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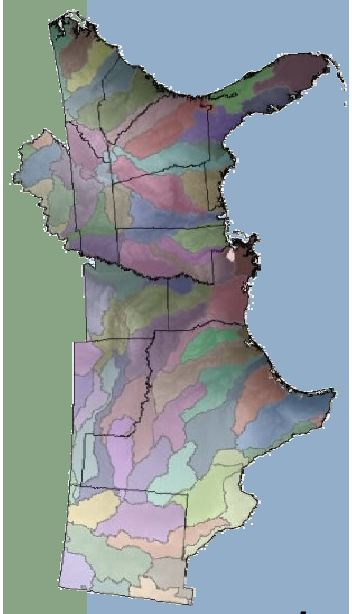

Nutrient Management in the Southern Region

Nutrient management research and education efforts are needed to address major regional problems associated with nutrient losses to surface waters and ground water. The multi-state, multi-agency Nutrient Management Workgroup is prioritizing needs and designing collaborative programs to support coordinated research and development of educational resources.

In This Issue

Contacts

Dr. Rao Mylavarapu
University of Florida/IFAS
Soil & Water Science Department
P.O. Box 110290
Gainesville, FL 32611-0290
Phone: (352) 392-1951 ext. 202
raom@ufl.edu

Dr. Deanna L. Osmond
North Carolina State University
Soil Science Department
Box 7619
Raleigh, NC 27695-7619
Phone: (919) 515-7303
deanna_osmond@ncsu.edu

Dr. Mark L. McFarland
Texas A&M University
Soil & Crop Sciences Department
348 Heep Center
College Station, TX 77843-2474
Phone: (979) 845-2425
ml-mcfarland@tamu.edu

The Nutrient Management Program is one of 12 priority program areas identified by the Southern Region Water Quality Planning Committee. A multi-disciplinary regional workgroup of nutrient management experts is improving nutrient management recommendations to enhance both economic and environmental outcomes in threatened and impaired watersheds. Through strengthened regional and multi-agency collaboration, the workgroup identifies gaps in knowledge and resources, defines significant research needs, and conducts strategic planning to develop appropriate educational and technology transfer tools. This newsletter is an outlet for sharing and showcasing success stories and products from the Nutrient Management Program. It will be posted to http://srwqis.tamu.edu biannually in pdf format. Questions or comments can be directed to the team leaders or the appropriate state contact.

Nutrient Management Education in Arkansas

Mike Daniels, University of Arkansas

The State of Arkansas General Assembly passed new nutrient management laws in 2004 with the following implications:

Nutrient Surplus watersheds were designated requiring all nutrient applications beginning in 2006 to be done according to a nutrient management plan or an approved protective use rate. This includes any material containing nitrogen or phosphorus and on any land including agricultural or urban areas

Requires Nutrient management plans in these watersheds be written by planners that have been certified by the State.

Requires that nutrients applied within the nutrient surplus watersheds be applied by State-certified nutrient applicators.

"This guide consists of 10 chapters and covers such topics as nutrients and water quality relationships, legal requirements as related to nutrient management planning, soil fertility, the 8 basic steps to developing a plan, estimating soil erosion, calculating the P-Index, nutrient balance concepts, making conservation recommendations, and record keeping. "

To help certify planners and applicators, the State provided funding to the University of Arkansas Cooperative Extension Service (UA-CES) to develop and deliver educational programs as part of the certification process.

In response, UA-CES developed a 4-day training program for planners as well as the "*Arkansas Nutrient Management Planner's Guide"*, which is used as training curriculum. This guide consists of 10 chapters and covers such topics as nutrients and water quality relationships, legal requirements as related to nutrient management planning, soil fertility, the 8 basic steps to developing a plan, estimating soil erosion, calculating the P-Index, nutrient balance concepts, making conservation recommendations, and record keeping. This guide has been accepted by three State agencies and one federal agency as the official State nutrient management planner's guide. To date, we have trained over 80 planners.

The UA-CES has also developed a two and one half hour nutrient applicator training program as well as the "*Arkansas Nutrient Applicator Guide"*, which is used as the training curriculum for private and commercial nutrient applicators. It covers such topics as nutrients and water quality relationships, legal requirements as related to nutrient applications, soil fertility, principles of nutrient application to pastures, equipment calibration, and record keeping. Over 1,000 private and commercial applicators have been trained to date with 17 more meetings scheduled in October, November, and December of 2005.

Web-based Training of Certified Animal Waste Vendors

Charles Mitchell, Auburn University

Alabama was the first state to initiate a Certified Animal Waste Vendor Program in 1998. In 1999, Alabama's AFO/CAFO Rules made the program official. Cooperative Extension coordinates the training and the Alabama Department of Agriculture does the certifying. While the program is not mandatory for those transporting and spreading animal wastes, it has been well received by vendors in Alabama. More than 500 CAWVs were certified in 1998 and renewed their certification in 2000, 2002, and 2004. Certification and recertification required attending a 4-hour training session held every other year at multiple Alabama locations. No exam or fee was required for certification. The training also served as continuing education for CAFO owner/operators.

Unfortunately, no funds were allocated by the State to support this training and certification, and the classes required extensive travel by specialists. In 2004, classes were held at 11 Alabama locations.

"While the program is not mandatory for those transporting and spreading animal wastes, it has been well received by vendors in Alabama. "

In order to (1) reduce the unfunded expenses associated with CAWV training, (2) generate some funds to cover the training expenses, and (3) verify the competence of the CAWVs, Ted Tyson and Charles Mitchell with the Alabama Cooperative Extension System have developed a WebCT-based, internet training for CAWVs and for CAFO continuing education. While access to the website and training through Auburn University's open WebCT program is free, the final exam associated with the program requires payment of an "educational verification" fee. Funds from this fee cover the costs of maintaining and future development of web-based training programs in animal waste management/nutrient management.

Since June, 2005, almost 150 Alabama animal waste vendors have completed the web-based training and the on-line examination and have become certified. While this number is substantially lower than the 500+ that were previously certified, it more accurately reflects those whose livelihood depends on transporting and spreading animal manures in Alabama. The success of this program will lead to more web-based training and continuing education programs in nutrient management in the future. To view the open WebCT training through Auburn University, follow the procedures on the Alabama Cooperative Extension System Animal Waste Management website:

"Since June, 2005, almost 150 Alabama animal waste vendors have completed the web-based training and the on-line examination and have become certified. "

http://www.aces.edu/dept/aawm/WebCTCAWV.php?ACAWV

Suwannee River Partnership – A Team Approach to Watershed Nutrient Management

Sarah Dasher Carte, IFAS Educational Coordinator, Suwannee River Partnership

Over the last two decades, nitrate levels in North Florida's Middle Suwannee and Santa Fe River basins have been on the increase. Nitrates in these rivers come primarily from human and livestock wastes, and fertilizers.

To address this problem, the Suwannee River Partnership was formed in 1999 to encourage those who would be most impacted to be proactive in assessing how they operate in hopes that regulations might be avoided. This coalition of 56 state, federal and regional agencies, local governments and private industry representatives are working together to assess sources of nutrient loading to the Suwannee and Santa Fe Rivers. The goal is to optimize reductions in nutrient loading to the waters of the basins emphasizing voluntary, incentive-based programs for protection of the environment and public health.

The Partnership has a goal of achieving at least 80% adoption of agricultural best management practices (BMPs) by 2008. This goal requires the research and educational support of the University of Florida-IFAS. Successful and long-term BMP adoption depends on having BMPs that are based on sound research and are demonstrated to agricultural producers and natural resources managers to be effective and economical.

UF/IFAS was one of the original signatories to the Suwannee River Partnership and today supports the mission of the Partnership with research and extension programs in nutrient and resource management. For example, UF scientists have been working under an EPA/FDEP 319 grant project in the Middle Suwannee River Basin to monitor and demonstrate nitrate BMPs on farms representing three of the major agricultural sectors in the Middle Suwannee River Basin. The demonstrations are being carried out on a poultry farm, a dairy farm, and a vegetable/row crop farm to demonstrate proposed nitrate management strategies that will reduce nitrate loadings to the groundwater and the Suwannee River. It is the goal of the Partnership that, through these types of demonstration projects, farmers will gain confidence in BMPs and will voluntarily adopt them farm-wide.

In another project in support of the Partnership mission, IFAS scientists are assisting FDACS in writing a BMP manual for vegetables and agronomic crops. This manual brings together all the current research-based knowledge about nutrient management and will form the basis for a voluntary, incentive based program of BMP adoption by growers. In the field, UF/IFAS scientists and extension personnel at the North Florida Research and Education Center-Suwannee Valley in Live Oak are continuing to demonstrate, verify, and modify nutrient BMPs. This effort

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Suwannee River Partnership – A Team Approach to Watershed Nutrient Management

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is carried out through research projects and extension field days at the Center and on farms in the region, in addition to workshops and educational programs in the counties throughout the region. Finally, the UF/IFAS Livestock Waste Testing Laboratory continues to support the Partnership with timely analysis of livestock manures and research on manure use for agricultural crop and forestry production.

"The Partnership recognizes producers that are successfully and voluntarily implementing BMPs into their operations with the County Alliance for Responsible Environmental Stewardship (CARES) program. "

The Partnership recognizes producers that are successfully and voluntarily implementing BMPs into their operations with the County Alliance for Responsible Environmental Stewardship (CARES) program. The CARES program was implemented in 2001 to promote environmentally sound and economically viable farming. CARES was first implemented in the Middle Suwannee Basin and then later extended to the Santa Fe River Basin. Each year the Partnership holds celebration dinners in each of the basins to recognize the achievements of producers throughout the year. To date close to 180 farms have the CARES designation.

Along with its main focus of recognizing producers, CARES also serves as a tool demonstrating to the public that the agriculture industry is actively involved in utilizing sound environmental management. CARES brings agricultural associations, public agencies, institutions and farmers together to increase environmental awareness.

The Partnership's commitment to on-farm improvements does not end with implementing BMPs. An equally critical part of our job is an effective Quality Assurance program to verify that the Partnership approach is working. This program consists of three main components, including a comprehensive basin wide ground and surface water quality network by the Suwannee River Water Management District and the Florida Department of Environmental Protection, research and demonstrations to verify that BMPs are effective by the University of Florida's Institute of Food and Agricultural Sciences, and a technical assistance program to ensure farmers are correctly using the recommended practices by the Florida Department of Agriculture and Consumer Sciences.

The BMP Quality Assurance program not only shows the general public and regulatory agencies farmers are operating and maintaining BMPs properly but it also helps give an account for the public funds that are used in cost share programs. In addition, it gives the farmer a way of getting help from the appropriate agencies or groups to solve challenges before they become serious problems.

The Suwannee River Partnership is well on its way to achieving its goals. Through research, education, and outreach programs, and involving all the stakeholders in the process, the Partnership has been able to apply the best resources available to make the BMP process effective and obtainable for the agriculture and natural resource industries in the Suwannee and Santa Fe River basins.

Fertilizer Use in Urban Areas

Deanna L. Osmond, NC State University and David H. Hardy, NC Department of Agriculture

In rapidly urbanizing areas, there is concern about the role of turf fertilization and water quality. To better determine fertilizer use patterns in urban areas, we conducted a door-to-door lawn care survey in five North Carolina communities. These communities, Cary, Goldsboro, Kinston, New Bern, and Greenville, are mostly located either in the Neuse or Tar-Pamlico River Basin, both of which are considered nutrient sensitive water resources. Residents in Cary used lawn care companies over twice as frequently as residents in the other communities (43% compared to 20%). Cary had the smallest mean lawn size (445 m^2), while the largest was in Goldsboro (1899 m^2). Tall fescue (*Lolium arundinaceum* (Schreb.) S.J.Derbyshine) was the predominant grass type in Cary (99%), whereas centipedegrass (*Eremochloa ophiuroides* (Munro) Hack.) or centipedegrass mixtures were the predominant grass types in Greenville, Kinston, and New Bern. Kinston had the lowest fertilizer usage with only 54% of the residents using fertilizer; Cary had the highest rate of 83%. The average N fertilizer rate applied to the lawns was dissimilar ranging from 24 to 151 kg N ha^{-1}. Analysis of variance results for fertilizer rates and household income indicated a significant difference ($P<0.05$) in application rate between high/medium income levels and the low-income level. Cary, Goldsboro and Greenville had approximately the same number of fertilizer applications per year (1.5). Fertilizer rates were close to the suggested amounts for fescue, although fertilizer was not applied as often as it should have been for fescue. Fertilizer rates were almost 3 times greater than needed for centipede in the Greenville area and twice as much in New Bern. Most household residents (53%) used instructions on the bag and either grass type and/or lawn area to guide them on fertilizer application rates. For further details on this study, see the *Journal of Environmental Quality* 32:565-575.

"Analysis of variance results for fertilizer rates and household income indicated a significant difference (P<0.05) in application rate between high/medium income levels and the low-income level. "

CSREES NUTRIENT MANAGEMENT IN THE SOUTHERN REGION NEWSLETTER

This newsletter was created to disseminate information on current projects in the Nutrient Management area.

If you would like to submit an article for inclusion in a future newsletter please contact:

Rao Mylavarapu
PO Box 110290, Soil & Water Science
University of Florida. Gainesville, FL 32611
(352) 392-1951
raom@ufl.edu

Effects of Composted Dairy Manure on Forage Yield of Coastal Bermudagrass

T.J. Helton, M.L. McFarland, F.M. Hons, J.P. Muir and S. Mukhtar; Texas A&M University

Background

One proposed strategy to address problems associated with manure management that has attracted the attention of farmers, waste-generators, public officials and environmentalists is composting. Composting manure produces a product that is more easily handled and stored because it reduces the total weight and volume of the material. Compost also has low odor and temperatures reached during the composting process kill most pathogens and viable weed seeds. Like raw manure, compost can improve soil physical and chemical properties by increasing organic matter while providing plant nutrients. However, the effects of composting on release rates and plant availability of nutrients contained in manure are not well understood. Research was conducted to compare the effects of composted dairy manure and raw dairy manure alone, or in combination with supplemental inorganic fertilizer, on Coastal bermudagrass yield and quality.

Table 1. Effects of dairy manure compost and raw dairy manure with supplemental N at 56 kg ha^{-1} cutting^{-1} compared to inorganic fertilizer alone on Coastal bermudagrass yields.

	2002				
	Yield				
Treatment†	H1	H2	H3	H4	Cumulative
			kg ha^{-1}		
C1	—	2,542 d‡	3,723 b	3,345 b	9,610
C2	—	2,990 c	4,267 a	4,505 a	11,762
C3	—	3,563 ab	4,467 a	3,446 b	11,475
M	—	3,740 a	4,433 a	4,607 a	12,779
IF	—	3,327 b	4,367 a	4,088 ab	11,782
		***	*	*	
	2003				
			kg ha^{-1}		
C1	5,389	3,907	3,835	4,398	17,530‡
C2	5,717	4,128	4,215	4,599	18,657
C3	5,927	4,224	4,277	4,792	19,219
M	6,058	3,961	4,273	4,981	19,274
IF	5,915	3,793	4,380	5,064	19,153
					NS

†Abbreviations: C1, compost 14 Mg ha^{-1}; C2, compost 29 Mg ha^{-1}; C3, compost 57 Mg ha^{-1}; M, manure 54 Mg ha^{-1}; IF, inorganic fertilizer (112 kg N ha^{-1}; 112 kg P_2O_5 ha^{-1} yr^{-1}; 112 kg K2O ha-1).

‡Means within a year and column followed by the same letter are not significantly different.

*,**,*** $P \leq 0.05$, $P \leq 0.01$ and $P \leq 0.001$; NS = not significant; (Fishers Protected LSD).

Results

Composted dairy manure was surface applied at rates of 14 (125 kg N ha^{-1}), 29 (250 kg N ha^{-1}) and 57 (500 kg N ha^{-1}) Mg dry matter (DM) ha^{-1}, and raw dairy manure was surface applied at a rate of 54 (420 kg N ha^{-1}) Mg DM ha^{-1} to established bermudagrass. Selected compost and manure plots received supplemental inorganic N at rates of 56, 84 and 112 kg ha^{-1} cutting^{-1} or 112 kg ha^{-1} cutting^{-1} of supplemental N with supplemental inorganic phosphorus or potassium at rates of 112 kg P_2O_5 ha^{-1} yr^{-1} and 112 kg K_2O ha^{-1} cutting^{-1}, respectively.

Composted dairy manure (29 and 57 Mg DM ha^{-1}) or raw manure alone increased cumulative forage yields compared to the untreated check in both years of the study, but were less than those obtained using inorganic fertilizer alone. Application of 56 kg N ha^{-1} cutting^{-1} or more of supplemental N to compost (29 and 57 Mg DM ha^{-1}) or manure produced forage yields that were equal to or greater than those obtained using inorganic fertilizer alone. Supplemental inorganic K improved forage yields for the low rate of compost and manure, but no yield response was observed when supplemental inorganic P was applied to compost or manure.

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Effects of Composted Dairy Manure on Forage Yield of Coastal Bermudagrass

T.J. Helton, M.L. McFarland, F.M. Hons, J.P. Muir and S. Mukhtar; Texas A&M University

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Outcomes

Results of this research contributed to the establishment of standard management practices for optimizing economic and environmental nutrient management in areas receiving composted dairy manure. Most importantly, they contributed to enhanced marketing and utilization of composted dairy manure both within and outside the phosphorus-impaired Bosque River Watershed in north central Texas. Complete results have been published as a thesis and at the annual meeting of the American Society of Agronomy.

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http://srwqis.tamu.edu/nutrient-pesticide.aspx

Nutrient Management Program Team

Deanna Osmond, Program Leader	North Carolina State University
Rao Mylavarapu, Program Co-Leader	University of Florida
Mark McFarland, Program Co-Leader	Texas A&M University
Charles Mitchell	Auburn University
Teferi Tsegaye	Alabama A&M University
Mike Daniels	University of Arkansas
Cass Gardner	Florida A&M University
Mark Risse	University of Georgia
Mark Latimore	Fort Valley State University
J. Stevens	Louisiana State University
Larry Oldham	Mississippi State University
Alton Johnson	Alcorn State University
GB. Reddy	North Carolina A&T State University
Robert Flynn	New Mexico State University
Hailin Zhang	Oklahoma State University
Forbes Walker	University of Tennessee
Sam Dennis	Tennessee State University
Desh Duseja	Tennessee State University
Fred Moore	CSREES/EPA Region 6 Liaison
Mike Bira	EPA Region 6
Jerry Collins	EPA Region 6
Jerry Lemunyon	NRCS