# Spatial Variability of Soil Properties in Relationship to Soil Development Determined by Fractal Analysis for a Prairie-Forest Transition Soil. (S05-hudnall071741-Oral)

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# Abstract:

Studies have shown that the invasion of grassland by woody plants is associated with an increase in soil heterogeneity. We studied the spatial variability of soil pH, Electrical Conductivity (EC), and Mehlich III extractable K, Ca, Mg, Fe and Mn at three remnant prairie-forest associations in Winn Parish, Louisiana. Surface soil samples (0-15 cm depth) were obtained from four transects. Soil pH separated prairie soil from the forest soil. The prairie soil was alkaline, the forest soil was acidic, and the transition soil was approximately neutral. Geostatistical analysis showed that spatial dependence was expressed over a range of 20-30 m. Local topography was observed to influence the spatial variability of most of the soil properties. Semivariogram shapes were similar among sites, suggesting the greater control of soil parent material on the observed spatial soil pattern. The estimated fractal dimension (D) for soil properties were >1.75, indicating the dominance of short-range variability. Short-range variability in soil pH emerged when soil data from the forest was deleted, showing the scaling characteristics of soil pH and its susceptibility to plant induced changes.

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