Kentucky Dairy Notes

February 2013

Kentucky Dairy Partners
Annual Meeting
February 26 & 27, 2013
Sloan Convention Center, 1021 Wilkinson Trace, Bowling Green, Kentucky

Tuesday, February 26th (All Times are Central Time)

10:00 AM-4:30 PM	KDDC Young Dairy Producers Conference
10-Noon	SUDIA/ADA Budget Committee Meeting
1-4	SUDIA/ADA Community Outreach Training-Telling Your Story
2-5	SUDIA/ADA Board Meeting
2-6 PM	Exhibitors Set up Exhibits
6-7	Dinner – *Sponsored by KDDC and SUDIA/ADA of Kentucky*
6-9 PM	Reception and Exhibit Hall Open

Wednesday, February 27th (All Times are Central Time)

7:00 AM-8:00 AM	Breakfast in the Exhibit Hall area (Ticket Required May be purchased for $15)
7:00 AM	Registration Opens
8:00 AM	View Exhibits
9:30	Welcome
9:50	CSI: Cow Signals Investigation - *Tom Lorenzen* - Alltech
10:20	Dedicated to Dairy: Enhancing the Image of Dairy-Phase 2 - *Cheryl Hayn and Jeff Deener*
10:50	Recognizing and Managing Lame Dairy Cows – *Dr. Ernest Hovingh*- Pennsylvania State University
11:30	KDDC Annual Business Meeting
12:00-1:30 PM	Lunch and Visit Exhibits
1:30	Dedicated to Dairy: Cow Care-Communicating Dairy Image in a Changing World – *Shaheen Solomon* - Southeast United Dairy Industry Association, Inc., Public Relation Account Manager
2:00	Prevention of Lameness in Your Dairy Herd – *Dr. Ernest Hovingh*-Pennsylvania State University
2:30	Farmer Panel- Cow Comfort - *Bob Klingenfus, Adam Robey, and Steven Weaver*
3:20	Wrap up and Door Prizes
3:30	Adjourn

Registration $30/ person at the door. No registration fee for Kentucky dairy producers - limit 2 per dairy permit (more than 2 per permit may attend but must pay $30.00 for each additional person) A block of rooms is available at the Holiday Inn $95/night. Please contact the hotel directly at (270) 745-0088 to make your reservations.

Management Practices before Calving Help Prevent Fresh Dairy Cows from Becoming "Losers"
Donna Amaral-Phillips

Successfully transitioning dairy cows back into the milking herd after the dry period is one of the most important pillars associated with well-performing and profitable dairy herds. The success of these nutrition and management programs directly relates to the reproductive performance, milk production, and health of cows during this next lactation. Essentially, transition cow programs need to be designed and managed to result in cows eating well after calving and entering lactation with no or very minimal health- and metabolic-related issues, such as metritis, milk fever, ketosis, or fatty liver.

As dairy researchers learn more about this vital time frame, they have found that subclinical diseases have a substantial impact on future reproductive and production performance and health, may often go undetected, and may be the underlying cause of suboptimum performance in dairy herds. The key becomes understanding when problems, even if they do not result in a diagnosed clinical disease, are occurring and then develop and modify management practices to prevent problems in the future. Dairy cows that suffer from these issues, whether clinically or subclinically, often are prematurely culled, and in Denmark, these cows are part of the complex that the Danes refer to as "loser cows." The question we want to consider is how we can prevent early-lactation dairy cows from becoming "loser dairy cows."

Prevention starts in the previous lactation by preventing excessive body condition in later-lactation cows

Transition cows that are overconditioned (body condition scores are equal to or greater than 4.0) eat less before and after calving, with feed intake dropping sooner and to a greater extent before calving than optimally body conditioned pre-fresh cows. As a result, these cows mobilize body fat to a greater extent compared to cows where feed intake is not compromised as greatly before calving. This greater mobilization of body fat causes excessive fat to accumulate in the liver of these cows, which further compromises the liver's ability to make glucose to support milk production. Thus, these cows have a higher likelihood of developing fatty liver and then subclinical or clinical ketosis in addition to other metabolic disorders.

Feed intake of most cows decreases just before calving (generally less than 5 days before calving) which results in some mobilization of body fat. The key is the degree of mobilization of body fat. Overconditioned cows and cows whose feed intake is excessively reduced before or just after calving mobilize more body fat (more than 0.5 body condition score by 30 days in milk) and consequently accumulate more fat in the liver. Thus, this increased mobilization of body fat results in a higher incidence of fatty liver and thus subclinical or clinical ketosis as evidenced by elevated ketones and non-esterified fatty acids (NEFA) in the blood pre- and post-calving.

Oftentimes, these overconditioned cows were cows that experienced long days in milk due to reproductive problems during the previous lactation. In herds where later-lactation cows are becoming overconditioned, these late-lactation cows may need to be housed and fed separately where the energy content of rations is adjusted downward and more forages are fed to prevent these cows from becoming overconditioned. At the same time, adequate energy and nutrients (e.g., protein) need to be supplied to maintain good milk production. The key is to recognize the problem early and take corrective measures to prevent overconditioning of late-lactation cows.

Feed adequate but not excessive amounts of energy during the entire dry period

Overconsumption of energy during the dry period can negatively impact intake shortly before and after calving and can result in higher losses of body condition after calving. Both of these outcomes potentially increase the likelihood of metabolic diseases after calving and cows not milking as well during the next lactation. In addition, feed intake before calving impacts feed intake after calving, especially where feed intake drops sharply before calving. Studies have shown that cows with metritis after calving also had lower intakes before calving. Thus, it is critical to design feeding programs before calving that optimize intake.

Correctly sampling all forages for dry cows and using the test results to formulate rations are vital steps for avoiding overfeeding energy during the dry period. Overfeeding energy increases costs, but

more importantly, it can negatively affect performance during the next lactation. Far-off dry cow diets are recommended to contain about 0.60 Mcal NE_L/lb dry matter (calculated using the NRC model) and for Holstein cows provide 15 to 17 Mcal/day NE_L. To achieve these lower energy concentrations, especially when corn silage provides part of the forages, 5 to 10 lb of chopped (2 to 3 inches in length) wheat straw or high neutral detergent fiber (NDF) grass hay should be added and the consumption behavior of cows monitored to make sure the TMR is not sorted. These diets need to contain adequate amounts of fiber (i.e., NDF), but not excessive amounts as can occur when poor-quality forages are fed. For example, if the NE_L intakes are less than desired, the concentration of NDF is probably too high, and some of the high NDF forages need to be removed and replaced with other lower NDF forages. Likewise, if the NE_L intake is higher than desired, dietary NDF should be increased and more high NDF forage added.

Close-up dry cow diets should contain slightly more energy and metabolizable protein than far-off dry cow diets, but energy density still should be controlled to optimize intake after calving. Mineral balance of dry cow diets is critical to prevent problems after calving. Diets for dry cows 3 weeks before calving often contain lower potassium forages and grain products to allow for formulation of diets that prevent subclinical and clinical milk fever. Subclinical milk fever, lower blood calcium content without clinical signs, has been associated with higher risks of mastitis, retained placenta, metritis, and displaced abomasums.

Minimize stresses on close-up dry cows

Social, environmental, and metabolic stresses can negatively impact not only feed intake but also immune function and overall productivity and health of dairy cows before and after calving. Management practices that decrease these stresses include:

- **Providing adequate feedbunk space:** When feedbunk space is limiting, close-up dry cows may spend more time standing and eat less dry matter or eat larger and fewer meals. Cows that spend more time standing are more predisposed to lameness. To prevent potential problems with lameness and other metabolic disorders after calving, close-up dry cows should be provided with 36 inches/cow of feedbunk space. Plans for the total amount of bunk space provided should reflect the largest number of cows the facility will handle, not the average number of cows through the facility.
- **Providing adequate resting space:** Close-up dry cows need a clean, dry, and comfortable place to rest. Limiting the resting space increases the time cows spend standing and predisposes them to hoof issues and increased incidence of lameness after calving. During this time frame, cows naturally have a lower immune function and are more susceptible to infections, such as mastitis and metritis; thus, providing a clean, dry environment is critical. Each cow should be provided with a minimum of 1 well-bedded freestall (sand is the preferred bedding) or 100 square feet of bedded pack space. Again, facilities should be designed for the maximum number of cows to prevent overcrowding, not the average number of cows.
- **Minimizing number of pen moves or addition of cows to the group:** Each time new cows are added to a group, the social hierarchy within the group is changed and must be reestablished. If herd size allows, cows should remain in the same group throughout the close-up period and, if possible, even established as a group early in the far-off dry cow period. For herds where this is not possible, new cows should be added no more frequently than once weekly to the close-up dry cow group. When possible, multiple cows, rather than single cows, should be introduced into a group together.
- **Minimizing heat stress:** Heat stress during the dry period decreases feed intake during the dry period and after calving, immune function after calving, and milk production during the next lactation. Providing fans and sprinklers to cool cows is critical during this time period and the entire dry period.

House springing heifers and mature cows separately, if possible

Heifers compete better with other heifers and have higher dry matter intakes and longer resting times when housed separately from mature cows. Diets for heifers then can reflect lower intakes (approximately 23 versus 26 lb/day dry matter intake) and the need for additional protein (15% crude protein or 1,200 g/day of metabolizable protein for springing heifers) during the close-up dry period over

mature cows. In addition, heifers are not as likely to respond to the addition of anionic salts because they are less likely to have subclinical hypocalcemia (milk fever) than mature cows and the addition of anionic salts may reduce feed intake.

Prevention of metabolic disorders and optimizing feed intake after calving starts with implementing sound feeding and management practices not only 3 weeks before calving but throughout the entire dry period. Essentially, dairy cows that consume adequate dry matter pre-fresh (24 to 28 lb/day dry matter—Holstein cows) throughout the entire dry period have fewer metabolic issues (i.e.. ketosis) after calving, have a better immune system to fight off disease challenges (i.e., mastitis), and generally become care-free, early-lactation cows that rebreed easier. These dairy cows become "winners" and not "losers."

What to Look For in an Oral Electrolyte Product

Michelle Arnold, DVM

There are five major infectious causes of diarrhea in calves less than 21 days of age: *E. coli* K99, rotavirus, coronavirus, Cryptosporidia, and *Salmonella* species. Noninfectious factors such as insufficient or poor quality colostrum, poor sanitation, stress, and cold weather can also cause or contribute to neonatal calf diarrhea. Regardless of the cause, diarrhea results in increased loss of electrolytes and water in the feces of calves and decreases milk intake. Ultimately, this process causes dehydration, metabolic acidosis (the blood is more acidic than it should be), electrolyte abnormalities including a critical sodium deficiency, and a negative energy balance from the lost nutrients and lack of milk. Oral electrolyte solutions have typically been used to restore fluids, correct the pH and electrolyte levels in the blood, and provide nutritional support with the added benefit of being relatively inexpensive and easy to administer. However, there are a tremendous number of products on the market to choose from and they differ considerably. This article is intended to provide guidance in selection of an oral electrolyte product according to the latest research.

Accurate assessment of a calf with diarrhea is necessary to determine if oral fluid therapy is adequate or if intravenous fluids are indicated. Please consult the December 2012 issue of KY Dairy Notes regarding how to perform this assessment or a table summarizing these assessments and treatment options including the amount of fluids required can be found at: http://www.extension.org/pages/65519/early-identification-of-sick-dairy-calves-important-to-their-survival-and-future-milk-production . After determination that oral fluids are needed, the solution chosen must satisfy the following four requirements:

1. It must supply enough sodium to rapidly correct the losses that have occurred;
2. It must include agents (glucose, citrate, acetate, propionate, or glycine) that actually encourage absorption of sodium and water from the intestine;
3. It must provide an alkalinizing agent (acetate, propionate, or bicarbonate) to correct the blood from being too acidic;
4. It must provide energy because calves with diarrhea are in a negative energy balance.

Sodium, chloride, and potassium are all lost in the feces of calves with diarrhea. Sodium is the most important of these and most research suggests a level of 90-130 mmol/L is necessary to correct dehydration. However, sodium absorption from the small intestine will only occur if there is glucose or an amino acid such as glycine, alanine, or glutamine that the sodium can join with and cross into the cells in the gut. The ratio of glucose to sodium present in an oral electrolyte solution should fall somewhere between 1:1 and 3:1. Volatile fatty acids such as acetate and propionate are also known to increase intestinal absorption of sodium. With dehydration, potassium is lost in the feces and urine so calves may experience a profound loss of body potassium stores. A common clinical sign in calves with chronic diarrhea is extreme muscle weakness due in large part to this loss of potassium. Oral electrolyte products should contain between 10-30mmol/L of potassium. A relatively new theory called the "strong ion theory" encourages the use of products that deliver an excess of strong cations (sodium and potassium) relative to the concentration of strong anions (chloride) in order to help correct a portion of the acid-base balance in the blood. This "strong ion difference" or "SID" is calculated as follows: $[Na^+] + [K^+] – [Cl^-]$= SID and

should fall in the range of 60-80 in an oral electrolyte product. Chloride should be present in the range of 40-80 mmol/L ; concentrations at the lower end of the suggested range will beneficially increase the SID. It is extremely important that the oral or IV fluids chosen for rehydration will be able to increase blood pH from an acidic state to a more neutral state. This is normally accomplished by alkalinizing agents such as bicarbonate, acetate, or propionate found in oral electrolytes. Although all have similar effects, acetate and propionate have several advantages over bicarbonate:

1. Acetate and propionate help sodium and water to be absorbed in the small intestine but bicarbonate does not;
2. Acetate and propionate are sources of energy but bicarbonate is not;
3. Acetate and propionate will not alkalinize (raise the pH) in the abomasum or true stomach but bicarbonate will; this is important because an acidic stomach kills harmful bacteria before they can reach the small intestine and finally,
4. Acetate and propionate do not interfere with milk clotting in calves whereas bicarbonate has been shown to interfere with this normal digestive process. For this reason, experts recommend that bicarbonate-based electrolytes not be fed at the same time as milk or milk replacer. Conversely, products with acetate or propionate do not cause digestive disturbances and are well tolerated when fed with milk.

Commercial preparations may also vary in the amount of particles dissolved in the solution. A "hypertonic" oral electrolyte product has a very large amount of glucose in the preparation and may have the denotation "HE" for high energy. These differ from "isotonic" solutions which have a similar amount of particles in the solution as is normally found in the bloodstream. Hypertonic solutions give greater nutritional support because of the higher glucose level yet they have been associated with abomasal bloat and increased diarrhea if the calf is unable to absorb this large amount of sugar. Depressed calves that refuse milk can be given a hypertonic electrolyte product while milk feeding is withheld. A hypertonic oral solution of 500-600mOsm/L is ideal in dairy calves or beef calves separated from the dam. Beef calves that continue to suckle or dairy calves with a good appetite will need isotonic solutions. **It is necessary to continue feeding milk or milk replacer to calves with scours because milk is better at maintaining a normal blood glucose level than any electrolyte solution.** Never mix electrolytes with milk or milk replacer as these products are designed to be mixed with water only.

In summary, it is important to examine the oral electrolyte product label and understand the contents. Unfortunately, ingredients are often presented in different ways that make comparisons difficult. Consult a veterinarian or nutritionist to properly evaluate your oral electrolyte product before your next case of neonatal calf diarrhea.

Welcome Katie Holzhause

Katie Holzhause has recently been hired as an Extension Associate at the University of Kentucky. She is working on the Kentucky Farm Start program. She is building a web-based computer application for dairy farmers to plan management and economics of an entire dairy operation. This project is supported by the Beginning Farmer and Rancher Development Program of the USDA's National Institute of Food and Agriculture. It is a joint program with the University of Kentucky and the University of Tennessee.

Katie received her bachelor of science in animal science with a dairy specialization and a minor in agricultural economics from the University of Kentucky. She grew up on a small farm in northern Kentucky, riding horses and raising sheep and chickens for 4-H and FFA. In college Katie became interested in dairy where she participated in Dairy Club, National Dairy Challenge and ADSA, as well as the Block and Bridle club.

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February 12th 1:00-2:00 Eastern Time
Webinar: Better Milk Quality for Better Mastitis Therapy Decisions
Presented by: Dr. Ron Erskine, Michigan State University

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Kentucky Dairy Partners Meeting
Bowling Green, KY
http://www2.ca.uky.edu/afsdairy/extension/kydairypartners

March 4th 1:00-2:00 Eastern Time
Webinar: Outcome Driven Health Management
Presented by: Dr. John R. Wenz, Washington State University

March 18
4-H Dairy Jeopardy Contest
Barren County Extension Office
Registration Due March 1st