POSTER PRESENTATIONS

Applying Adaptive Management to Nitrogen Fertilization on Iowa Corn Fields

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Abstract: Nitrogen (N) fertilizer management is a major resource management concern for both economic and environmental reasons. The increased cost and policy implications have led many growers to participate in voluntary programs that assist them in evaluating the N status of their corn fields. More than 1,000 fields were evaluated in the 2005 and 2006 crop seasons, supported by private, state and federal funding sources. Because of the within-field variability of N status, techniques to account for spatial variability were implemented. The basic level of N management evaluation was a guided end-of-season stalk nitrate sampling using targeted points based upon georeferenced color aerial imagery and digitized soil map unit data. This targeted sampling permitted growers to evaluate how much N was available to the crop, including excess N, for different areas/environments in their fields. A more advanced approach was for growers to apply alternating strips of two N management practices and measure the yield differences with combines equipped with yield monitors and GPS. Where actively managed, specific management practices, such as fall vs. spring application of N fertilizer, can be evaluated at a scale and frequency to adequately represent a targeted area, such as a given soil type or a whole watershed. While both evaluation methods were helpful, the greatest impact occurred when using a combination of survey data from the guided stalk sampling and the replicated strip testing. Results from this program show that evaluations, when executed and interpreted correctly, can be a tremendous tool motivating growers to change voluntarily.

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Assessment of mineral nitrogen dynamic and its concentration in the soil profile with the updated NLEAP V.2 model: A case study in South Central Bulgaria

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Abstract: Nitrogen fertilization management is important to maximize use efficiencies and reduce losses, especially under irrigated cropping systems grown on sandy soils. The simulation modeling approach provides a fast and efficient means of integrating management effects with soil and climate information to evaluate the effect of management on nitrogen losses. There is the need to test quick assessment tools that can be used to evaluate management practices for cropping system in south central Bulgaria. This study uses experimental data and revised NLEAP model simulations of a four-field cropping system corn (*Zea mays* L), cotton (*Gossypium hirsutum* L.), wheat (*Triticum aestivum* L.) and sugarbeet (*Beta vulgaris* L. *saccharifera*) carried out on Fluvisols in Southern Bulgaria. The model will be used to evaluate effects of nitrogen-fertilization techniques such as N fertilizer rates and time of application. The initial version of the NLEAP model was parameterized using the experimental crop and soil data. Nitrogen dynamics in the top 0.3 m and residual nitrogen in the 0-0.9 m soil profile were monitored and simulated. This preliminary testing with the NLEAP model suggested that NLEAP can be used to evaluate best management practices for this European region. A deeper analysis will be conducted with the new NLEAP V.2 model to assess how best management practices can be used to reduce nitrogen losses without reducing yields for this region of Bulgaria. These new results and analysis will be presented.

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Balancing Crop Biomass for Bioenergy and Conservation

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Abstract: Soil and water conservation benefits must be included in biomass assessments to prevent long-term environmental damage as the nation addresses short-term energy problems. Therefore, to develop an environmentally and economically sound bioenergy economy, the tradeoff between managing crop residues to protect soil from erosion and to sustain soil organic carbon/matter (SOC/SOM) and building a biomass economy must be assessed carefully. The objectives of our Renewable Energy Assessment Project (REAP) are to determine the amount of residue needed to protect the soil resource; to estimate the economic implications based on the value of stover for bio-energy versus a soil C source; and to provide initial harvest rate recommendations and guidelines. Products from this multi-location research project will be 1) guidelines for management practices supporting sustainable harvest of crop residue, 2) algorithm(s) estimating the amount of crop residue that can be sustainably harvested, and 3) decision-support tools and guidelines describing the economic trade-off between residue harvest and retention to sequester soil C. Delivery of this knowledge and these products to farmers and the biomass ethanol industry will promote harvest of stover and crop residues in a manner that preserves the capacity our soil to produce food, feed, fiber, and fuel.

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