

SOIL
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**PROCEEDINGS OF THE FORTY-EIGHTH
ANNUAL MEETING OF THE SOIL SCIENCE
SOCIETY OF NORTH CAROLINA**

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RALEIGH, NORTH CAROLINA
JANUARY 18–19, 2005**

EDITED BY

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Note: No information from this poster was provided by the corresponding author

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A.E. Baldwin and M.J. Vepraskas

Note: No information from this poster was provided by the corresponding author

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Note: No information from this poster was provided by the corresponding author

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(No Photo Available)

Roger J. Leab
2005 Achievement Award Recipient

The annual SSSNC Achievement Award is given to an individual to acknowledge and commend his/her outstanding achievements in the field of soil science. The criteria used in evaluating this achievement include research, teaching, extension, administration, and/or other areas that are directly related to soil science.

The individual selected to receive the 2005 Achievement Award is Roger J. Leab.

Roger has been the Soil Survey Party Leader for 4 soil surveys: Bladen, Stokes, Surry, and Alamance Counties, North Carolina. In addition he worked on the surveys for Guilford and Mecklenburg Counties, North Carolina and Patrick County, Virginia. He has a B.S. in Geology from Catawba College and a B.S. in Soil Science from N.C. A&T State University.

He was actively involved in 2 mesic-thermic temperature studies in the Piedmont section of North Carolina. He instigated a study of mesic terrace soils in Piedmont North Carolina and Virginia for determination of kaolinitic versus mixed mineralogies, which involved about 18 counties and related personnel. He also spearheaded a study in 4 counties of North Carolina and 4 in Virginia, using dataloggers to study suspected temperature differences between poorly drained wetland soils and nearby upland soils.

Roger was the leader in successfully implementing the establishment of a soil survey office on a historic 1890's university campus, the MLRA 136 office at NC A&T State University, benefiting both the university and NRCS.

Roger has presented poster papers on the mesic-thermic temperature studies at the annual meetings of the Soil Science Society of North Carolina. He has served on the Editing and Publishing Committee of the Soil Science Society of North Carolina. He has worked with David Lindbo and others in locating sites for use on tours by the Soil Science Society of America. He has also provided source material for use by Dr. Ray Daniels on the publication, Soil Systems of North Carolina. He has actively promoted professionalism in the soil survey program and the practice of soil science.

Innovative Stormwater & Wastewater Design for Northern Guilford Middle & High School Campus

Barrett L. Kays, Ph.D. and Russell Briggs, P.E.

Northern Guilford Middle & High School Campus is in the Greensboro Water Supply Watershed (WS-III) and has been designed to meet the stringent requirements for Leadership in Energy and Environmental Design (LEED) Certification by U.S. Green Building Council. Guilford County Schools wanted to provide environmental protection that exceeded the federal and state regulations, and wanted to create a state-of-the-art outdoor environmental education laboratory. The stormwater from building roofs is collected and reused for toilet and urinal flushing. The stormwater runoff from parking lots is treated in peat biofilters. Discharge from biofilters and

other site runoff are routed through wetland parabolic swales and wetland floodplains and finally discharge into aquatic wetland ponds. The aquatic wetland ponds are designed to retain up to a 25 year flood event. The wastewater system consists of pretreatment using the "Living Machine" followed by subsurface trickle irrigation. Nine athletic fields (17-acres) and one traditional nitrification (3-acres) are used for the trickle irrigation system. An 18-inch depth of custom sandy topsoil is used in the athletic fields over the subgrade. Over 140 miles of trickle irrigation line are proposed to be used for the wastewater system.

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Russell Briggs

Erosion, Sediment, and Turbidity Control on Construction of I-485

Sara Hayes and Rich McLaughlin

Large sediment losses and high turbidity levels, which are typical of construction sites, adversely impact receiving waters and may result in complaints from the public. Currently, we are installing and monitoring alternative Best Management Practices (BMPs) on NC DOT construction of I-485, a new outer loop around Charlotte, NC. Practices include erosion and sediment control with hydraulically applied mulches, channel stabilization, and improved basin designs, and turbidity control using polyacrylamide (PAM). Monitoring on site

includes turbidity levels entering and exiting basins, and turbidity levels of streams above and below the construction site. The results suggest that several changes to current practices will result in substantially lower sediment losses on these developments. We have also found that PAM, while very effective in reducing turbidity under controlled conditions, has many limitations under typical construction site conditions.

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Sarah Hayes, NCSU
Rich McLaughlin

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Using the Soil Data Mart and Geospatial Data Gateway

Phil Tant and Roy Vick

The Soil Data Mart is now the primary source of on-line soil data. The Soil Data Mart supersedes the National SSURGO Website. The Soil Data Mart allows you to:

- Determine where soil tabular and spatial data is available
- Download data for one soil survey area at a time. (Download requests for more than one survey area at a time can be submitted through the [Geospatial Data Gateway](#). Going through The Geospatial Data Gateway also provides the option to obtain data on CD or DVD.)
- Download a template Microsoft Access® database for working with downloaded data.
- Generate a variety of reports for one soil survey area at a time.
- Find out who to contact for information about soil data for a particular state.
- "Subscribe" or "unsubscribe" to a soil survey area. A person who is subscribed will automatically be notified whenever data for that soil survey area is updated.

Phil Tant
Roy Vick, USDA-NCRS

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Determination of Environmental Mehlich-3 Phosphorus Threshold Levels

C.R. Bond, R.O. Maguire, J.L. Havlin, and D.A. Crouse

In some cases, North Carolina (NC) soils have elevated Mehlich 3 phosphorus (M3-P) levels above the agronomic M3-P levels for optimal yield, raising concerns about the effects of potential P losses on water quality. The NC Phosphorus Loss Assessment Tool (PLAT) estimates potential P losses from fields through various pathways and is used to help minimize non-point P transport to freshwaters. Soil test P serves as a critical component in estimating P losses in both soluble and particulate-bound forms. Our research objective is to provide

estimates of environmental M3-P threshold levels for eight texturally diverse soil series across four major physiographic regions (Mountains, Piedmont, Upper and Lower Coastal Plains) of NC. Current PLAT critical environmental M3-P levels are set at 50, 100, 200, 500 mg P kg⁻¹ soil for organic, sandy, loamy, and clayey soils, respectively. Our study utilizes non-linear M3-P versus water-soluble P relationships to identify change points for these four soil textures, beyond which solution P levels increase rapidly.

C.R. Bond
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Published in Soil Science Society of North Carolina Proceedings, Vol. XLVIII (2005)

Soil Science Is Systematically Improving NC K-12 Science Education

Dennis J. Osborne, Ph.D., J.D. and Sam Houston, Ed.D.

NC Licensed Professional Soil Scientists are having a positive, immediate impact in classrooms of NC. The scientists are delivering basic soil science instruction to students in NC's primary schools. Recent adoption of outcome-based examinations in elementary schools forced the public school system to seek "user-friendly" methodology. NC adopted soils as a vehicle to introduce students to inquiry-based learning. Soil science is now a formal part of the Department of Public Instruction's lesson plans and is in state textbooks. Adoption of such instruction is a paradigm shift in NC

education. Because hands-on inquiry-based systems demonstrably improve learning in science and because soils are readily adaptable to such teaching, soils as a subject has been adopted into NC elementary schools. In 2002-2004 the Burroughs Wellcome Fund, the NC Science, Mathematics, and Technology Education Center and NC Professional Soil Scientists introduced rural and urban school systems to soils as an object of study. This paper reports results of a two year effort in which soils became the preferred science of several hundred students.

Dennis Osborn
Sam Houston

Published in Soil Science Society of North Carolina Proceedings, Vol. XLVIII (2005)

Changes in Soil Test Phosphorus Relative to Dynamics in NC Agriculture

D. H. Hardy, B. R. Cleveland, R. C. Reich, and C. E. Stokes

The North Carolina landscape is represented by over 480 soil series that range in physicochemical properties affecting P retention as measured by soil test P. Soils largely devoted to agricultural production include Histosols in the eastern Tidewater region, coarse-textured Ultisols in the Coastal Plain, and fine-textured Alfisols and Ultisols in the Piedmont. Over the past twenty years, the state's agriculture has greatly changed. Cotton acreage has increased from 28,000 hectares in 1982 to nearly 400,000 harvested hectares in recent years, largely replacing a decline in corn acres. Hay acreage has doubled to approximately 300,000 harvested hectares, due largely to the need for animal and poultry waste management as industry expansion occurred.

Tobacco acreage has fluctuated with quota adjustments. Additionally, cropping systems have changed with no-till acreage doubling to about 600,000 hectares during the time period of 1990 to 2000. Agronomic Division soil sample volume has increased from approximately 200,000 to 300,000 annually, with approximately 85% coming from agriculture. Soil testing demands have corresponded to acreage shifts and environmental regulation. Soil test P levels in the state for some crops have increased during the past twenty years. Increases in soil P are partly related to use of crops such as hay for swine and poultry waste applications. Soil test P for crops such as tobacco, that have been over-fertilized for many years, have not changed.

D.H.Hardy, NCDA
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Published in Soil Science Society of North Carolina Proceedings, Vol. XLVIII (2005)

Soil Nitrogen Mineralization Tests for Predicting Corn Nitrogen Needs

J. Williams, C.R. Crozier, J.W. White, D.A. Crouse, and R.W. Heiniger

Accurate and quick soil N mineralization tests are necessary for developing soil-based N fertilizer recommendations in corn for the humid southeast. This study was conducted to determine the precision and crop response predictability of two "quick" soil N mineralization tests. Soil samples were acquired from 36 fields from 2001-2004 which were expected to have different residual N supply. Soil tests were the amino sugar N, and gas pressure. The amino sugar test determined residual N by adding H_2SO_4 to 1 g soil and trapping NH_4 using H_3BO_3 . The gas pressure test is a measurement of pressure change following the digestion of organic matter by adding $Ca(ClO_2)$ to 5 g soil.

The two methods were tested for precision based on their coefficient of variation value, and the ranking order was the amino sugar N test (9%) and gas pressure test (12%). Additionally, values for both tests were correlated with economic optimal N rates (EONR). Correlations (r^2) for amino sugar N test were 0.39 across all years and 0.96 for 2003. Correlations (r^2) for the gas pressure test were 0.46 across all years and 0.61 for 2003. These results suggest a year effect exist for both tests and EONR. These tests could replace current N recommendation methods and foster appropriate fertilizer application which could result in less pollution.

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POSTERS

Chemical Migration in the Capillary Fringe at Juniper Bay, North Carolina

Abit, S.M.

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Niewoehner, C.P., Soil Science Dept., NCSU

Vepraskas, M.J., Soil Science Dept., NCSU

Note: No information from this poster was provided by the corresponding author

Changes in Soil Morphology after 8 Years of Wetland Restoration

Baldwin, A.E.

Ve[r]aslas, M.J.

Note: No information from this poster was provided by the corresponding author

Characterizing Field-Scale Soil Electrical Conductivity-Soil Moisture Relations for Site-Specific Management (SSM)

Bang, JiSu., Soil Science Dept., NCSU

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Characterization of soil spatial variability at the field scale is a prerequisite to optimize site-specific management (SSM). Apparent soil electrical conductivity (EC_a) has been used effectively to map soil spatial variability in many areas. We took field measurements to evaluate the effects of field-scale soil EC_a measurement-soil moisture relations on characterizing soil spatial variability for SSM. Soil samples taken in a 12-ha field in the North Carolina Coastal Plain were analyzed for soil physical parameters (bulk density; percentage sand, silt, and clay; plant-available water content; soil moisture contents) and chemical parameters (humic matter, cation exchange capacity, extractable P and K). Soil EC_a measurements were collected on multiple occasions under significantly different soil moisture conditions. Spatial patterns of soil EC_a were stable over changes in soil moisture contents. Few significant direct correlations were found between EC_a and the selected soil properties ($r^2 < 0.50$), but overall correlations improved when soil EC_a was measured in a relatively dry condition. Our results suggest that spatial and temporal variability of soil moisture

contents could be critical parameters for evaluating soil EC_a in terms of estimating other soil characteristics. This study is preliminary and additional analysis will be included.

Phosphorus Mobilization During Creation of a Wetland

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Vepraskas, M.J., Soil Science Dept., NCSU

Concern over decreased oxygen levels resulting from algal blooms in aquatic ecosystems has spurred interest in non-point phosphorus discharge to North Carolina's surface waters. Phosphorus dissolution is often enhanced under reducing soil conditions that occur when soils are flooded, potentially leading to increased P discharge to surface waters. Such an effect may be realized in Robeson County, NC, where the NCDOT is establishing a 254-hectare wetland at Juniper Bay. As part of the wetland reconstruction process, low redox potentials will be induced by raising the water table at the site. Thirty years of fertilizer application has increased the Mehlich III extractable phosphorus levels up to 90 mg P/kg soil in the top 10 cm of mineral soils and mineral soils with histic epipedons. Additionally, data from a recent laboratory incubation study on soil samples from Juniper Bay show that dissolved phosphorus concentrations tripled following microbial reduction. Thus, increases in dissolved phosphorus can be expected when the soils are reduced. This paper will present the research plan and initial data for a project aimed at quantifying the overall phosphorus discharge from Juniper Bay, and at accounting for the relative contribution of dissolved phosphorus from different soil types. While the former objective will involve collection and analysis of soil solution samples from reduced parts of Juniper Bay, the latter objective entails laboratory redox experiments coupled with molecular level, spectroscopic analyses to determine phosphorus speciation in relation to reductive dissolution

Utilization of the Hydric Soil Technical Standard to Evaluate Restoration Success and Three Surface Treatments to Restore Agricultural Land to Forested Wetlands

Burdette, J.A.

Broome, S.W.

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Note: No information from this poster was provided by the corresponding author

Comparison of sidedress N placement to improvement N-use efficiency for no-till corn

Crozier, C.R., Soil Science Department, NCSU

Hardy, D.H., Agronomic Division, NCDA

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This research compares the N rate response to broadcast, dribbled, and injected sidedress N applications in no-till corn in order to 1) determine the most profitable sidedress fertilization strategy, and to 2) determine if sidedress N placement can be an effective BMP in reducing N loading to water. A total of 9 site-years were studied in 2002, 2003, and 2004. Sites were in Hyde, Perquimans, Tyrrell, and Washington Counties and had been in no-till for 2 to 5 years prior to our N tests. Data were pooled by calculating relative yield for each site-year, and the optimum N rate was calculated using a linear-plateau approach. We also investigated root pruning damage due to the coulter injection (not observed), potentially beneficial direct foliar contact when dribbling or broadcasting N, surface residue N content at harvest, and volatilization losses of ammonia using a static chamber approach. Volatilization losses were only detectable from two sites with surface soil pH >6.2. This suggests that the relatively low soil pH limits ammonia volatilization for most of the organic soil region, but may be an issue for mineral soils limed to pH above 6.0.

Spatial Variability of Coastal Plain Soil Physical Properties: Implications for Site-Specific Management

Duffera, M., Soil Science Dept., NCSU

White, J.G., Soil Science Dept., NCSU

Weisz, R., Crop Science Dept., NCSU

Spatial variability of soil physical properties was characterized for use in a study of N-use efficiency and ground water management strategies for southeastern coastal plain soils. There are three major soil map units in the field: Goldsboro loamy sand (Go), Lynchburg sandy loam (Ly), and Norfolk sandy loam (No). Relatively undisturbed soil core samples were obtained to about 1-m depth and were sectioned into five depth increments. Sample segments of 7.6 cm diameter by 7.6 cm high cores were taken and analyzed in the laboratory for saturated hydraulic conductivity, soil water retention, bulk density, porosity, and soil texture. Significant differences in soil water retention and sand, silt, and clay content were observed among the soil map units to a depth of 45 cm. Goldsboro and Norfolk soils exhibited similar properties compared to the Lynchburg series which suggests that soil management approaches for Go and No could be similar. The results indicate that soil map units appear to be reasonable starting points for developing management zones in Coastal Plain soils.

Academic Progeny of S.W. Buol

Graham, R.C.

McDaniel, P.A.

Note: No information from this poster was provided by the corresponding author

Riparian Buffer Effectiveness as Influenced by Vegetative Type

King, S.E., Soil Science Dept., NCSU

Osmond, D.L., Soil Science Dept., NCSU

Evans, R.O.

Gilliam, J.W.

Riparian buffers are considered a major best management practice in the reduction of pollutant loading in waterways, especially in agricultural regions. However, there are no definitive studies of the influence of different vegetative types on buffer effectiveness, and since shrub or grass buffers are more acceptable to the agricultural producers, it is critical that such information be developed. Many dollars are currently being directed into buffer practices that may not be any more effective than much less expensive practices. The objectives of this project are 1) to test and demonstrate the effectiveness of riparian buffers zones along a stream segment in the Neuse River Basin in reducing shallow groundwater NO_3^- -N concentrations, and 2) to investigate and

demonstrate the effect of vegetative type on buffer function. Vegetative types include grass, shrubs, pine trees, native vegetation, and a control buffer of adjacent crop species. Preliminary results revealed that approximately 79% of the buffers underwent a reduction in NO_3^- -N, with specific buffer vegetative type results as follows; grass 59% reduction, shrubs 74% reduction, pine trees 81% reduction, native vegetation 56% reduction, while crop species experienced a slight increase.

A Method for Evaluating Uncertainty in North Carolina's Phosphorus Loss Index

Johnson, A.M.

Osmond, D.L., Soil Science Dept., NCSU

Parsons, J.E.

Per recent revised regulations concerning nutrient management, many states have implemented an index system to estimate potential P loss from fields receiving animal wastes. However, thoroughly validating these complex models with field data is logistically impossible. Therefore, the knowledge of which model parameters carry the most uncertainty would be beneficial in allocating resources for future research aimed at improving state P indexes. North Carolina's Phosphorus Loss Assessment Tool (PLAT) was evaluated using Monte Carlo simulation to assess which input parameters contribute the most variability (uncertainty) on the model outputs. Input parameters collected at over 1400 sites were used to develop confidence intervals on output uncertainty.

Relating Field Indicators of Hydric Soils to Hydrology and Soil Morphology in Sandy Soils

Lanier, G.K.

Lindbo, D.L., Soil Science Dept., NCSU

Vepraskas, M.J., Soil Science Dept., NCSU

Since the inception of the Clean Water Act in 1977, the identification of wetlands has been a vital part of their protection. To aid in the identification of wetlands the *Field Indicators of Hydric Soils in the United States* was developed by soil scientists of the Natural Resources Conservation Service (NRCS) in cooperation with the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, various Regional, State, and local agencies, universities,

and the private sector. While these indicators encompass many possible soil types, the sandy soil indicators have been used in the field with some difficulty, mainly due to lack of research in the area of relating the indicators to hydrology and soil morphology data. To attempt to fill in some of this research, three transects were chosen in Dare County on the Outer Banks of North Carolina to monitor hydrology, redox potential, and soil morphology properties. At the conclusion of this research we hope to be able to determine which field indicator is best to use in the identification of wetlands in the sandy soils of the Southeastern United States.

Soil and Site Evaluation Teaching Module for On-Site Wastewater Practitioners

Lindbo, D.L., Soil Science Dept., NCSU

Stolt, M.

Mokma, D.

Miles, R.

Greene, S.

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Note: No information from this poster was provided by the corresponding author

Supplementing Phytase and Decreasing Phosphorus in Turkey Diets Reduces Phosphorus in Litters and in Runoff from Amended Soils

Maquire, R.O., Soil Sci. Dept., NCSU

Sim, J.T.

Applegate, T.J.

Regional excesses of phosphorus (P) associated with intensive animal production and concerns over the fate of this P, have generated interest in animal diet modification to reduce the P concentration fed. We grew two flocks of turkeys on the same bed of litter using diets with reduced P and following two strategies, (i) supplementing phytase in diets, and (ii) reducing the P concentration fed. Turkey performance was similar in all treatments. Litters sampled after the second flock was analyzed for total and water soluble P and applied to soil boxes with runoff generated under simulated rainfall. In combination, these two dietary strategies reduced the total and water soluble P concentrations in litters produced and also decreased soluble P in runoff from amended soils. These two dietary strategies should decrease the buildup of P in soils in areas of

intensive poultry production, without increasing short-term concerns about soluble P losses.

Iodine Retention on Amorphous Clays

McKinney, D., Soil Science Dept., NCSU
Hesterberg, D.L., Soil Science Dept., NCSU

Management strategies for the permanent disposal of high-level waste (HLW) containing harmful radionuclides such as I-129 include long-term storage (thousands of years) in subsurface geological media. However, iodide anions are only weakly sorbed in many subsurface media. Our previous short-term studies on iodide retention by synthetic AgCl showed that the conversion of AgCl to AgI was only 45% to 75% efficient, which could limit AgCl as a sole geosorbent for anion retention. The objective of this study was to determine the effects of Ag^+ and pH on an allophanic soil. Iodide sorption isotherms showed a sorption maximum of ~ 325 mmol l⁻¹/kg for allophanic soil with 200 mmol/kg of pre-adsorbed Ag^+ and was ~ 35 mmol l⁻¹/kg in the absence of Ag^+ . Soil pH (5.0 vs 7.4) had no apparent effect on I⁻ sorption. The presence of Ag^+ greatly enhanced the I⁻ sorption capacity of an allophanic soil.

Sampling Fields Under Long-Term No-Till Culture for Bulk Density, Soil Carbon and Nitrogen Contents: Status Report, Preliminary Results and Plans for Completion

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Brock, B., State Conservation Agronomist, NRCS
Reddy, G.B., Dept. of Natural Resources and Environmental Design, NC A&T State Univ.
Raczkowski, C., Dept. of Natural Resources and Environmental Design, NC A&T State Univ.

In the spring of 2003, following a six-year conservation tillage study at CEFS, special soil sampling revealed the common occurrence of high soil density (about or above 1.6 gm-cm⁻³) just below the surface. Usually within the first two inches soil bulk density was adequate to good, but the problem was found within the 2 to 5 inch zone. Having favorable soil density in this zone is very important for root establishment of all crops, but especially so when early season soil conditions are unfavorably wet and/or cool,

or when soils become too hard during dry conditions.

The previous study also revealed:

a) Soil density was closely and inversely related to soil carbon concentration. Higher soil C content appeared to protect the soil from forming high density.

b) The sandiness of the surface soil influenced this low carbon/high density concern. Where the soil contained somewhat more silt and less sand, soil C was higher and the density was favorable to root growth and air/water movement.

c) In the rotation study at CEFS, this low C/high density concern was greater where corn/peanut/cotton crops were grown than where corn was grown in rotation with soybean or wheat/soybean.

Methodology

In the present study we've used the same sampling and analytical methods to examine farm fields across the state having a history of at least several years of No Till culture, without conventional tillage. When complete, the project included 74 sampled areas (1184 samples), taken from a broad range of surface soil textures, soil drainage classes, organic matter contents, soil parent materials and crop histories. Note the wide distribution of the sampling (shown on the map, and the list of cooperating farmers, included on the pages that follow.

Some Results and Plans for the Coming Year
Most of the surface textures at sites sampled in the Coastal Plain, and some in Piedmont and Mountain counties, have been sufficiently sandy as to present the "low soil carbon/high soil density" concern at the 2-5 inch depth, similar to the previous findings. We intend to acquire the last soil samples and complete the analytical work by March 31, 2005. During the coming summer we'll analyze the data and prepare a brief publication intended for farmers, Extension agents and others directly involved. We intend to report the findings in regional meetings planned for early in 2006. Together with that of the state Corn and Soybean Associations, the cotton research program has offered support for completion of this project and for the reporting phase in coming months.

Effect of Temperature on Measured Saturated Hydraulic Conductivity

Niewoehner, C.P., Soil Science Dept., NCSU
Amoozegar, A., Soil Science Dept., NCSU

Saturated hydraulic conductivity (K_{sat}) of the vadose zone is measured in situ at various times of the year when ambient temperature can vary from near zero to > 40 °C. It has been suggested that measured K_{sat} can be corrected to a desired temperature (e.g., 20 °C) by multiplying the measured value by the ratio of the viscosity of water at measurement temperature to that of the desired temperature. The objective of this study was to assess the impact of the temperature of water used for measurement on the resulting K_{sat} values. The constant-head well permeameter method was used to measure K_{sat} using water at different temperatures. Six 8.5-cm diameter cylindrical holes were dug into each of the Bt horizon and saprolite at a site on the NCSU Reedy Creek Filed Research Laboratory near Raleigh. A section of a 2-inch aluminum irrigation pipe, sealed at the bottom, was securely installed 1-cm above the bottom of the hole in the center of 3 of the holes for each of the Bt and saprolite horizons. Tap water at ambient temperature was initially applied to each hole under a constant head (H) ranging between 9-11 cm for the Bt and 10-12 cm for saprolite. The steady-state rate of water flow (Q) under the constant H was measured a number of times and a K_{sat} value was calculated for each Q by the Glover equation. We selected a relatively low H to minimize the impact of the vertical variability of the soil on the measured K_{sat} . For the Bt horizon, hot water was applied to the 2-inch aluminum pipe in three of the holes to raise the temperature of water that infiltrated the soil at the bottom of the hole. The temperature of water in each hole was measured along with the rate of water infiltrating the soil. Measurements with hot water in the Bt horizon were conducted for 2.5 hours. Then, the water in the aluminum pipe was allowed to cool and Q for each hole was measured a number of times for approximately 20 hours. The next day, after measuring Q under ambient temperature, ice water was applied to the aluminum tube in the three holes that had received hot water treatment. Temperature and Q for each hole was measured for five hours. For saprolite, after measuring K_{sat} using water at ambient

temperature, ice water was applied to the aluminum pipe in three of the holes and water under ambient temperature was applied to the other holes. The flow rate and temperature were measured for 4 hours in each hole. After removing the ice water from the aluminum pipes, water under ambient temperature was applied to all holes for 17 hours. After measuring Q a number of times, hot water was applied to the three aluminum tubes that had received ice water treatment, and Q was measured a number of times for 4 hours. Then, the hot water from each tube was removed and Q and temperature were measured a few times. Although air temperature fluctuated during our measurements, and we changed the temperature of water infiltrating some of the holes, there seems to be no relationship between the ambient temperature or water temperature and measured K_{sat} for measurements between 5 and 40 °C. Correction of measured K_{sat} using viscosity values for water at measured temperature and the desired temperature should be practiced with caution.

Comparing Biological and Structural Features of Soils Under Different Agricultural Management Systems

Overstreet, L.
Hoyt, G.D., Mountain Horticultural Crops Research and Extension Center, NCSU

Note: No information from this poster was provided by the corresponding author

Impact of Manure and Soil Test P on Phosphorus Runoff from Soils Subjected to Simulated Rainfall

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Runoff from agricultural fields amended with animal manure or fertilizer is a source of P pollution to surface waters, which can have harmful effects such as eutrophication. The objectives of this study were to compare P in runoff from soil box systems with that from small field plots and evaluate effects of P sources and soil test P (STP) on runoff P from soil box systems. Soil boxes set at 5% slopes received 11 cm hr⁻¹ of simulated rainfall. Study soils included a Mexico silt loam from Missouri,

Kenansville loamy sand, and Davidson loam from North Carolina. Soil STP levels ranged from 16 to 283 mg P kg⁻¹. Three P sources, swine slurry, broiler litter, (NH₄)₂HPO₄ (DAP), and an unamended control were used to evaluate P in runoff from the Mexico soil. Sources of P applied to North Carolina soils included broiler litter, breeder litter, breeder litter treated with three rates of Al₂(SO₄)₃, and DAP along with an unamended control. All P sources were applied at 67 kg P ha⁻¹. Water extractable P (WEP) represented an average of 10% ± 6% total P in manure. Runoff samples were taken over a 30-min period. A relationship between dissolve reactive (DRP) in runoff and WEP applied to soil boxes was observed (R²=0.56). Manure treated with 3.9 and 7.8 kg m⁻² Al₂(SO₄)₃ decreased DRP in runoff by 33%. Management based on these results should help minimize harmful effects of P in runoff.

Soil-Hydrologic Relationships for Two Lower Coastal Plain Catenas in North Carolina

Severson, E.D., Virginia Tech, Eastern Regional Interpretive Soil Scientist

Lindbo D.L., Soil Science Dept., NCSU

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Redox depletions and their depth in the soil indicate seasonal high water tables, which are the critical factors in sighting onsite wastewater disposal systems. Soil wetness regulations have created a need for more research in soil hydrology. The objective of this study is to define soil morphological-water table relationships in order to confirm or establish water table monitoring and interpretation procedures used by state regulatory agencies. Recording water table level wells monitored transects of clayey Aquic Hapludults and coarse-loamy Aquic Paleudults for 395 days. First occurrence of redox concentrations and chroma three and two depletions in the coarse-loamy soils correlated to periods of saturation corresponding to 10, 13, and 21% of the study period. The features correlated to hydrology in the clayey soils for 3, 8, and 9% of the period monitored. The shallowest depths of continuous saturation for 14-d was higher in the profile than depletions in the coarse-loamy soils, and notably lower in the clayey soils. Water table and on-site rainfall data were used to calibrate DRAINMOD and to predict 30-yr historic water table levels separately for each soil. Simulated shallowest

water table depths for a 14-d continuous period with a recurrence frequency of 30% using long-term weather data did not agree with the first presence of more than 2% redox depletions for all soils.

Minutes of the North Carolina Soil Science
Society Annual Business Meeting

January 19, 2005

President Steve Stadelman called to order the business meeting of the 48th Annual Meeting of the Soil Science Society of North Carolina at 10:30 a.m. on January 19, 2005, at the McKimmon Center in Raleigh, North Carolina. After making a few introductory remarks, President Stadelman introduced the candidates for President position: Mr. Jim Beeson, Dr. David Hardy, and Mr. David Knight; and gave a brief biographical information about each one. He then asked for nominations from the floor. No nomination was made from the floor and President Stadelman closed the nominations and asked for the ballots to be distributed among the members.

As the second order of the meeting President Stadelman introduced the minutes from the 47th Annual Meeting of the SSSNC. Copies of the minutes were made available to members, and Mr. John Williams made the motion to accept the minutes and Mr. Everett Coats seconded the motion. The motion was approved unanimously by a voice vote.

President Stadelman then called on Ms. Roberta Miller-Haraway for the Treasurer's report. Treasurer Miller-Haraway presented a brief report about the financial status of the Society. She noted that for the 2005 meeting approximately 160 were pre-registered and 30 registered on-site. She also noted that there were approximately 10 students and 10 retired members at the meeting. She indicated that at the end of 2004 there was \$21,134.58 in the bank account of the Society, of which \$6768.00 was for the Hubert Byrd's Scholarship. Overall, after taking the expenses and incomes for 2004, there was an approximately 1,500 dollars positive cash flow for the year. After calling by President Stadelman, a motion was made, and was seconded to accept the Treasurer's report. The motion was passed unanimously by a voice vote.

President Stadelman then called for committee reports. Mr. John Kelley presented the Audit Committee report. Mr. Phil Tant made the motion to accept the Audit Committee's report. Dr. Bob Uebler seconded the motion, and the

motion to accept the Audit Committee's report was passed unanimously by a voice vote.

Mr. Steve Bristow presented the Continuing Education report. He reported on the course that is available through NCSU Cooperative Extension immediately after the Annual Meeting. Ms. Miller-Haraway talked about the checks that have gone to her for this class and asked for help to separate the funds that must go for course registration from the ones that were for the Annual Meeting and Society's membership fee. Dr. Bob Uebler made a motion to require the members to write a separate check for any after meeting courses. After the motion was modified by Ms. Caroline Edwards and seconded by Ms. Delores Chandler, the motion was passed to require members to pay their annual membership fee and the registration fee for the Annual Meeting separate from any other payment.

Dr. Steve Stadelman presented the Editing Committee's report. He discussed the problems with receiving all the papers, editing the papers, and posting them on the Society's Web site. He indicated that Ms. Catherine Stokes has accepted to maintain the Society's Web site for now.

Dr. Aziz Amoozegar presented a report on the Scholarship Committee's activities, and indicated that a well-qualified candidate from NCSU has been selected for Byrd's Scholarship and will be introduced at the Luncheon Banquet after the business meeting. He indicated that no student from NCA&T University was nominated for the Scholarship.

The Nomination Committee and the Public Relationship Committee had no report. The Divisional representatives presented no report. Mr. Joe Hinton requested that members provide him with contact information.

Dr. Joe Kleiss reported that the Soil Judging team at NCSU did not place at the National Spring competition in Illinois, but was in first place at the Southeast regional contest at Auburn University in the fall. The team will go to the National Contest in Spring 2005. He also indicated that NCSU will host the regional contest next October and estimated that the cost of event will be several thousand dollars. Dr. Uebler made the motion to provide 2000.00 dollars to the Soil Judging team for the

upcoming year. Mr. Joe Hinton seconded the motion. The motion was passed unanimously by a voice vote without any discussion.

Mr. Richard Brooks presented a brief report about the FFA Land Judging activities. He indicated that the team had a successful competition last year, and that this contest will be in Surry County. Dr. George Naderman made a motion to support the NC FFA Land Judging team in the amount of 1000.00 dollars, 300.00 dollars for hosting the event, 500.00 dollars for 2nd place team, and 200.00 dollars for Proficiency Award in natural Resources management. Ms. Sandra Weitzel seconded the motion. The motion was passed unanimously with a voice vote.

Mr. Richard Brooks, Chair of the NC Board for Licensing of Soil Scientists, presented the Licensed Soil Scientist report. He recognized Ms. Peggy Longmire as the Administrative Assistant, and noted that the new address and phone number for the NCBLSS are posted at the Board's Web site. He also mentioned that the renewal notices should be going to members in May and the licenses should be renewed by June 30th. The grace period for renewing licenses extends to September 1. Approximately 10% of the licensees are audited for PDH, and this will continue in the future. Ms. Longmire requested that the Licensed Soil Scientists go to the Web site and check their status under active licensees section and send her any necessary corrections.

Mr. Larry Baldwin presented an update on the Consulting Soil Scientists of the Carolinas. The new organization was incorporated and received tax status notification. The Business League of the Consulting Soil Scientists, which is a chapter of the National Society of Consulting Soil Scientists looks forward to working with the SSSNC as a liaison organization for soil science issues. Membership to the Consulting Soil Scientists of Carolina is open to anyone and the organization will have a drawing for a prize for new members at the end of the business meeting.

President Stadelman asked for any old business, and opened the floor for new business. Supporting the Smithsonian Institutes' Soil Project was discussed. President Stadelman suggested that the Society donate 1000.00 to the Smithsonian Institute Soil Exhibit

to get the Society's name on the plaque for donors. He asked the floor for comments and a question was asked regarding the cause where the money will go. It was mentioned that we could specify where our donation should go, and that we, as the Society, need to make some donations. Another question was asked regarding the required 10,000.00 dollars for NC State Soil Monolith. Dr. Bob Uebler made a motion to donate 1000.00 dollars this year and discuss the issue at our next year annual meeting to see if we want to make additional contributions. The motion was seconded, and a question was raised as who receives the funds, Smithsonian or NC.

Dr. Joe Zublena introduced himself as the representative of the College of Agriculture and Life Sciences (CALs). He indicated that per Dean Johnny Wynne's direction, he would be the liaison between CALs and SSSNC. Dr. Uebler talked about the qualifications of graduates and Dr. Zublena indicated that he would transmit the concerns to the CALs Administration.

Dr. Amoozegar talked about the need for the Society to pay for treasurer's services, and Dr. Naderman talked about paying someone to do the auditing of the Society's account. Dr. Stadelman discussed the problems in getting the authors to present their papers for the Proceedings, and Ms. Longmire asked who puts the program together. Dr. Uebler recommended that the Executive Committee look at the cost of the services and discuss it at the next year's business meeting. Ms. Chandler suggested compensating Ms. Miller-Haraway with a gift of 500.00 dollars. The motion was seconded, and Mr. Allison talked about the Executive Committee to make the decision. The motion was passed with only one opposition.

Dr. Uebler talked about recruitment to the soil science profession. He suggested forming a committee to promote the profession. Dr. Kleiss mentioned that the Soil Science Department does the promotion, and asked about possible internship for students. Suggestion was made to advertise about Byrd's scholarship at high schools, and Dr. Naderman talked about his opportunities with schools. Dr. Uebler made a suggestion to form a committee to address compensations. Mr. Bill Marlin asked about the 50th Anniversary of the SSSNC. Mr. Hal Owens made a comment regarding the Society's

financial situation. A motion was made and seconded to adjourn the meeting.

The meeting was adjourned at 12:05.