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NUTRITION PLUS NEWSLETTER

DAIRY NUTRITION PLUS™

FOUR KEYS TO SUCCESSFUL TRANSITIONS

Many dairies have conquered clinical metabolic issues at calving. But if you stop there you leave money on the table. Most dairies still have opportunity to reduce subclinical hypocalcemia and subclinical ketosis. Reducing subclinical issues will result in more milk and better reproduction.

Recent research has improved our understanding of the transition period, of rumen function and of the negative effects of subclinical disease. Results show that focusing on the transition period—three weeks prior to and following calving—improves milk production and reproductive performance.

"I tell producers that once the calf hits the ground, the cow is ready to make milk; but we have to give her the nutrients to do so," explains Mary Beth de Ondarza, Paradox Nutrition, West Chazy, N.Y. After calving, cows' dry matter intake is reduced and fluctuates. The goal must be to get enough nutrients into her safely, maintain rumen fill with adequate effective fiber and keep her healthy.

To accomplish that goal, de Ondarza recommends focusing on four key areas: 1. Cow comfort and management; 2. Subclinical hypocalcemia; 3. Subclinical ketosis; and 4. Metabolizable protein and amino acids. Research has shown that each can negatively impact transition cows. Getting these four things right removes the impediments that prevent cows from having a successful transition, improves milk production and reproduction.

WHERE TO START

Often, de Ondarza can address all four key areas at once to reduce subclinical issues on dairies. But, "I would probably put cow comfort and management at the top of the list with subclinical hypocalcemia as a close second in order of importance," she says. It's about evaluating each dairy individually to determine which of these areas is the most limiting for transition success and then making little tweaks and measuring results.

Due to hormonal changes and gut capacity issues, dry matter intake naturally declines somewhat before calving (Bertics et al., 1992). But stress from competition at the bunk and for stalls, and environmental stress can all decrease DMI further before calving. Stress also can change how cows partition available nutrients and increase fat mobilization. Stressors can accumulate as a precursor to metabolic dysfunction. Other common stressors include: Mixing first-calf heifers with older cows; > 1 hour/day in headlocks; > two pen moves during the transition period and uncomfortable stalls. To overcome these stressors de Ondarza recommends the following for pre-fresh cow management:

- Don't crowd. DMI starts to decline when stocking density exceeds 80%.
- Provide a minimum of 30 inches of feedbunk space per cow.
- New research recommends 140-150 sq. ft. of resting space/cow (Grant 2017).
- Clean stalls/pens every 2 to 4 days.
- Check pre-fresh cows hourly and move at the point of calving to a separate pen.
- Once a cow is up after calving, move her to a fresh-cow pen.

Decreased DMI before calving has been linked to increased risk for subclinical ketosis (Goldhawk et al., 2009) and increased risk for metritis (Huzzey et al., 2007). A study by Bertics et al., 1992, showed that just getting cows to eat more can improve transition success.

"I am convinced that good cow comfort and management will make up for inadequacies of the diet," she says. Unfortunately, sometimes cow comfort and management can't be improved without investing in new facilities. In that situation, investing more in nutrition can help make up for shortfalls in cow comfort and improve cows' transition.

PRE-FRESH DIET

A good pre-fresh diet should keep cows eating, maintain rumen fill and provide adequate effective fiber. In addition, it should provide enough metabolizable protein (MP) to meet fetal growth and the needs of the cow. Aim for 1,300 g/d of MP in the pre-fresh diet.

Provide adequate energy to reduce fat mobilization and subclinical ketosis; about 1.4 to 1.5 Mcal NE_L/kg DM. Feed low potassium forages. To improve calcium regulation keep dietary potassium at <1.3%, sodium at <0.15% and raise magnesium to 0.4%. Add a palatable anionic supplement to induce metabolic acidosis for increased sensitivity to the parathyroid hormone and better calcium response. The pre-fresh diet should also include additives such as yeast, choline, niacin and vitamin E.

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FOUR KEYS TO SUCCESSFUL TRANSITIONS

A good pre-fresh diet will help minimize the incidence of subclinical hypocalcemia which has been linked to ketosis, retained placentas, displaced abomasums and infections.

THE FRESH COW DIET

Proper diet during the first three weeks of lactation is critical. According to de Ondarza a fresh-cow diet should: provide nutrients to rapidly increase milk yield and dry matter intake, reduce health problems, reduce subclinical ketosis by promoting DMI and propionate production, control but not eliminate negative energy balance and prepare cows for conception.

Some dairies prefer to feed the high-group TMR to fresh cows, too. While that can work, de Ondarza prefers to make a couple of tweaks to the high-group TMR for just-fresh cows. The first is to add 2-3 lbs. of high-quality chopped hay. And since high nutrient demand combined with lower feed intakes can lead to subclinical ketosis, she also adds yeast, calcium propionate and rumen-protected choline. She aims for 12-14% MP and a lysine to methionine ratio of 2.7:1.

"Generally dairy producers understand the need to 'baby' the fresh cows a bit," she says. "It makes sense to put the more expensive additives into the just-fresh cows in order to give them a good start on their lactation and prevent fresh cow problems down the road such as DAs and ketosis."

When it comes to metabolic issues during transition, less is always better. "I know some farms that have a goal of producing 100 lbs./day at 10 days in milk (DIM). To me, that indicates real transition success," says de Ondarza.

All producers can use 10 DIM as a benchmark. Evaluate your transition program for these four areas, make improvements and then reevaluate milk production at 10 DIM. You may be surprised. The same is true for reproduction. Select criteria to monitor and then work to improve.

Investing in the transition period is an investment in the cows' next lactation and longevity in the herd. More milk and better reproductive performance are always welcome.

FROM THE MATERNITY PEN

New Research on Calcium Supplements

New research from Cornell University shows that when it comes to calcium supplements, targeted use may be better than whole-herd treatment for transition cows. Researchers evaluated the effects of two calcium supplements on early lactation health, milk production and reproductive performance at a large New York dairy. Cows received one of three treatments—a subcutaneous administration of 500 mL 23% calcium gluconate at calving, an oral calcium bolus containing 43 grams of calcium at calving and 12-hours after calving (experiment 1); or 8 to 32 hours after calving (experiment 2); or no calcium supplementation.

In experiment 1, all cows were fed the same prepartum diet with a negative dietary cation-anion difference (-10 to -15 mEq/100g of DM). As expected, subcutaneous calcium supplementation raised serum total calcium for 12 hours, and the oral calcium bolus given at calving and again in 12 hours produced a prolonged but more modest increase in serum total calcium.

In experiment 2, cows were fed either the negative DCAD diet described above or a neutral DCAD diet (0 mEq/100g of DM). Calcium supplementation after calving was oral, subcutaneous or none. Results showed that calcium supplementation of either type did not greatly improve health outcomes, milk production or reproductive success compared to control cows.

However, cows with high relative herd milk rank (top 45%) that received calcium supplementation were half as likely as non-supplemented cows to be diagnosed with mastitis in the first 60 days in milk (DIM). Researchers also found that second parity cows fed a negative DCAD diet prepartum that received calcium supplementation had a greater risk of herd removal in the first 60 DIM than non-supplemented cows. Both types of calcium supplements used showed the same response in that group. The reason for this finding is not clear. But it does demonstrate that more research is needed to evaluate calcium homeostasis and response to calcium supplementation in younger cows.

Currently, research indicates that calcium supplementation at calving should be used for specific high-risk cows, as opposed to a whole-herd treatment.

HAPPENINGS

DNP Teaches Simplicity of pH Testing at Dairy Consortium

The Dairy Nutrition Plus (DNP) team taught students from across the country the simplicity of urine pH testing and the value of a DCAD program during the 2018 U.S. Dairy Education & Training Consortium (USDETC) last month in Clovis, New Mexico.

For the past five years, DNP has supported the USDETC, a multi-university organization established a decade ago to help meet the educational needs of the rapidly expanding dairy industry. For students interested in large herd management, the program offers comprehensive dairy management lessons, both in the classroom and on the farm.

"This is an incredible program offering hands-on education to a wide range of students. It's a privilege to help support their education," said Johnny Ware, regional sales manager for SoyChlor and SoyPlus.

Throughout the summer, USDETC students work with renowned nutritionists and professors and network with industry representatives. The program covers a variety of dairy management skills, from budgets to equipment to nutrition and everything in between.

"Area producers allow us on their farms to offer access to critical hands-on and practical training. This makes the Dairy Consortium so unique. The doing, seeing and practicing in commercial herds is put into context by owners and managers. And our allied industry partners provide the technical expertise. How would you ever learn how to check the urine pH without actually going out and doing it?" said Dr. Robert Hagevoort, USDETC co-founder and director of development.

During the consortium's nutrition week in June, the DNP team offered their transition cow expertise with urine pH training and DCAD management tips. Students collected urine samples in the close-up pen at Heritage Dairy, read pH strips and analyzed the results.

The DNP team is proud to support hands-on dairy education for students from across the country. For more information about the USDETC, visit https://usdetc.tamu.edu/.

CONSULTANTS CORNER

Evolution of Transition Cow Management

ROBERT VAN SAUN
Penn State University

Thanks to research, feeding and management practices for transition cows have changed over the past 30 years. However, postpartum disease still occurs all too frequently. The cost—lost milk, discarded milk, veterinary fees, increased labor, pharmaceuticals, premature culling and reduced reproductive performance—is significant.

It is well established that periparturient health disorders are a complex of interrelated disorders, Curtis et al, 1985; Correa et al., 1993. They are not individual events. And transition cow nutrition is not the sole solution.

HISTORICAL PERSPECTIVE

Although we have made progress in understanding the transition cow, our advances have not eliminated the issues, requiring a retrospective look at where we have been to better direct future decisions. In looking for nutritional answers to milk fever and the cascade of problems that can occur, researchers first manipulated the calcium to phosphorus ratio and supplemented vitamin D. Low-calcium rations prepartum to stimulate the homeostatic system were tried next. Then came the application of dietary cation-anion difference to improve calcium homeostasis, but on-farm adoption has been slow despite documented success. Development of the "Goldilocks" diet, where dry cows can eat their fill but only receive enough energy to meet their needs is another iteration of dry cow feeding.

During this time researchers also were examining the interrelationships between disease conditions during the postpartum period. Nutrient requirements were refined to reflect the increased nutritional need of late pregnancy cows to support a growing calf and prepare for lactation. As research progressed, NEFA (non-esterified fatty acids) and BHB (beta-hydroxybutyrate) were identified for their role in metabolic disease during times of negative energy balance. Now NEFA and BHB are used on-farm to test and define individual and herd risk. Recently the role of inflammatory mediators, feeding behavior and insulin resistance were identified as precursors of metabolic disease. Non-nutritional factors, overcrowding, pen moves and facilities were also identified as contributing factors to metabolic disease during the transition period.

Research and on-farm trials during the last 30 years have demonstrated that nutrition, plus cow comfort, feeding management and minimizing behavioral and environmental stress are the keys to successful transitions.

GUIDELINES

In order to achieve low disease prevalence, high milk production and efficient reproductive performance, current research suggests:

- Ensure all transition cows have sufficient opportunity to consume a properly balanced diet.
- Feed energy to meet but not exceed energy needs (<120% of requirement).
- Feed 1,300 grams of metabolizable protein (MP) to ensure that with intake variation all cows consume 1,100 grams of MP.
- Aim for dietary NDF intake of 0.6 – 0.9% body weight (BW) for pre-fresh cows and 0.8 – 0.95% BW for far off cows.
- Do not increase starch from pre-fresh to fresh diet by more than 10%.
- Minimize dietary lipid content to <5% DM.
- Maintain calcium homeostasis by manipulating DCAD.
- Provide sufficient dietary vitamins and trace minerals to meet needs of the cow, colostrum, the fetus and the immune system.
- Do not overcrowd (85% occupancy). Provide a clean, comfortable resting place (50-inch wide stalls or 140 – 150 sq. ft. of bedded pack).
- Provide 30 inches of bunk space per cow and multiple waterer locations.
- Heat abatement strategies are necessary for the entire dry period.
- Keep the number of pen moves to less than two.
- Promote the cows' ability to eat and rest collectively.
- Establish a monitoring system to assess postpartum health, disease risk and action steps to intervene when needed.

BEYOND BYPASS

Five Amino Acids Identified as Limiting

When it comes to balancing diets for amino acids, the dairy industry is in its infancy. Research, combined with more refined nutrition models, has helped identify some amino acids as limiting. But additional work is needed to evaluate more individual AAs and to better understand the role they play.

New research in the January 2018 issue of the *Journal of Dairy Science* sought to identify which AAs were most likely to have an effect on milk yield, milk protein yield and milk protein percentage. Researchers identified 63 published papers with 258 individual treatments for the study. Two different statistical models were used. Regardless of the analytical approach used, the Cornell Net Carbohydrate and Protein System (CNCPS) predicted that metabolizable histidine, leucine, tryptophan, threonine and methionine were all limiting or co-limiting amino acids for lactating dairy cows. Results for lysine did not support it as a limiting amino acid, but the inclusion rate in the diet may not have been enough to yield a response.

Here's what the analysis showed:

- Methionine was associated with increased milk protein yield and milk protein percentage.
- Leucine was associated with increased milk yield and milk protein yield.
- Tryptophan and threonine were associated with increased milk yield.
- Histidine was associated with increased milk yield.

Focusing on amino acids instead of crude protein allows producers to potentially increase milk protein and milk yield while feeding less protein. Doing so may help reduce cost, minimize the amount of nitrogen excreted in waste and maintain or improve cow performance. More research is needed to fully understand the interactions of specific amino acids in the dairy cow diet at different stages of lactation and to provide specific nutritional guidance.

LANDUS COOPERATIVE

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QUALITY CORNER

Manufacturing Quality, from Start to Finish

The SoyPlus manufacturing team recently took some time away from their duties ensuring the consistent quality in SoyPlus to visit one of the dairies that relies on it every day.

Over the course of three weeks, every member of the SoyPlus manufacturing team toured Blood Dairy, located in central Iowa, where they got up close with the cows fed SoyPlus and learned from the Blood family the importance of quality and consistency in producing high quality milk for consumers.

"It's important to me that the SoyPlus production team gets to see why the quality and consistency of this product matters. It means even more to them when they can meet the people and animals directly impacted by their hard work," said Kevin Grundmeier, SoyPlus production manager.

The majority of milk produced at Blood Dairy is trucked to the Anderson Erickson plant in Des Moines. For many of the SoyPlus plant employees, Anderson Erickson is the brand they purchase for themselves and their families.

"It's pretty cool to see how our feed ingredient plays a role in the dairy foods that I consume. I'm proud to participate in that supply chain, from start to finish," said Nick Schultes, SoyPlus production specialist.

SoyPlus is one product in the Dairy Nutrition Plus family of quality products manufactured by Landus Cooperative. Want to see what else the Dairy Nutrition Plus team has been up to lately? Visit blog.dairynutritionplus.com.