Michi

Michigan Dairy Review

... connecting research & education with the dairy industry

www.msu.edu/user/mdr/

Vol. 15 No. 2

April 2010

Understanding the Changing Debate on Greenhouse Gas Regulation

David B. Schweikhardt
Dept. of Agricultural, Food, & Resource Economics

Introduction

As the debate over the phenomenon of climate change continues, the issue of a public policy response to climate change is occurring at several levels. On the one hand, international agreements on a policy response (e.g., the Kyoto Treaty or the Copenhagen Agreement) have produced relatively little in the way of actual policy decisions.

In July 2009, the U.S. House of Representatives passed the American Clean Energy and Security Act (i.e., the “cap and trade” bill) that includes the objective of reducing U.S. carbon emissions by 17 percent by the year 2020 and 80 percent by 2050. No bill has passed the U.S. Senate.

At the same time, a lesser-noted approach to policy has been proceeding through the federal court system and now to the Environmental Protection Agency (EPA). This approach has received relatively little attention until recent months, but is receiving greater attention as an alternative that may result in a significant change in U.S. greenhouse gas emissions policy.

Origins of EPA Action

In 1999, 19 environmental organizations petitioned the EPA requesting that greenhouse gas emissions suspected of contributing to climate change be regulated by the EPA. In particular, the rule making petition requested that the EPA regulate the greenhouse gas emissions (carbon dioxide and three other gases) of new motor vehicles under the provisions of the Clean Air Act (CAA).

The EPA, after consideration of the petition, denied the petition in September 2003. In doing so, the EPA...

This article summarizes the origin and status of a lesser known policy approach on greenhouse gas regulation being considered in the federal court and monitored by EPA. Because this process is ongoing, many of the details of the final regulations are unknown. At the same time, it is possible to see some likely directions this process could take in the coming months.

In this issue...

Greenhouse Gas Regulation ......................... 1
Estimating Air Emissions on Farms .......... 4
Battling Johne’s Disease ......................... 5
Blue Green Algae Poisoning in Cattle ....... 7
How’s Your Fridge Health? ....................... 9
Clinical Mastitis Treatment Decisions ....... 10
Vaccinating the Cow Protects the Calf ..... 11
Ten Common Myths about Dairy Foods ...... 12
The Next Peak Milk Price ....................... 14
Developing Communities of Young Producers .... 15
MSU Wins Award for Quality Milk .......... 18
MSU Success in Dairy Judging Contests .... 19
What’s Happening .............................. 21
based its decision on two factors. First, the EPA determined that the CAA did not give the agency the authority to regulate greenhouse gases as air pollutants. Second, the EPA determined that even if the agency did have the authority to regulate greenhouse gases, a decision to do so would be unwise because it might conflict with other Bush administration policies on the climate change issue.

These other policies included support for technological research, voluntary programs to encourage reductions in greenhouse gas emissions, and the pursuit of international agreements on greenhouse gas emissions.

**U.S. Supreme Court Decision**

After the EPA's denial of the original rule making petition, the petitioners began a series of appeals of the EPA decision in the federal court system. After a series of lower court decisions, the issue reached the U.S. Supreme Court in 2006. By the time of the decision, the 19 environmental organizations had been joined by 12 states, three cities, and one American territory in appealing the EPA's decision.

Ten states (including Michigan) and several industry groups joined in support of the EPA's position at the Supreme Court. The two legal issues decided by the Supreme Court were the two issues used by the EPA in its denial of the petition. First, does the CAA give the EPA the authority to regulate greenhouse gases? And second, did the EPA provide an adequate basis to justify its decision to deny the petition requesting regulation of greenhouse gases?

In a 5-4 decision in the case of Massachusetts v. Environmental Protection Agency, the Supreme Court found that the CAA requires the EPA to regulate “the emission of any air pollutant from any class . . . of new motor vehicles . . . which in [the EPA's] judgment cause[s], or contribute[s] to, air pollution . . . reasonably . . . anticipated to endanger public health or welfare.” The CAA further defines an “air pollutant” to include “any air pollution agent . . . , including any physical [or] chemical . . . substance . . . emitted into . . . the ambient air.”

Finding that greenhouse gases (including carbon dioxide) are a physical or chemical substance emitted into the ambient air by motor vehicles, the Court cited the language of the CAA in ruling that such substances could be classified as air pollutants if such substances were found to “cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare.”

Thus, on the issue of whether the CAA gave the EPA the authority to regulate greenhouse gases, the Supreme Court ruled that the EPA had erred in its decision to deny the petition and the agency did have the authority to regulate greenhouse gases as an air pollutant if such gases were found to endanger public health or welfare.

On the second issue, the question of whether the EPA had an adequate basis for denying the rule making petition, the Court returned to the language of the CAA statute. Again citing the statute’s definition of a possible air pollutant, the Court ruled that the decision whether to regulate a physical or chemical substance as an air pollutant must be based on the question of whether that substance “could be reasonably anticipated to endanger public health or welfare.” Thus, the Court concluded that the basis given by the EPA in its rejection of the petition (i.e., because it could conflict with other Bush administration efforts to control greenhouse gases), were “policy” reasons, and not reasons related to the potential endangerment of public health and welfare, as required by the CAA statute.

Thus, the Supreme Court ruled that (a) the EPA did have the authority to regulate greenhouse gases as air pollutants under the CAA and (b) under the CAA, the decision to regulate greenhouse gases as air pollutants must be based solely on the issue of whether such substances endanger public health and welfare, and not on unrelated policy considerations.

Consequently, the Supreme Court returned the petition to the EPA with an order to base its decision on the proper considerations identified under the CAA statute (i.e., whether greenhouse gas emissions endanger public health or welfare).

**Subsequent EPA Action**

In December 2007, the EPA sent a draft report of an endangerment finding (i.e., its report on whether greenhouse gas emissions endanger public health or welfare), as required by the Supreme Court's decision in Massachusetts v. EPA, to the Office of Management and Budget (OMB).

The OMB refused to consider the report, leading the EPA to withdraw the report and issue an advanced notice of rule making to seek public comment on the endangerment issue.

In December 2009, the EPA issued its final ruling on whether greenhouse gases were classified as an air pollutant under the CAA and based on the Supreme Court's ruling in Massachusetts v. EPA. In doing so, the EPA found that (a) emissions of greenhouse gases from motor...
vehicles cause or contribute to greenhouse gas pollution and, (b) that such air pollution endangered public health and welfare.

Based on this endangerment finding, the EPA announced in February 2010 that greenhouse gas emission standards will be phased in for light vehicles during the 2012 to 2016 model years. It also announced that greenhouse gas emission standards for large (greater than 25,000 tons of emissions per year) “stationary” sources (e.g., utility plants, refineries, etc.) would be phased in beginning no earlier than the latter half of 2011, while standards for smaller stationary sources would be phased in beginning no earlier than 2016.

Implications and Outlook
The EPA’s endangerment finding provides the basis for the EPA to issue regulations on the greenhouse gas emissions on light duty motor vehicles. In addition, the ruling could also provide the basis for EPA regulations on other sources of greenhouse gas emissions.

Thus, though the EPA’s endangerment finding and any regulations based upon it could face additional legal challenges, the Supreme Court’s decision is likely to withstand any attempt to permanently prevent the issuance of greenhouse gas regulations. There have also been Congressional proposals to ban the use of EPA funding for greenhouse gas regulation or other legislation that would limit the EPA’s power to regulate greenhouse gases. None of these proposals have yet passed either house of Congress.

Assuming the EPA retains its authority to regulate greenhouse gases, what form would such regulations take? On the one hand, the EPA would likely have the authority to choose among a wide range of regulations, including regulations that are much stricter than the regulations contained in the cap and trade bill passed by the House of Representatives.

Such regulations could require larger reductions in greenhouse gases or could require the use of “command and control” regulations (i.e., technical specifications) that would likely be more costly than the cap and trade approach adopted by the House bill.

In addition, the House bill contains several provisions that are specifically designed to reduce the cost of cap and trade legislation for agricultural producers. The EPA would not be required to include such provisions in any regulations that it promulgates in the future.

On the other hand, the cap and trade system included in the House bill is seen as a lower cost regulatory method by many economists and interest groups (i.e., lower cost than a command and control system). With this in mind, the EPA might choose to establish a cap and trade system as the method of regulating greenhouse gases.

Once again, however, it must be noted that the EPA would not be required to adopt the exact language of the House bill, including the provisions in the House bill that are favorable to agricultural producers. As a final comment, it should be noted that if a bill does pass the Senate and gain the president’s signature, such a bill would likely preempt the EPA’s action under the CAA and establish its own regulatory framework for greenhouse gas regulation (as does the House bill).

References

U.S. Environmental Protection Agency. Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act. Available at: http://www.epa.gov/climatechange/endangerment.html

MSU Extension Dairy Educators
Ben Bartlett .................................................. 906-439-5880
(bartle18@msu.edu)
The Upper Peninsula
Faith Cullens ............................................. 989-224-5249
(cullensf@msu.edu)
Clifton, Gratiot, Shiawassee
Phil Durst ................................................... 989-826-1160
(durstp@msu.edu)
NE-MI-(North & East of US-127 & I-75)
Ira Krupp .................................................... 517-279-4311
(kruppi@msu.edu)
Allegan, Berrien, Branch, Cass, Hillsdale, Kalamazoo, St. Joseph, Van Buren
Kathy Lee .................................................... 231-839-4667
(leeka@msu.edu)
NW-MI- (Osceola, Lake, Mason, Mecosta, North & East of US-127 & I-75)
Mike McFadden ........................................ 989-772-0911 E-302
(mcfadd10@msu.edu)
Isabella, Clare, Gladwin, Midland, Saginaw
Bill Robb ..................................................... 616-994-4580
(robbb@msu.edu)
Kent, Muskegon, Montcalm, Newaygo, Oceana, Ottawa
Dean Ross ................................................... 517-546-3950
(rossdea@msu.edu)
Genesee, Ingham, Jackson, Monroe, Macomb, Livingston, Oakland, Lenawee, Washtenaw, Wayne
Craig Thomas ............................................. 810-648-2515
(thomasc@msu.edu)
Sanilac, Huron, Lapeer, St. Clair, Tuscola
Estimating Air Emissions on Dairy Farms

Wendy Powers
Dept. of Animal Science

Air Quality

Introduction

Gases and particulates (dusts) are the two main concerns related to air emissions from animal operations. These emissions are a result of complex processes driven by the animal diet, manure handling practices, and environmental conditions such as temperature, wind and humidity.

EPA Requirement

Recently, EPA has required that large CAFOs report ammonia and hydrogen sulfide emissions under Emergency Planning and Community Right-to-Know Act (EPCRA).

Producers were uncertain what values to report as little data are publicly available to guide them in estimating how much of any gas their particular operation emits. A unified approach to estimating emissions from livestock operations is needed.

Estimates of air emissions are currently made by applying ‘emission factors’. Emission factors are production unit (i.e., per animal) multipliers that are used to calculate the total farm emissions.

A 2003 report from the National Academy of Science (NRC, 2003) Committee on Air Emissions from Animal Feeding Operations concluded that the existing emissions factors for livestock operations are generally inadequate and inappropriate because of the limited number of measurements on which they are based, as well as the wide emission variability across different kinds of operations.

In the absence of more appropriate values, regulatory agencies will continue to use the emission factors available at present.

The National Air Emission Monitoring Study (NAEMS) is currently being conducted at five dairies across the U.S. in order to contribute data to what is currently available. While the study is winding down (most sites concluded in 2009) it is unknown at present how emission factor values used by EPA will change as a result of the NAEMS data.

Measuring Emissions

Emission factors are most commonly expressed as emissions per animal or per unit body weight. However, animal weight is not a good predictor of emissions. Rather, nutrient intake and the efficiency of its conversion to produce an animal product affect the quantity and composition of emissions and manure excreted by animals.

For this reason, American Society of Agriculture and Biological Engineers (ASABE) Standard D384.2—a standard that is widely used across the U.S. as the basis for determining nutrient excretion values for manure planning purposes—was revised in 2003. More than 30 scientists who contributed to the revision recognized that nutrient intake relative to nutrient needs for animal maintenance and production was the critical control point for determining nutrient excretions.

The revised standard now estimates manure nutrients and mass as a function of diet inputs relative to animal nutrient needs. Expressing air emissions as a function of number of animals or total body weight is inappropriate because the number or weight of the animals is not a critical control point for emissions from animal housing. Rather, emission factors should be based on nutrient inputs and productivity of the animals.

Similarly, animal species may not be relevant when it comes to manure storage; loading rate and chemical and physical properties, including chemical composition, biodegradability, microbial populations, oxygen content, moisture content and pH, are the critical control points.

As one considers a systems-wide evaluation of environmental impact of the dairy industry and the impact that mitigation strategies will have on the environment, the manner in which emissions and changes in emissions are expressed is critical. Efforts are underway to develop a Life Cycle Analysis for the dairy industry, including impacts on air quality. Of particular interest is the dairy industry’s contribution to climate change, a topic addressed in recent issues of the Michigan Dairy Review (Bartlett, 2009 and Beede and Powers, 2009).

Dairy Operations & Climate Change

Climate change is a good example for illustrating the need to consider animal efficiency when expressing air emissions. As population increases and the inclusion of animal protein in human diets increases in developing nations, mass reductions in GHG emissions will be

Continued on page 20
Researchers Team up with Producers to Battle Johne’s Disease

Laura Moser
Agricultural & Natural Resources Communications

When the National Animal Health Monitoring System released its comprehensive report on Johne’s disease in 1997, the majority of dairy producers had only a general idea of what the disease was, and fewer still thought it affected their herds. But with an estimated 50 percent of the dairy animals in Michigan infected with Johne’s disease, there was no doubt it was a serious industry priority.

Several Michigan State University (MSU) researchers sought out funding to learn more about this economically damaging animal health issue, which has an estimated $200 million annual impact on the U.S. dairy industry.

Central to the initial research efforts was Dan Grooms, MSU associate professor of large animal clinical sciences and a large animal veterinarian. Along with learning more about the disease, Grooms and his colleagues from MSU and other universities would work for several years to determine the best management practices to employ on a dairy farm to prevent the spread of the disease and lower the percentage of animals infected (prevalence rate).

In 2003, researchers and veterinarians from the MSU Department of Animal Science, College of Veterinary Medicine and the Diagnostic Center for Population and Animal Health, and the Michigan Department of Agriculture joined researchers from 16 other states to monitor dairy herd management practices. The Michigan team was chosen to be a part of the USDA’s National Johne’s Disease Demonstration Project. The purpose of the national project was to evaluate the long-term feasibility and effectiveness of management-related practices designed to control infection by Mycobacterium avium paratuberculosis (MAP), the causative organism for Johne’s disease.

Grooms selected seven herds to serve as his Johne’s disease demonstration herds. The herds, located in various regions of the state, underwent whole-herd testing to measure baseline levels of infection. From there, a disease risk assessment was conducted, and management practices were put in place to help control on-farm spread of the disease.

“We know that animals are most susceptible to Johne’s infection at a very young age, so calf management was our first priority. There is no cure for Johne’s, so the best way to manage the disease is to prevent it.”

At the same time that Grooms was assembling his herds for the demonstration project, Galen Schalk, a dairy farmer in Hillman, Mich., encountered his herd’s first diagnosed case of Johne’s disease.

“I had heard about Johne’s disease but thought, ‘That’s not me,’” Schalk says. “We have had a closed herd since 1974, so because I was not bringing new animals into the herd, I didn’t feel we were at risk for the disease.”

The first Johne’s test from the Schalk herd came back with a 21 percent prevalence rate among the 168 animals tested; the second year, 2004, the rate jumped to 42 percent. The more Schalk learned about the disease and the test results on his herd, the more he realized...
that he had seen cows develop clinical signs of the disease in the past but hadn’t realized it was Johne’s.

“We would have cows get really thin and drop in productivity, so we would cull them from the herd,” Schalk says. “Now I know they were Johne’s animals.”

Seeing the high prevalence rate, Schalk was eager to eliminate the problem as quickly as possible. Shalk, Grooms and other MSU scientists put together new management strategies to help control the disease.

The area of highest concern on the Schalk farm was the calving area. Cows calved on a manure pack, which created the perfect environment for disease organisms to survive and spread to newborn calves. Though the Schalks had already drawn up building plans for a new transition heifer barn, they opted instead to construct a new maternity and housing area for close-up cows.

“It was good that we were already looking to put up a new building because we really needed a better place for the animals to calve in,” Schalk says.

Along with building the new maternity area, Schalk started withholding the colostrum from Johne’s-positive cows and feeding newborn calves colostrum from only non-infected cows.

“Johne’s can be transmitted to the calf through the colostrum or from the contaminated environment,” Grooms says. “Knowing which cows are positive for Johne’s is critical in stopping the disease from spreading.”

The new maternity area also provided an opportunity for each cow to calve in its own pen and allowed Schalk time to clean and disinfect each pen between calvings. Because animals contract Johne’s disease early in life, properly caring for calves is one of the most critical steps in preventing disease transmission, even though measuring immediate results from changing management practices is difficult.

“Even though we culled a number of animals during the first two years of the project, we still need to manage for the disease because we know some of the older animals are carriers,” Schalk says.

Visually identifying the Johne’s carriers helps Schalk manage the disease. Schalk now tags all animals that test positive for Johne’s disease with a special red neck chain. Any heifers born to positive dams are also tagged with the red neck chain until they receive a negative test reading.

“It is not perfect,” Schalk says. “Occasionally an animal is born early in the close-up area and not in the assigned calving pen, but we are really making progress.”

Animals can shed the organism that causes Johne’s even if they are not showing clinical signs of the disease. Research indicated
Blue Green Algae Poisoning in Cattle

Wilson K. Rumbeiha
Diagnostic Center for Population and Animal Health

Blue green algae, also known as cyanobacteria, are microorganisms with characteristics that fall between those of bacteria and plants. They grow in water bodies in tropical, subtropical and temperate regions all around the world. In Michigan, blooms of blue green algae occur any time from late spring to early fall (June through September or October) but more especially in July and August.

For blooming to occur, the right combination of environmental conditions must exist and these include warm sunny weather with temperatures ranging from 50 to 86 degrees Fahrenheit, phosphorus concentrations in excess of 30 micrograms/liter, and high water nitrogen content. Some of these environmental conditions are consistent with water pollution, generally referred to as eutrophication.

Around the world blue green algal blooms are found both in fresh and brackish water bodies. In Michigan, blue green algal blooms are associated mainly with fresh water bodies. For the past 3 years there have been more than usual inquiries or reports of blue green algal poisoning in cattle in Michigan. In summer of 2008 there was an unconfirmed case on a dairy farm in Michigan in which nine out of 80 cows died suddenly.

Toxic Species and Compounds
There are hundreds of blue green algal species but only a handful are associated with poisoning in animals. Common poisonous species include Microcystins, Anabaena, Planktothrix, Nostoc, Oscillatoria, and Anabaenopsis. These species of blue green algae produce different kinds of toxins of which two classes -- microcystins and anatoxins -- are responsible for most animal deaths. Microcystins poison the liver, whereas anatoxins target the nervous system.

Microcystins
The majority of blue green algal poisoning is caused by microcystins. Naturally, these toxins are found inside algal cells, but stressful conditions such as treatment of water with algaecides or natural death of cells results in release of these potent toxins.

Cattle can be affected by drinking water containing toxins or intact blue green algal cells. In small lakes or large ponds of water, wind effect tends to concentrate the blooms on one side of the water body. Cattle are usually poisoned when they drink from the windward side of these stagnant water bodies where the blue green algae have accumulated.

However, toxic blue green algae also will grow in stagnant small paddles of water and in water collection vessels on farm if left uncleaned for a long time. The microcystins will poison the liver rather acutely. In some cases, affected cattle die within a few hours of exposure. In subacute cases, death may come in a day or so. Microcystin LR, the predominant prototype microcystin, causes massive centrilobular hepatic necrosis.

Shock is a result of hemorrhage within the liver caused by massive liver injury. In a natural setting of an algal bloom several microcystins (with different potencies) are produced. In some cases anatoxins are present at the same time.

Anatoxins
Anatoxins are the second class of blue green algal toxins most responsible for livestock poisoning in Michigan. The anatoxins are structurally different from the microcystins and are also structurally different among themselves.

As mentioned earlier, these target the nervous system. They are produced by Anabaena, Planktothrix, Oscillatoria, and Microcystin species. Some of these same species also produce microcystins. It is possible to have both microcystins and anatoxins produced in an algal bloom.

Two common anatoxins are produced (i.e., Anatoxin a and Anatoxin a(s)). Anatoxin a is a nicotinic agonist at the cholinergic receptors. Intoxication results in a very rapid (minutes to a few hours) onset of rigidity and muscle tremors, paralysis and death by respiratory paralysis.

On the other hand, Anatoxin a(s) is an irreversible acetylcholinesterase inhibitor. In this regard, its toxic mechanism is similar to that of organophosphorous or carbamate insecticides with the exception that Anatoxin a(s) does not cross the blood-brain barrier while the insecticides do.

Clinical signs are all related to the effects of this toxin to the pe-
Peripheral nervous system and include salivation, lacrimation, urination, diarrhea (SLUD), tremors, ataxia and convulsions. Affected animals die of respiratory paralysis. There are no gross or histological lesions in animals that have died of anatoxin intoxication.

Death comes quickly, usually in a matter of minutes to hours and may occur in the vicinity of the contaminated water body. There is no antidote for Anatoxin a intoxication. Treatment is supportive and includes respiratory support and anti-seizures medications. Atropine is an antidote for Anatoxin a(s) intoxication. 2-PAM is not effective and should not be given. The rest of the treatment is supportive and involves respiratory support and anti-seizure medications.

**Diagnosis**

Diagnosis of microcystin intoxication involves water analysis for microcystins, microscopic water and gastrointestinal content examination for the cyanobacteria, and tissue analysis for bound microcystins. For morphological identification, a water sample in a glass jar in the ratio of 50:50 water: neutral buffered formalin solution can be analyzed at the diagnostic lab. There is no antidote to microcystins and there is no proven effective therapy. In this regard, prevention is the cure.

Diagnosis for Anatoxin a(s) intoxication includes whole blood cholinesterase assay, analytical confirmation of the toxin in water, stomach contents, and in the tissues. The brain cholinesterase test is not useful as these toxins do not cross the blood-brain barrier. Morphological identification of toxin-generating algae in water is also beneficial.

Diagnosis of Anatoxin a intoxication commonly relies on morphological identification of toxin generating cyanobacteria in water or stomach contents as well as analytical confirmation for the toxin(s) in water, stomach contents and tissues. As is true for microcystins, methods for analytical confirmation for Anatoxins are not commonly available in veterinary diagnostic laboratories. Thus, blue green algal intoxication is probably under diagnosed.

**Conclusion**

In summary, blue green algal poisoning should be considered in cattle presented with acute episodes of liver and/or neurological disease.

These clinical signs are caused by microcystin and/or anatoxin toxin poisoning. Although these two classes of toxins are responsible for most cyanobacterial intoxications, there are other cyanobacterial toxins produced in fresh waters that potentially could cause toxicity with different clinical signs.

More information on health effects of blue green algae poisoning are online at http://www.cdc.gov/hab/cyanobacteria/facts.htm
How’s Your Fridge Health?

Dan Buskirk
Dept. of Animal Science

Believe it or not, your refrigerator could be one of the most important aspects of your animal health program. If you have more than one refrigerator, my guess is that your newer refrigerator is in your kitchen, while the older one is in the garage, mud room, porch, tack room, barn, etc. The one in your kitchen may have a $75 worth of food, while the ole clunker in the barn may have several hundred dollars of animal health products. The appearance of the refrigerator where you keep your animal health products is not important, but how it functions may be critical to your animal health program.

Refrigeration is required for most animal health products (i.e. pharmaceuticals, vaccines). These products should be stored according to the label directions, but generally, these products are labeled to be stored between 35° and 45°F (2° to 7°C). If a product is not stored properly, there is a good chance that it will not be as efficacious as it should be, or may not work at all. Freezing is particularly detrimental to some products and can cause separation of their components.

A survey of temperature ranges found in animal health product refrigerators was recently conducted by University of Arkansas researchers. They surveyed 191 refrigerators on farms (76%), retail stores (18%), and veterinarian clinics (6%). Data loggers were used to record the temperature at 10-minute intervals for 48 hours. The results are shown in (Table 1.).

Only 27% of the refrigerators tested reliably kept the temperature between 35° and 45°F; meaning that more than 7 of 10 refrigerators were unacceptable in keeping the proper temperature.

<table>
<thead>
<tr>
<th>% of readings within the acceptable range of 35° to 45°F</th>
<th>Number of refrigerators</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 95%</td>
<td>51 (27%)</td>
</tr>
<tr>
<td>66% - 95%</td>
<td>38 (20%)</td>
</tr>
<tr>
<td>36% - 65%</td>
<td>34 (18%)</td>
</tr>
<tr>
<td>5% - 35%</td>
<td>23 (12%)</td>
</tr>
<tr>
<td>&lt; 5%</td>
<td>45 (24%)</td>
</tr>
</tbody>
</table>

*288 data points were recorded over a 48-hour period for each of 191 refrigerators.

Following are best management practices for maintaining proper storage of your animal health products:

Refrigerator placement
Good air circulation around the refrigerator is essential for proper heat exchange and cooling functions. The unit should be placed in a well-ventilated room and should have space around the sides and top. Whether or not the unit has coils on the back, there should be at least 4 inches of space between the back and the wall for proper air circulation.

The unit should stand firmly and level and the wheels or leveling legs should be adjusted so that the bottom sits 1 to 2 inches above the floor. It is a good practice to post a “Do Not Unplug” sign next to the refrigerator’s electrical outlet to reduce the risk of accidental power loss. Posting a sign is standard practice in medical clinics, but may be even more important in the farm shop, where an outlet may get “borrowed”.

Refrigerator maintenance
Dust and dirt build-up affects the transfer of heat, and therefore, the efficiency of the unit. The front grill should be kept clean to permit free air flow to the condenser. The condenser coils should be cleaned regularly with a brush or vacuum cleaner to remove dirt and dust accumulation. Door seals should be washed with soapy water.

Check and clear the drain tube with a pipe cleaner as necessary. Regularly check the integrity of the door gaskets. They should not be torn or brittle and there should be no gaps between the gaskets and the body of the unit when the doors are closed. The “paper test” can be used to check the condition of the gaskets. If a piece of paper can slip between the gasket and the body, the seal is not tight enough and requires adjustment of the door hinges or replacement of the gasket.

Temperature monitoring
Refrigerator and freezer thermostats are marked in various ways, but in general, thermostats show levels of coldness rather than

Continued on page 21
Clinical Mastitis Treatment Decisions

Phil Sears
Dept. of Large Animal Clinical Sciences

Trying to diagnose the type of mastitis by its clinical signs is not accurate and often incorrect. Almost anyone can use milk cultures to make current mastitis decisions when choosing the best antibodies for the farm or choosing cows to treat. However, culturing cow’s milk to make future treatment decisions can be misleading.

The next case of clinical mastitis may not be the same organism as the one you just cultured. Using a milk culture to identify the bacteria before treating requires withholding antibiotic treatment for 24 hours before starting antibiotic treatment.

In a study on a large Michigan dairy farm, waiting 24 hours before starting antibiotic treatment did not adversely affect the outcome of the infections or jeopardize the health of the animal. Mastitis episodes did not last longer and fewer days were lost to milk withholding for residue and unsalable milk. This protocol reduced treatments by 80% and saved on treatment costs.

Because of these results, many dairy farms have begun to use local veterinary laboratories or to establish “on-farm” diagnostic testing to culture milk before starting antibiotic treatment. However, before these diagnostic-treatment protocols can be used in dairy farms, someone must be assigned and trained to do diagnostic testing. This person also should be responsible for treating mastitis cases and monitoring cows with mastitis. If clinical mastitis is viewed as a catch-as-you-can by milkers, then this protocol will not be successful.

In this winter’s MSU Extension Dairy Team educational meeting, we explore the choices farmers have in diagnosing clinical mastitis and making treatment decisions. Knowing when not to use antibiotic treatment in some clinical mastitis cases can be just as important as using the correct antibiotic. It could be one of the best economic decisions you can make in animal health care.

The winter meeting presented information about how to:
1) set up an “on-farm laboratory” to culture clinical mastitis;
2) identify major groups of bacteria that cause mastitis;
3) use this information to treat clinical mastitis;
4) use antibiotic susceptibility Minimum Inhibitory Concentration on your farm; and,
5) reduce chronic and recurring clinical mastitis.

You can incorporate this information into your daily routine to make a difference.

Vaccinology: How Vaccines Work
Vaccines have long been considered an important part of disease control for most dairy farms. Understanding how vaccines work (or do not work) is important when developing a vaccine program for the farm. Not all vaccines are equal.

Live vaccines are often made from modified less-active (attenuated) virus. They are useful in causing cells to change in the immune system so they can recognize the disease better and fight the infection. These vaccines are most useful when given in young cattle before the animals have had exposure to the disease. If this is the first time the animal experiences the disease it can respond at a cellular level (cell-mediated immunity) which has some great advantages in protecting the animal. Additional exposure to either live or killed vaccines can additionally boost the immune system by producing more antibodies. These live vaccines are commonly used with viral diseases such as a Bovine Viral Diarrhea Virus.

Killed vaccines, viral or bacterial, are aimed at stimulating antibody production in the animal. These do not produce good cellular responses but produce antibodies that neutralize toxins and reduce damage by the disease. To get the best response, multiple inoculations must be given to achieve adequate antibodies to help the animal fight off the disease.

Editor’s note: Because of their relevance at this time of the year, this article and the one following are re-runs from an earlier MDR issue.

The Michigan Dairy Review and the Dairy Team join in wishing Professor Phil Sears all the best as he transitions into retirement at the end of this academic year.
Vaccinating the Cow Protects the Calf

Ron Erskine
Dept. of Large Animal Clinical Sciences

Colostrum is critical to protect the newborn calf, as it provides crucial antibodies to combat bacteria and viruses for the first several weeks, perhaps months of life.

Thus it is essential that adequate, (4-6 quarts in the first 6 hours) good quality (preferably tested with colostrometer) colostrum, collected only from the first milking of cows, is a consistent part of a calf raising program. Antibodies generated by the cow from every day exposure to infectious agents are "passively transferred" via colostrum to the calf.

Vaccination of cows to elevate immune protection from commonly transmitted diseases, such as Bovine Viral Diarrhea Virus, Infectious Bovine Rhinotracheitis, Bovine Respiratory Syncytial Virus, and Para-Influenza, also can bolster the antibody "package" in the colostrum.

Thus, a regular vaccination program is an insurance policy that can help protect two animals for the price of one, the cow and the calf. This is particularly important for protection of neonatal calves from common pathogens that cause diarrhea including E-coli, and rota- and corona viruses.

These pathogens are often the most common cause of diarrhea in calves less than 3 weeks of age, and at times contribute to high death rates. Vaccination of the calf to protect against these enteric pathogens generally is less useful because the calf's immune system is not fully functional at this young age. Additionally, even if a calf's immune system was able to respond to the vaccine and produce antibodies, the response to a first exposure is not very vigorous, and nearly 2 weeks would pass before maximum antibody concentrations would appear in serum.

Thus, the best way to impart protection to a calf against the neonatal diarrhea complex is to vaccinate the cow, which then transfers protection to the calf by way of colostrum.

To take advantage of this opportunity, the following guidelines should be considered:
1) don't forget to vaccinate pregnant heifers, preferably twice before calving. The first shot at about 2 months before the due date for calving, and a booster 1 month before the due date;

2) accurate breeding dates, and thus expected calving dates are essential. Not all cows calve on schedule, and use of clean-up bulls extends the window of actual calving dates in relation to expected due dates. This can lead to problems with dry cow mastitis therapy, proper close-up ration feeding, and vaccination schedules. In the long-run, the more accurate the calving dates, the better the vaccination results;

3) use proper vaccination handling and storage, dose, site of administration, and injection techniques;

4) consider vaccinating the cow at least 3 to 4 weeks before calving. The reason for this is illustrated in Figures 1 and 2. Typically, cows start to generate antibodies, particularly IgG, in the serum of the cows as the colostrum.
Ten Common Myths about Dairy Foods

Zey Ustunol
Dept. of Food Science and Human Nutrition

Introduction

Milk and dairy foods provide the diet with at least ten essential nutrients which include high quality protein, carbohydrate, vitamins A, D, B12 and riboflavin, and minerals: calcium, phosphorus, magnesium, potassium and zinc.

Three servings of milk or equivalent will provide the recommended daily intake of calcium for most people. In addition fermented dairy foods such as yogurt are considered excellent carriers of probiotic organisms and prebiotics which are known to be important in gastrointestinal health.

Although, awareness on health benefits of dairy products is increasing, there are still a number of commonly held misconceptions about dairy foods. The following section addresses 10 common myths about dairy foods and provides the facts.

Ten Common Myths

1. Myth: Consuming dairy products can lead to weight gain.
   Fact: Weight gain occurs when one consumes more calories than the body can burn as energy. Contrary to this common myth, research both in animals and humans suggest that including three servings of low fat dairy foods in a calorie controlled diet may help achieve greater weight loss (Zemel, 2005).
   Clinical trials have also shown a strong correlation between increased calcium intake and reduced body weight, body fat percentage and waist size (Zemel, 2005).

2. Myth: Spinach is as good a source of calcium as milk.
   Fact: There is more calcium in 1 cup of milk than there is in 16 cups of spinach. One will need to eat more than 48 cups of spinach to get the recommended daily intake of calcium (USDA, 2010). Furthermore, milk contains Vitamin D which enhances calcium absorption (Wasserman, 2004).

3. Myth: People with lactose intolerance should avoid dairy foods.
   Fact: Lactose intolerance is often confused with milk allergies. Lactose intolerance is not an allergic reaction to dairy foods. Rather it is the inability to digest the milk sugar lactose. Lactose-free milk and yogurt are good alternatives to drinking milk for people that are lactose intolerant. Aged cheeses such as Cheddar and Swiss are also low in lactose. Many people with lactose intolerance can drink up to 1 cup of milk daily without problems (Miller et al., 2000).

4. Myth: Milk causes asthma.
   Fact: While infants with milk allergies are more likely to develop asthma later in life, there are no scientific data that support that consuming dairy foods makes a person asthmatic.

5. Myth: Consuming dairy foods can increase the risk of heart disease.
   Fact: A diet high in saturated fat regardless of the source will likely cause heart disease and not dairy foods. Recently, it was reported that the evidence linking saturated fat intake to heart disease is lacking (Siri-Tarino et al., 2010).
   Furthermore, today saturated fat from butter is believed to be not as bad as transfat filled hydrogenated vegetable fats such as margarine and other so-called ‘healthy’ spreads. Those still wishing to reduce their fat intake can consume low fat dairy foods and receive the nutritional benefits of dairy foods without the high fat (Berner, 1992; Miller, 2000).

6. Myth: If you take calcium supplements you don’t need milk.
   Fact: Milk isn’t only a good source of calcium but it also provides other high quality nutrients such as high quality protein, vitamins A, D, B12, riboflavin; zinc; potassium and magnesium.
   Fermented dairy foods such as yogurt also serve as an excellent carrier of probiotic organisms and prebiotics, which are important for gastrointestinal health.

   Taking supplements does not provide the enjoyment of drinking a cold glass of milk; pouring cold milk
“Although awareness on health benefits of dairy products is increasing, there are still a number of commonly held misconceptions about dairy foods”

on a bowl of cereal for breakfast; eating a creamy delicious bowl of ice cream on a hot summer day; or enjoying the pleasure of a creamy cheese sauce on nachos, or melted cheese slices on a hamburger.

Myth: Milk causes mucus.
Fact: After drinking whole milk or eating ice cream some people mistake the thin coat or residue in their mouth and throat for mucus.

This is the normal creamy texture of milk fat which melts near body temperature and not excess mucus. A study conducted by Pinnock and co-workers (1990) reported that there is no association between milk and dairy products intake and mucus production in healthy as well as rhinovirus infected individuals.

Myth: Humans are not designed to drink cow’s milk.
Fact: Humans are designed to eat plants as well as animal products such as meat and dairy products. Domestication of cattle (and consumption of milk and dairy foods) date back to 6000 BC.

We are equipped with the lactose enzyme in our gut that aids in the digestion of cow’s milk. Consequently humans have enjoyed consuming dairy foods over many, many centuries.

If we were restricted to consuming milk only from our own species, we would not enjoy many of the dairy foods we enjoy today; such as blue cheese on our salads, ice cream on apple pie, sour cream on baked potatoes, Mozzarella cheese on pizza, shredded cheese on our tacos, and buttermilk in our pancakes.

Myth: Drinking milk can cause kidney stones.
Fact: Milk may actually protect against the formation of kidney stones (NHS, 1990). It was suggested that the calcium in milk may bind to oxalates in food so that they can no longer be absorbed by the body, reducing the risk of kidney stones.

Myth: Eating cheese and high-fat dairy foods can cause acne.
Fact: Science does not support any link between acne and dairy foods. Importance of vitamins A and D in skin health is well established. Milk is a good source of vitamins A and D in the diet (Miller et al., 2000).

References


“Humans are designed to eat plants as well as animal products such as meat and dairy products. Domestication of cattle (and consumption of milk and dairy foods) date back to 6000 BC.”
The Next Peak Milk Price

Christopher Wolf
Dept. of Agricultural, Food & Resource Economics

Michigan Milk Market

Having heard recent talk about a 3-year “price cycle” in the US dairy market, I thought it might be worth checking into further. As figure 1 demonstrates with annual average prices, there is some support for this idea.

The figure does not reveal cycles in the 1980s as the price support was interfering with milk prices. However, since the mid 1990s supply and demand, and not the price support, have largely determined price and a cycle appears to have emerged.

The 3-year cycle seemed to hold from 1998 through 2009 with milk price peaks in 1998, 2001, 2004 and 2007. If that cycle held, then we would expect a new peak in 2010. The price will be higher in 2010 than 2009—but that is more a function of the dismal 2009 price than a cycle producing a new peak.

In fact, it looks more and more likely that 2011 will be a peak year rather than this year. However, given the propensity for milk price to make sudden turns (both up and down) in recent years, there is still time for substantial recovery in 2010 especially if there is a significant decline in milk cow numbers decline significantly in the coming months.

At the end of 2009, the price recovery looked promising with US milk cow numbers down 252,000 from the previous year.

However, after declining all of 2009, cow numbers leveled off and even grew a very small amount to start 2010 and the market reacted negatively. It appears the recovery is delayed slightly and the market has been uncertain.

On the bullish side for prices, Cooperatives Working Together reactivated the export assistance program and has the potential for more herd buyouts; and butter production and inventories are lower than 2009.

On the bearish side for milk prices: total natural cheese stocks were up 11.6% from a year earlier (with more than 983 million pounds in February) and the spring flush is likely to add to these inventories; available heifer replacements are up to 49.7 heifers per 100 milk cows; and consumption continues to reflect a sluggish US and world economy.

“.... since the mid 1990s supply and demand, and not the price support, have largely determined price and a cycle appears to have emerged.”

“... given the propensity for milk price to make sudden turns (both up and down) in recent years, there is still time for substantial recovery in 2010 especially if milk cow numbers decline significantly in the coming months.”
Developing Communities of Young Producers

Phil Durst
MSU Extension Dairy Educator - NE Michigan

Introduction
Youth are entering the dairy business in Michigan because the industry is growing and providing them opportunities. They are making the choice to start a career in a dairy business, a career that they hope will be financially and personally fulfilling.

Many are coming to the industry with some formal education that helps prepare them for the business of dairy production. While formal education is vital and important, it alone does not fully prepare people for the challenges of managing a dairy business including labor management, family business relations, business planning and evaluation, and facility planning and building.

In a business with larger operations and slim margins, the demands are great. These demands often create additional stress beyond the normal challenge of working to reach goals with cattle. In addition, the demands of the business often work to isolate young people from peers.

In February 2007 in the northeast Lower Peninsula, several young producers met with the Extension Dairy Educator to discuss the issues facing young dairy producers and to recognize the increasing numbers of them in our area. We hypothesized that bringing together these producers into a group would be effective in helping them develop better management skills and knowledge and provide an outlet for them that would reduce stress.

Objectives
The purposes of a young dairy producer group were to: (1) provide an opportunity to meet and network with people in a similar stage of a dairy career and similar perspectives; (2) learn from and share with each other experiences, knowledge, questions and problems; (3) see and learn new or alternative ways to manage or approach problems; (4) encourage one another; and, (5) renew enthusiasm for the dairy business by the interaction. In short, the purposes were to grow as dairy managers and to be able to share that with others and have fun doing it.

Methods
A group was started in March 2007 by assembling a list of those ages 17-35 known to the planning group. An invitation for a get-together was made by mail and backed up by personal contacts by this core group.

At the first get-together we discussed the issue of change in the industry and the need to adapt to it using a video of the book “Who Moved My Cheese”. Then we talked about getting together regularly to keep learning. They enthusiastically agreed and decided to meet monthly. Get-togethers were scheduled for the first Thursday evening each month at 7:00 p.m. and always involved food. The Young, Savvy and into Dairy Facebook fan page

Inviting young producers to join the “Young, Savvy & into Dairy” Facebook fan page

This fan page provides opportunity to get to know other young people in dairy, share questions and experiences with them and be part of a group.

When new fans join, I ask them to introduce themselves to the group by telling a little about themselves, their connection to dairy and what they do. Discussion questions are regularly posted and include:

- What seems to work best to motivate employees to do their best?
- Who has been a good influence on you?
- What is something you have done to improve communication on the farm?
- What is your next building project and what problem is it meant to solve?
- What does “savvy” mean to you in the context of the dairy business?

Fans also can post pictures and there are occasional boxes with educational material posted.

To get to the fan page, search pages for “Young, Savvy & into Dairy”. We welcome your involvement.
(YSD) group was formed. The meetings are informal yet each with a specific educational topic brought by the Extension Educator. Conversation is encouraged through questions. There are no officers and no planning group; it is a flat structure of equals who get-together to learn.

During the warmer months with longer days, get-togethers are held on farms. We have met on farms of group members and the member hosting is responsible to tell about their operation and provide metrics about it.

The older generation is not permitted to take part. Group members are then divided up into smaller groups with instructions to cite three things on which to commend the family, and three things to recommend to the family.

One from each group presents those to the host. In this way, members learn to evaluate the pros and cons by results of different management systems and set-ups.

We also have met on farms of successful, experienced producers to learn from them specific strengths including keeping and using records, monitoring cost of production and managing employees.

During the colder months with shorter days, the group meets to discuss issues facing agriculture including animal well-being and producer responsibilities, and design of a lactating cow barn.

The group hosted a similar group from upstate New York and conducted a tour of four of their farms for those New York young producers. In April 2010, the Michigan YSD group will be making the reciprocal trip to visit the New York group and see their farms first-hand.

In January 2010, a second YSD group was started by the Educator in the Alpena area. Again, a list was compiled with the help of some key young producers and they helped to make personal contacts to invite people.

In the same month, a Facebook fan page was started for young people in dairy with the Educator as the administrator. The purpose of the fan page is to provide an additional means to contact members of these groups, increase the networking among them and with others outside the area around the topic of dairy management and to help create additional excitement.

Results

The first group has not missed a monthly meeting in over 3 years. A total of 75 young people in dairy have attended at least once with a core group of fairly regular participants numbering 20-25 and average get-together attendance of 15-25.

The group took on the identity of “Young, Savvy and into Dairy” and go by the acronym “YSD” group or “YSD’ers”.

The following member actions have been noted:

- Persistence in inviting others to join the group.
- Bringing problems up for discussion.
- Acceptance of each other within the group based on respect for what they accomplish rather than personality fit.
- Five members travelled 50 miles one way to meet with the new group at their first get-together in order to encourage them to form a group and tell about what they have done together in the first YSD group.
- Two other members talked on a conference call with a West Michigan group that was forming for the same purpose.
- One member, seeing a call go out for those in mid-Michigan to form a group offered with a note that said “if you get enough interest and would like somebody from YSD North to come down and give a little chat about how we do our meetings, let me know. Anything to help create a new YSD group!!” It would be a hundred-mile trip one way.

A survey of the members (n=18) conducted in September 2008 showed that 100% reported the meetings over the past season as beneficial, that same percentage said that through it they had developed a greater respect for their peers and were willing “to contribute more to the development” of their peers. They want each other to succeed.

These measures along with the attitudes and actions of the members indicate that more than forming a group, a real community has formed and continues. In addition, the actions and words of the members indicate that the community is effective in driving development of knowledge, abilities and confidence.

A second group also has formed and is meeting monthly with 20-35 in attendance each time. These young people are excited about getting together and immediately began offering to host the group at their farms.
Seven members of the first YSD hosted a hospitality at the Great Lakes Regional Dairy Conference for all young producers at the conference. Many attended the hospitality. Members of YSD were there to talk and share with others what they are doing and why they enjoy it and profit from it. The hospitality also served as the launching of the Facebook fan page “Young, Savvy & into Dairy”.

The Facebook fan page has been successful to date. There are currently 350 fans signed on. Although primarily from Michigan so far, they represent many other states and six foreign countries as well. These have made over 140 posts to the fan page including posting and responding to Discussion Questions, posting short write-ups about themselves and their dairy connections and posting comments and questions to each other.

Discussion

McMillan and Chaviz (1986) proposed that a sense of community is “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through commitment to be together.” They defined four key elements of community: membership, influence, integration and fulfillment of needs, and shared emotional connection.

The development of community is a process that begins with forming a group, and evolves into a community through openness, sharing, respect and mutual benefit. Over 3 years of monthly interaction has molded the first group into a community that continues to look to bring others into it. Prior to this group, in many cases, members did not even know each other, now, based on the care they show for one another, it is obvious that a transformation has occurred.

It is believed that through time, interaction, being on each other’s farms and talking over problems with each other, that the second group will also become a community.

In their paper, Kallioranta et. al. (2006) talk about forming virtual communities of individuals who work with and market forest products connected by a specific web focal point on the Internet. They discuss the reasons for it and construct elements that would define virtual communities. And while they admit that their groups are “not yet true communities, they contain many community elements”. The same could be said of the YSD fan page fans at this point.

Conclusions

Through the two groups, this Extension Educator meets with 35-50 young dairy producers each month for 2 to 2.5 hours each time. Conservatively, this represents over 1,000 person-hours annually of meeting educationally with young producers.

In addition, it means that over a 3-year period, producers who attended 80% (28) of meetings would have over 60 hours of educational contact time with the Extension Educator. That educational contact and the relationships that are being built provide a tremendous platform for effective education and impact potential on the dairy industry for a long time to come. Technology allows us to link across distances with others with similar issues, needs, and perspectives to form a virtual community. When Jody from Texas shares about the stress on the farm, and Brent from Tennessee reports on prices for commercial dairy cattle at a recent sale and when Chris from Michigan posts a question about motivating employees and people from all over respond with what works, a community is forming.

To a large extent, this age group represents a new audience for Extension. At least 80% of those who have attended the YSD get-togethers have not previously been Extension meeting attendees. Yet, since their involvement with YSD groups, in some cases they have also begun coming to more traditional Extension meetings. While this clientele segment is reachable, they are apparently more likely to respond to methods that have not been traditionally used.

The response to both physical communities and the virtual community has shown the receptiveness, even hunger, among young dairy producers to learn and grow as dairy managers.

Meeting that need is an essential component for farm success and farm preservation. Forming communities of these young producers help to meet that need.

References


For the second year in a row, the MSU dairy farm, having distinguished itself by producing high quality milk, is recognized with a National Dairy Quality Award Platinum prize for the year 2010. The award was presented to the farm’s manager, Robert Kreft at a recent National Mastitis Council meeting in Albuquerque, NM.

The MSU Dairy Teaching and Research Center is one of six working farms located on the campus of Michigan State University in East Lansing. It serves as a hub for teaching, extension and research and is the setting for course work and practical learning experiences for students studying animal science and large animal clinical science and for Extension programs. Research is conducted in dairy nutrition, mammary and reproductive physiology, animal breeding and selection, manure and nutrient management, and dairy management.

The crucial question is, how did the farm attain the platinum price for a second year in a row? As it turns out, there is no secret to their success; it simply takes a dedicated staff with a penchant for keeping a close eye on the details of routine dairy management practices. From discussions with Kreft, who has worked at the farm since 1989, along with Ray Lee (student employee) and Bruce Kurzhals (one of four other full-time employees at the farm), the farm’s usual milking process has merely improved overtime with some milestone changes that management has implemented over the years.

Cow Preparation for Milking
Kreft explains that when cows walk in to be milked, they are sprayed with hydrogen peroxide-based pre-dip. “We stimulate their udders and teats for 10-15 seconds. We do 3-4 cows in a group so we have about 50-60 seconds of contact time with the dip. We wipe that dip off and strip each quarter to make sure its milk is normal, then attach the milker. The stimulation time and the interval to attachment of the milking unit are important so we get good let down. Thereafter, we use post-dip when the cows are done milking.”

The prep procedure requires all milkers to wear gloves. In addition, says Kreft, “we use individual cloth towels that are laundered after each use.” He adds, “Our milking equipment is serviced at least twice per year to make sure everything is working correctly.”

Cow Cleanliness
For bedding, Kreft says, “We switched to dry saw dust a number of years ago. We also started adding hydrated lime to our tie stalls before we put the sawdust down. The lime changes the pH of the bedding and reduces bacterial growth. There is a saying that sums it up: The most important piece of real estate on a dairy farm is where the cow’s udder lies when she is resting.”

Kreft adds that about 3 weeks before heifers are due to calve they are given a dry cow treatment, he advises that individual dairy farmers should work with their veterinarian to develop a treatment protocol specific to the needs of their herd.

“To help make it easier to clean udders during milking the hair is syng-clipped every 10 weeks. We also
MSU Dairy Judging Success in National Contests, Michigan 4-H Team Earns Invitation to International Competition

By Joe Domecq
Dept. of Animal Science

The Michigan State University Collegiate, Ag Tech, and several Michigan 4-H Dairy Judging Teams spent many summer and fall weekends visiting farms and judging cows in preparation for the 2009 judging season.

The teams visited dairy farms in Michigan and across the Midwest. A weekend practice trip in August included farms in Ohio and a trip to the main offices of Select Sires near Columbus. The hard work resulted in outstanding results at three national dairy judging contests and another invitation to an international competition.

The 2009 MSU Collegiate Dairy Judging Team members were Melissa Brower (Jamestown), a junior in Animal Science, Emily Butcher (Corunna), a junior in Animal Science, Rosemary Rice (Filion), a senior in Animal Science, and Amanda Sollman (Brown City), an Agriculture Education senior. The MSU Ag Tech Dairy Management Program was represented by Eric Cole (Durand), Gerald Green (Williamston), Liz Reed (Owosso), James Weber (Vassar), and Eric Westendorp (Nashville).

The first contest of the year was at the Pennsylvania All-American Dairy Show in Harrisburg, PA. The MSU Collegiate Team and Michigan 4-H team participated in the contest. Michigan 4-H was represented by Lauren Bush (Swartz Creek), Amber Mulder (Hudsonville), Katie Thelen (St. Johns), and Cristine VanLieu (Reading).

The Collegiate Team placed 2nd in Ayrshires, 9th in Brown Swiss, 10th in Guernseys and Holsteins, 11th in Jerseys, 10th in oral reasons, and 11th overall. Individually, Rosemary was 1st in Ayrshires and Emily was 1st in Jerseys. Amanda was 4th in Holsteins and 11th overall. The Michigan 4-H Team placed 9th in Ayrshires, 11th in Guernseys and Jerseys, 10th in reasons, and 12th overall.

In early October, the Collegiate, Ag Tech, and 4-H Teams traveled to Madison, WI for the national contests at World Dairy Expo. Michigan 4-H Team members included Katie Arndt (Ovid), Lauren Bush (Swartz Creek), Sarah Mann (Hillsdale), and Eric Sneller (Sebewaing).

The Michigan 4-H Team placed 8th in Brown Swiss and Guernseys, 6th in Ayrshires, 4th in Jerseys, 2nd in Holsteins, 2nd in oral reasons, and 2nd overall. By placing 2nd in the contest, this team earned an invitation to...

Continued from Page 18

watch animals that are due to calve closely, if they start to leak milk we will start premilking them before they calve. Colostrum is collected, tested for antibody content and frozen to be fed to calves later,” he says.

Monitor Milk Quality & Cow Health
The dairy farm gets regular feedback from the coop that it sells milk to -- the Michigan Milk Producers Association. “I’m getting current information on the somatic cell count, butter fat, protein, raw bacteria count, and PI count. I post the information in the break room where all employees can review it. And if there is a problem where a count goes higher than normal we are real quick to see what happened and how we can fix it,” Kreft says.

Adding to that, Kreft says, “We get feedback from the Dairy Herd Improvement Association (DHIA) every 4 weeks on the somatic cell count, butter fat, and protein. And there is a “hot sheet” report that’s generated after DHIA has been here which identifies specific cows that are likely to cause us problems. We use the CMT (California Mastitis Test) to identify which quarter of those cows is the problem. We aseptically take milk samples and turn them in to the MSU Diagnostic Center for Population and Animal Health even if cows are not showing clinical mastitis (so long as their cell count is up). With results back, we make decisions either to treat them, perhaps dry...

Continued on Page 21
Estimating Air Emissions...
Continued from Page 4

difficult to achieve because of enteric fermentation contributions along with fossil fuel use to plant and harvest food and fertilizer use to maximize food production for the growing population on a finite land base. However, large reductions in GHG emissions per unit of product are possible, particularly as use of dietary energy and nutrients improves.

A recent study (Capper et al., 2008) reported that use of rbST corresponds to 6.8 percent reduction in manure mass per unit of milk produced and a 7.3 percent reduction in methane output per unit of milk. In their analyses, industry-wide use of rbST reduced arable land requirements for grain production, soil erosion, nutrient excretions, and the global warming potential of the equivalent of 400,000 passenger cars.

As more research is conducted to mitigate air quality and climate change impacts from the U.S. dairy industry, particularly research to curb methane resulting from the dairy cow itself (enteric fermentation), it is imperative the methane per unit of milk produced be considered as the benchmark and not just gross methane emissions or emissions per animal.

In addition to using dietary means of improving efficiency of nutrient use, another approach is to extend the productive lifetime of the animal to distribute the emissions associated with birth to first calving over more lactations, thereby reducing the “fixed costs” associated with lactation.

Conclusion
While much research is underway to mitigate air emissions, improving animal efficiency and expressing emissions per unit of efficiency or product produced will be central to discussions.

Researchers Team up...
Continued from Page 6

that the disease-causing organism is shed through the manure. So Schalk implemented another critical management practice -- taking preventive measures to ensure that no manure comes in contact with animal feed.

To prevent cross-contamination, the Schalks bought a second skid steer and use one only to clean and scrape manure and the other only to handle and move feed. They also make sure not to cross over feed alleys with equipment to minimize the risk of any manure on the tires coming into contact with the feed.

Since the Schalk herd became part of the Johne's demonstration project, the prevalence of Johne's in the herd has dropped to less than 5 percent. The results on this herd are similar to the outcomes realized by the other test herds.

“We saw a reduction in the number of Johne’s-positive animals in all the herds we worked with,” Grooms says. “This project shows us that, though there is no cure for Johne’s disease, with proper management farmers can prevent the spread of the disease on their farms and reduce its prevalence over time.”

As the demonstration project winds down, Schalk is looking ahead to how he will continue implementing the recommended management practices on his farm. Now that he has the prevalence rate down to less than 5 percent, he will continue to test the herd to monitor for any new infections.

“We were surprised to learn that we had the disease at all. If we don’t continue to test the herd, we won’t know if we’re continuing to make progress,” Schalk says.

Funding for Grooms’ position with an emphasis on cattle disease management was made possible by the Animal Agriculture Initiative (AAI) at MSU. The AAI was established in 1996 as part of the grass-roots-driven Revitalization of Animal Agriculture in Michigan Initiative.

Michigan’s animal agriculture research, teaching and Extension initiative housed at MSU, the AAI is a partnership between MSU, livestock producers and industry organizations, and the Michigan Department of Agriculture and governed by the AAI Coalition. Its objective is to address challenges facing Michigan animal-based agriculture through research and Extension projects.

The Michigan Animal Agriculture Initiative at MSU is vital to the health of the state’s economy. A survey commissioned by the AAI in 2007 reveals that nearly $22.9 million in annual economic activity can be linked back to the initiative. AAI-funded research adds $11.5 million annually to the state’s economy, and for every state tax dollar invested in the AAI, the initiative returns $3.40 in gross state product.
Fridge Health...
Continued from Page 9

temperature. The only way to know the tempera-
ture inside the unit is to measure it with a calibrated
thermometer. Thermometers designed for accurately
reflecting the temperature of a refrigerator generally
have a fluid filled bulb or bottle. If temperature fluc-
tuations are a concern, “min-max” thermometers are
available that record low and high temperatures.

The thermometer should be placed in the center of
the compartment away from the coils, walls, floor,
and fan in order to obtain a true reading of the tem-
perature. In the refrigerator, the thermometer should
be placed on the middle shelf, adjacent to the vac-
cine, or hanging down from the upper shelf. In the
freezer, the thermometer should be suspended from
the ceiling of the compartment or placed on a box
or some other item so that it is in the middle of the
compartment off the floor.

Storing animal health products
Store ice packs in the freezer and large jugs of water
in the refrigerator along with the animal health prod-
ucts. This will help maintain a stable, cold tempera-
ture in case of a power failure or if the refrigerator or
freezer doors are opened frequently. Store the water
bottles against the inside walls and in the door racks.

Store the frozen packs along the walls, back, and bot-
tom of the freezer compartment and inside the racks
of the freezer door. Sufficient freezer packs should
be stored in preparation for transport or for a power
outage.

Frequent opening of the refrigerator unit doors can
lead to temperature variations inside, which can re-
duce vaccine efficacy. For this reason, you should not
store food or beverages in the refrigerator or freezer.
In addition, do not store animal health products in
the door shelves. These shelves are subject to greater
temperature fluctuation than the main compartment.

Health Product Refrigerator Checklist
- Unit is placed with good air circulation
- “Do Not Unplug” sign is next to unit’s outlet
- Unit motor and coils are clean
- Door gaskets maintain tight seal
- Unit maintains temperature at 35°C to 45°F
- Thermometer is monitored regularly
- Food or drinks are not in the unit
- Products in center of unit, not in door
- Ice packs in freezer, water jugs in refrigerator.

What’s Happening...
April - July

Feed Management Workshop

Date: Monday, April 19, 2010
Time: 1:00 - 5:00 p.m.
Grand Wayne Center, Fort Wayne, Indiana

This program will be of interest to consulting nutrition-
ists and agri-professionals who want to become certified
feed management planners. Specifically, the workshop
will:
- Outline the process to become a certified Feed Man-
agement Planner.
- Define the conditions where a Feed Management Plan
is valuable.
- Demonstrate the use of on-farm assessment tools for
the development of a Feed Management Plan.
$50 per attendee
To register or for additional information, please contact
Tamilee Nennich at tnennich@purdue.edu,
or 765-494-4823

The ARPAS Feed Management Exam will also be offered after the
session for an additional fee.

MSU Milk Quality Award...
Continued from Page 19

them up early or if they have other serious problems,
we might sell the cow.

Cow Health
On maintaining cow health, the dairy farm administers
the J5 vaccine to help prevent E-coli mastitis. Kreft
and his team also watch for other signs, “If a cow
looks very sick, may be her temperature is elevated,
maybe she is not eating well, or not producing milk as
she should, we will use antibiotics and sometimes pain
relievers to try to make her feel better quicker.”

Conclusion
Kreft is well aware how hard it is to get to the top,
retaining top quality milk is even harder. “We have
to keep doing everything as well as we can. I think
some other key points are that I have good employees.
I teach them as well as I can. And we communicate
regularly. If I hear any new idea I discuss it with them;
if they see problems or opportunities to improve they
are comfortable coming to talk with me. So I just want
to keep that going,” he says.
Vaccinating Cows

is more intensively packaged. If a cow were vaccinated in the last 2 weeks before calving, assuming she calves on her due date, she would have peak quantities of antibodies from the vaccine in colostrum until very nearly the calving date, and thus would probably not offer optimum antibody transfer to the calf.

However, if the vaccination is administered earlier in the dry period, at least 3 to 4 weeks before calving, or at dry off, the cow will respond to the vaccine with her antibody response well before the IgG is deposited into colostrum.

The important concept is that if you wait to vaccinate the cow too close to calving, or if she calves before her due date, it is possible that the vaccines’ contribution to colostrum will be less effective.

5) most important -- if a sound colostrum program is not in place, vaccination will likely fail, no matter how good that vaccination schedule and technique;

6) vaccines are not magic bullets that can overcome poor management practices such as calves maintained on damp bedding, in poorly ventilated housing, exposed to poor biosecurity, or fed inadequate nutrition (for example, not enough milk replacer during cold weather); and,

7) vaccines don’t exist, or may be less effective, for other pathogens such as Crystosporida and Salmonella.

If the previous guidelines are being followed, and a diarrhea problem still exists in your neonatal calves, consultation with a veterinarian and potential use of a diagnostic laboratory may be needed to ensure proper diagnosis of the causative agent(s) and therapeutic options.

MSU Dairy Judging Success in National Contests

Continued from Page 19

participate on the International Livestock Judging Tour in Europe.

This is the third time in 5 years that Michigan 4-H has earned this opportunity. Individually, Sarah Mann was 5th in Holsteins and 14th overall. Lauren was 2nd in Ayrshires, 7th in Holsteins and oral reasons, and 13th overall. Katie placed 10th in Brown Swiss, 8th in Guernseys, 3rd in oral reasons, and 2nd overall.

The Collegiate Team placed 2nd in Ayrshires, 5th in Brown Swiss and Guernseys, 6th in Holsteins, 4th in Red and Whites, 9th in oral reasons, and 10th overall. Amanda was 2nd in Ayrshires and 12th in reasons. Emily placed 8th in Guernseys, 5th in Holsteins, 3rd in Red and Whites and 14th overall.

The Ag Tech Team placed 3rd in Brown Swiss, 4th in Guernseys, and 8th overall. Eric Cole was 2nd in Brown Swiss and 6th in Guernseys. Liz was 4th in Red and Whites. Eric Westendorp was 2nd in Holsteins and 5th overall.

The final contest of the year was held at the North American International Livestock Exposition in Louisville, KY in November. The Collegiate Team placed 1st in Ayrshires, 5th in Brown Swiss, 7th in oral reasons, and 9th overall. Melissa was 3rd and Emily was 5th in Ayrshires. Amanda was 10th in Guernseys.

The Ag Tech Team placed 4th in Ayrshires, 6th in Holsteins and Jerseys, and 9th overall. Eric Westendorp and James Weber placed 8th and 9th respectively in Holsteins.

Michigan 4-H was represented in this contest by J.W. Hart (North Adams), Matt Mann (Hillsdale) Sarah Michalek (Deckerville), Sarah Mann (Hillsdale), and Brittany Westendorp (Nashville). This team had an outstanding day placing 10th in Brown Swiss, 5th in Jerseys, 2nd in Holsteins and Jerseys, 1st in Ayrshires and oral reasons, and 3rd overall.

Individually, Brittany was 3rd in Holsteins, J.W. was 1st in Jerseys and 3rd in reasons. Sarah was 10th in Ayrshires, 1st in Brown Swiss, 3rd in Guernseys, 2nd in oral reasons and 6th overall. Matt was 1st in Ayrshires, 7th in Guernseys, 9th in Holsteins, 12th in reasons, and 7th overall.

The Michigan 4-H teams are selected from the top 25 individuals at the state judging contest held during Michigan Dairy Expo in July. These individuals are invited to participate in several workouts during August, and the teams for each contest are selected at the end of August.

All 4-H youth are invited and encouraged to participate in the contest at Michigan Dairy Expo and try-out for one of the national teams. The
Collegiate and Ag Tech team members are selected from students at Michigan State University who have completed a judging course and have been part of the judging program during their education at MSU.


Team members also participate in fund raisers throughout the year, including the Spartan Spectacular Calf Sale held every March.

The MSU Dairy Judging Program would like to extend appreciation to all of the individuals, farms, and agricultural businesses that support the program by providing cattle, expertise, and financial support.

Special thanks to Sarah Black, Gail Carpenter, and Renee McCauley who coached and traveled with the teams to various contests and workouts this fall. The MSU Dairy Judging Program is coordinated by Dr. Joe Domecq.
The Michigan Dairy Review is published in January, April, July and October by the Dairy Programs Group at Michigan State University. It provides useful information to the dairy producers and dairy-allied industries of Michigan to enhance the success of their businesses. The Michigan Dairy Review is located at <https://www.msu.edu/user/mdr/>.

Editor & Publisher ................................................. Dave Beede
Managing Editor .................................................. Ike Iyioke
Final Copy Editor .................................................... Kathy Lee
Circulation ............................................................... 5,800