Fossilized Pollen Is Preserved in Alluvial Soils

Fossil pollen is a powerful tool to understand both land use and climate dynamics over time. Working in flood-plain soils is challenging compared with working in traditional lakes or bogs because alluvial soils are more oxygenated, which accelerates pollen degradation.

In a recent article published in the *Soil Science Society of America Journal*, researchers report on studies from 18 watersheds in southern New England where specific physical and chemical soil properties were correlated to preservation and abundance of pollen in riparian soils.

Pollen indices are under-utilized in river soil systems due to perceived lack of preservation. However, this study illustrates that most alluvial soil horizons (60% overall) contain pollen. The researchers also found that pollen presence is positively correlated to higher soil organic matter concentration, C/N ratios, and silt and clay content within a given horizon.

Pollen analyses require specialized chemicals and procedures that can be both expensive and time consuming. The guidelines developed in this study can be used to pre-identify samples that likely contain enough pollen for palynological analysis, which may save future researchers considerable laboratory time, effort, and cost.

Riparian soil profile showing typical stratification where organic-matter-rich topsoil (0–20 cm) and buried surfaces at 50 cm are more likely to contain preserved pollen compared with the low-organic-matter horizons below 60 cm.


doi:10.2134/csa2019.64.S055

Modeling Inorganic Soil Nitrogen Status in Maize Agroecosystems

Nitrogen (N) management is an important economic and environmental concern in the North American Corn Belt. In a recent article in the *Soil Science Society of America Journal*, researchers developed a real-time modeling framework for simulating soil N availability in corn fields. Understanding how much soil N is available to support crop growth with different N application times or forms, or following periods of wet early spring weather, could help growers make informed N management decisions.

A public sector model, DSSAT, was calibrated and validated using soil inorganic N concentration data from six Illinois field experiments consisting of different combinations of N fertilizer source and timing. This project involved extensive soil sampling during vegetative corn growth with help from a number of collaborators (see photo). Model inputs were developed based on the Gridded Soil Survey Geographic Database (gSSURGO) and the Illinois Weather Network. As an additional validation step, simulations were compared against soil N concentration from 49 commercial corn fields.

Overall, the modeling framework had “fair” performance across sites with variable weather patterns and soil properties, which provided encouraging results. However, the researchers conclude that further work is needed to improve model accuracy and understand what level of confidence is required by farmers to utilize model-based decision support tools for N management.


doi:10.2134/csa2019.64.S056

Dan Schaefer, Illinois Fertilizer & Chemical Association, collects soil samples from an on-farm trial.