

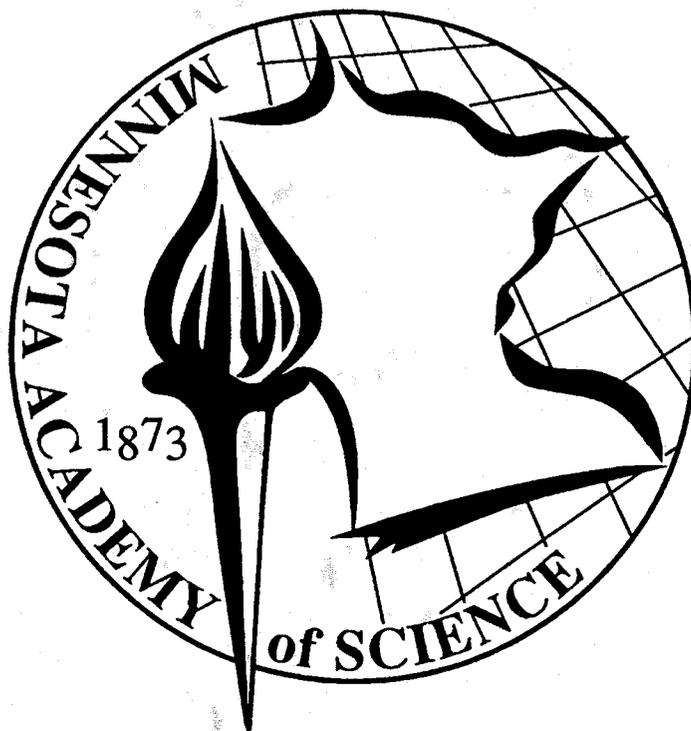
# Journal of the Minnesota Academy of Science

71<sup>st</sup> Annual Meeting

hosted by the

University of Minnesota

April 25-26, 2003



Spring 2003

Vol. 67, No. 1

#### FOUR NORTHERN GREAT PLAINS SOILS: THEIR UNIQUE CHEMICAL SIGNATURES

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Most soils in the Northern Great Plains are managed as if little variation occurred within the landscape. The current study was undertaken to determine the chemical nature of four soils in Western Minnesota, Eastern South Dakota, and Central and Eastern North Dakota. A Resin extraction technique was applied to samples of four adjacent soils (Barnes, Buse, Langhei, and Svea) collected on 23 sites. Extracts were analyzed for 20 elements by inductively coupled plasma. Samples were also subjected to conventional analyses for available P, K, total and inorganic C, total N and pH. Conventional soil analyses showed little differences between soils; they were generally rich in available P, and K. The Barnes, Buse and Svea soils were relatively rich in organic C and N. The pH values followed the order Svea = Barnes < Buse < Langhei. Resin extractions provided some unexpected results. As a consequence of complexes with exceptionally large amounts of Ca and Mg in the Langhei soil, more than 90 % of the resin extractable anions such as S and B were extracted with cationic resins. Bicarbonate extractable P was often correlated with resin extractable P with the exception of the Langhei soil for which no relationship was observed. The characteristics of these soils that were revealed by resin extraction point to management options for each soil such as fertilizer placement and composition.

#### LEACHING LOSSE OF NITROGEN FROM STOCKPILED MANURE IN SEASONAL GRAZING DAIRY SYSTEMS

Frantisek Majs, Dr. Neil C. Hansen, Dr. Michael P. Russelle

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Winter-feeding is a challenge for grazing based livestock systems. Low input dairy system may use outdoor winter-feeding in lots that provide protection from weather and a straw bedded pack is used to keep cows dry. The water quality risk associated with outdoor winter-feeding of dairy cows is not well known. The objective of this paper is to evaluate potential risks of leaching of nitrogen from stockpiled manure obtained during outdoor wintering of dairy cows. Soil nitrate and ammonium concentration in the wintering lot was determined with grid soil core sampling and used as an evidence of leaching from the manure. Manure from the straw bedded pack was stockpiled in the spring in lot and left

to compost. Leachate from the piled manure was sampled weekly using passive samplers at the soil surface and analyzed for nitrate and ammonium concentration. The data were extrapolated to determine potential for nitrogen discharge to the local watershed.

#### RIBOGRO ENHANCES ROOTING DEVELOPMENT

Fernholz KM, Seifert JG, Shecterle LM, St.Cyr JA  
Fernholz Farms

A strong root system is vital to plant health and growth. The purpose of this experiment was to determine the effects of RiboGro (RG) on root development and appearance. Three treatments were tested: water (W), low concentration RG (L) (1 tsp/16 ozs), and high concentration (H) (1 tsp/4 ozs). Each treatment group had n = 6. The seeds were planted on day 0 and equally watered at regular intervals. The seedlings were uprooted, weighed, and the tap roots were measured for length at days 5 and 10, and the average change is reflected below: Treatments Measured weight (gm) Tap Root Length (cm) W -0.27 4.1 RG-L 1.76 22.98 RG-H -0.29 4.1 There were significant differences between L and H and L and W for both weight (L vs. H, p = 0.02; L vs. W, p = 0.04); and tap root length (L vs. H, p = 0.01; L vs. W, p = 0.02). There were no significant differences between H and W for either weight or tap root length. Many of the seeds uprooted on day 10 showed signs of rotting or splitting (W=4/6, L=1/6, H=4/6), probably due to excessive moisture. These results imply that a low concentration of RiboGro may be beneficial to developing roots in less than ideal conditions.

#### USING GIS TO EVALUATE NITRATE LEACHING AND WELLHEAD PROTECTION IN THE VERDI WELLFIELD, LINCOLN COUNTY, MN

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Excessive fertilization of agricultural lands can lead to health risks if this nitrate-rich runoff enters a drinking water aquifer. Officials testing soils and wells in the Verdi Wellhead Protection Area have found nitrate levels dangerously close to the 10ppm USEPA drinking water safety standard. Using a GIS, it is possible to locate farmed fields with high soil permeability and revise the Best Management Practices (BMPs) in place in these areas. Areas of high soil permeability were determined in the following way: A soils layer was extracted from a 1970 Lincoln County soil survey by tracing the original paper survey onto Mylar sheets, scanning those sheets, and heads-up digitizing the soil boundaries. Air photos were then used to identify County Land Units that are currently being farmed, producing a layer of farmed areas in the Wellfield. The farmed areas were then overlaid onto the soils layer, producing a farmed areas layer that includes the soil horizons. GLEAMS (Groundwater