achnanthes delicatula, β; Cocconeis amphisbaena, β-α; Trachelomonas armata, β*	2,28
9 nov. 2004/ St.2	*Synedra acus, β; Phacus inflexus, β-α Neidium dubium, β; Navicula viridula, α Diatoma vulgare, o-β; Amphypleura pellucida,β; Navicula rhynchocephala, α ; Synedra ulna, α; Cymatopleura solea, β-α; Synedra vaucharise, β; Trachelomonas sp., β; Euglena oblonga, β*	2,28

Table 8. The epiphyton analysis for the ChinejaRiver in 2003 and 2004

Data / Station	*Taxonomic structure*	(S)
6 aug. 2003 / St.1	*Monomorphyna pyrum, β; Synedra vaucharise, β; Navicula rhynchocephala, α Achnanthes minutissima, o-β; Synedra acus, β; Navicula viridula, α; Tabellaria fenestrata var. intermedia, o-β; Navicula cryptocephala, α*	
6 aug. 2003/ St.2	*Tabellaria flocculosa, o; Navicula viridula, α; Synedra vaucharise, β; Trachelomonas stokesiana, β; Achnanthes minutissima, o-β Achnanthes lanceolata, β; Synedra acus, β*	

	Monomorphyna pyrum, β	
23 apr. 2004/ St.1	*Gomphonema angustatum, o; Navicula viridula, α; Surirella brightwellii, β; Trachelomonas stokesiana, β; Achnanthes minutissima, o-β; Aphanizomenon flos-aquae, β-α; Euglena caudata, p-α*	2,24
18 aug. 2004/ St.1	*Neidium productum, o; Caloneis Bum, α Trachelomonas stokesiana, β; Monomorphyna pyrum, β; Surirella ovalis, β; Euglena caudata, p-α; Stauroneis arestis, β; Caloneis amphysbaena, β-α, Trachelomonas armata, β; Neidium seminulum, α; Navicula gracilis, o-β Achnanthes lanceolata, β; Phacus pusillus, β-α*	1,91
23 apr. 2004/ St.2	*Caloneis placentula, α; Achnanthes minutissima, o-β; Euglena limnophila, o-β Navicula cryptocephala, α; Pinnularia microstauron, o; Hantzschia amphyoxia, α Caloneis amphisbaena, β-α; Amphora ovalis var. gracilis, o-β; Nitzschia palea, α Artrospira major, α; Neidium productum, o*	2,2
18 aug. 2004/ St.2	*Synedra acus, β; Monomorphyna pyrum, β Phacus inflexus, β; Synedra ulna, α; Synedra vaucharise, β; Euglena oblonga, β Neidium dubium, β; Diatoma vulgare, o-β Cymbella lanceolata, β; Navicula rhynchocephala, α; Navicula viridula, α*	2,26

Table 9. The macroinvertebrates analysis for the Chineja River in 2003 and 2004

Data / Station	Taxonomic structure	(S)
13 mai 2003 St.1	*Dikerogammarus villosus, β Oligochaeta sp., p-α*	2,6
6 aug. 2003 St.1	*Dikerogammarus villosus, β Daphnia pulex, α*	2,4
13 mai 2003 / St.2	*Dikerogammarus villosus, β; Dikerogammarus sp., β Hydropsyche instabilis, o Nematoda g. sp., o-p*	2,12
6 aug. 2003/ St.2	*Dikerogammarus villosus, β Hydropsyche sp., β Nematoda g. sp., o-p*	2,14
23 apr. 2004 /St.1	*Dikerogammarus villosus, β Daphnia pulex, α; Dikerogammarus haemobaphes fluviatilis, β; Oligochaeta sp., p-α*	2,52
18 aug. 2004 /St.1	*Daphnia pulex, α Dikerogammarus haemobaphes fluviatilis, β; Stylaria lacustris, β; Nematoda g. sp., o-p*	2,32
23 apr. / 2004 St.2	*Dikerogammarus villosus, β; Dikerogammarus haemobaphes fluviatilis, β; Hydropsyche instabilis, o*	1,63
18 aug. 2004 /St.2	*Nematoda g. sp., o-p; Dikerogammarus haemobaphes fluviatilis, β; Dikerogammarus villosus, β*	2,06

The final step of these researches is to frame the four monitored station in one of the five quality classes or to attribute one of five ecological status after the calculated values of saprobe indice (S) for each sampling data.

If there are different quality classes that characterised the three biological groups, we choose the lowest one, set as result of the analysis of the three biological groups in the same month (table10, 11, 12, 13).

Table 10. Ecological status and quality class for the Berheci River in Bosia station

Year	2003					2004							
Biologycal group	Phytoplankton		Epi-phyto	Macro-invertebrates		Phytoplankton				Epiphyton		Macro-invertebrates	
Month	Feb	Aug	Aug	Apr	Aug	Feb	Apr	Aug	Nov	Apr	Aug	Apr	Aug
Ecological status	GES	GES	GES	GES	GES	GES	GES	GES	GES	MES	MES	HES	HES
Quality class/ month	II	II	II	II	II	II	II	II	II	III	III	I	I
Quality class/ year	GES II					MES III							

Table 11. Ecological status and quality class for the Berheci River in Berheci railway station

Year	2003					2004							
Biological group	Phytoplankton		Epi-phyto	Macro-invertebrates		Phytoplankton				Epiphyton		Macro-invertebrates	
Month	Feb	Aug	Aug	Apr	Aug	Feb	Apr	Aug	Nov	Apr	Aug	Apr	Aug
Ecological status	GES	MES	MES	GES	GES	MES	GES	MES	MES	GES	MES	GES	GES
Quality class/ month	II	III	III	II	II	III	II	III	III	II	III	II	II
Quality class/ year	MES III					MES III							

Table 12. Ecological status and quality class for the Chineja River in Beresti station

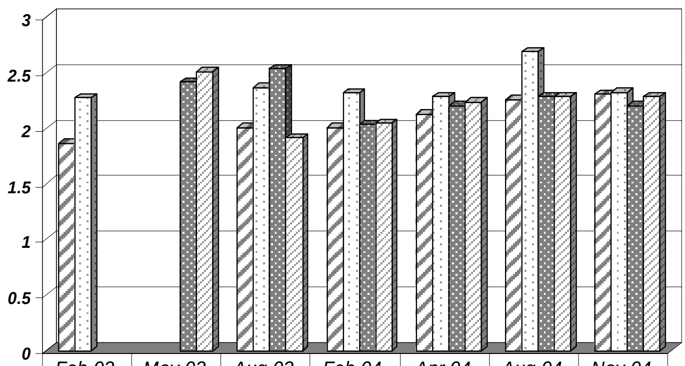
Year	2003					2004							
Biologycal group	Phytoplankton		Epi-phyto	Macro-invertebrates		Phytoplankton				Epiphyton		Macro-invertebrates	
Month	May	Aug	Aug	May	Aug	Feb	Apr	Aug	Nov	Apr	Aug	Apr	Aug
Ecological status	MES	MES	GES	MES	MES	GES	GES	GES	GES	GES	GES	MES	MES
Quality class/ month	III	III	II	III	III	II	II	II	II	II	II	III	III
Quality class/ year	MES III					MES III							

Table 13. Ecological status and quality class for the Chineja River in Fartanesti station

Year	2003					2004							
Biologycal group	Phytoplankton		Epi-phyto	Macro-invertebrates		Phytoplankton				Epiphyton		Macro-invertebrates	
Month	May	Aug	Aug	May	Aug	Feb	Apr	Aug	Nov	Apr	Aug	Apr	Aug
Ecological status	MES	GES	GES	GES	GES	GES	GES	GES	GES	GES	GES	HES	GES
Quality class/ month	III	II	II	II	II	II	II	II	II	II	II	I	II
Quality class/ year	MES III					GES II							

CONCLUSIONS

1. The monitored river are similarly of point of view geographic, like size, length, river typology, flow typology (table 2) but, the Berheci River has a natural regime comparative with Chineja River which has a regulated regime.
2. Between all the monitored biological groups there isn't one which has a constant sensibility during investigated period.
3. The phytoplankton analysis (fig.1) saw a saprobe indice (S) values between a better one of 1,86 (that corresponding of II quality classes) and a bad one of 2,68 (that corresponding of III quality classes).



	Feb-03	May-03	Aug-03	Feb-04	Apr-04	Aug-04	Nov-04
Berheci river, up-stream station	1.86		2	2	2.12	2.25	2.3
Berheci river, down-stream station	2.27		2.36	2.31	2.28	2.68	2.32
Chineja river, up-stream station		2.41	2.53	2.03	2.2	2.28	2.2
Chineja river, down-stream station		2.5	1.91	2.04	2.23	2.28	2.28

Fig. 1. Comparative evolution of the saprobe indice (S) values in the monitored stations in 2003-2004 years after phytoplankton analysis

4. The epiphyton analysis (fig. 2) saw a saprobe indice (S) values between a better one of 1,91 (that corresponding of II quality classes) and a bad one of 2,54 (that corresponding of III quality classes).
5. The macroinvertebrates analysis (fig. 3) saw a saprobe indice (S) values between a better one of 1,63 (that corresponding of I quality classes) and a bad one of 2,60 (that corresponding of III quality classes).
6. The diversity of monitored biological groups from Berheci river and Chineja river had the similarly values (table 14), the macro-invertebrates groups is very low represented.
7. In booth rivers the macroinvertebrates are low represented as number of species and as number of individuals.
8. In 2004 year the biological diversity in all the stations are higher conversely the 2003-year.
9. Between up -stream station and down - stream station there is a difference at level of each biological group.
10. The frame of monitored Berheci River in one of the five quality classes is the same after the biological criteria and the physical -chemical criteria. But, for the monitored Chineja River the frame in one of the five quality classes is different. The biological criteria lead to higher quality classes conversely the physical – chemical criteria. (table 15).
11. The higher quality classes of biological indicator comparated with the physico – chemical indicators show a faster remediation of biological groups conversely the longer persistence of the physico – chemical modifications.

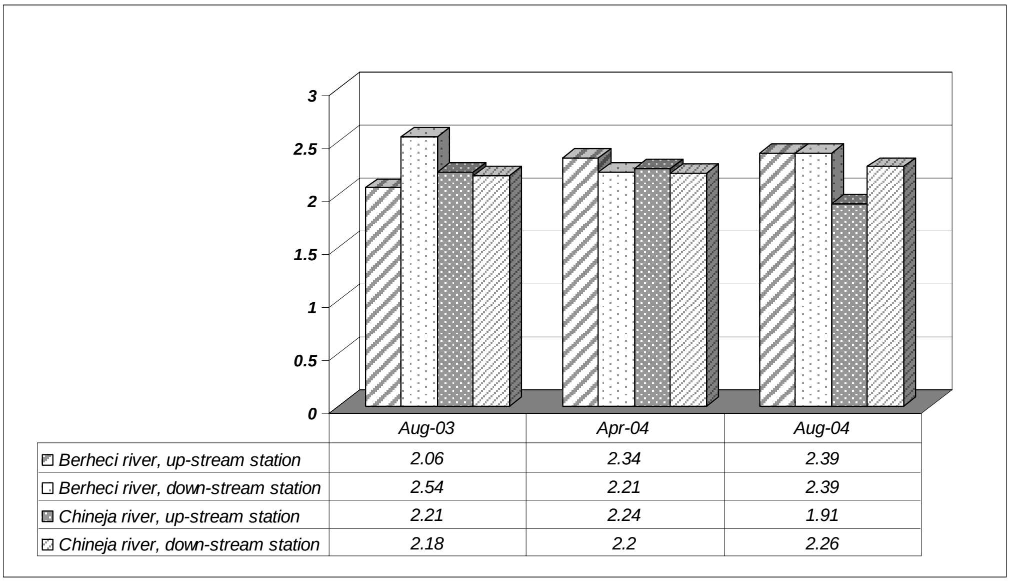


Fig. 2. Comparative evolution of the saprobe indice (S) values in the monitored stations in 2003-2004 years after epiphyton analysis

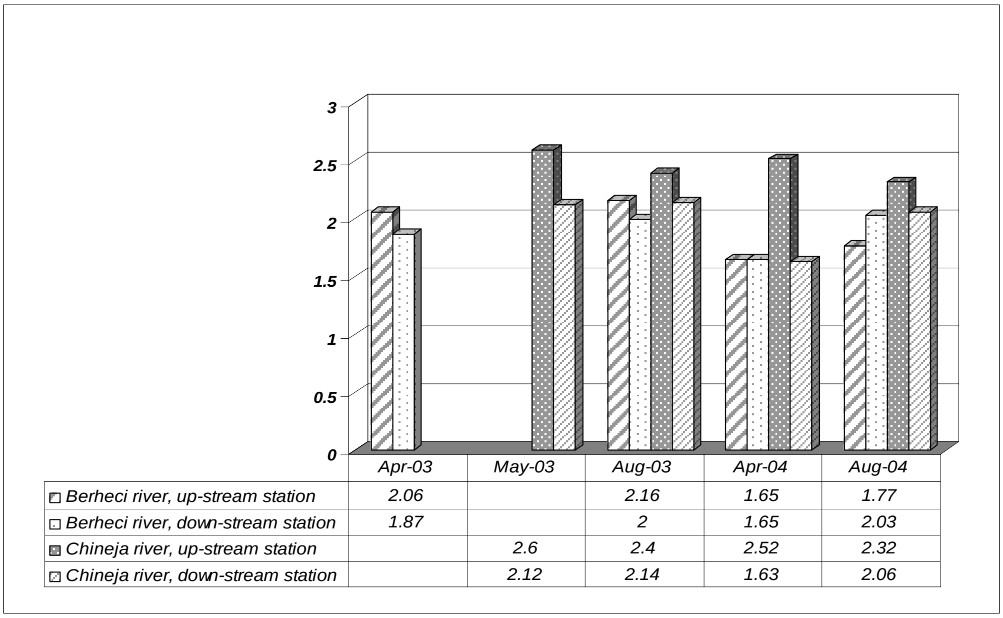


Fig.3. Comparative evolution of the saprobe indice (S) values in the monitored stations in 2003-2004 years after macroinvertebrates analysis

Table 14. The maximum and the minimum species diversity for phytoplankton, epiphyton and macroinvertebrates in Berheci River and Chinela River

Berheci river– species diversity						Chineja river– species diversity					
Phytoplankton		Epiphyton		Macroinvertebrates		Phytoplankton		Epiphyton		Macroinvertebrates	
max. / data	min. / date	max. / data	min. / data	max. / data	min. / data	max. / data	min. / data	max. / data	min. / data	max. / data	min. / data
31 sp. / 2004, st.$_{2}$	14 sp. / 2003, st.$_{1}$	16 sp. / 2004, st.$_{1}$	8 sp. / 2003, st.$_{2}$	13 sp. / 2004, st.$_{1}$	5 sp. / 2003, st.$_{1}$	38 sp. / 2004, st.$_{2}$	14 sp. / 2003, st.$_{2}$	22 sp. / 2004, st.$_{2}$	8 sp. / 2003, st.$_{2,1}$	6 sp. / 2004, st.$_{1}$	3 sp. / 2003, st.$_{1}$

Table 15. Comparation between ecological status and quality class for the Chineja River and Berheci River after physical chemical criteria and biological criteria

Quality class / Ecological status	Berheci river				Chineja river			
	Station 1		Station2		Station 1		Station2	
	2003	2004	2003	2004	2003	2004	2003	2004
physical chemical criteria	II / GES	III / MES	III / MES	III / MES	V / BES	IV / PES	III / MES	III / MES
Biological criteria	II / GES	III / MES	III / MES	III / MES	III / MES	III / MES	III / MES	II / GES

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