Spatial variability of optimum N rate for corn. (S04-scharf170946-Oral)

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Abstract:

Applying only as much N fertilizer as is needed by a crop has economic and environmental benefits. Small plot research has shown that fields can differ substantially in their need for N fertilizer, but the amount of within-field variability is not well understood. Our objective was to characterize the spatial variability of corn N need in production corn fields. Experiments were conducted in three major soil areas (Mississippi delta alluvial, deep loess, claypan) over two years. Treatments were field-length strips of discrete N rates from 0 to 280 kg N/ha. Yield data were partitioned into 20-m increments and a quadratic-plateau function was used to describe yield response to N rate for each 20-m section. Optimum N fertilizer rate was highly variable in all six experimental fields, with an average standard deviation of 56 kg N/ha. Our results suggest that uniform N applications result in large areas with excessive and/or insufficient N. Further attempts to develop systems for predicting spatially variable N needs are justified in these production environments.

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Presentation Information:

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 2:15 pm

Keywords:

nitrogen response, precision agriculture, variable rate fertilizer