Least-Limiting Water Range Indicators for Assessing Corn Establishment in Tilled and No-Tilled Clay Loam Plots. (S01-lapen075146-Poster)

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Abstract:

Soil oxygen, water supply to plant roots, and soil strength are important environmental variables affecting corn yield potential. The least-limiting water range (LLWR) attempts to incorporate crop-limiting values of these environmental factors into one effective parameter. This study evaluated the use of the LLWR as an indicator of soil quality and farm management impact on early season corn plant establishment during observed wetter and drier soil conditions. Regression-type analyses were employed using corn establishment as a dependent variable and a suite of LLWR threshold indicators as independent variables. The R2 of the model was 0.62 and the model indicated that best plant establishment occurred in conventional tilled plots, when trafficked timely (i.e. when soil conditions did not promote excessive compaction). Poorest plant establishment occurred on no-tilled plots, when trafficked untimely (i.e. when soil conditions promoted compaction). In general, air-filled porosity of the soil relative to critically limiting values around 10%, was more statistically important than soil strength as an indicator of early plant establishment during observed climate conditions.

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