Cover Stories:

Major Scientific Publications Featuring NRI-funded Research

Knowledge For Tomorrow's Solutions

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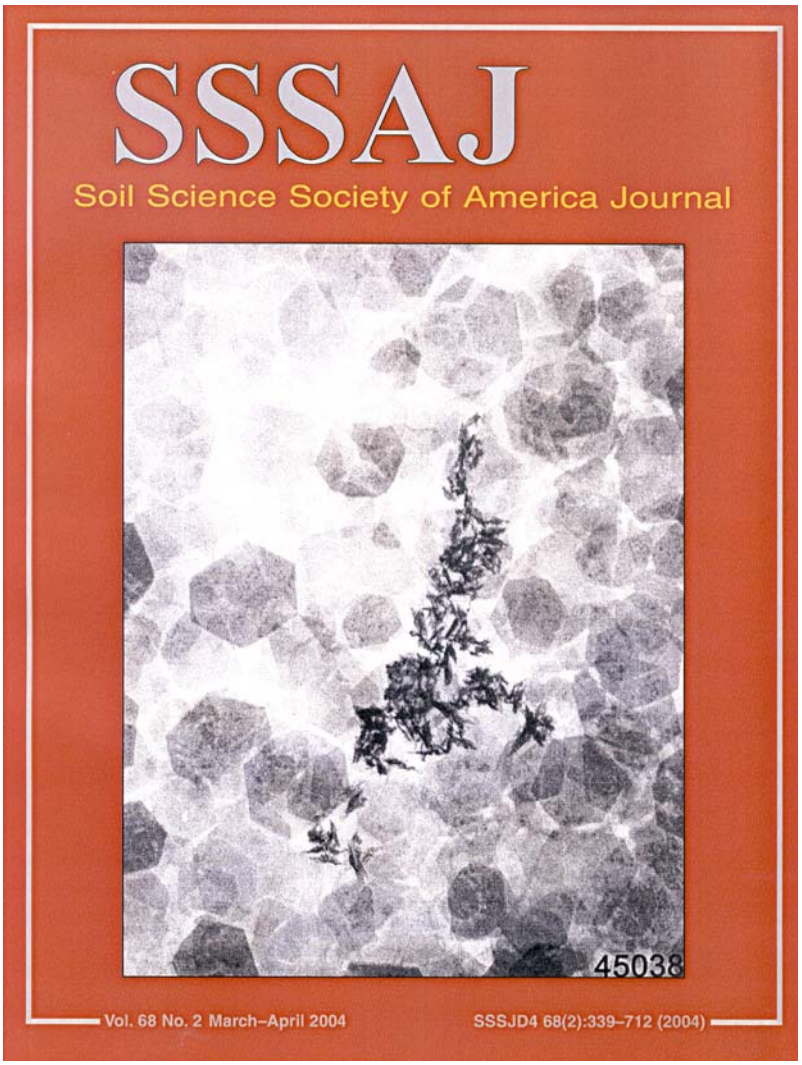

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N. Khare, D. Hesterberg, S. Beauchemin, and S. Wang. March-April 2004. XANES Determination of Absorbed Phosphate Distribution between Ferrihydrite and Boehmite in Mixtures. ***Soil Science Society of America Journal.*** *68(2): 460-469.*

Severe environmental problems result when phosphorus and nitrogen move from agricultural lands to streams, rivers, and lakes. Problems including algal blooms, anoxia, and fish kills diminish water purity and its aesthetic character. Each year, more than 15-million tons of phosphorus and nitrogen are applied annually to agricultural soils in the US. Land management practices that diminish environmental problems with nitrogen may actually increase problems with phosphorus. For example, when agricultural soils are converted to wetlands, nitrogen is converted to harmless forms and lost to the atmosphere. However, phosphorus is released from soil particles into water, and moves more readily to waterways.

Researchers and legislators across the US have recently designed regulations for minimizing the environmental impacts of agricultural phosphorus. Nevertheless, intricate soil processes that affect phosphorus movement in wet soils are generally not considered in the regulations because these processes are poorly understood. Problems usually arise when iron-bearing soil minerals break down under wet conditions and release associated phosphorus.

Soil scientists at NC State University developed a method for analyzing intricate processes affecting phosphorus binding in soils. A highly-advanced x-ray beam at DOE's National Synchrotron Light Source at Brookhaven National Laboratory was used to determine how much phosphorus is associated with iron-bearing minerals versus other minerals in a complex mixture. The method will help in predicting which soils will deteriorate water quality by releasing iron-associated phosphorus under wet conditions. This research was funded by the USDA National Research Initiative (NRI) and the College of Agriculture and Life Sciences at NC State.

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