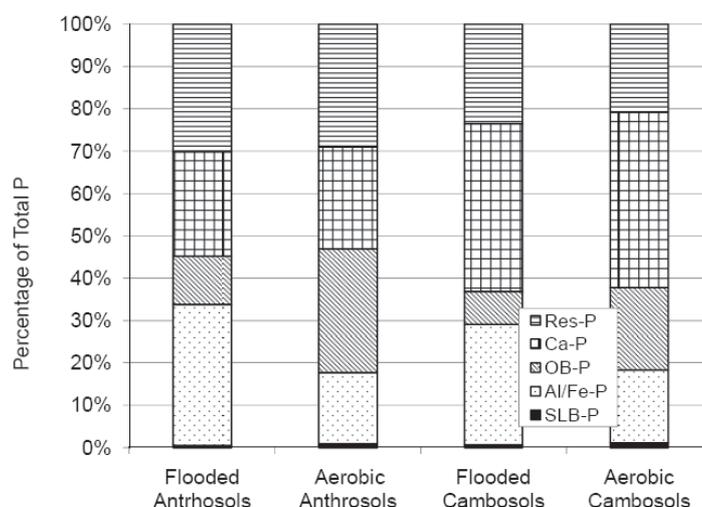


Effect of moisture conditions in rice paddies on phosphorus fractionation in agriculture soils of developing regions of China

Jeremy L. Darilek¹, Biao Huang¹, Zhigang Wang¹, Yanbing Qi¹, David C. Weindorf²

¹ State Key Laboratory of Soil and Sustainable Agriculture, Institute of Soil Science, Chinese Academy of Sciences, Nanjing 210008, China; ² Louisiana State University, AgCenter, 307 M.B. Sturgis Hall, Baton Rouge, LA 70803, USA
bhuang@issas.ac.cn

Moisture conditions in rice paddies play an important role in phosphorus (P) cycling and may affect P loss to nearby water bodies. This study seeks to identify factors that contribute to P fraction transformations in flooded rice paddies on Cambosols (Endisols) and Anthrosols (Inceptisols) using Zhangjiagang County of the Yangtze Delta Region, China, as a study area. Soil samples with wide ranges of soil pH and organic matter preserved under flooded and aerobic conditions (n = 60) were collected and P fractions and soil properties were measured. Under flooded conditions, soluble and loosely bound P (SLB-P) significantly decreased to half of aerobic levels, aluminum/iron bound P (Al/Fe-P) increased by 66%, and organic bound P (OB-P) decreased by 64%. Moisture conditions do not affect the more unavailable forms such as calcium bound P (Ca-P) and Residual P (Res-P) :



P fraction percentages in rice paddies of Zhangjiagang County, China

Soil organic matter, cation exchange capacity, pH, and active Fe were well correlated with soil P fractions under both moisture conditions across two soil orders despite a disparity in soil properties. Because of the increase in Al/Fe-P, and because Al/Fe-P is available to plants, plant available P is generally sufficient for rice production under submerged conditions. However, the production of wheat during the dry season, as is commonly the practice in the area, requires P fertilization. Further research goals are identified which would aid in specific fertilizer recommendations and management strategies.