LEM NEWS



Livestock Environmental Management Newsletter

Volume 6, Issue 3. September 2017.

North American Manure Expo Innovation. Research. Solutions.

It's always fun to see the reaction of family and friends when they ask me

NorthAmerican MANUREXPO

Professionalism in Nutrient Management

what my next out-of-state trip is for and I get to answer, "The North American Manure Expo (NAME)!" The replies are either, "The what?" or "Only you would be excited about that." The funny thing is, I do get excited to go to NAME each year.

Arlington, Wisconsin was the location of the 2017 NAME. I attended the Endres Berryridge Farms Composting tour. We visited the Jeff Endres dairy operation that uses a compost bedding management and bedding recycling system. Bedding



pack manure and sawdust are mixed with free stall manure before going to the compost pad that is under roof. Compost windrows are built over four weeks and with scheduled turning produce

(Continued on page 2)

On a recent Podcast I listened to, the speaker said we should think of September like another January: a chance to reset and start again before the year is over. After this summer, I think a reset is exactly what I'm looking for!

From traveling to Utah and Wisconsin to share the work we've been doing in North Dakota, to forage sampling, to Nutrient Management Day, I'm ready to share with you what I've learned during this past season.

Fall is my favorite time of the year for producer visits so if you have any manure management questions, give me a call (701.652.2951) or send me an email (mary.berg@ndsu.edu)!

My guess is that you, too, are ready for a reset after the past growing season's weather conditions.

As we finish summer's work and roll into fall, let's think of it as a time to reset our plans for the next four months and do the best with what we have despite our current conditions.

—Mary

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Editing and layout: Linda Schuster, Carrington REC.

NAME 2017

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finished compost over the next eight weeks. This compost system helps balance P & K for the farm nutrient management plan and brings the opportunity for better distribution of nutrients and a wider window for application.

The education tents were ripe with presentations such as <u>Can Cover Crops and Tillage Help Reduce Erosion and Phosphorus Losses?</u>, <u>Public Perception</u> and <u>Manure Application Uniformity - Agronomic and Machinery Considerations</u>. All of the presentations along with other tour topics can be found at https://

www.manureexpo.org/2017-presentations.html.

Of course, it wouldn't be the NAME without demonstrations of the newest solid manure spreaders, liquid spreading systems, pond agitation equipment and compost turners.

Though there is comfort in tradition, learning comes from change. And so each year the location of NAME changes, which allows us "manure professionals" the opportunity to learn about manure management in various parts of the US. It also allows producers and haulers from different regions the opportunity to experience NAME. Each year the NAME tours have a new focus and the educational sessions emphasize the latest research and pertinent industry information.

We are very excited to be co-hosting with South Dakota State University Extension for the 2018 NAME. Stay tuned to LEM News and check the NAME website (http://www.manureexpo.org/) often as details will start to roll in with planning underway. I hope you will join me in Brookings, SD on August 15-16, 2018! — *Mary Berg*



August 15-16, 2018

TOP 10 REJECTED MANURE EXPO SLOGANS

- ☑ Let's Make Manure Great Again.
- ☑ Get the Scoop on Poop.
- **☑** Manure Expo. Immerse Yourself!
- ☑ Manure Expo 2017 You Just Gotta Go!
- ✓ Our Job is Crappy on a Good Day.
- **☑** Craptologists Unite.
- ☑ Man-ure In for a Good Time.
- **☑** Experience Our Excremental Growth.
- ☑ My Dad Went to the North American Manure Expo and All He Got Was This Crappy Shirt!



Manure's Value to Erosion and Runoff

Excerpts from July 26, 2017 Soil Health Nexus Manure and Soil Health (MaSH) blog posted by Mary Berg

Manure's impact on formation of larger and more stable soil aggregates was the focus of a July 2017 MaSH blog. This article reviews the soil erosion and runoff benefits that results from changes to soil's physical characteristics from manure.

Charles Wortmann and Dan Walters, faculty with the University of Nebraska-Lincoln, provide several important insights in a field research initiative that monitored soil erosion, runoff, and phosphorus (P) loss from replicated field plots over three cropping seasons immediately after manure application and four subsequent years when no manure was applied. This blog reviews results published in a Journal of Environmental Quality article, Phosphorus Runoff During Four Years Following Composted Manure Applications, and related information.

Figure 1. Can manure be part of the solution for the erosion in this photo?

Take Home Message:

This research demonstrates that manure has significant value for reducing runoff and erosion. It does not solve the problems illustrated in the photo. In combination with other soil management practices, manure can protect our soils and limit agriculture's environmental costs. However, manure can be an environmental negative if phosphorus is allowed to accumulate in soils. To achieve the environmental benefits of manure and minimize the risks, manure application rates and frequency of re-application to the same field must maintain soil P levels near the agronomic levels required by the selected crops.

Wortmann and Walters's primary intent was to understand P losses from manure application. However, several important results on soil physical and chemical characteristics were observed.

Lesson 1: Compost application reduced erosion and runoff by approximately 2/3 during the three cropping seasons following manure application. Improvements in soil water holding capacity and soil infiltration rates were responsible for the lower runoff and erosion levels. However, increased P levels in neighboring surface waters is an expected negative environmental impact (*more in Lesson 4 below*).

Lesson 2: Manure application has a residual benefit for runoff and erosion that persisted for at least the next 3 cropping seasons. This research observed an approximate reduction in runoff of 40% and erosion of 55%. The reduced runoff also suggest additional soil moisture storage and greater crop resiliency to dry periods.

Lesson 3: Additional soil quality benefits were observed for soil bulk density, soil organic matter, and pH. Although visual evidence of compost disappeared within one year, soil organic matter content and pH benefits of manure were observed 4 years after the last manure application.

Lesson 4: Increased soil P levels were significant as a result of three consecutive years of compost manure application and producing increased P movement in runoff and erosion. Application to meet crop N requirements applies more P than is required for crop production. Repeating this practice three years in a row as well as application of a high P compost (manure from cattle fed diet with distillers grains) further aggravates this negative environmental impact.

Manure's economic and soil improvement benefits should both be recognized and built into successful cropping systems. Thanks to the work of Wortmann and Walters, we have better insights as to how manure can improve the physical characteristics of soils thus reducing runoff and erosion.

Author: Rick Koelsch, University of Nebraska. – Lincoln. Reviewers: Charles Shapiro, University of Nebraska-Lincoln; Gary Lesoing, University of Nebraska-Lincoln; John Gilley, USDA Agricultural Research Service.

Soil Life on Display!

One of the major advances in understanding soils is the realization that the soil is ALIVE!

Soil contains millions of soil microbes or "critters"....living, breathing, functioning organisms that as farmers, ranchers and anyone who likes to eat food, we depend upon for carrying out vital processes. Management has much to do with how "healthy" a soil is. <u>Less tillage (disturbance), more soil cover (moderate temperature), and increased diversity in crop rotation (buffet of microbe food) are major soil health building factors</u>. Overall soil health and microbial health can be greatly enhanced by using manure and composted manure as a food source for soil microbes.

Below is a great visual demonstration showing the beneficial biological impact that livestock manure/compost can have on a soil in a short period of time. Biological decay is present as fast as 30 days. The amount of decay is dependent on tillage vs no tillage and manure/compost vs none applied. As shown, there is less decay in the conventional tillage example (center) due to the microbes constantly being destroyed. Conventionally tilled fields will have delayed breakdown of crop residues compared to long term no-till fields where the microbe activity is performing at a higher level seen in the lower left example. The most amount of microbial activity was on the examples of where manure or compost was applied (top left and right). The examples clearly show a dramatically greater amount of microbial activity that has been carried out due to the easily digestible microbial food available in the manure/compost.

To "energize" a soil microbe population, manure/compost as well as cover crops are a couple management options producers can use to increase the available food supply. Adding manure/compost and cover crops also enhances soil structure, organic matter, and infiltration. These are key components to improved soil health for long term sustainable production agriculture. — *Paul DuBourt, District Conservationist, USDA - Natural Resource Conservation Service, Carrington Field Offices.*



Nutrient Management Day 2017

Nutrient Management Day was held Tuesday, August 29th at the NDSU Carrington REC. The day began with a great start as early arrivers asked in-depth questions relating to their operations. Participants were welcomed to the Carrington REC at 10 a.m. and shortly thereafter loaded the wagon to make way to the livestock unit.



At the livestock unit, Chanda Engel, Livestock Research Specialist, provided an overview of the cattle, nutrition research being conducted at the CREC and explained the management of maintaining a drylot pen surface as Tim Schroeder, Livestock Technician scraped the surface manure into a pile with a box scraper. Participants asked questions relating to the genetics of the cattle, heat and insect stress in a drylot pen, and research trials currently being conducted. As we watched Schroeder make rounds in the drylot pen, Engel and Mary Berg, Livestock Environmental Management Area Extension Specialist pointed out factors involved in surface man-

agement such as slope and drainage of the drylot pen.

Next up were the compost rows. As participants exited the wagon, they received a pair of gloves. Everyone dug into the compost piles as Megan Vig, Griggs County Agriculture and Natural Resources Extension Agent and Berg visited with them on what it takes to make a quality compost. Participants learned about moisture levels, temperature fluctuations, and the requirements of the aerobic microbes that convert livestock manure into compost. Participants were surprised to see the

volume reduction of compost materials. Schroeder provided a



Participants at Nutrient Management Day check out freshly turned compost rows.

compost turner demonstration. The speed of the tractor (creeper gear) and moisture of the compost row was addressed during the demonstration.

Following lunch, participants stayed inside the meeting room for Chris Augustin's, Soil Health Area Extension Specialist, presentation on interpreting lab analyses of compost and soil samples. The presentation highlighted the nutrient requirements of crops and how producers can approach meeting nutrient requirements with compost. If you try to meet the plant needs of nitrogen with compost or manure, you will be overloading the system with too much phosphorus. Conversely, if you meet crop needs of phosphorus, additional nitrogen fertilizer will need to be supplied. Using example scenarios, participants followed along with Augustin to calculate compost application rates.



Buried treasure. See companion article on page 4.

NM Day 2017

(Continued from page 5)

Participants loaded the wagons for a final time to visit locations around the CREC. A month prior, Berg buried men's undergarments around the station. Participants had the opportunity to excavate the undergarments and evaluate microbial activity. After collecting the drawers, Berg displayed each pair to be compared to one another. Likely the highlight of the afternoon for all the participants, ob-

servations of the cotton material or lack thereof were shared.



Participants were able to observe run-off and infiltration of differently manured soils using the rainfall simulator.

Megan Vig demonstrates the "wet-rag test" for checking moisture levels in a compost row.

Paul DuBourt, NRCS District Conservationist followed Berg's thought-provoking demonstration with another influential demonstration. Using a rainfall simulator and five field soil examples, participants observed the differences between run-off of rainfall and water infiltration of the soil profile. With variables of manure/compost application, tillage practices, and cover crops, participants were intrigued with how rainfall either infiltrates the soil profile or finds its way into the nearest slough. The simulator demonstrated the benefits of applying manure to fields. Those soils that had manure applied had more visible infiltration into the soil rather than runoff.

Nutrient Management Day was full of information and powerful demonstrations. Be sure to include it on your calendar for next year! — Megan Vig, Ag and Natural Resources Extension Agent, Griggs



North Dakota 1500 Head Dairy Featured at World Dairy Expo Virtual Tour

World Dairy Expo Virtual Farm Tours have been bringing the best dairy operations in North America to Madison for more than 15 years. The eight dairies selected this year are no exception, featuring technology and innovation, outstanding milk production and genetics, strong community ties and first-generation immigrant farmers, top-notch cow and calf care and an expanding dairy. These tours begin with a half-hour visual presentation of the operation by the owner or herd manager, followed by time for questions and an open discussion.

Hosted by: Van Bedaf Dairy LLP, Carrington, N.D. Highlights: 1,500 milking/First Generation U.S. Farm

Sponsored by: Quality Liquid Feeds, Inc. Virtual Farm Tour Friday, October 6, Noon

Conny and Corne van Bedaf have dairy farmed in the Netherlands, Canada and now North Dakota. Moving to the United States after experiencing expansion limitations in both previous locations, the van Bedaf family has built VanBedaf Dairy, LLP from the ground up.

Starting with 800 springing heifers in 2009, the 1,400-cow herd has increased its size and rolling herd average more than 29,000 pounds of milk to more than 28,000 pounds of milk today. This growth was achieved through breeding cattle to top without compromising wellness. Now with more data available, they utilize genomic testing to continue the herd's genetic progress.

The van Bedaf family has worked hard to build relationships in the community. In a continued

effort, every other year, the family opens their doors for LegenDAIRY, a community appreciation open house. They also lease dairy calves and heifers to local 4-H members to show.

To minimize its environmental impact, the farm collects rain water from the roofs and the waste water from the parlor to aid in sand separation. The farm also incorporates unique byproducts into the herd's rations, such as pasta waste.

The van Bedaf family. Back row, left to right: Casey Murphy, Dries van Bedaf, Piet van Bedaf. Front row, left to right: Maartje van Bedaf, Conny van Bedaf, Corne van Bedaf, and Taryn van Bedaf. Photograph by Duke Photos. Used with permission.

VanBedaf Dairy will wel-

come two new partners in the operation this year, Conny and Corne's sons, Piet and Dries.

— from https://worlddairyexpo.com/pages/2017-Virtual-Farm-Tours.php

Don't Waste Your Money!

It's that time of the year, just prior to hearing bawling calves for days at a time, that we *smell* the pens they will be going into getting cleaned out. I equate freshly cleaned, dry pens to freshly washed bed sheets. For cattle health purposes and disease free areas, we know it's best to have clean pens.

Whether you are spreading the manure yourself or having a North Dakota Custom Manure Hauler do the job for you (find one here: www.ag.ndsu.edu/lem) calibrating the spreader should be a top priority. I often ask producers, "Would you spread your commercial fertilizer without calibrating the spreader?", and 100% of the time the answer is no.

It is well known that livestock manures, more specifically for North Dakota, cattle manure, contains beneficial soil building ingredients, along with necessary plant nutrients. These valuable nutrients may be wasted by over-application or crop yield goals may not be met due to under-application because of a lack of spreader calibration. Manure is money, so let's not waste it!

Full details and photos on calibration methods can be found here: https://www.ag.ndsu.edu/publications/livestock/manure-spreader-calibration-for-nutrient-management-planning as well as attached to the end of this newsletter. I'm going to highlight the Sheet Method.

This method works well for solid manure applications.



Various brands of manure spreaders were features at the North American Manure Expo in Arlington, Wisconsin. Photo by Kevin Erb. Used with permission.

Materials:

easily as it will on a plastic sheet.

- ⋄ Scale

	Manure on Sheet (lbs)	Multiply	Correction Factor (21.8)	Divide	Square Feet of Sheet (Length x Width)	Equals	Tons of Manure Per Acre
Example 1	21.25	x	21.8	÷	21.8	=	21.25
Example 2	21.25	x	21.8	÷	24	=	19.3
Sheet 1		x		÷		=	
Sheet 2		x		÷		=	
Sheet 3		x		÷		=	

Manure	Tarp Size, feet							
Weight	5x7	6x8	6x4, 8x3°	4x10, 8x5				
lbs.								
2	1.2	0.9	1.8	1.1				
4	2.5	1.8	3.6	2.2				
6	3.7	2.7	5.4	3.3				
8	5.0	3.6	7.3	4.4				
10	6.2	4.5	9.1	5.4				
12	7.5	5.4	10.9	6.5				
14	8.7	6.4	12.7	7.6				
16	10.0	7.3	14.5	8.7				
18	11.2	8.2	16.3	9.8				
20	12.4	9.1	18.2	10.9				
22	13.7	10.0	20.0	12.0				
24	14.9	10.9	21.8	13.1				
26	16.2	11.8	23.6	14.2				
28	17.4	12.7	25.4	15.2				
30	18.7	13.6	27.2	16.3				
32	19.9	14.5	29.0	17.4				
34	21.2	15.4	30.9	18.5				
36	22.4	16.3	32.7	19.6				
38	23.6	17.2	34.5	20.7				
40	24.9	18.2	36.3	21.8				
42	26.1	19.1	38.1	22.9				
44	27.4	20.0	39.9	24.0				
46	28.6	20.9	41.7	25.0				
48	29.9	21.8	43.6	26.1				
50	31.1	22.7	45.4	27.2				

Procedure:

- 1. Weigh the bucket and a sheet to tare the weight of the manure.
- 2. Lay out the sheets in a row and anchor them down with a few rocks or stakes.
- 3. Start the tractor and turn the spreader on. Allow time for the spreader to start spreading.
- 4. Record your tractor gear, engine's revolutions per minute (RPM) and spreader settings.
- 5. Drive over the sheets, applying manure over them.
- 6. Retrieve the manure covered sheets and weigh them in the bucket.
- 7. If a sheet measuring 21.8 feet² (3 feet by 7 feet 4 inches or 4 feet by 5 feet 6 inches) is used, then the weight in pounds of manure on the sheet is equal to tons/acre (Table 2, Example 1). Example 2 shows how to determine the application when a different size sheet is used (see Table 3 for some examples of tarp sizes, manure weight and correspondent application rate).

The application rate is given by the following expression: Rate (tons/acre) = (pounds of manure on sheet x 21.8) \div sheet area (feet²).

NDSU Extension Agriculture Agents and Specialists Recognized for Their Work

Several North Dakota State University Extension Service agents and specialists were honored for their work during the recent annual meeting and professional development conference of the National Association of County Agricultural Agents (NACAA) in Salt Lake City, Utah.

Those receiving recognition were:

Dan Folske, agriculture and natural resources agent in Burke County - National Distinguished Service Award, which recognizes the recipient with a 10-plus-year Extension career for long-term effectiveness of Extension programming. Folske has been an Extension educator for more than 27 years and is known for his programming in horticulture, cropping systems and computer technology. He works with youth at area schools and in 4-H clubs to start plants indoors, making sure each participant receives transplants to take to a home or container garden. He is known as the "go to" person for computer problems in Burke County and has led the way in the use of technology in Extension programming and on the farm.



Mary Berg accepted the National Achievement Award from (left) NACAA President Mark Nelson and (right) Bill Viar, representing award sponsor American Income Life Insurance Company.

Mary Berg, area Extension livestock environmental management specialist at the Carrington Research Extension Center - National Achievement Award, which recognizes outstanding educational efforts by a person with less than 10 years of experience with the Extension Service. Berg's Extension programming focuses on water quality improvement via livestock manure management. She is secretary of the North Dakota Association of Agricultural Extension Agents and treasurer for the North American Manure Expo.

Berg also was the state winner in the Website, Video Presentation and Fact Sheet categories. These awards recognize her efforts with her website, Center Points, a weekly blog that high-

lights current research and programming at the Carrington Research Extension Center, and her YouTube clip "How to Compost Dead Livestock" and a companion-piece printed guideline titled "5 Easy Steps for

Composting Dead Livestock." Alicia Harstad, the agriculture and natural resources agent in Stutsman County, collaborated on these projects.

In addition, Berg was named a state winner and national finalist in the Search for Excellence in the Consumer or Commercial Horticulture category for her learning module "Kids, Compost, Crops and Consumption," which was developed with team members Todd Weinmann, the agriculture and natural resources-horticulture agent in Cass County, and Harstad.

As part of "Kids, Compost, Crops, and Consumption, students were asked to create a sketch depicting their connection to soil.

Weinmann - honored in the Program Promotional Piece cate-

gory for his leadership and collaboration with Fargo Cass Public Health in designing and planting a successful containerized community vegetable garden.

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Greg Endres, area Extension cropping systems specialist at the Carrington Research Extension Center regional winner in the Publication category. His Extension publication, "Impact of Planting Dates on Dry Edible Bean," emphasizes that the traditional planting dates from late May to early June remain appropriate because early planting increases risk, while seed test weight increases at normal planting dates. This publication won at a state competition before advancing to the regionals. Hans Kandel, NDSU Extension agronomist, co-authored this publication.

Harstad - state winner in the Computer Generated Graphic Presentation category for a presentation that's part of the NDSU Extension's "Composting Dead Livestock" program. It details the process of effectively dealing with mortalities while creating beneficial compost suitable for application on cropland. Mary Berg collaborated on this project.

Lindy Berg, agriculture and natural resources agent in Towner County - national finalist for Poster Presentation in the Extension education category. Her poster highlighted a real-life case study of a local producer who was faced with frost-damaged flax and wondered whether he should replant flax, start over with soybeans or see how the original crop recovered. Berg competed at state and regional levels before advancing to the national level.

Lindy Berg also was the North Dakota honoree in the Search for Excellence in Crop Production category for "Women on the Farm," a collaborative project with the Towner County Soil Conservation District and Dakota Precision Ag Center at Lake Region State College. The project educates women, empowers them to expand their role on the farm, and helps them gain a better understanding of the everyday problems and solutions in agribusiness.

In addition, Lindy Berg was recognized as a state winner for her weekly column, "People Were Wondering," published in the Towner County Record Herald and distributed via email from May through October. Each week's installment is distributed to 2,700 households in Towner County. The column addresses horticulture and farming questions from the community.

Craig Askim, agriculture and natural resources agent in Mercer County - Agriculture Awareness and Appropriation Award for his recent master's thesis on the importance of

preciation Award for his recent master's thesis on the importance of agriculture education and agricultural literacy across North Dakota and in his county.

Brad Brummond, agriculture and natural resources agent in Walsh County - named to the State and Regional Halls of Fame for his lifelong service to Extension. Brummond has been heavily involved with underserved audiences throughout his career and is best known for his work with organic and sustainable agriculture programming in ND.

Mary Berg, Weinmann and Harstad were recognized for their team newsletter, "KCCC-Kids, Compost, Crops and Consumption," which advanced through state and regional competitions before competing on this national platform.

Mary Berg also presented a seminar at the conference on the longterm value in developing meaningful relationships with constituents. More than 1,000 Extension professionals from the U.S. and Puerto Rico attended the conference. — *NDSU Agriculture Communications*



NACAA participants had a little time for sight seeing while they visited Utah.

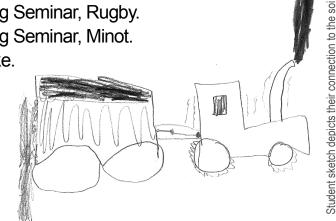
Coming Events

- Oct. 3-7 World Dairy Expo, Madison, WI
- Oct. 10 NDSU Calf Backgrounding & Feeding Seminar, Center.
- Oct. 10 NDSU Calf Backgrounding & Feeding Seminar, Medora.
- Oct. 10 NDSU Calf Backgrounding & Feeding Seminar, Bowman.
- Oct. 11 NDSU Calf Backgrounding & Feeding Seminar, Linton.
- Oct. 11 NDSU Calf Backgrounding & Feeding Seminar, Ashley.
- Oct. 11 NDSU Calf Backgrounding & Feeding Seminar, Napoleon.
- Oct. 12 NDSU Calf Backgrounding & Feeding Seminar, Binford.
- Oct. 12 NDSU Calf Backgrounding & Feeding Seminar, Rugby.
- Oct. 12 NDSU Calf Backgrounding & Feeding Seminar, Minot.
- Oct. 21 Dakota Feeder Calf Show, Turtle Lake.

2018

Jan. 19-20 Winter Ag Expo, Jamestown.

Feb. 27: Farming & Ranching for the Bottom Line, Bismarck.



Center Points: Easy as 1-2-3...

The Carrington REC has a weekly blog with updates on what's happening now and information on coming events. Read online at www.ag.ndsu.edu/CarringtonREC or subscribe to receive a weekly reminder and quick link.

Subscribing is as easy as 1-2-3:

- 1. Send an e-mail to Listserv@listserv.nodak.edu
- 2. Leave the subject line of the email blank
- 3. In the body (not the subject line) of the e-mail enter the following: SUB NDSU-CARRINGTONREC-CENTERPOINTS yourfirstname yourlastname

OR: Simply send a regular email to Mary.Berg@ndsu.

Contact Us —

Center

Carrington

NDSU Carrington REC

663 Hwy 281 NE | PO Box 219 | Carrington, ND 58421 Phone 701-652-2951 | Mary.Berg@ndsu.edu Visit us on the web at www.ag.ndsu.edu/CarringtonREC







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