



## The Mehlich Phosphorus Saturation Ratio (M3-PSR)

The Mehlich-3 Phosphorus saturation ratio (M3-PSR) is a combination of the agronomic Mehlich-3 P soil test and the environmental aspects of a soil P saturation test (Khiari et al., 2000; Sims et al., 2002; Maguire and Sims, 2002).

The M3-PSR has initially been developed as an environmental management tool and is reportedly better at identifying soils susceptible to soluble P losses by leaching than Mehlich-3 P alone. As a gauge for P solubility, it has great value as an agronomic indicator of potential P availability to plant roots.

In general, a PSR <0.062 is considered to be below the agronomic optimum. At a PSR >0.23, P losses through leaching will most likely occur. Depending on site conditions i.e. the likelihood of surface run-off, rapid drainage (e.g. lack of plant cover) and vicinity to waterways, a range of 0.10 to 0.15 M3-PSR may already indicate a risk of P losses. Considering this, it is important to integrate any form of soil P testing with other site risk assessments to avoid P effects on water quality. This is especially important for water re-use schemes effluent and manure use.

While environmental soil limits are useful in identifying potential problems, a more comprehensive approach, e.g. using a phosphorus site index, will be more accurate at identifying the relative risk of P losses than soil P testing, including M3-PSR and other P buffer capacity indicators, alone.

### References:

Fortin. 2000. An agri-environmental phosphorus saturation index for acid coarse-textured soils. *J. Environ. Qual.* 29:1561–1567.

Maguire, R.O., and J.T. Sims. 2002. Measuring agronomic and environmental soil phosphorus saturation and predicting phosphorus leaching with Mehlich 3. *Soil. Sci. Soc. Am. J.* 66(6) (in press).

Sims, J.T., R.O. Maguire, A.B. Leytem, K.L. Gartley, and M.C. Pautler. 2002. Evaluation of Mehlich 3 as an agri-environmental soil phosphorus test for the mid-Atlantic United States. *Soil. Sci. Soc. Am. J.* 66(6).