

Livestock Environmental Management News

Greetings!

-1, Energy Beets, & the Nutrient Reduction Strategy

Thank you for sticking with LEM News and sharing 2013 with us through stories and photos. We appreciate all the feedback and input that you provide after reading our stories. Following you will find 3 updates that are important to the LEM program, the CREC and to you.

1. Late this year, Emily was provided with the opportunity to work closer to her family and ranch and is no longer working for NDSU. We wish her the best of luck with her new career. If you are ever in Hurdsfield, swing

by the elevator and say hello, she'll be glad you did!

2. Feeding studies using energy beets are underway in the CREC feedlot (photos on the right). We invite you to stop in if you are passing by and check it out.

3. Approximately 40 people representing the agriculture and other non-point source pollution group participated in the Nutrient Reduction Strategy stakeholder meeting that I invited you to via the listserv. Everyone in

attendance had the opportunity to share ideas about how to move forward and create a plan with the environment and agriculture in mind. A review of the meeting will be made available by the organizing contractor and can be found at this website (<http://www.tetrattech-ffx.com/nutrients/nd2013/stakeholder.htm>) within the next couple weeks. I'll let you know when it is available and answer any questions you may have at that time.

Best Wishes in 2014!

"To create learning partnerships that help youth and adults enhance their lives and communities."

NDSU Carrington REC

PO Box 219

Carrington, ND 58421

701-652-2951

mary.berg@ndsu.edu



Using windbreaks to feed cattle in a non-confinement area.

Partial Manure Management Systems Definition (Including Portable Windbreaks)

*Ryan Odenbach
319 Watershed Coordinator*

The purpose of partial manure management systems is to provide livestock producers, particularly those with cow-calf operations, with a cost effective means of complying with current environmental regulations. The goal of the project is to rotate livestock winter

feeding areas so that concentration in any area does not happen longer than 30 to 45 days. For a cow-calf producer this can be an ideal situation: 1) the cows remain mobile during the winter months leading to improved animal health (i.e. cows are not sedentary during this time period); 2)

livestock waste is spread out during the winter leaving little or no expense involved in manure spreading in spring and summer; 3) often crop ground can be used for this winter rotational feeding, which is ideal for high nutrient use crops such as corn. Other ideas which can be incorporated in-

Continued on page 3

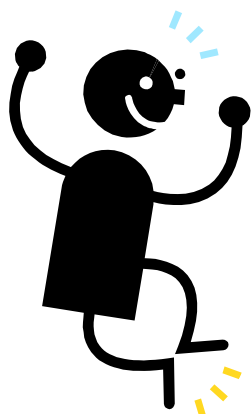
Inside this issue:

Serendipity	2
Partial Manure Management Systems	3
Manure Fertilizer Use	3
Innovations and Traditions in Nutrient Mgmt.	4
Scenes from CNMP	5
Inside Stories Cont.	6

Serendipity

Roger Ashley, NDSU Area Extension Specialist/Cropping Systems

Reprinted from: Manitoba North Dakota Zero Tillage Farmers Association Newsletter



“My wake-up call on the importance of soil biology in soil fertility came in 2004, a year following a seed treatment trial...”

Some things we take for granted, pay no attention to, or never really think about until it whacks us across the side of the head. Scientists provide a great deal of information, some of it difficult to understand what are the ramifications from knowing this information or it falls in the category of “that’s interesting but I don’t see any real use for it.” And besides if it is really worthwhile someone will commercialize it and I can buy it in a can, bag, or tote from my local supplier.

When I attended university classes on soils, I had about 30 or 40 credits worth during my time as a university student, one professor spent about a week’s worth of classes and a lab discussing the importance of soil biology in the beginning soil’s class. In soil fertility classes

we spent a brief amount of time discussing biological transformations from one form of the nutrient to another. The rest of the time was on soil physical and chemical properties. When soil biology was discussed a number of the processes were discussed in very general terms such as “microbial gum” and bacteria but nothing was really discussed about beneficial nematodes or fungi, partly because scientists didn’t know enough. They could not tell us exactly what effect the presence or absence of soil biology was on crop yields. In pest management classes we spent a great deal of time studying disease causing nematodes and fungi and its very easy to forget there are good guys as well as there are bad guys in the microbial world.

My wake-up call on the

importance of soil biology in soil fertility came in 2004, a year following a seed treatment trial where we had used a soil fumigant to create a “fumigated check” free of soil-borne disease causing fungi – this is a really effective tool to determine how effective and ineffective our seed treatments are in controlling these diseases in wheat. The cooperating no-till producer who hosted the seed treatment trial in 2003 planted the field to corn in 2004. The soil test indicated the field had adequate phosphorous, potassium, zinc and sulfur but the producer also included these nutrients in his starter fertilizer in a band to the side and below the seed. On July 21 the producer contacted me and reported corn plants grown in the fumigated soil plots (Figure 1) as be-

Continued on page 6

Figure 1. Photo on left shows stunted corn growing on fumigated soil plot surrounded by corn growing on natural soil. Photo on right shows classic phosphorous deficiency symptoms on corn plant grown on fumigated soil.

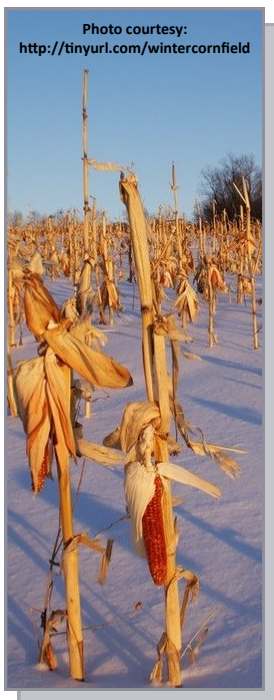


Photo courtesy: <http://tinyurl.com/wintercornfield>

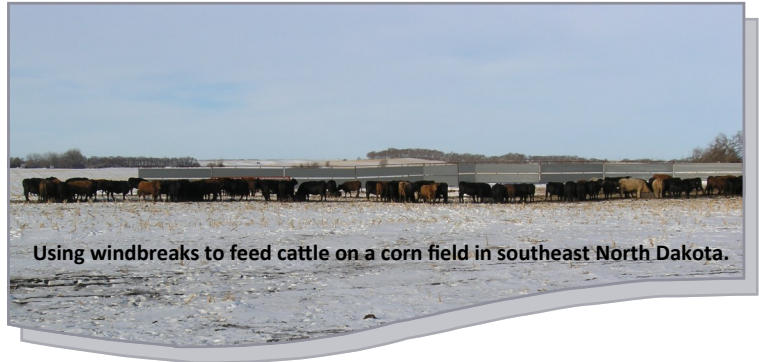


Partial Manure Management Systems Definition continued from page 1

clude swath grazing, bale grazing, and cover crop grazing. These ideas provide opportunities to limit costs further by reducing labor and machine hours. Producers can apply for cost-share and planning assistance for installation of partial manure management systems through the 319 program either through a local watershed coordinator or through the ND Department of Agriculture. The program is open to operations that are within a mile of a water body of concern. Planning and applications are simple and straight-forward and steps include: 1) field visit by coordinator; 2) determination of how cattle will be rotated; 3) determination of practices to make feeding plan successful; 4) determine if any other livestock on farm will be concentrated (i.e. feeder calves) and develop a nutrient management plan for these animals; 5) complete plan, review and sign and send in to the

North Dakota Department of Health for approval. A workable plan can generally be completed within a day and review usually takes no longer than a week, so there is a quick turn-around time with these plans.

Practices which help make partial manure management systems successful and which can be cost-shared include: additional fencing; watering facilities which include tanks, pipelines and wells; portable windbreaks; shelterbelt plantings; and cover crops. Portable windbreaks and watering facilities are often key components that make a plan successful. The portable windbreaks can be cost-shared at a rate of up to two feet per head on each operation. Watering facilities utilize actual costs of construction and need to have win-



terized components including seven foot burial of pipelines and insulated or heated water tanks. Partial manure management systems can be used on operations which have 450 head of beef cattle less. Structural practices may be necessary for larger operations. For more information on this project contact your local Soil Conservation District Office or the North Dakota Department of Agriculture.

“The portable windbreaks can be cost-shared at a rate of up to two feet per head on each operation.”

North Dakota Manure Fertilizer Use Recommendations

Mary Berg, LEM Area Specialist

Using livestock manure as a sole fertilizer is not a practice that is commonly done by North Dakota crop producers. Manure contains all the nutrients necessary for plant growth but these nutrients are primarily in the organic form. Microbial breakdown is a natural process

whereby manure nutrients are made available for plant growth. The rate at which the nutrients are made available through this process will vary depending on soil conditions and what species of animal the manure came from. The NDSU Carrington Research Extension

Center conducted a research program to determine if manure can supply the necessary nutrients for typical crops grown in the upper Great Plains. Corn, canola, and hard red spring wheat were the three crops used in the research trials. Five trials were conducted with fall-



Innovations and Traditions in Nutrient Management

Mary Berg, LEM Area Specialist



Innovation: To introduce new methods, ideas or products. **Tradition:** The transmission of customs or beliefs from generation to generation.

How do these two words, which by their definition are completely opposite, end up being the motto of a conference for nutrient management? When looking at the history of manure use in North Dakota, we can see a cyclic pattern. In recent years, we are back at the start of that cycle, but with a new perspective on manure use.

Producers and researchers have known for years that manure contains certain nutrients that are necessary for plant growth, and that by spreading this product on crop or hay land, we are altering yield potential. However, profit sustains a business, so when purchasing commercial fertilizers was more affordable than paying for manure-spreading costs and we knew exactly what the nutrient content of every pound being applied was, manure use as a fertilizer declined.

Since then, we have watched commercial fertilizer costs climb to all-time highs, which makes the challenge of keeping a farming/ranching business profitable that much more challenging. And now, in the most recent years, we seem to be back at the start of the manure-use cycle in North Dakota.

What has changed? We not only have the tradition, and all of the knowledge that comes with it, of using manure as a fertilizer, we also have innovations that help producers best utilize their product with minimal impacts to the environment. You could say that innovations and traditions in nutrient management help livestock and crop producers be even better stewards of the land that is their livelihood.

By using knowledge of the past, along with current sampling and calibration techniques for manure and commercial fertilizers, as well as a nutrient management plan, whole farm nutrient balance has never been more accessible or attainable for producers.

During the recent Multi-State Comprehensive Nutrient Management Planning Conference (CNMP) held in Fargo on Nov. 18-20, three North Dakota livestock/crop producers sat on a panel and answered questions from nutrient management professionals dealing with anything from hands-on management to field management to rules and regulations. Personnel from the Environmental Protection Agency, state regulatory agencies, Extension Service and National Resources Conservation Service; 319 Watershed Program coordinators; engineers; and technical service providers attended and presented at the conference.

Having interaction with manure managers seems to be a necessary component of program development for the people from all seven states who attended the conference. According to the results of the post-conference survey taken by participants, the producer panel was scored as the most relevant session of the entire conference.

The goal of this conference was to gather nutrient management professionals from around the region to network on current concerns pertaining to water quality and nutrient management relative to livestock production. Besides the producer panel, those in attendance had the opportunity to participate in a preconference tour of the North Dakota State University livestock research facilities. At each stop, the facility manager explained the manure-handling process, and a scientist joined the group at each stop to discuss the latest research being conducted at that facility. Although everyone on the tour had seen a manure storage facility during his or her career, NDSU's livestock research facilities have the unique feature of being within city limits.

Other conference session topics included beef cattle facility options, water management, state updates and compost management, and a panel of state and national regulators answered audience questions. The CREC Livestock Environmental Management program is thankful for the opportunity to have hosted this event.

The first conference for regional representatives was held in Nebraska in 2005 and the second conference was held in South Dakota in 2010. Slide presentations from the North Dakota Multi-State CNMP conference can be found here: www.slideshare.net/tag/cnmp2013.

Through various conversations and interactions during this conference, we learned that although innovations keep us pushing forward in the ever-changing world of agriculture, we rely on traditions of the past for the base of our knowledge.

Photos from the CNMP Multi-State Conference



North Dakota Manure Fertilizer Use Recommendations

continued from page 3

and spring-applied manure as well as spring applied commercial fertilizer were compared on spring wheat. Spring applied manure was compared with commercial fertilizer in 2 studies each on corn and canola. Plots with no fertilizer were the control treatment for all the trials.

Corn yields did not vary significantly when commercial fertilizer vs. spring-applied manure were compared (Table 1). Canola yields were significantly lower when spring-applied manure was compared with commercial fertilizer. Fall-applied manure vs. commercial fertilizer were statistically similar for the spring wheat trials.

Following are some recommendations for using

manure as a fertilizer source.

- ⇒ Sample the manure that is going to be used to determine the nutrients available. Information about manure sampling labs can be found by going to: www.ag.ndsu.edu/lem/resources/manure-nutrient-sampling-and-testing.
- ⇒ Credit 50% of the total N in the manure analysis as available the first year of application.
- ⇒ Manure nutrients are a complete substitution for commercial fertilizer for corn production and can be applied in the spring or fall.
- ⇒ Short-season, high N-demand crops such as

spring wheat and canola require 20 to 40 pounds per acre supplemental commercial fertilizer if manure is spring-applied. The same recommendation may be beneficial for fall-applied manure as well.

More information on this study, including data, can be found by going to: www.tinyurl.com/NDManureFertilizer.



Treatment	Trial 1	Trial 2	Treatment Average
	bu/acre		
Check	136 ^b	98 ^b	117
Commercial fertilizer	145 ^a	111 ^a	128
Spring-applied manure	144 ^a	105 ^a	125
^{a,b,c} Numbers with similar letters are not statistically different at a 95 percent confident level.			

Serendipity continued from page 2

ing “stunted and purpled.” This is a classic phosphorous deficiency symptom in corn. Corn plants and soil samples were taken from fumigated and natural soil plots and submitted to Dr. Kris Nichols, scientist at the Northern Great Plains Research Laboratory, Mandan, ND, for arbuscular mycorrhizal fungi (AMF) analysis. In her analysis mycorrhizal fungi colonization on roots from the fumigated soils was about a third of that found on corn roots from the natural soil. Corn grain yield, Table 1, from the fumigated soil plots was about a quarter of what it was from the natural soil plots.

Serendipity is making a desirable discovery by accident and this demonstration was just that. We now have an idea here in southwest North Dakota that when you eliminate or have low levels of AMF, a fungus, no matter if the phosphorous levels tests high and phosphorous fertilizer applied, corn growth and yield will be limited. It is interesting to note the producer has not seen stunting or purpling of corn or any other crop that he has grown in that field since his discovery in 2004. His management practices such as crop rotations and no-till have brought the speedy recovery of AMF and other soil

biology in the fumigated soil plots back to life. Additional information about this demonstration can be found on the Dickinson Research Extension Center website at <http://www.ag.ndsu.edu/DickinsonREC/annual-reports-1/2010-annual-report/agron10i.pdf> or use your search engine to find “NDSU AMF.”



Table 1. Corn grain yield grown on fumigated and natural soil plots, New Hradec, ND, 2004.

Treatment	Grain yield
	bu/acre
Natural soil	64.1
Fumigated soil	15.2
Mean	39.7
CV%	7.5
LSD _{0.05}	4.42