University of California
Agriculture and Natural Resources

California Dairy Newsletter

Vol. 8, Issue 3 August 2016

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Dairy Biosecurity – Do You Know Who is on Your Dairy?

Denise Mullinax, California Dairy Research Foundation

In order to protect the health of your animals, the productivity of the facility and your family's financial investment, it is important to identify and control traffic on the dairy. Simple precautions and employee training, as highlighted below, can go a long way in helping protect your farm from the spread of disease, theft and more:

- ✓ **Do** establish boundaries around the dairy that eliminate open-access and help funnel traffic to main points of entry as much as possible.
- ✓ **Do** post biosecurity signs at entry points as well as no trespassing and no unmanned aircraft (drones) signs for the protection of animal safety along the property line.
- ✓ **Do** empower and train employees to stop unrecognized visitors and ask them who they are, who they need to speak with and/or the nature of their business on the dairy. Provide clear direction on where visitors should be directed and who to contact.
- ✓ **Do** verify ALL non-regular visitors such as government inspectors and new contractors, etc. with a picture I.D.
- ✓ **Do** accompany non-routine visitors (e.g. inspectors) around the dairy during their visit – answer questions, assist in finding needed inspection locations within the facility, and if you allow them to take pictures, take pictures of your own to capture their points of interest/discussion.

If you suspect suspicious activity:

- ✓ **Do** learn as much information about who they are as possible (including vehicle make and license plate number).
- ✓ **Do** take pictures/video of their activities while they are on or near your property.
- ✓ **Do** report the activity to your trade association and /or milk processor in case the incident is part of a bigger effort.
- ✓ **Do NOT** be combative or destructive.

Manure—Maximizing the Value of its Nitrogen

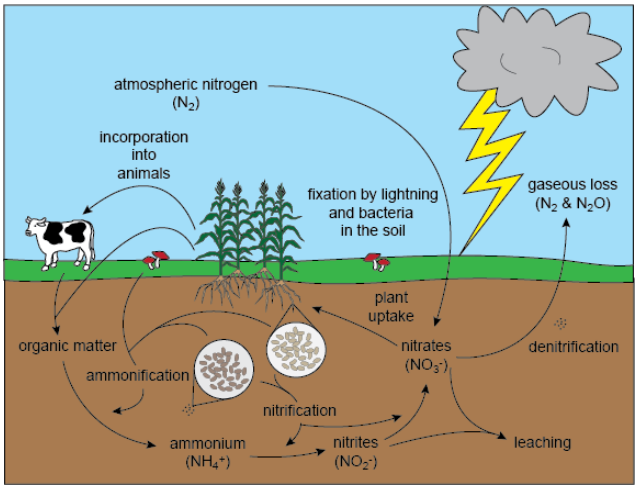
Deanne Meyer, Ph.D., Livestock Waste Management Specialist Department of Animal Science, UC Davis

It's summer and temperatures often break the 100° F mark. It's funny how we are all grateful when the highs during fair are in the upper 80s or low 90s and not over 100! No doubt we still have a few days before fall when the temperatures will go beyond 100. Why would I be thinking about temperature and nitrogen management at the same time? My simple answer is that manure nitrogen can be a valuable crop nutrient when conserved and managed. Temperature plays a part in that. Now for the rest of the story…

The crude protein concentration in diets is formulated to provide nitrogen and amino acids for animal production and growth. Diets with concentrations greater than needed result in animals excreting more nitrogen. Diets with concentrations less than needed may result in reduced production (less milk made or lower growth rates). **Targeting formulations to animal needs has the greatest potential to optimize nitrogen use efficiency.**

Data from feed inventory analysis on 7 commercial dairies in CA identified that 16 to 27% of total nitrogen in feedstuffs delivered to the facility were recovered in milk and animal tissue (growth). The other 84 to 73% of nitrogen was assumed to be excreted. For 100 lbs of nitrogen fed to these dairy herds (all replacements were reared on-site) roughly 73 to 84 pounds would be excreted.

What happens to the excreted nitrogen? That all depends on the animal housing and manure collection/storage process. Most of the nitrogen excreted by dairy animals is in the organic form. Let's look at the highlights of the nitrogen cycle. Organic nitrogen needs to be mineralized to ammonium (see ammonification in the lower left part of graphic). Ammonium is a plant available form of nitrogen. It's not particularly mobile. It clings to negatively charged particles including clay. It may also off gas to the atmosphere as ammonia. Or, ammonium may be converted to nitrite and nitrate through nitrification. Nitrate is also plant available. Unfortunately, since nitrate has the same negative charge as most soil particles, it does not cling to soil particles. In fact, it leaches easily when excess rain or irrigation water is applied. Nitrate may be fully denitrified and leave the solid/liquid system as N_2 gas. This colorless, odorless gas makes up about 78% of the air we breathe. Microbes and enzymes present in the soil are responsible for nitrogen metabolism.



Most nitrogen in manure is in the organic fraction. The fact that it's organically bound is great for the soil, as organic amendments are a great way to help build up soil organic matter content. However, the timing of availability of organic nitrogen is not as predictable as we'd like it to be in order to manage crop nutrient needs based on organic nitrogen applications.

Urea is the next largest form of nitrogen excreted in cattle urine. Urea is no stranger in farming. In fact, synthetic urea is used as a fertilizer. When entering the dairy manure stream, urea is often hydrolyzed to ammonium (if in a moist or wet environment) and then either volatilized as ammonia or it stays in solution. Ammonium in liquid manure is plant available. Ammonium will volatilize. Volatilization increases as pH, temperature, and wind speeds increase. Site specific conditions, including management, impact how much ammonia is volatilized. When liquid manure is managed to conserve nitrogen, the next step is to manage it to minimize losses. Ammonium can undergo nitrification to nitrate after land application. Matching application timing and rate to crop needs is key to be efficient with nitrogen incorporation into plant matter and not lost to

the environment. The nitrification process requires an oxygen rich environment [note: very few dairy lagoons in California would promote nitrification within the lagoon]. Ammonium may also remain adhered to soil particles. Under our hot summer conditions, urea in open lots may not hydrolyze as the moisture rapidly dissipates. Urea that hydrolyzes in open lots will likely volatilize as ammonia.

Manure collection/treatment systems

Rapid drying of open lot feces and urine has the greatest potential to conserve nitrogen. Keeping corrals dry and well managed will minimize pockets of wet material. Some operators harrow daily to break up clods and aid in drying. This is helpful to reduce fly populations as well as conserve urinary nitrogen. Management of solid manure through active composting is great to reduce microbial populations present, however it will result in loss of ammonium as piles are turned and rewetted. Flush systems regularly collect feces and urine from concrete lanes and transfer the material to a liquid storage/treatment structure. Urea is hydrolyzed and ends up in the liquid system as ammonium. The amount of this volatilized to the atmosphere will depend on wind speed, pH, temperature, and exposure surface. If you actually smell ammonia at the bank of a lagoon, you might want to check the pH and see what modifications are possible to lower the pH to something closer to 7.

Use of manure treatment technologies

First, identify what you expect the technology to accomplish (its job description) before you ask any questions about the technology. If you want a technology that removes solids from a liquid waste stream there are many different types and they all function a bit differently. If this is your focus---carefully evaluate your bedding source, amount used and particle size length. Experience shows us that particle length of different bedding sources varies, resulting in big differences in how separators or technologies work from dairy to dairy. Alternatively, if you want a technology that reduces the amount of nitrogen you emit to the atmosphere from your manure treatment/storage area, then perhaps you're considering monitoring and management of pH, temperature, and wind speed. Transferring nitrogen from the liquid to the solid phase opens up greater opportunities for nitrogen exports.

Carefully identify the job description and expectations (manure function, employee labor, etc.) of any new management practice or technology before you consider it for your facility. Due your due diligence with air and water regulatory agencies BEFORE considering purchase and installation.

Summary

Yes, the nitrogen cycle is complex. Yes, nitrogen is very important to manage in order to maintain groundwater quality. Yes, there are things one can do. First, talk with your dairy nutritionist to be sure you're not over feeding nitrogen to your animals. Second, evaluate manure handling to optimize nitrogen conservation once excreted. Keep solids in corrals dry in summer. Regularly flush lanes to collect and contain urea/ammonium nitrogen. Third, talk with your crop consultant about organic nitrogen variability.

Reference

Meyer, D. and P.H. Robinson. 2007. Use of feed inventory records to reduce nutrient loading at dairy operations: Producer options. http://anrcatalog.ucanr.edu/pdf/8277.pdf

Metritis Diagnosis Considerations

Arnau Espadamala, Pau Pallares & Noelia Silva-del-Rio, Veterinary Medicine Teaching & Research Center

What is metritis?

Metritis is an inflammation of the uterus after calving, characterized by an enlarged uterus with an abnormal, foul-smelling vaginal discharge and usually accompanied by other systemic signs of disease such as fever, loss of appetite or drop in milk yield. Most metritis cases occur in the first 14 days in milk (DIM) with a peak around 5 to 7 DIM. Cows that had dystocia, twins, stillbirth or retained fetal membranes (RFM) are at a greater risk of metritis. The incidence of metritis varies significantly across herds ranging from 10 to 25 %. The average cost per metritis case is estimated at $304 to $354. Economic losses are associated with culling, decreased milk yield, poor reproductive performance, treatment costs and discarded milk.

How can metritis be diagnosed on dairies?

There is no gold standard to identify metritis, thus, a combination of signs is used to diagnose this postpartum disease. **Two** of the following signs should be present:

- **Systemic signs of health disorders**: poor appetite, low production, and dull attitude.
- **Fever**: rectal temperature above 103ºF.
- **Abnormal vaginal discharge:** watery, foul-smelling, and brownish.

Does fever always means metritis?

Elevated rectal temperature in postpartum cows is considered a sign of a health disorder, most likely associated with an infectious disease such as metritis. However, **45 to 70% of healthy postpartum** cows can have at least **one elevated temperature event** during the first 10 DIM. Moreover, it should be taken into consideration that **22% of cows** with signs of metritis can **self-recover** within the first 4 days after calving.

What is the cut-off point of fever?

In dairy cows, normal body temperature (**BT**) is 100.4º F to 102.5º F. Cows are considered to have fever when BT is ≥ 103 ºF. However, factors such as parity [primiparous cows have higher (0.4º F) BT] and season (higher BT in summer) should be taken into consideration when defining fever. In summer months, a BT of 104º F can be normal. Thus, it is recommended to check the BT of 4-5 healthy looking cows and add an additional 1.5 to 2º F to define the cut-off temperature for fever on hot days.

Based on our survey results from 45 dairies in the San Joaquin Valley, most herds have adopted ≥ 103º F as the cut-off for fever. However, 3 dairies used a lower cut-off point (≥ 102.5º F) for all cows, only for primiparous cows, or only during summer season.

Take home message

Metritis is diagnosed as a combination of signs. The observation of a single sign of a health disorder **should not lead** to treatment. Consider the season and lactation number of cows when defining fever. Ask your veterinarian for advice on postpartum health protocols and to train your fresh cow evaluators to properly identify metritis cases.

Alternative Forages: How does Sorghum Fit into California Dairy Systems?

We've received a grant to look at the viability of sorghum silage in California dairy systems. This summer, we are looking to work with dairies that are growing sorghum for silage. Below you will find the goals and objectives of the project; to make it simple, I've included what we're looking to do in this first year:

We're looking for dairies to participate this summer. This entails:

1. Filling out a sorghum silage management survey – information from field to feed-out
2. Allowing us to sample at harvest and again (once) during feed-out. We'll be looking at nutritive value, physical characteristics, as well as fermentation characteristics of the silage.

The project's overall goal is to determine the value of sorghum as silage in California dairy farms. Specific objectives are to:

1. Determine water use and water use efficiency of select sorghum varieties grown for silage per unit of feed energy;
2. Evaluate sorghum silage for use by California dairy farms, including cultivar selection, irrigation water allocation, harvest and ensiling practices, as well as the ensiling characteristics and nutrient profile of the silage;
3. Determine quantity of manure nutrients (i.e. N, P, K) that should be applied to a sorghum crop;
4. Conduct a feeding study with lactating cows to determine maximum inclusion rates of the most promising sorghum silages without compromising animal performance and health.

If you are growing sorghum this summer and would like to participate, or would like to learn more about the project, please contact **Jennifer Heguy at jmheguy@ucdavis.edu** or **(209)525-6800.**

Recruitment Underway for UCCE Fresno/Madera Dairy Advisor

The Area Cooperative Extension (CE) advisor for dairy will conduct a locally-based extension, education and applied research program focused on Dairy Science. The CE advisor will provide programs across a spectrum of industry issues as they relate to dairy production systems in Fresno and Madera Counties and will address production issues and sustainability in an integrated approach that considers economic viability and conservation of natural resources including land use, air, water, and energy.

The CEadvisor will provide essential leadership to address critical issues facing dairy production systems in the two counties. The focus of the applied research program will be based on a needs assessment, and may include development of a knowledge base in the areas of nutrition, milk quality, herd health and reproduction. Applied research to support economically viable management alternatives for dairy production with respect to land, air, water, and food resources is also critical to the resilience and sustainability of the industry.

A minimum of a Master's Degree is required, though other advanced degrees are encouraged, in disciplines such as Dairy or Animal Science, or a closely related field. Excellent written, oral and interpersonal communication skills are required. Demonstrated ability in applied animal science research and extension experience are desirable.

The position will be located in **Fresno**. For more information, or to apply, please visit:
http://ucanr.edu/Jobs/Jobs_990/

University of California Cooperative Extension

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Merced, Stanislaus & San Joaquin Counties, August, 2016

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