

# Nutrition

**P + L + U + S**

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## IN THIS ISSUE:

How Will We Feed Cows in the Future?  
 Consultant's Corner: Navigating New Waters to Deliver Nutrients  
 From the Maternity Pen: Records Enhance Transition-Cow Management  
 Beyond Bypass: Feed Efficiency is a Dairy Tool, Too  
 Quality Corner: Is Your Approach to DCAD Working?  
 Happenings: Find us on YouTube!

## How Will We Feed Cows in the Future?

Corn. It has been king of the livestock world for decades, and the dairy industry has long been a part of that kingdom. But it is no secret that this important staple of most dairy rations also has reached record-high prices, to the point that it is driving profitability right out the door.

That's the bad news for many dairy operations. The good news is that dairy cows do not need specific ingredients to produce milk and stay healthy. Rather, they need specific nutrients, which can be delivered via a variety of combinations of feedstuffs. David Casper, PhD, Assistant Professor of Dairy Science at South Dakota State University, says successful dairying today and down the road will require a shift in mindset that embraces alternative nutrient sources through improved forages and feeds.

He maintains that improving the quality and digestibility of forages will afford dairy producers the greatest control of their ration cost. "Homegrown forages are the most economical source of nutrients on the farm, and maximizing their quality can reduce reliance on high-priced commodities," says Casper. "Improving forage quality is the single most important factor controlling the amount of forage and commodities fed to dairy cows, and, therefore, to the overall cost of the ration."

Casper says "quality" of forage is measured mainly via digestibility. He notes that forages have greater variability in digestibility than grains or other commodities, and that the quality of forage



has a tremendous bearing on its energy density. Pinpointing the digestibility of an individual forage sample can be tricky business, as Casper has found large differences in forage samples with virtually identical nutrient profiles. "Our research has shown that there is a poor relationship between nutrient profile and digestibility among forages despite the fact that they fall into similar nutrient classifications," says Casper.

Daryl Kleinschmit, PhD, technical nutrition consultant for Agri-King, Inc., says this information points out the importance of regular forage sampling to evaluation dry matter (DM) and neutral detergent fiber (NDF) for an accurate assessment of digestibility. "It's important to make sure you're not under- or over-supplementing in a TMR," says Kleinschmit. "Providing too few nutrients obviously could alter the health and performance of cows, but overloading cows with nutrients adds unnecessary cost to the ration." He also suggests sampling the same forage at regular intervals, as the digestibility of a single batch of silage can change dramatically — sometimes for better, others for worse — as it is ensiled over time.

Assessing digestibility also can help producers place a monetary value on forages. Casper says that more highly digestible forages should be more valuable for supplying nutrients to the ration. Once digestibility values are determined, computer models can be used to compare the nutritive value of the forage to that of replacement commodities that would be used to create the same ration. "The value of forages will fluctuate along with other commodity prices," advises Casper. "As commodity prices increase, forages become more valuable as a source of nutrients."

Unfortunately, dairy producers in much of the country recently have had to deal with yet another wrinkle in their feeding plans: drought. In addition to driving up commodity prices, drought causes a sheer scarceness of feedstuffs that can leave producers scrambling to feed their cows. "If the weather models that predict a continuance of the Midwestern drought are accurate, we could be left with a corn crop next year that might not even make typical corn silage," suggests Casper. He says some producers are proactively exploring different cropping options that partially could circumvent drought-induced feed shortages. They include silages made from small grains like triticale, wheat, oats and grazing corn. Many of these are 60-day crops that could ideally be double-cropped if conditions are favorable. If the drought continues, "at least they will get one crop," says Casper.

Kleinschmit, who consults with herds across the country, says dairies in some parts of the U.S. are embracing long-term forage-crop alternatives, such as BMR sorghum in West Texas, Oklahoma and California. "In those more arid regions, another production variable is water value and use restrictions," he explains. "In addition to other ways of controlling the cost and quality of their rations, they are striving to use water more efficiently."

In addition to his work with Midwestern herds, Casper consults regularly with herds in the Southeast, where the commodity picture changed recently with the sudden closure of most of the ethanol plants in the region. "We had to embrace flexibility in that case by quickly finding alternative feedstuffs to replace the distillers grain that was being used widely there," says Casper. "It's another example of our need to be more creative and adaptive in our approach to formulating dairy rations than we ever have been before."

While no one has a crystal ball to predict what will happen to commodity prices in the short- and long-term future, Kleinschmit says he does not expect the bottom to fall out of the corn market anytime soon. "The world population is not shrinking, and U.S. regulations are likely to be expanding," he predicts. "Commodity prices may soften a bit in the short-term, but they are closely tied to the price of oil, and in the long term, I expect they will stay high. Granted, milk and beef also could stay higher, but the reality is that when we used to be profitable at \$12.00 to \$14.00/cwt. milk, we now routinely need \$18.00 to \$19.00 milk to function."

But if producers are able to successfully embrace a strategy that incorporates more, highly digestible forages, Casper says there's one big winner: the cow. "For a long time, we've fed

cows as close to monogastrics as we could get away with," he says. "Transitioning to more highly forage-based diets will allow us to treat ruminants like ruminants, which should yield a host of benefits in terms of animal health, productivity and longevity."

## CONSULTANT'S CORNER

### Navigating New Waters to Deliver Nutrients

*By Daryl Kleinschmit, PhD, Agri-King, Inc., Yankton, S.D.*

Feeding cows today is a different task than it was even a few years ago. In the future, the trend toward high land, oil and commodity prices will continue to challenge us as nutritionists to deliver high-quality rations with favorable profit margins. To do so, I believe the fundamental principles of profitable dairy feeding should include:



1. **Maximize the use of everything you can get off the farm.** Land base is everything in today's dairy economy. The more feed that producers are able to grow themselves, the more they will be able to control the quality and cost of their ration inputs.
2. **Start with sound agronomic principles.** Producing high-quality forages needs to be a complete, roots-to-rumen approach. Employ agronomic advice for precise decisions related to soil fertility; hybrid selection; weed and pest control; and harvest timing.
3. **Strive for excellence in silage production from start to finish.** A good share of the nutritive value of a forage crop can be lost via substandard ensiling and/or feed-out practices. Strive to harvest silage for optimal moisture content, and work to achieve the highest-density pack possible to create a good, anaerobic environment. New, oxygen impermeable cover films also can improve preservation, and inoculants can enhance fermentation. Finally, the best-managed dairies pay careful attention to the feeding face, taking care to maintain a small and clean face to limit spoilage.
4. **Utilize feed enhancements to improve digestibility.** Utilizing enzyme technology can make starch and fiber more available, particularly when using recently ensiled forages. Strategic use of direct-fed microbials, live yeast cultures, and probiotics also can improve digestive efficiency. Feeding monensin can improve the volatile fatty acid (VFA) profile to help maximize energy efficiency. Feed efficiency is driven by the quantity of nutrients absorbed by the cow, not just included in the ration. These feed enhancements can help the cow maximize the nutrients that are carefully balanced and put in front of her.
5. **Monitor dry-matter intake (DMI) carefully.** Surprisingly, many herds still do not monitor dry-matter intake. Pounds of milk versus pounds of DMI is a very important metric that should be measured routinely.
6. **There is no such thing as forage that is "too good."** Sometimes we hear the argument that very high-quality forages, such as brown midrib (BMR) corn silage, is of excessive quality and makes for a "too hot" ration. I maintain that forage can never be too good, with the important caveat that the herd must have adequate inventories of the forage to replace the highly fermentable concentrates. I would much rather feed a 60-percent-forage TMR that uses an excellent, high-energy forage, than a 40-percent-forage ration that relies more heavily on highly fermentable concentrates.

## MATERNITY PEN

# Records Enhance Transition-Cow Management

During the critical transition period, optimal performance is dependent on three factors, according to Michael Overton, DVM, MPVM, Senior Consultant – Dairy Informatics with Elanco Knowledge Solutions. Overton says successful transition-cow management involves the triad of (1) excellent management, (2) real-time recordkeeping; and (3) regularly monitoring and acting on key outcomes measured within those records, which he suggests include:

- **Feed intake.** On a daily basis, weigh both the amount of fresh feed delivered, and the amount left over. Target a 5-percent daily refusal in the close-up and fresh pens. Strive to achieve at least 26 pounds of DMI/day for mature Holsteins and 23 pounds/day for Holstein heifers, when these animals are housed in separate close-up pens. In the fresh pen (2 to 21 DIM), aim for at least 35 pounds/day for first-lactation Holsteins; 43 pounds/day for mature Holsteins; and 38 pounds/day for mixed-parity pens (exact targets will vary based on how long cows stay in these pens).
- **Body condition loss.** Aim for weight loss during the first 30 DIM of no more than 0.75 BCS, or approximately 90 pounds.
- **Disease monitoring.** Conducting monthly risk evaluations for milk fever; displaced abomasum (DA); retained placenta (RP); mastitis; metritis; and lameness. These metrics can help identify trends over time that require intervention.
- **Days dry.** Avoid excessively long or short dry periods. A.I. herds with weekly pregnancy evaluation should strive for 85 percent of dry lengths falling within 14 days of their predetermined goal.
- **Time in the close-up dry pen.** Strive for 21 days with less than 10% under 10 days.
- **Milk production.** First-test milk; week-4 milk; or early lactation milk production (in herds with daily meters) are better monitors of transition performance than waiting for peak milk.
- **Milk components.** Fresh cows that mobilize excessive body fat often will have higher-than-normal butterfat levels. If more than 10 percent of the herd has a high first-test fat percentage (above 5.0 for Holsteins; 6.0 for Jerseys), investigate further.

View [Overton's suggestions](#) on key metrics to monitor transition-cow performance.

## BEYOND BYPASS

# Feed Efficiency is a Dairy Tool, Too

"Feed efficiency" used to be an evaluation used exclusively by non-dairy livestock species like beef, pork and poultry. This measure of cost-versus-output has long been an important measure of profitability in those industries, says Jim Sullivan, PhD, PAS, Technical Manager of U.S. Dairy Business for Novus International.

"Now dairies, too, need to look more closely at feed efficiency," says Sullivan. "The historically high feed prices of the past five years have made even lower-priced by-product feeds more costly."

Feed efficiency on dairies typically is measured as a ratio of some measure of milk production (actual milk, fat-corrected milk or energy-corrected milk) to dry-matter intake.

But Sullivan suggests that "feed conversion" — or feed converted to milk components — might be a more accurate term for the dairy industry. He says some nutritionists calculate the "feed conversion ratio," which is derived by dividing dry-matter intake by the sum of pounds of milk

fat plus pounds of milk protein. And, while nutritionists are most tuned in to feed-related factors, feed efficiency in dairy cows is influenced by both feed and non-feed factors:

- **Feed factors** — forage quality; particle size; protein, fat and starch levels; feed additives.
- **Individual cow factors** — days in milk; lactation number; lameness; acidosis and other disease conditions.
- **Environmental and management factors** — stocking density; lying time; and time and distance away from milking.

"Clearly, feed efficiency in dairy cows is impacted by a number of factors, and the non-feed factors may actually be the most influential," says Sullivan. "In this climate of continued high feed prices, it is important for us to consider the whole picture when trying to maximize feed investments."

View more of [Sullivan's comments](#) on this subject.

## QUALITY CORNER

### Is Your Approach to DCAD Working?

In this issue of *Nutrition Plus*, Dr. Mike Overton's article on the importance of record keeping for transition cows brings to light the adage "if you can't measure it, you can't manage it." To twist that saying somewhat with regard to various herd health variables, if you do not measure the responses to your management practices, you do not know if you are doing harm or helping the cow. When it comes to feeding reduced DCAD diets to improve the calcium status of transition cows, there are varying degrees of application of that well-proven science.

A "moderate" approach to managing DCAD might be employed. With this strategy, DCAD levels are not quite as low as might be found on some other farms. Quite often this approach is taken in order to avoid monitoring urine pH, which is how we make sure we are not over-acidifying the cows. A more aggressive approach involves implementing a "full" DCAD nutrition program, with which monitoring of urine pH is strongly recommended to ensure against over acidification.

Sure, even a moderate DCAD program can bring about an obvious decrease in clinical milk fever cases, but is moderate DCAD as effective in all ways as a full DCAD program? Since many transition cow disorders are secondary, by one mechanism or another, to some degree of hypocalcemia, how are these disorders affected by various degrees of DCAD application?

These questions can only be answered by careful record keeping and evaluation to bridge the gap between "noticeable change" and "measured change." Don't get too comfortable just because an initial foray into DCAD management has noticeably decreased the incidence of clinical milk fever. You should be curious whether or not you are getting all the benefits that optimum calcium status can bring. To satisfy this curiosity, one should continuously scrutinize postpartum dry matter intake, performance and health variables, and routinely look back into the records to see how these relate to the prepartum DCAD and urine pH of the same cows.

Quantifying what had been done before calving and what resulted from it should bring greater confidence and give better direction in decision making.

## HAPPENINGS

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