

## **Evolution of the phosphate saturation degree and its distribution with depth in acid sandy soils in Flanders**

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Intensification of agriculture, with concentration of intensive livestock breeding and intensive horticultural cropping systems in certain areas in Western Europe, has resulted in excessive fertilization both with mineral fertilizers and organic manures especially between the 1970's and 1990's. This has resulted also in excessive P build-up in specific areas, and especially acid sandy soils are prone to P leaching. According to Van der Zee et al. (1990), an acid sandy soil is considered P saturated when the phosphate saturation degree (PSD) is > 25% (or when the P concentration in the shallow groundwater is > 0.1 mg o-P l<sup>-1</sup>).

Between 1995 and 1997 an intensive sampling campaign was launched to make an inventory of the PSD of acid sandy soils in Flanders (DeSmet et al., 1996). This was used as a basis for enforcing strict P fertilization rules on P saturated soils. In 2009, we revisited a number of locations, part of which were P saturated fields with severe P fertilizer restrictions, and part of which were not P saturated at the time of the first survey.

Fields that were not P saturated in general had a higher PSD in 2009, while fields that were P saturated (with severe P restrictions) had equal or slightly lower PSD in 2009.

In the majority of cases, we observed a very clear movement of P from the upper 0-30 cm soil layer to deeper soil layers. While the total PSD of the field may have remained unchanged, the movement of P from the top layers to the deeper layers in a time span of only about one decade is of very serious concern. Indeed, it shows that P movement in these soils is relatively fast, and that these soils are an increasing threat to groundwater quality. Additional measurements from samples taken in the beginning of 2010 will be used to further check this trend.

De Smet, J., G.Hofman, J. Vanderdeelen, M. Van Meirvenne, and L. Baert. 1996. Phosphate enrichment in the sandy loam soils of West Flanders, Belgium. *Fert. Res.* 43:209–215.

Van der Zee S.E.A.T.M, Van Riemsdijk W.H. & De Haan F.A.M. (1990). The protocol of phosphate saturated soils. Part I: explanation (in Dutch). Department of soil science and plant nutrition, Faculty of agriculture, Wageningen, The Netherlands: 69 p.