CONFERENCE ABSTRACTS

The Precision Agriculture Center, University of Minnesota
Presents the

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Precision Agriculture

and Other Precision Resources Management

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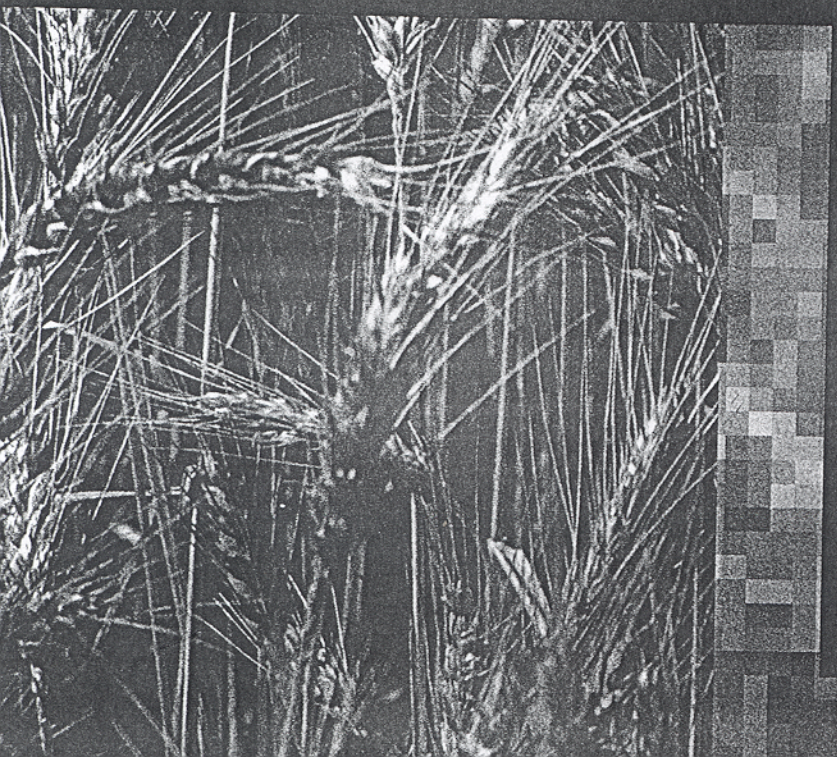
Cooperators
ASAE, PPI, CoSSRM, NCR-180, ASA/CSSA/SSSA



CONFERENCE THEMES

- Natural Resource Variability
- Information Management
- Precision Management
- Profitability
- Environment
- Education/Outreach
- Engineering Technology
- Modeling
- New Applications Around the World
- Remote Sensing
- Crop Quality
- Geostatistics/Sampling
- A to Z for Practitioners

Assessing Active Inorganic Chemical Variability of Soils with Resin Extraction

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Current methods of characterizing soils are inadequate for economic evaluation of precision management of genetic and fertilizer resources. Advances in evaluation of soil fertility and plant nutrition needs have lagged advances in the plant breeding. Plants are sensitive to a wide range of soil chemical and fertility factors and these are poorly addressed with current evaluation methods. Resin extraction has the potential of identifying multiple soil resource differences to which plants respond. A Resin extraction technique was applied to samples of four adjacent soils (Barnes, Buse, Langhei, and Svea) collected on 23 sites in western Minnesota, eastern South Dakota and eastern and central North Dakota. Extracts were analyzed for 20 elements by inductively coupled plasma. Samples were also analyzed for texture, bicarbonate extractable P, pH, organic C and total N. Extracted suites of elements were unique for each of the soils. While traditional anions such as S, As, B, and P were usually found on anion exchange resins for three of the soils, as much as 90% of these extractable elements were found on the cation exchange resin for the Langhei soil. It is suggested that large amounts of readily extractable cations such as Ca were responsible for complexation of anions in the Langhei soil. Resin-extractable P was correlated with bicarbonate extractable P but the relationship was unique in each soil; this suggests that interpretations of test results by soil mapping unit are needed. Also, ratios of resin-extractable elements that correlate with plant response differed between soils and suggest that specific fertilizers and their placements affect resource use efficiency.