

Phosphorus transport in the Fonte Espiño-Rego de Abellas watershed (Galicia, NW Spain)

Troitiño, F.; Leirós, M.C.; Trasar-Cepeda, C.; Gil-Sotres, F.*

Dep. Edafología, Santiago de Compostela University, Santiago de Compostela, Spain.

With the aim of estimating the dynamics of P loss from soil to water, eight different sampling points were selected in a sub-basin (Fonte Espiño – Rego de Abellas, ---Ha) within the Xallas river basin (Galicia, NW Spain), in which the soils are mainly dedicated to forest and grassland use (with high inputs of organic fertilizers). The water flow and concentrations of P (total phosphorus, TP; particulate phosphorus, PP, and molybdate reactive phosphorus, MRP) were measured fortnightly at these sampling points, over a period of 12 months.

The results showed that the flow rates were very variable and depended on the climate conditions, with an important reduction in the summer period, during which some sources of both rivers dried up. The concentrations of P were also very variable throughout the year; the TP values reached close to 0.30 mg L⁻¹, so that the waters would be classified as category B (under Spanish legislation). The predominant form of P in the waters was PP, and the concentration of MRP was only higher than 0.03 mg L⁻¹ (one of the limiting values considered for the start of eutrophication) on very few occasions at some sampling points. The highest concentrations of PP were obtained after intense periods of precipitation, which suggests that they are mainly derived from soil erosion.

Despite the high levels of precipitation, the intense agricultural management and the concentrations of TP observed at certain times and points in the watershed, which indicate transfer of large amounts of P from the soil to the water, the amount of TP lost annually in the watershed under study was not excessively high. The relatively low amounts of P exported suggest the action of a buffering mechanism within the rivers. Thus, it was found that some stretches of both rivers within the watershed act as sinks of PP as a result of sedimentation of fine particles transported by the water.

In summary, although the climate (characterized by a intense rainy periods) and soil management (addition of large amounts of organic fertilizers such as cattle manure and slurry) may have favoured P losses, the water flow processes, which favour sedimentation of fine particles, tended to minimize the environmental impact of these losses, so that the sub-basin did not appear to be an important source of P for the main river basin (Xallas).