

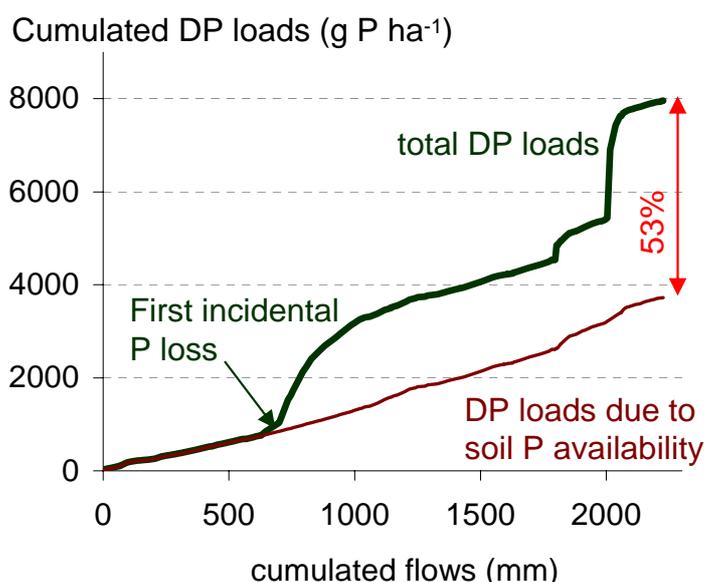
Contribution of P supply to P losses from fields

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Aim of the study

The part of dissolved P lost from fields due to P inputs followed by rainfall causing runoff and/or subsurface drainage were assessed in a study carried out in western France for 10 years. Runoff and drainage were continuously measured in 5 plots (4200 to 10800 m², P1 was not drained) on a silty soil. Dissolved P concentrations (DP = total P in water filtered at 0.70 μm) were analyzed from weekly samples. Maize and wheat were cropped in P1, P2, P3, and pea, oilseed rape and wheat in P4, P5.

Determining the contribution of the incidental losses to total P losses



Incidental losses due to fertilizer supplies were detected by observing the variations of DP concentrations and the abrupt change of the slope of the relationship between cumulated DP loads and cumulated flows. Then, removing the periods when incidental P losses occurred, the relationship between cumulated DP loads and cumulated flows allowed the calculation of the DP losses due to the soil P availability. The contribution of incidental DP losses was calculated by the difference between total P loads and loads assigned to soil P availability (53 % for the undrained P1 plot in the figure shown).

Results

Mean annual values from 1998 to 2007	Manure + inorganic fertilizers			Inorganic * fertilizers		Mean of the 5 plots
	P1	P2	P3	P4	P5	
Olsen P (mg P kg ⁻¹)	29	25	28	68	14	33
P supply (kg P ha ⁻¹)	46	46	46	27	27	39
Runoff + drainage (mm)	222	297	266	249	273	261
Dissolved P losses (g P ha ⁻¹)	796	528	651	470	455	580
Share due to P supply (%)	53	45	42	36	48	45
Fertilizer transfer rate (%) **	0.91	0.51	0.58	0.62	0.81	0.69

* DAP or TSP, ** DP loads due to P fertilizers / P applied

Conclusion : Incidental P losses due to P inputs (manure or inorganic fertilizers) may in some cases account for the major part of dissolved P losses. Nevertheless, P losses from P supplies always represent a little share of the P applied (less than 1% in this study carried out in France)