THE RELATIONSHEEP BETWEEN SOIL FERTILISATION AND SURFACE WATERS

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Abstract

In the hydrographic basin of Mures river, aboard an altitude gradient, were taken samples from surface waters for research the nutrients concentrations. Thereference point was represented by a dairy caw farm where the agricultural fields of this is applied the organic fertilization with manure. The water samples were prelevated in spring and autumn and the prelevate dates are the same with spread manure dates. At the second data prelevaion (in autumn) it observed an increase of N-NH4, N-NO3 and P in surface water in comparison with the concentrations founded at first data collection (in spring). These bigger concentrations values of N in water are consequence of wrong manure management.

Key words: surface water, nutrient, run-off process.

INTRODUCTION

The nitrogen concentrations from water and sediments represent the balance of assimilation, mineralization, nitrification and denitrification process as well as oxidation loss (Botnariuc, Vădineanu, 1982). The phosphorus inputs from water are due to: the alimentation waters (transporting the phosphorus results from desegregation volcanic rocks and fertilizers manure from agriculture fields aboard alimentation hydrographic basin, residual waters ejection and aquatic organisms (especially fishes) (Budoi, 2000, Davidescu, 1981). In water the phosphorus components are both in soluble and particulate forms.

MATERIALS AND METHODS

The samples from surface water were taken aboard an altitudinal gradient to flow water sense. The samples were taken with seasonality (March – September/October). The samplings were realized using the quantitative methods. Conservation and working samples were made using the classical methods. The fields along side the farm have 10 degrees back fall, the zone been in C vulnerability categories, according to implementation plan for 91/676/EEC Directive (Cod de bune practici agricole, 2003). This zone has a vulnerability potential to surface water pollution with nitrates from agricultural sources by run-off process.

RESULTS AND DISCUSSIONS

In the water we found increased concentrations of NH4, NO3 and PO4 values, along the studied altitudinal gradient.
In table no. 1 are presented the result obtained from samples taken from hydrographic basin of Mures.

Table 1

Concentration values of different forms of N and P in water

DATA	STATION	WATER µg/ml			
		$N\text{-}NH_4$	$N\text{-}NO_3$	N_{anorg}	P
5.03.08	P1	0.000	0.489	0.489	0.000
	P2	0.008	0.575	0.583	0.097
	P3	0.355	0.405	0.760	0.130
	P4	0.612	0.622	1.234	0.113
21.09.08	P1	0.000	0.877	0.877	0.001
	P2	0.472	0.882	1.354	0.100
	P3	0.898	0.655	1.552	0.146
	P4	1.296	0.423	1.719	0.180

The concentration levels of different forms of N and P in water from Mures stations, at the first data prelevation are presented in Graph no. 1.
We observe that are the comparative concentration values of all prelevation stations, the N forms dominating the P forms. We have a relative equilibrate structure of different N forms concentrations which means a nutrient presence in water as well as a high own-cleaning activity of water.
The concentration levels of different forms of N and P in water from Mures stations, at the second data prelevation are presented in Graph no. 2.
It's observed an increase of inorganic nitrogen concentration in comparison with this element concentration at the first data prelevation, as well as increase of P concentration.
The samples were prelevated when the manure was spread in field but, from first data relevation, the nutrient concentrations increased and those fact means that the nutrients were washing by precipitation waters and arrived in river waters by run-off process after the manure fertilizer application (Ionescu, 1982).

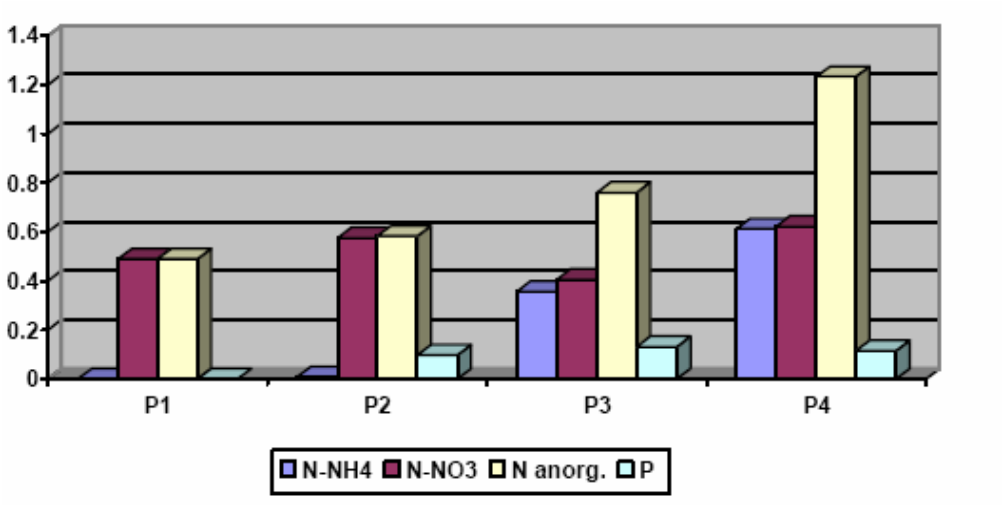

Fig.1 – The concentration levels of different forms of N and P in water from Mures stations, at the first data prelevation

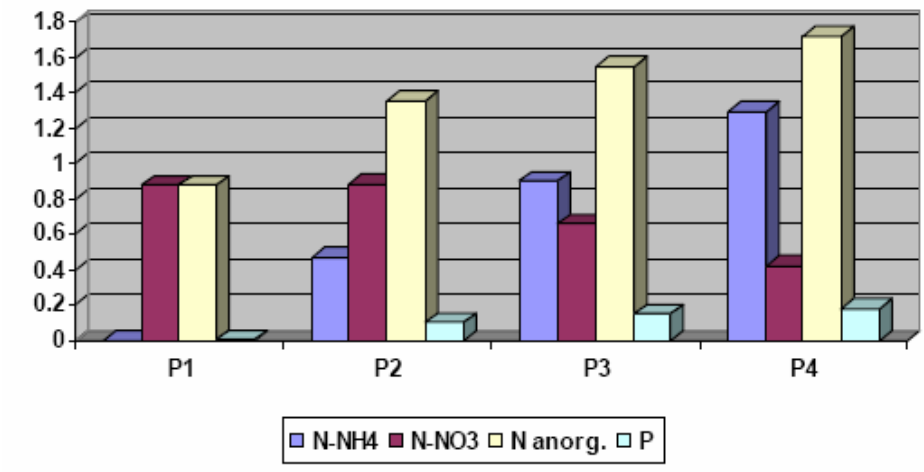

Fig.2 – The concentration levels of different forms of N and P in water from Mures stations, at the second data prelevation

Aboard the altitudinal gradient, the NH4, NO3 and PO4 concentration values are bigger down the river than up the river (the farm is reference point).

The cause is manifestation of cumulative effects of introducing in water to the organic matters, probably washed from neighboring agricultural fields (Decun, Crăiniceanu, 1984, Popescu, Man, Crăiniceanu, 1985, Budoi, 2000).

In Table no. 2 are presented the calculated values of Student test for seasonal comparisons.

Table 2

The calculated values for Student test for seasonal comparisons in Mures basin

SPECIFICATION	SURFACE WATER		
	$N\text{-}NH_4$	$N\text{-}NO_3$	P
t calculated	1.3397	1.5648	0.4478
t critical value α=0.05	2.447		
t critical value α=0.02	1.440		

The critical values for Student test were read to level probability 95% and 20%. The level probability 20% (α = 0.02) is used in ecology very frequently because if we work with a big α risk, we minimize the β risk which represent the probability to unobserved an environment degradation when it's exist.

Such an interpretation affects an entirely community, an ecosystem, and than, this strategy is correct (Dragomirescu, 1996). Another reason for this probability level interpretation was sample error (the number of observations in each stations was small).

CONCLUSIONS

For 20% probability level, in the hydrographic basin of Mures, the seasonal differences were significant for concentration values of N-NO3, in surface water.

The prelevations dates for samples which are the same with manure fertilization dates, we determinate to conclude that these bigger concentrations values of N in water are consequence of wrong manure management or a wrong calculated manure fertilizer doses which must spread on certain surface (Sas, 2005, Silvaş, 1998).

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