

IN THIS ISSUE:

(Click on headline to jump to story)

Using cow behavior to manage transition

Two rows or three?

From the Maternity Pen: New reviews: Don't neglect magnesium

West Central Happenings: West Central to host 73rd annual membership meeting

Consultant's Corner: Ask the cows. They'll tell you

Beyond Bypass: The next step in AA-based formulation

Quality Corner: How do you independently confirm SoyPlus® quality control?

USING COW BEHAVIOR TO MANAGE TRANSITION

A continuing series of studies coming from data gathered by the University of Wisconsin vet school's Production Medicine Group demonstrates the need to manage the transition cow's behavior and environment — as well as pointing out some unanswered questions. Clinical Professor Ken Nordlund, DVM, suggests checking some critical control points in understanding and managing that behavior:

CHECK STALL DESIGN. Poor stall design becomes particularly hard on increasingly larger cows in their final few weeks of gestation, Dr. Nordlund says, because their girth is at its widest and often exceeds stall capacity. He says the Wisconsin team still sees stalls with dividers mounted at 45 inches on center — fully 9 inches

FEEDING BEHAVIOR AS ACCURATE METRITIS DIAGNOSTIC

Assistant professor of animal welfare Marina von Keyserlingk, PhD, and her colleagues at University of British Columbia electronically tracked cow positions every 4.4 to 5.8 seconds in the pre- and post-calving feed alleys. They then examined them after calving and identified those with metritis — either subclinical or

narrower than their current recommendation of 54 inches for pre-fresh cows.

TWO ROWS OR THREE?

Dr. Cook recently reported a study showing cows in three-row barns will go through about twice as many of the typical aggressive interactions as they do in a two-row barn. Those results occurred when either barn was stocked at, or just over, one cow per stall. Overcrowding made it worse. He suggests the study's findings reinforce the opinion that it's worthwhile to design barns so all cows can eat when they want to eat, in order — particularly — to avoid subacute acidosis and hoof problems.

Source: Mentink RL, Cook NB. Short communication: Feed bunk utilization in dairy cows housed in pens with either two or three rows of free stalls. J Dairy Sci. 2006 Jan;89(1):134-8.

DON'T OVER-INTERPRET COMFORT INDICES. Dr. Nordlund and his Wisconsin veterinary colleagues Nigel Cook, MRCVS, and Thomas Bennett, published a study last year that showed despite their widespread use, the indices that gauge cow comfort may not be particularly sensitive

indicators of resting time. By watching indicator cows constantly, their study failed to find a significant association between indices of cow comfort and the average time cows spent lying in the pen during a 24-hour cycle.

What they did find was that indices could accurately predict standing time, if done at two hours before the morning or afternoon milking. However, standing time is less an accurate measure of comfort than it is a good measure of a herd's lameness incidence. A stall-standing index of 0.2, measured two hours before milkings, indicates a mean daily stall standing time higher than two hours per day and should point you toward a more thorough lameness evaluation and stall design flaws that could be contributing.

FIGHT OVERSTOCKING. Even in the best of facilities, Dr. Nordlund concedes, controlling overstocking isn't easy. Yet it's important not to accept it as normal in the close-up group simply because they're not lactating and thus DMI is lower. Not true.

He cites field data from New Mexico's Ken Buelow, PhD, showing a drop in DMI as you increase cow numbers relative to headlocks on dry-lotted cows, and by Wisconsin's Gary Oetzel, DVM, showing overstocking the pre-fresh group in a 1600-cow dairy is particularly hard on first lactation cows housed with older cows. Those firstlactation animals produced 6.5 pounds more per day when stocked at 80 percent of stall space compared to those overstocked at 120 percent. To ensure young cows aren't bullied out of the critical full access to feed, Dr. Nordlund recommends no less than 28 inches of bunk space per animal in the pre-fresh group. Adequate heat abatement during the breeding period and transition is likewise important in managing the throughput peaks that cause overcrowding.

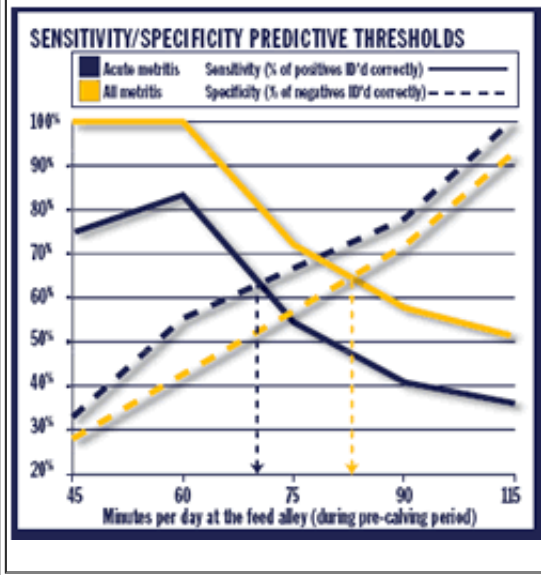
NEW STATE OF THE ART IN OBJECTIFYING THE INDIVIDUAL COW'S TRANSITION

Dr. Nordlund's group has licensed technology to DHI records provider AgSource to begin providing client herds with a new "Transition Cow Index," a scoring system that can be used to objectively benchmark and monitor transition programs.

The TCI equations take the normal breed, lactation, milk production and frequency, SCC, days in milk and other DHI data and assign each cow an

acute. Metritic cows spent an average 22 minutes per day less time at the bunk than non-metritic cows. Every 10-minute decrease in time feeding doubled the likelihood of metritis. When the researchers set 75 minutes of daily bunk time as the diagnostic threshold, the test showed an overall diagnostic sensitivity of 89 percent; a specificity of 62 percent. That is, it caught 89 percent of the sick cows, and correctly eliminated 62 percent of the negatives.

Source: Urton G, von Keyserlingk MA, Weary DM. Feeding behavior identifies dairy cows at risk for metritis. J Dairy Sci. 2005 Aug;88(8):2843-9.



expected production level based on its own history. It then uses that data to categorize the transition as average, negative, or successful, using the individual as its own control. In that way, Dr. Nordlund explains, the TCI score isn't skewed or masked by factors like high peaks and persistency. Using the concrete historical data of the TCI, he says, an experienced management team "that takes the time to breathe the air and look at cows" can make specific, realtime recommendations to improve ration and environment.

"TCI will become to transition-cow management what SCC is to mastitis control," Dr. Nordlund says.

FROM THE MATERNITY PEN

NEW REVIEWS: DON'T NEGLECT MAGNESIUM

Two new *Journal of Dairy Science* reviews underscore the potential hazards of undersupplying magnesium while trying to manipulate the DCAD of transition diets.

- In a wide-ranging review of the research connecting nutrition with dairycattle disease, Ames, Iowa, USDA Supervisory Veterinary Medical Officer Jesse Goff, DVM, PhD, reminds us that European work has demonstrated magnesium is a necessary component of the process the body uses to regulate blood calcium and prevent milk fever. Berlin veterinary physiologist Holger Martens, DVM, has shown the enzymes that dephosphorylate ATP are magnesium dependent; Dr. Goff's earlier work has likewise demonstrated magnesium deficiency reduces synthesis of key intermediary cellular messengers, leaving kidney and bone less responsive to the parathyroid hormone needed for calcium homeostasis. And work going back more than 30 years by Dr. Goff's colleague Ron Horst, PhD, and Wisconsin's Neal Jorgensen, PhD, showed the metabolic acidosis we today try to induce by a low DCAD diet can actually increase renal excretion of magnesium.

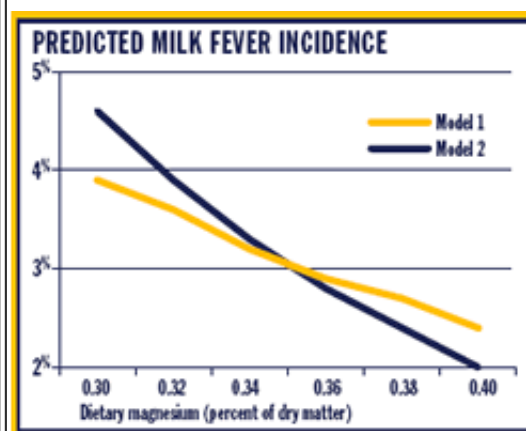
Dr. Goff notes that European work has demonstrated high levels of magnesium supplementation can overcome factors that interfere with the ability to absorb magnesium across the rumen — in particular, high potassium in the diet.

- A new meta-analysis of 137 previous trials involving 2,545 calvings demonstrates the importance of feeding those adequate levels of magnesium — in spite of any calculated impact on DCAD. Ian Lean, BVSc, PhD, University of Sydney Adjunct Professor and a principle in the contract research firm Bovine Research Australasia, used data from the previous studies to develop and validate models for predicting milk fever risk.

His models show that magnesium, which increases DCAD in some equations, nevertheless had a profound effect in reducing risk of milk fever — prepartum dietary magnesium concentrations had the largest effect of any variable on decreasing incidence of milk fever in both his models. He points out the implications of his conclusions: Although his models support the value of the DCAD theory, in practice there's a marked difference between predicting DCAD accurately and predicting the risk of milk fever. You can't forget the importance of evaluating macro mineral

MG AND MILK FEVER

Dr. Lean's models show a strong association between higher concentrations of magnesium in the diet and a lower incidence of milk fever. Increasing magnesium from 0.3 percent to 0.4 percent of dry matter — all other variables equal — reduced the risk of milk fever by about 62 percent.



nutrition separate from its role in DCAD balance.

WEST CENTRAL HAPPENINGS

WEST CENTRAL TO HOST 73RD ANNUAL MEMBERSHIP MEETING

West Central will be hosting its 73rd Annual Membership Meeting on Thursday, June 22. This year's meeting will take place at Hilton Coliseum, on the campus of Iowa State University in Ames.

The meeting is an annual event for cooperative members to learn more about West Central, its services and products, and the state of the cooperative, as well as to visit with area producers. This year's event will include a dinner and formal presentation by management, an industry trade show, educational breakout sessions for farmers and their business partners, and a guest appearance by veteran farm broadcaster Orion Samuelson.

Members will receive their invitations by mail in early June.

CONSULTANT'S CORNER

ASK THE COWS. THEY'LL TELL YOU

Dr. Mary Beth de Ondarza, PhD, Paradox Nutrition LLC, Plattsburgh, N.Y., paradoxnut@westelcom.com

The greatest ration isn't worth the computer paper you've printed it on if the cows aren't comfortable. If you help clients dedicate some time to looking at cows, they'll tell you a lot. Like:



- Are they using the stalls? Or are they in the alley or perching half-in, half-out?
- Do cows rise the same way from stalls as they do outside? If they don't bob their heads down and then forward to lunge, check the stall loop bottom height. Are brisket boards 66 inches from the stall curb?
- When you walk into a free stall, do all the cows run away, leaving you splattered? Somebody or something is giving them a hard time.
- Are fresh cows eating? Combine an unbalanced pre-fresh diet with some overcrowding, and these cows will start off feeling poor, will not be aggressive at the bunk, will take off body condition rapidly, and will tend to become more ketotic.
- How's the floor surface? Overcrowding on slick floors will contribute to slug feeding that encourages rumen acidosis even with the best rations.
- Are they resting? Higher producing cows should rest about 14 hours in a 24-hour period. An accurate daily cow schedule — written out — should identify time pinches that aren't allowing enough time for eating and lying. Your first suspect culprit should be too much time spent standing in the holding pen. Can you change cow grouping, especially for fresh cows, to minimize it?

BEYOND BYPASS

THE NEXT STEP IN AA-BASED FORMULATION

The efficiency advantages that have accrued to pig and poultry producers by balancing for limiting amino acids eventually will fully come the way of dairy producers, as well, says Brian Sloan, PhD, ruminant methionine products manager for Adisseo in Alpharetta, Ga.

Of course, there remains just one hurdle to that more

RESEARCH PLUS

West Central will support new research by New Hampshire PhD candidate Sarah Boucher, under the direction of Chuck Schwabb, PhD, to evaluate the accuracy of five in vitro methods to

efficient formulation — and a huge one it is: The rumen. More specifically, it's what the rumen does to component amino acids. The industry has already made big strides forward in being able to balance for amino acids using the best tools currently available — NRC 2001 and CNCPS 2003. That has reduced variability in cow response compared to building rations based simply on the basis of protein degradability, Sloan says.

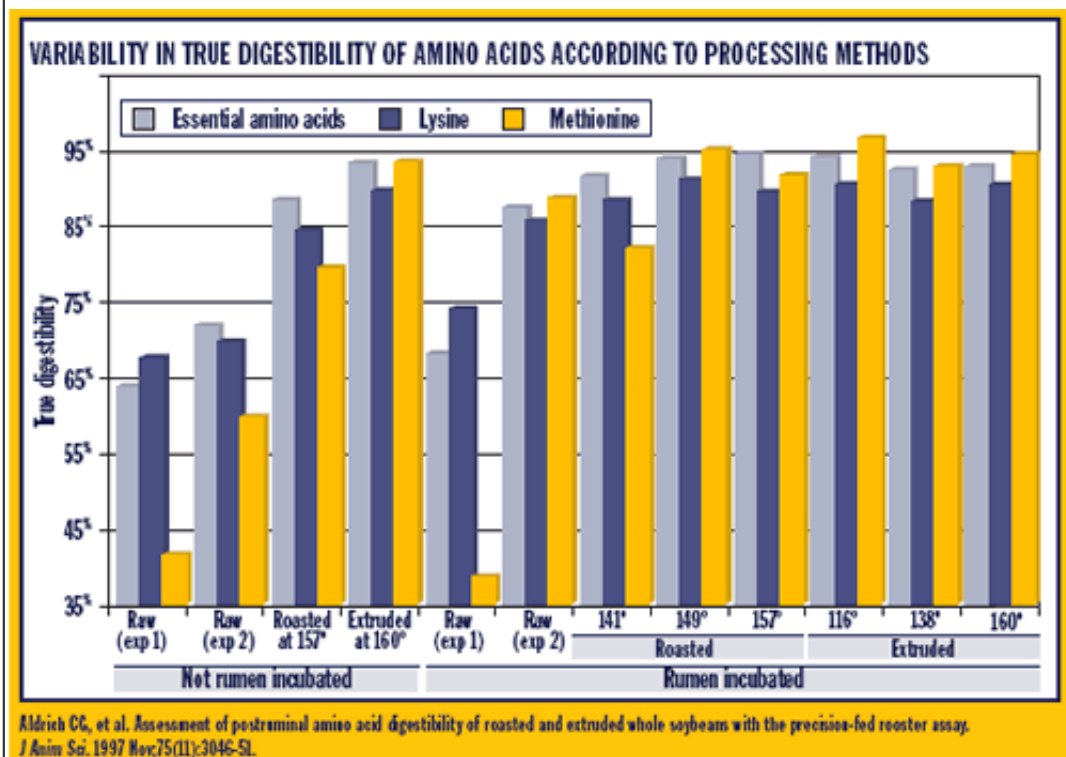
analyze intestinal RUP and lysine digestibility, and then validate them by measuring predicted vs. actual milk response. Watch *Nutrition Plus* for progress reports over the next two years.

Yet even those advanced nutritional models recognize that undegradable protein which escapes the rumen varies both in intestinal digestion and amino-acid composition, notes New Hampshire dairy nutrition PhD candidate Sarah Boucher. Boucher leads a new project investigating the issue under the auspices of the Feed Analysis Consortium, a collaborative effort between industry and public institutions to standardize feed-analysis methods. Even those best models, Boucher says, can still only assume that the digestibility of the constituent amino acids in the bypassprotein portion matches the digestibility of the protein itself. Both research and practical experience tell us that's seldom true. Meanwhile, the heat treatment commonly used to increase levels of bypass protein can simultaneously decrease the intestinal digestibility both of that bypass protein and the amino acids. Lysine's characteristic side-chain e-amino group leaves it particularly vulnerable to such heat damage.

Despite that variability — or perhaps because of it — analyzing feedstuffs for digestible RUP content is not a routine analysis in testing labs, Boucher points out. The industry needs simple, reliable and inexpensive procedures to estimate those digestibilities. Commercial acceptance of those assays, which will come only when they're standardized and reliable, will lead the next advances in AA-based formulation.

The continuing challenge of predicting amino-acid digestibility

Illinois work from 1997 illustrates the challenge of predicting and then formulating based on the digestibility of amino acids: Intestinal digestibility varies considerably among and within feedstuffs, affected both by rumen fermentation and processing methods employed to create the ingredient.



QUALITY CORNER

HOW DO YOU INDEPENDENTLY CONFIRM SOYPLUS® QUALITY CONTROL?

In addition to our continuous monitoring using an in-house NIR, we send check samples to Woodson-Tenent Laboratories in Des Moines. Samples are also analyzed for bypass protein at Cumberland Valley Analytical Services in Hagerstown, Md., using an *in situ* method. Results from November 2005 and January 2006 (CV samples) and for January to March 2006 (WT samples) are listed below:

Nutrient	Percent	Standard Deviation
Dry Matter ^{WT} (N=44)	89.02	1.01
Dry Matter ^{CV} (N=16)	89.21	0.41
Crude Protein ^{WT} (N=44)	42.76	0.83
Crude Protein ^{CV} (N=16)	43.02	0.59
Crude Fat ^{WT} (N=44)	6.14	0.33
Crude Fat ^{CV} (N=16)	6.91	0.33
ADF ^{CV} (N=16)	11.04	1.04
NDF ^{CV} (N=16)	20.90	0.70
ADFIP ^{CV} (N=16)	1.15	0.16
NDFIP ^{CV} (N=16)	6.37	0.54
Urease ^{CV} (N=16)	0.03	0.01
RUDM ^{CV} (N=16)	40.15	2.50
RUP % CP ^{CV} (N=16)	55.84	2.62

WT: Woodson-Tenent tests CV: Cumberland Valley tests NDF is without sulfite

In order to ensure a constant chloride level in SoyChlor® samples are tested hourly with a digital chloridometer. Results for January through March 2006 are:

	Percent	Standard Deviation
Chloride (N=271)	9.32%	0.39



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