

Riparian buffers of small streams have larger phosphorus mobilization potentials than adjacent farmland in Eastern Denmark

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The mandatory establishment of 10 m riparian buffer zones is a prioritized means of legislators to reduce phosphorus (P) transfer from agricultural land to water in Denmark. Whereas the buffer zones' retention potential for surface transported P is well documented in the international literature, relatively little is known about their overall source or sink function for P transport in landscapes. In Denmark riparian buffers have previously been found to be more P-enriched than adjacent agricultural land indicating amongst others a correspondingly higher P leaching potential. The objective of our study was to compare the P mobilization potential in soil profiles along short transects spanning from the crest of stream banks across 3 m wide riparian buffers into adjacent arable fields. The selected four sites were situated in the River Odense catchment at 1st or 2nd order streams and representative for intensively farmed land in the Weichsel moraine landscape of Eastern Denmark. We discuss the spatial distribution of different P forms and the degree of P saturation in different soil profiles in relation to general soil properties, land use, management of riparian buffers and stream typology. Additionally, the P mobilization potential is related to P concentrations in the shallow ground water obtained with piezometers along the transects. Our study questions the effectiveness of riparian buffers in reducing subsurface P losses the low order streams.