31  Nitrogen Specific Management by Soil Condition: Managing Fertilizer Nitrogen in Corn

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Best management practices for nitrogen (N) fertilization of corn (Zea mays L.) are being improved continuously. Environmental and economic concerns are considered when evaluating a fertilizer practice or program, but a sound agronomic practice must be open to new ideas. Site-specific fertilization is seen as a link between sound agronomic practices and new technology. Its appeal comes in the form of perceived economic and environmental benefits. The benefits appear justified, since, in theory, fertilizer recommendations can be calibrated at the site-specific scale as well as the field scale. By fine tuning the recommendations to inherent soil variability, a site-specific fertilizer program should produce equal or greater yields while reducing the risk for N losses to the environment due to over application.

There are several questions involving research in site-specific N fertilization. This paper will address four: Is there significant variability in the N supply of production fields? Does this variability affect yields? Does this variability have any spatial character (can it be mapped) or is it random variation? If this variability is significant enough to warrant site-specific application, what soil–crop–other parameters can be used to make site-specific N recommendations? Field research experiments were designed in 1990 to address these questions. The objectives of these experiments were: to quantify yield and nutrient variability in production fields, evaluate yield response of applied fertilizer N and differential N loss as influenced by soil conditions, and to determine what soil parameters can be used to make site-specific N fertilizer recommendations for corn.