



**RIO18**  
21st World Congress  
of Soil Science

**21 WORLD CONGRESS OF SOIL SCIENCE**  
Sunday 12 – Friday 17 August 2018  
Rio de Janeiro, Brazil

Rio de Janeiro August | 12 - 17

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**Poor P use efficiency and novel fertilizers - when can the latter mitigate the former?**  
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Fixation of phosphorus (P) in soils is often regarded as a huge problem for agriculture globally, due to the term "fixation" often being poorly defined and also often confused with P adsorption onto, or precipitation in, soils. At the same time many countries suffer from eutrophication of water bodies due to movement of "legacy" P from soils to surface water supplies. Co-existence of problems due to fixation and legacy P in the same soil or region seems paradoxical and new fertilizer products often promise to solve both issues, paradoxically again sometimes simultaneously. The agronomic efficiency of P fertilizers is primarily controlled by P reactions with the soil surfaces and interactions of fertilizer form/placement and soil moisture conditions that affect root interception of, or access to, the fertilizer. With a few notable exceptions, losses of P from soil do not markedly affect the agronomic efficiency of P fertilizer use, but certainly have the potential to cause adverse environmental effects. In many soils fixation of P has much less effect on fertilizer efficiency than is commonly believed, and products that claim to improve fertilizer efficiency have much less effect than is commonly claimed. Recent reviews of the performance of "enhanced" P fertilizers have concluded that they have no, or little, agronomic effect. Situations where we really need to be concerned about P fixation are in soils with no, or a poor, history of P fertilizer use, on soils with strong P retention due to high contents of aluminium and iron oxides, on soils rich in calcium carbonate, and where crops require large and/or rapid P uptake to grow successfully. The role of fertilizer formulation and plant breeding in these situations will be discussed in relation to improving P fertilizer use efficiency in tropical soils.



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