LEAVING FIELDS AND REACHING STREAMS - PHOSPHORUS EMITTED FROM EXCLUSIVELY AGRICULTURAL HEADWATERS

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Czech Republic has problems with eutrophication of freshwaters similar to other densely inhabited developed states of temperate zone. Community of phytoplankton is regularly dominated by noxious cyanobacteria during summer stratification in a lot of reservoirs. Large rivers lost their dilution capacity for treated municipal wastewaters during the period of low discharge and with increasing temperature develop to the same stage – dense algal blooms. Those water bodies are suspected not to reach good ecological status according to WFD.

While limnologists are quite sure that phosphorus is prevailing cause, water managers ask for its sources and priorities to treat. Basic apportionment would be simple task for water authorities in stable socio-economic circumstances. It is not a case of Czech Republic in the last two decades. While municipal and industrial point sources of pollution have been the first targets of massive investment into WWTP´s (and CZ should install further WWTP for hundreds of municipalities according 91/271/EC Directive until 2010), non-point sources were rather left to self-development. Namely agriculture is characterized by cattle and pig stock decline after 1989 to $^2/_5$ or ½ respectively, manure and slurry production logically followed. The same drop is documented for mineral fertilizers consumption (only in P to $^1/_6$), all resulting in long-term decrease of the P soil storage.

In this context, the goal of our research is to characterize P emissions from arable land, but according to their algal availability. Availability in our understanding is extended not only to distinguishing chemical form, but the time of season and the kind of water body, where and when the impact would take a place (e.g. which dominant algal group will benefit).

In 2006 over 150 one-shoot samples from exclusively agricultural headwaters were used to characterize major soil types in CZ (median of PO_4-P = 0.025 mg/l; Eutric Fluvisols and Dystric Cambisols are the ends of gradient). From 2007 to 2009 we are sampling 25 watersheds monthly for baseflow evaluation (preliminarily March-April low and November high; preliminary specific yields are 45 - 1kgTP/km^2/yr). Simultaneously we installed series of passive samplers for suspended solids to trap periods with elevated flow (from 0.8 TP* during snowmelt to nearly 1000 TP* during erosion runoff; TP* means maximum value from I-XII of total P in baseflow).

Our final outcomes will help to precise apportionment between point and non-point P sources in Czech Republic and specify impact of phosphorus emitted from arable land on phytoplankton in different water bodies during all the year.