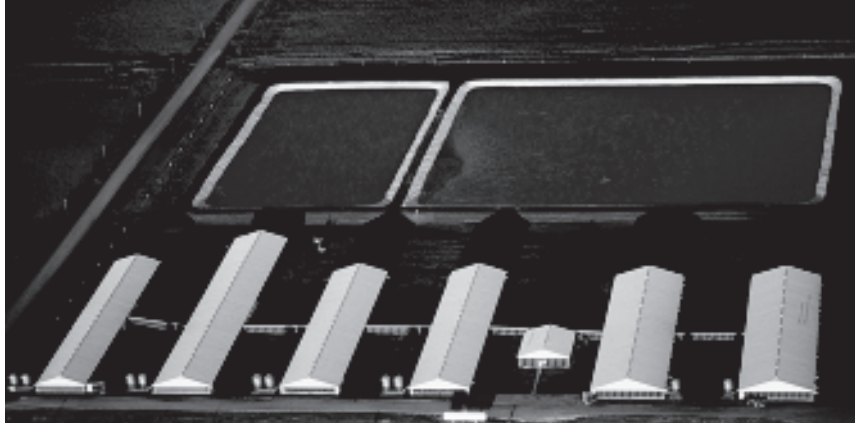


Odor

and Nutrient Management

EDC-129-21, Volume 6, Issue 3

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Welcome to the Odor and Nutrient Management Newsletter

by Angela Rieck-Hinz, Department of Agronomy

Welcome to the 21st edition of the *Iowa Manure Matters - Odor and Nutrient Management Newsletter*. With this edition, we begin the sixth year of publication and are currently mailing newsletters to 5,675 people. This newsletter is published four times per year and is available to subscribers at no charge through a cooperative agreement with the Iowa USDA-NRCS. The newsletter is also available on the Web at: <http://www.extension.iastate.edu/Pages/communications/EPC>.

The goal of the *Manure Matters - Odor and Nutrient Management Newsletter* is to provide

timely educational articles relating to manure management concerns to Iowa producers and their technical advisers. Occasionally, the newsletter offers readers the opportunity to complete a survey regarding information found in the newsletter. Please take time to complete and return the survey. Information collected from the surveys is used to determine your needs and ways to improve the newsletter.

Extra copies or back issues of the newsletter can be ordered through the Iowa State University Extension Distribution Center



Field day attendees listen to ISU Extension Ag Engineer, Kapil Arora, explain how to calibrate a manure tank wagon.

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by calling (515) 294-5247. Please refer to publication number EDC-129 and the specific volume and issue number. To subscribe or change an address; please contact Angela

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Changes Coming for 2004 Manure Applicator Program

by Karen Grimes, Iowa Department of Natural Resources

Commercial and confinement applicators can expect major changes in the 2004 manure applicator certification program, due to House File 644, passed by the 2003 General Assembly.

The Department of Natural Resources (DNR) will write rules to put the new law into practice, a formal process that includes public input and normally takes about six months. The rules are presented to the Environmental Protection Commission (EPC) two or three times and the final version often changes based on public input or the commissioners' concerns. Because of the short time before applicator certificates begin to expire on Dec. 31, the DNR may ask the commission to adopt the rules on an emergency basis. This will allow the rules to be finalized before the new training sessions begin in January of 2004.

Until the new rules are written and approved by the EPC, the DNR can only provide information about the changes required by H.F. 644. Details of the program will be available when the rules are finalized. However, the DNR anticipates that both confinement site and commercial applicators will have to pay an educational fee, and that certification fees for commercial applicators will be set at the maximum allowed by law. Confinement site application fees will be adjusted annually, based on program costs.

The major change for commercial applicators is that certificates will not be issued to individuals. Starting in 2004, the new law requires commercial manure services to be licensed and commercial applicators to be affiliated with the licensed business. The service license fee will be \$200 in 2004, whether the business is a sole proprietor or a business association. Sole proprietors will be covered under the service license as managers.

Employees of the business or commercial manure service representatives must still be certified by taking three hours of annual training or passing a test. The law

allows each company to designate a manager, someone who is actively involved and makes management decisions in the operation of the business. Although managers are service representatives and have to fulfill the training or testing requirements, they will not have to pay a certification fee. Other service representatives will pay a certification fee of \$75 in 2004.

Businesses may pay the certification fee. If the commercial manure service pays the certification fee, it will hold the certificate numbers for its employees, allowing substitutions if an employee quits during the year. The new or substituted employee will have the same certificate number as the former employee. The DNR will still have information on the former employee's training or testing record. However, the former employee will need to be associated with another licensed commercial manure service or start a business of his own.

All employees will have to fulfill the training or testing requirement annually. New or substituted employees who have not taken training or passed a test must complete those requirements within 30 days of hiring. Commercial manure services can anticipate naming a manager and representatives to the DNR and inform the DNR when a substitution occurs.



ISU Extension Ag Engineer, Kris Kohl, demonstrates how to block a culvert to contain a manure spill.



Use of the Phosphorus Index in Manure Management Planning

by Jeremy Klatt, Iowa Department of Natural Resources

Current manure management plan (MMP) requirements for confinement feeding operations base manure application rates on the amount of nitrogen (N) needed to obtain an optimum crop yield. Due to the typical N to phosphorus (P) ratio of manure, this type of manure management often leads to over application of P, which over time can increase the risk of P loss from fields to surface waters. In accordance with Senate File 2293, the Department of Natural Resources is developing rules that incorporate the use of the Iowa P-index to determine acceptable manure application rates in MMPs.

The P-index is a management tool that assesses the potential for P loss from a field to surface waters. It provides a comprehensive estimate of P loss that considers not only soil P concentrations, but also other factors that affect P loss from fields, such as soil properties and land management. Once the new rules become effective, all fields that receive manure from operations requiring an MMP will need a P-index risk assessment. The results of the P-index will be used to determine, on a field-by-field basis, if manure application rates may be based on N (current guidelines) or must be based on P.

If an application rate must be based on P, manure application rates cannot supply more P than will be removed from the field with crop harvest(s). As a result of the field-by-field determination of application rates, it is possible that some operations will apply N-based rates to all fields, other operations will apply P-based rates to all of their fields, and

still others will apply N-based rates to some fields and P-based rates to others. The P-index provides flexibility for making management decisions to reduce P losses, therefore allowing reduction of a field's P-index rating through the use of conservation practices.

The DNR will review the proposed rules with technical and stakeholder committees in September. The rule-making process will begin in October and DNR anticipates that the rules will become effective in March or April of 2004. The rules will be phased in over four years, starting 60 days after the rule becomes effective. Depending on when a particular operation's original or first-time MMP was submitted, the P index must be used to determine application rates according to the following schedule:

In order to conform to U.S. Environmental Protection Agency (EPA) rules, this timeline may change. The EPA is requiring that large, concentrated animal feeding operations (CAFOs) implement plans that consider potential P loss when applying manure by December 31, 2006. Large CAFOs are open feedlots or confinement sites with more than 1000 animal units.

The Iowa P-index was developed by a team of scientists from Iowa State University, Iowa USDA-National Resources Conservation Service, and the USDA-Agricultural Research Service National Soil Tilth Laboratory. The P-index calculator and support documents can be accessed at: <http://www.ia.nrcs.usda.gov/technical/Phosphorus/phosphorusstandard.html>.

Implementation Date for P-index Based Plans

Original MMP Submitted	P-index Based MMP Update Due
Prior to April 1, 2002	4 years after rule is effective
Between April 1, 2002 and effective date of rule 60 days after DNR rules are effective (probably May or June of 2004)	2 years after rule is effective
	Upon submittal



Calibrating Slurry Tank Manure Applicators

by Kapil Arora, Agricultural Engineering Field Specialist and Mark Licht, Department of Agronomy

Correct application rates for manure has become more critical over the last few years. Future manure plans may require appropriate management of phosphorus (P), which for some producers will mean much lower application rates. The responsibility of livestock producers is not limited to completing manure management plans. It also requires that the actual application rate in the field is in compliance with the approved manure management plan (MMP).

Producers or custom applicators must know their application equipment and manure characteristics to ensure accurate application rates in the field. Liquid manure applicators generally have a slurry tank with a pump that feeds to the distribution chamber, which in turn distributes manure to different points on the tool bar. A slurry tank generally has a specific design capacity for the quantity of manure it can hold. However, due to manufacturing variations, manure foaming, and solids build-up the slurry tank may not be filled up to the rated capacity. Therefore, knowledge of how many gallons a slurry tank may hold is important. Inaccuracies may result in either under-application that may affect crop yields or over-application, which is not allowed by the

manure management plan and could potentially cause loss of nutrients to the environment.

Producers and custom applicators can easily calibrate their manure applicators after following instructions on how to weigh the

slurry tank applicator (full and empty), measure the spread pattern (length and width of spread) and application area, measure manure density, and calculate manure application rates.

Weighing the slurry tank applicator.

Manure applicators can be weighed at the local grain elevators but this will take two

trips: one to weigh the applicator full and one to weigh it empty. An alternative is to use weigh pads in the field or at the confinement site. Weigh pads should have enough capacity to weigh each tire without the tires squatting over the pad and touching the ground. If using weigh pads, make sure to take into account the

weight on the hitch. Record both the empty and full weights of the manure applicator. If you weigh on a scale that weighs the complete unit, record the total full weight and total empty weight. The weight of the manure is the full weight minus the empty weight of the manure applicator.

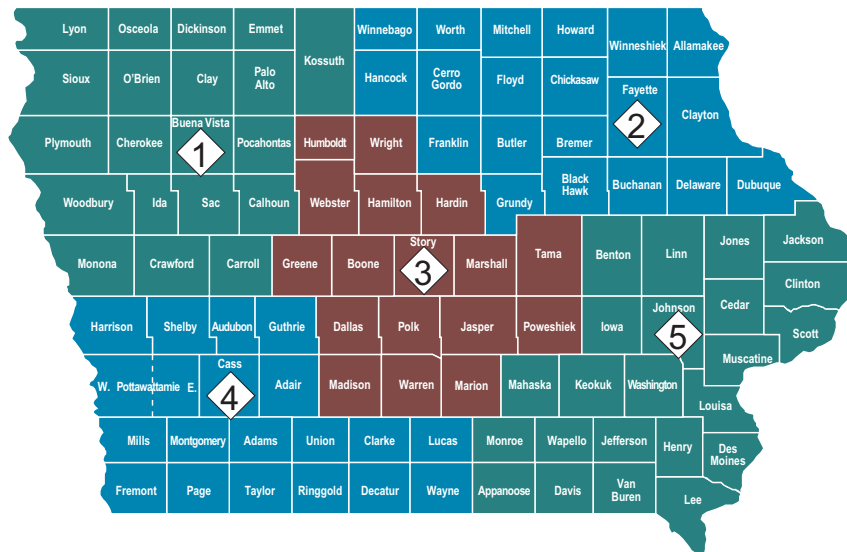
Measuring the spread pattern and application area. A spread pattern refers to how widely and how far an applicator covers



Weighing manure tank wagon for calibration.



Weigh-pad used to weigh manure tank wagon.



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before it empties the slurry tank. To calculate the spread pattern, measure (in feet) the number and spacing of knives. The spread pattern width is obtained by multiplying the row spacing by the number of knives. In the case of splash plate applicators, the spread pattern width is the actual splash width over the rows in the field. To measure the length of the spread pattern, use a measuring tape, a measuring wheel, or a range finder. Range finders generally require a reflective surface to provide a measurable reading. A measuring wheel may be the most practical, although it does require the producer to walk the whole length of application. The number of acres the manure was applied to equals the spread pattern width multiplied by the linear distance the manure was applied, divided by 43,560.

Measuring manure density. Water weighs 8.34 lbs. per gallon. However, liquid manure may weigh more based on the presence of organic solids and other heavy solids such as sand and silt. As a rule of thumb, liquid swine manure ranges in density from 8.3 to 8.9 lbs per gallon. As different livestock operations are managed differently, swine manure density is likely to vary from one operation to another. To calculate manure density, perform a five-gallon bucket test. This test requires a

five-gallon bucket, a one-gallon measuring flask, and a scale.

Fill the measuring flask up to the one-gallon mark with water and pour it into the five-gallon bucket. Repeat this process four times. Mark the five-gallon bucket where the five measured gallons of water leveled off. Now, empty the bucket and fill it with manure up to the five-gallon mark. Weigh the five-gallon bucket on a scale. Repeat the process to get at least three weight readings. Then, divide the average weight of the five-gallon bucket of manure by five, to get the pounds of manure per gallon.

Calculating manure application rates. To calculate the application rate, divide the net manure weight by the manure density, to get the number of gallons applied. The actual application rate is the number of gallons divided by the number of acres to which manure was applied.

Manure application rates can be altered by adjusting the speed of application, adjusting the diameter of the gate opening, or by other methods. For more information on manure calibration and application, contact your area extension agricultural engineering field specialist.



Manure Management: Successes and Challenges

by Mahdi Al-Kaisi and Mark Licht, Department of Agronomy, and Mark Hanna, Department of Agricultural and Biosystems Engineering

As part of an integrated tillage and manure management demonstration project in NE Iowa, a survey evaluated the impact of improved management practices in tillage and manure management. The survey was conducted with participants in the project. Cooperators consider manure a valuable nutrient source for crop production; 57 percent of them believe that using manure alone can produce corn yields comparable to commercial nitrogen (N). All cooperators take manure samples for analysis every year, to determine manure application rates. This information is

important because 71 percent of the cooperators self-apply manure: 86 percent of them applied manure based on N needs while only 14 percent based on phosphorus (P) needs.

From data obtained from on-farm trials, cooperators are finding that optimal yields can be achieved with manure use only and result in a reduction of commercial N-fertilizer use. Thirty percent of the cooperators have stopped applying commercial N-fertilizer on other (non-trial) manured fields and 14 percent have reduced supplemental commercial N by 50 lbs/acre. Cooperators are also realizing the consequences manure can have on the environment. The prevailing attitude among them was, “if you over-apply N and you do not see any yield response, this means the N is going somewhere.” Another attitude change was related to their understanding of manure as a nutrient source rather than a waste product. These changes in cooperator behavior and attitudes towards manure use

and management are a very significant step in achieving integrated tillage and manure management.

When producers were asked about the importance of manure management, the consensus was “it helps us fine-tune our

management practices” and “the project gives an opportunity to increase manure management knowledge.” Cooperators appreciate timely, site-specific information that enables them to fine-tune their individual practices. They also stress that on-farm manure management trials are “actual



Hubs and Spokes cooperators prepare to calibrate manure application equipment.

results” and “it’s exactly what happens at our fields.” Cooperators also mentioned “the information is site specific and readily available to us.” Many of them indicated that it is an advantage to have replicated and repeatable data for making manure management decisions in on-farm trials.

Cooperators are enthusiastic about participating in on-farm manure management demonstrations. Seventy-one percent of them believe they learned or improved skills by working with the project and 79 percent indicated they are managing manure much more efficiently now.

However, cooperators have expressed concerns about tillage and manure management. Currently, they foresee the following challenges related to tillage and manure management: incorporating residue cover vs. manure, achieving accurate application rates with available technology, timing manure application and sample analysis, deciding on N vs. P based application

rates, having cost-share funds available for manure application technology (i.e. flow controllers), dealing with the costs associated with hauling, applicators, technology, and sample analyses.

For more information regarding this demonstration project, please see the project summary reports for the Hubs and Spokes

Demonstration project at this Web site: <http://extension.agron.iastate.edu/iflm/hubspokes.html>.

The Hubs and Spokes Project, part of the Integrated Farm/Livestock Management (IFLM) Demonstration Project, receives funding from the Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation.



Upcoming Events Related to Nutrient Management

For more information regarding the following events, please see the IMMAG Web page at: <http://extension.agron.iastate.edu/immag/events.html>.

Environmental Quality and Agriculture Coexisting in the 21st Century: Balancing Nutrients and Enhancing the Environment
November 10-12, 2003
Des Moines, IA

33rd North Central Extension-Industry Soil Fertility Conference
November 19-20, 2003
Holiday Inn University Park,
West Des Moines, IA

Governor's Water Quality Summit
November 24-25, 2003
Ames, IA

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... and justice for all

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