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DAIRY
NUTRITION
PLUS™

WAITING 7 DAYS BETWEEN VACCINATION, PEN MOVE PAYS

Research during the last 20 years has changed how producers feed and manage transition dairy cows. The introduction of controlled-energy diets for dry cows and feeding a negative dietary cation-anion difference (DCAD) diet for 21 days before calving are proven nutritional strategies that help cows have a healthier transition into lactation.

Changes in cow management—stocking density of 80% or less in close-up pens, increased feed bunk space of 30 inches per cow and managing cows so that they can feed and rest as a group—are all changes that have helped improve transition cow success. Together these nutritional and management changes have helped reduce the incidence of the most common transition cow problems—hypocalcemia, ketosis, metritis, displaced abomasum and excessive body weight loss prior to calving.

However, subclinical problems, and a few clinical ones, still persist and negatively impact transition cows. The dairy industry must continue to look for solutions that can improve cows' health, productivity and longevity in the herd. That's where new research comes in.

Research presented at this summer's ADSA virtual meeting examined the effect of timing of prepartum vaccination and pen change of pregnant Holstein cows on lying time, energy status, nonesterified fatty acids (NEFA) and serum calcium at calving. Previous research had already shown that after a pen change or after vaccination, some negatives, such as decreased dry matter intake, decreased lying time, altered feeding behavior, increased metabolic rate and metabolic cost, often occur. But because of logistics and labor-savings, pen change and prepartum vaccination for dry cows traditionally have been done simultaneously, explains Bernardo Menichetti, PhD student, and his advisor Gustavo Schuenemann, dairy extension veterinarian at The Ohio State University. That begs the question, does pen change and vaccination when done together worsen the animals' ability to maintain homeostasis because of the negative effect on lying time, eating behavior and dry matter intake?

To answer that question, 296 Holstein cows from one dairy herd were enrolled in a study. Three treatment groups were created: Vaccination at 28 days before expected

calving date with pen change at 21 days before expected calving date, vaccination and pen change at 28 days before expected calving date, and vaccination and pen change at 21 days before expected calving date. Prepartum cows were all fed a diet with 42.7% NDF, 13.3% CP and 1.34 NE_L Mcal/kg of dry matter (DM) with a formulated DCAD of -131.9 mEq/kg DM. Cows were randomly assigned to one of the three treatment groups at about 35 days before their expected calving date. Electronic data loggers were fitted to the hind leg of individual cows to track their lying time. Blood samples were collected at 28, 26, 21, 19, 14 days prepartum and on the day of calving. Results include:

- Regardless of treatment group, lying time of prepartum cows ranged from 12 to 13.2 hours/day.
- When pen change and vaccination occurred on the same day, lying time was reduced by 36 minutes/day for the first 3 days compared to pen move alone.
- Blood NEFA concentrations at 14 and 19 days prepartum were significantly higher in cows vaccinated and moved at 21 days prepartum compared to cows vaccinated and moved at 28 days prepartum and cows vaccinated at 28 days and moved at 21 days prepartum.
- Glucose concentrations at calving were highest in cows that were vaccinated at 28 days with a pen move at 21 days prepartum. Glucose concentrations were lowest in cows vaccinated and moved at 21 days prepartum.
- Cows vaccinated at 28 days and moved at 21 days prepartum had the least proportion of cows with hypocalcemia at calving—18.7% (as measured by total serum calcium concentration of ≤ 8.0 mg/dL within 1 hour of calving). The proportion of cows defined as hypocalcemic was 24.8% and 37.3% for cows vaccinated and moved at 28 days prepartum and for cows vaccinated and moved at 21 days prepartum, respectively. None of the cows developed clinical signs of hypocalcemia.

These results suggest that if the stressors of pen change and vaccination were uncoupled, prepartum cows would benefit from common prepartum changes in metabolism, such as improved serum glucose and calcium concentrations at calving, say Menichetti and Schuenemann. Vaccinating dry cows 7 days before a pen change could be part of an overall

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WAITING 7 DAYS BETWEEN VACCINATION, PEN MOVE PAYS

strategy, combined with other management practices, to reduce serum NEFA concentrations prior to parturition.

“The dairy business is the art of controlling variation and managing risk,” says Schuenemann. “Perhaps the best or most successful dairy farms (in terms of reproductive performance, longevity and milk quality) have achieved consistent management over time by implementing a simple but effective transition program consistent with their facilities and personnel.”

“We know what a good transition management program looks like,” explains Schuenemann. It is simple but meaningful with a strong emphasis on prevention and a process for continual improvement. Proper nutrition, grouping and cow comfort are paramount. A set of simple but effective protocols that most people can follow that are customized for your animals, feed, water and facilities. This includes monitoring DMI, TMR and water availability within reach of cows, space per cow (at the bunk and pen), lying time, urine pH, BCS and blood NEFA prepartum. Then assess health and productivity indicators such as hypocalcemia, ketosis, metritis, reproduction and milk yield. For best management consistency, the training program should be integrated with facilities consistent with established protocols.

Continued improvement during the transition period will come from finding the tweaks, the small details that can help improve your cows’ health, productivity and longevity. The simple change of separating vaccination and pen move for dry cows is one such small tweak that has the potential to improve transition cow success on your dairy. (ADSA Abstract M35, J. Dairy Sci. 103 Suppl.1, p 174.)

References available online at www.dairynutritionplus.com/enewsletter/nutrition-plus/2020-November.asp

HAPPENINGS

Robertson Joins SoyPlus, SoyChlor Leadership Team

As a farmer-owned cooperative, Landus always has an eye on the future. That’s why we are making organizational changes to enhance our leading-edge and position the cooperative for long-term success in the ever-evolving agricultural marketplace.

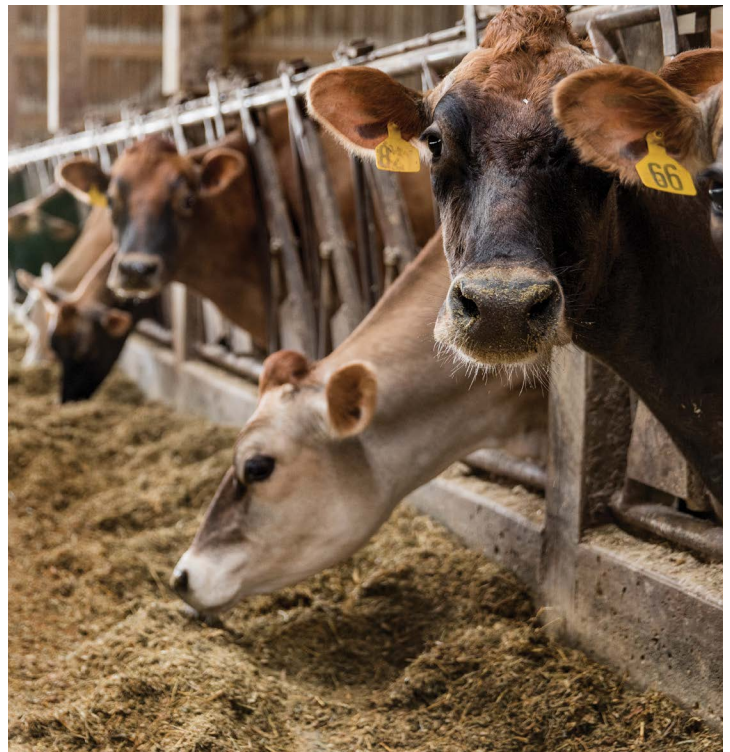
As part of an overall company restructuring, we are pleased to announce that Chris Robertson has transitioned internally to the role of Director of Sales for the SoyPlus and SoyChlor product lines. Chris will lead, develop and coach our team of regional sales managers and oversee domestic and international marketing. In this role, he will lead the preparation of sales and marketing plans, including; budgeting volumes, revenue, and gross margins; forecasting product needs coordination of product pricing and reporting results while integrating a strategic product line promotion program with materials and content that meet sales goals.

Chris has a broad business background, including ingredient procurement and sales, feed mill operations, product marketing and transportation. He most recently oversaw grain origination for 42 million bushels of corn and 330,000 tons of feed annually at Flint Hills Resources. He holds a Bachelor of Science degree from Iowa State University.

Our regional sales managers for SoyPlus and SoyChlor, Johnny Ware, Terry Creel, Brandi Gednalske and Leopoldo Orozco, will report to Chris. Dr. Tim Brown, Director of Technical Services, will report to Mary Harrington, who was recently promoted to oversee all aspects of SoyPlus and SoyChlor production and marketing.



CHRIS ROBERTSON



FROM THE MATERNITY PEN

Longer Dry Periods May Increase Culling Risk

Researchers at the University of Florida conducted a retrospective study to quantify the effect of dry period length on the risk of culling in the next lactation. DHI test records of 1,287,659 Holstein cows in 5,155 herds were used in the analysis.

Adjacent parities were used to create three groups—parity 1 and 2, parity 2 and 3 and parities 3 to 6. Then groups were subdivided into 9 categories by number of days dry, which ranged from 21 to 120 days. Season, reproductive status and several production parameters were included in the analysis that compared results for culling in early lactation (0-60 DIM) or late lactation (61 to 450 DIM). Hazard ratios were calculated for each of the categories of days dry. A hazard ratio of 1 was assigned to the 51-60 days dry group, which means the culling risk was compared to the risk in this group.

Results showed that the highest risk for culling was in early lactation for all parity groups. In addition, all cows with longer dry periods had a greater risk of leaving the herd in early lactation than cows with shorter dry periods. Cows with the highest risk of leaving the herd during early lactation were cows in parity group 1 and 2. These cows had a hazard ratio of 1.73 with long days dry (101-120) and a hazard ratio of 0.81 for short days dry (21-30). Cows in parity group 1 and 2 with long dry periods were nearly twice as likely to leave the herd as cows with a dry period of 60 days or less.

The same held true in late lactation. Cows in all parity groups with longer dry periods had greater risk for culling in their next lactation compared to cows with shorter dry periods. Researchers suggest culling risk should be considered when determining dry period length for individual cows. (ADSA Abstract T71, J. Dairy Sci. 103 Suppl. 1, p 235.)

CONSULTANTS CORNER

Understanding Functional Amino Acids

It wasn't that long ago that the dairy industry started balancing diets for amino acids instead of crude protein. Fast forward a few years and today a growing body of emerging research has identified functional amino acids as the next frontier in animal and human nutrition.



MILO WILTBANK
University of Wisconsin

Amino acids are commonly referred to as the building blocks of protein. But amino acids do so much more than that. Amino acids supply energy. They also fulfill several functional roles including cell signaling (neurotransmitters are an example), regulation of blood flow and they are regulatory molecules that tell cells to complete or halt their cell cycle, explains Milo Wiltbank, professor of reproductive physiology and management at the University of Wisconsin.

According to Guoyao Wu (2010) functional amino acids are "defined as those AA that regulate key metabolic pathways to improve health, survival, growth, development, lactation and reproduction of organisms. A deficiency of a functional amino acid (either essential or non-essential amino acids) impairs not only protein synthesis but also whole-body homeostasis."

Research in humans and in animals has shown that specific amino acids do impact growth potential, prevent disease, and affect reproduction and nutrient metabolism. The protein and energy provided by amino acids are important. But so are the functional aspects of amino acids. As research continues to increase our understanding of the role that functional amino acids play in dairy cattle, new avenues to improve overall animal health and productivity may be developed.

Reproduction is one area where researchers have examined the role of functional amino acids and found beneficial effects in some animal species. For example, when pigs and sheep are supplemented with additional arginine the result is increased uterine blood flow and an increase in the number of offspring born with less death loss. No studies with arginine have been done in dairy cattle in part because an effective rumen-protected arginine is not currently available, says Wiltbank. But based on research in other species, arginine may have the potential to reduce pregnancy loss and stillbirths in dairy cows.

Methionine is one amino acid that has been studied in dairy. It was identified as a limiting essential amino acid, and research has shown that supplementing cows with methionine increases milk protein production and improves health. Recent research has demonstrated that methionine also has functional effects on embryo development, changes gene expression in the embryo and that most genes are down-regulated by methionine, says Wiltbank. University of Wisconsin research showed that multiparous cows supplemented with rumen-protected methionine produced larger embryos and had reduced pregnancy loss.

A joint study with Cornell University showed that supplementing cows with methionine pre- and postpartum increased milk fat percent, milk protein percent and yield as expected. In addition, results showed that methionine supplementation tended to reduce time to pregnancy, particularly in cows with at least one health event after calving and decreased the likelihood of cows leaving the herd.

The next step will be to determine if higher levels of methionine supplementation can further improve reproduction and health traits. The amount of an amino acid needed to trigger a functional change could be more than indicated by current nutrition guidelines. More research is needed with large, randomized, controlled studies to determine the effects of functional amino acids on economically important traits of dairy cattle. Functional amino acids provide a new avenue to further refine and tailor cattle nutrition to improve animal health and productivity.

To learn more on this topic, please see Wiltbank's presentation from the Four-State Dairy Nutrition & Management Conference. His paper is on page 19 of the conference proceedings which are available for download at <http://fourstatedairy.org/proceedings.html>



BEYOND BYPASS

Calving Impacts Amino Acid Levels in Plasma

New research presented at the ADSA virtual meeting this summer indicates that the concentration of essential amino acids (EAA) in plasma declines after calving. Penn State University researchers collected blood samples at 3 weeks prepartum and then weekly for 3 weeks after calving to assess changes in the cows' plasma amino acid profile during the transition period. Both primiparous and multiparous Holstein cows were used in the study.

While the overall sum of EAA was similar between both groups of cows before calving, after calving, several differences were noted.

- Regardless of parity, the sum of EAA decreased by 20% at 1 week postpartum compared to 3 weeks prepartum.
- Right after calving, the EAA concentration was 17% lower in multiparous cows than in primiparous cows.
- By 3 weeks postpartum, the EAA concentration of primiparous cows—but not multiparous cows—had returned to the level recorded at 3 weeks before calving.
- Throughout the 6-week transition period, the overall sum of EAA was 9% lower in multiparous cows compared to primiparous cows.

Researchers also examined differences in several individual amino acids by parity. On average, throughout the transition period, primiparous cows had 8% greater histidine, 14% greater leucine, 15% greater valine and 14% greater isoleucine concentrations. The concentration of methionine and lysine were not affected by parity, but both decreased by 22% and 25%, respectively, after calving.

The data suggest that calving does significantly impact the concentration of EAA in transition dairy cows, explains Molly Fetter, graduate student, and Alex Hristov, professor of dairy nutrition at Penn State University. The decrease in EAA after calving may indicate an increase in energy demand for EAA around parturition. The lower EAA concentration in multiparous cows after calving likely reflects the need for greater EAA to sustain higher levels of milk production compared to primiparous cows.

More research is needed, but this indicates the important role that amino acids play in meeting the needs of transition cows' health and productivity during the transition period. (ADSA Abstract W122, J. Dairy Sci. 103 Suppl 1, p. 302.)



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QUALITY CORNER

Even Mother Nature Can't Change Quality, Consistency of SoyPlus

For Landus' SoyPlus customers, soybean harvest in Iowa is a critical part of the supply chain to create the reliable, consistent product you've come to know and trust over the last three decades.

Our 7,000 farmer-members report that this fall's bean harvest went smoothly. However, after a near-perfect planting process, the growing season had some ups and downs. Much of the cooperative's 26 county-area faced drought conditions and about 25% had major crop damage from an August derecho. Yields were variable from field to field, and we saw an overall decline in soybean bushels harvested of 5-15% compared to recent trendlines.

While this might sound like bad news, Iowa's farmers are resilient, and Landus can still easily supply the SoyPlus plant in Ralston, Iowa with quality beans to ensure your operation can continue feeding SoyPlus day in and day out. Approximately half of the soybeans purchased from farmers end up at the plant, which consumes up to 70,000 bushels daily 363 days per year.

While Mother Nature's wrath may have negatively impacted yields, she will not be messing with SoyPlus' consistency. Even though new crop soybeans have a higher oil content than previous years, our quality and manufacturing expertise means machines, presses and heat settings will be tweaked. Thanks to the years of experience from Kevin Grundmeier, plant manager, and his 24/7, hard-working manufacturing team, Landus can ensure that the SoyPlus you receive tomorrow is the same high quality and consistency as the Soy Plus you received yesterday.

The role our farmer-owners play in raising healthy soybeans is the start of your organization's dairy story. On behalf of those 7,000 farmers in Iowa, we appreciate your business!

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