



NUTRITION PLUS NEWSLETTER



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IS TOO MUCH OVERSTOCKING COSTING YOU MONEY?

Last fall milk prices hit record highs. Now they are about \$9.00/cwt less. That's a dramatic price swing, and one that will require you to plan how your dairy will weather this downturn.

Some producers respond to low milk prices by milking as many cows as possible to maintain cash flow. Others may trim the herd to reduce cost and focus on the most productive cows. While each producer must select their own plan, it is important to understand the ramifications of each decision and that there is an optimum profit per stall somewhere in between.

A lot of research has been done on the effect of overstocking in the milking herd. Most has been short term studies. But what about overstocking for a longer term?

Albert De Vries, associate professor of dairy science, University of Florida, sought to answer that question. De Vries and his team looked at overstocking during an entire lactation. Their goal was to find the economically optimal stocking density for lactating dairy cows housed in pens with freestalls measured in maximum profit per stall.

They also examined quantitative relationships between stocking density and milk production, milk quality, fertility and health. Since higher stocking densities can more severely affect transition cow health, transition cows were excluded from the study.

The Starting Point

The researchers used existing data to establish a typical daily time budget for lactating dairy cows – 3 to 5 hours eating, 10 to 14 hours lying down, 2 to 3 hours standing / walking in the alley, and 0.5 hours drinking. This leaves 2.5 to 3.5 hours per day for all milkings.

From there a literature review revealed the following:

- Significant overstocking appears to reduce feeding activity, alter resting behavior and decrease rumination (Grant 2011).
- Each 1 hour of lost lying time results in a milk loss of 3.7 pounds per cow per day (Grant 2011).
- For every 10 percent increase in stocking density over 100 percent, milk production drops. Fregonesi et al (2007) showed milk production decreased by 1.25 lbs/cow/day and Bach et al. (2008) showed a milk production loss of 1.15 lbs/cow/day.
- First lactation cows commingled with older cows will experience greater milk production declines from overstocking.
- The milk production of lame cows is more negatively impacted by overstocking than that of healthy cows.
- Observations in large commercial dairies in the Midwestern U.S. show that conception rate decreases by 0.1 percentage point for each 1 percentage point of overstocking (Scheffers et al 2010).

The Analysis

Previous research has shown that stocking density does affect cow behavior, health, milk production and reproduction. However, clear, direct, economic consequences have not been quantified.

To overcome this lack of conclusive economic analysis, De Vries set up a herd budget spreadsheet that mimics daily movement of cows through lactations until they are culled or otherwise leave the herd. Input values were selected



movement of cows through lactations until they are culled or otherwise leave the herd. Input values were selected based on actual conditions in the U.S. over the last several years. The default milk price was set at \$20.41/cwt. Fixed cost was set at \$2/stall/day. Variable cost was set at \$2/cow/day.

In the analysis, De Vries assumed that stocking densities over 100 percent had a linear negative affect on milk production. Each 10 percent increase in stocking density within the pen resulted in a milk production decrease of 1.10 lbs/cow/day, 1.54 lbs/cow/day or 1.98 lbs/cow/day respectively.

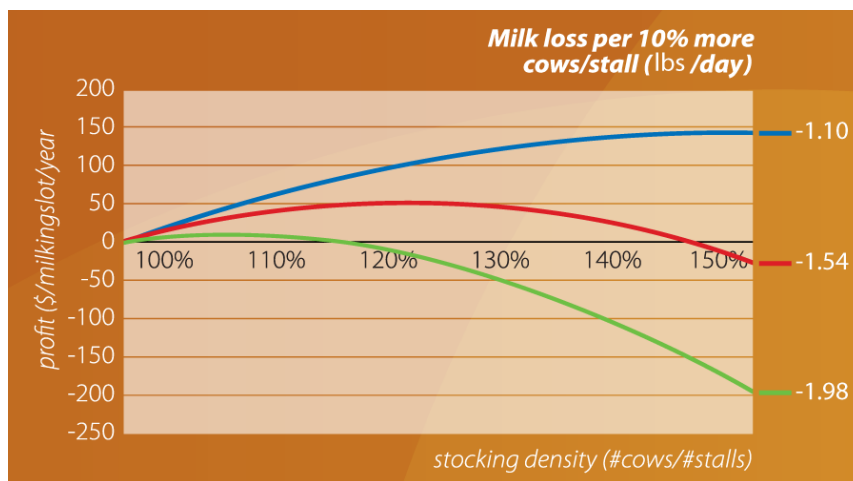
Overstocking also led to a negative linear effect on reproduction. The probability of conception was reduced by 0.1 percent per each 0.1 increase in cows/stall in all scenarios.

Lower milk production reduced dry matter intake, and therefore feed cost. Lower probabilities of conception resulted in longer days open, increased culling for reproductive reasons, and therefore changed herd demographics including the resulting revenues and costs.

The Findings

For comparison, the researchers used the input values to determine economic performance at 100 percent stocking density – one cow per stall in the group pen. The sensitivity analysis showed that optimum stocking density – as determined by maximum profit per stall – is very sensitive to changes in milk production and price.

At 100 percent stocking density milk production in each pen was 71.2 lbs/cow/day and profit per stall was \$500/year. In comparison, at a milk production loss of 1.54 lbs/cow/day the optimum stocking density becomes 122% and the profit per stall per year is \$543. The chart below shows the effects of milk losses of 1.10, 1.54 and 1.98 lbs/cow/day on profitability for each 0.1 percent increase in cows/stall.



The researchers also varied the price of milk from \$18.14 to \$22.68/cwt in the herd budget analysis. \$20.41/cwt was the default. Higher milk prices increase the profitability of each additional cow and therefore encourage overstocking. For example, with a milk price of \$22.68/cwt, a stocking density of 140% increases the profit per stall to \$680 per year, despite the decline in milk production and other parameters. When milk prices drop to \$18.14/cwt the optimal stocking density returns to 100%. At this price, overstocking was not profitable.

This scenario shows that less overstocking is a better economic plan when milk prices are decreased or feed prices have increased.

From the scenarios that we have ran, De Vries says, it is clear that the economically optimal stocking density is very sensitive to changes in price and production that affects the revenues and costs that vary with the number of cows.

Remember, some overstocking is profitable under certain economic conditions in the U.S. And there are situations where no overstocking is the most profitable option. The key is to know your business, run the numbers and determine the optimum amount of overstocking that delivers the maximum profit per stall for your dairy.

This article was adapted from Albert De Vries' paper "Crowding Your Cows Too Much Costs You Cash." You can read it online at: <http://wcds.ca/proc/2015/Manuscripts/Chapt%2020%20-%20de%20Vries.pdf> (<http://wcds.ca/proc/2015/Manuscripts/Chapt%2020%20-%20de%20Vries.pdf>)

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**FROM THE MATERNITY PEN
Is Your Maternity Pen Sized Correctly?**

One of the keys to improving the survival and performance of dams and calves is correctly sized maternity and close up pens, says Gustavo Schuenemann, extension dairy veterinarian, College of Veterinary Medicine at The Ohio State University. The size of the maternity pen and how it is equipped to aid animals needing assistance at birth can make a big difference in outcomes for both the calf and the cow.

While there is limited information in the literature on proper sizing of the maternity pen, Schuenemann recommends the following guidelines as a minimum:

- Provide at least 175 sq. ft. per cow.
- Use sand, dirt or clay for the floor.
- Cover with 6 to 10 inches of straw bedding.
- Change bedding frequently to keep it clean and dry for each calving.
- Ensure the maternity pen is well-ventilated with adequate lighting throughout the pen.
- Install a chute or headgate in the maternity pen so animals can be restrained if needed.
- Equip the pen with a water source and hose for sanitation.

Providing enough space is the starting point, says Schuenemann. In addition, employees should receive training on how to recognize the imminent signs of birth when a cow or heifer needs assistance, and how to assist without causing injury. Not all assisted births lead to dystocia. That's why training is so important.

Limiting dystocia directly influences the survival and performance of calves which affects the number of replacement heifers available. In cows, dystocia can lead to reduced milk yield due to pain (compromising dry matter intake in early lactation) and reproductive failure due to increased risk for uterine disease. A correctly sized maternity pen is the first step, combined with proper training, to minimize calving-related losses, improve cow performance and increase profitability of the herd.

To learn how to recognize signs of birth, calving progress – normal vs dystocia, and how to determine when to assist, check out Schuenemann's presentation on "Calving Management Training: Dystocia and Calf Care" at vet.osu.edu/extension/dairy-resources (<http://vet.osu.edu/extension/dairy-resources>)

Close-Up Cow Space

To learn about the recommended space for close-up cows please see "Create a Comfortable Environment for Transition Cows" from the July issue of Nutrition Plus.

dairynutritionplus.com/enewsletter/nutrition-plus/2015-september.asp
(<http://dairynutritionplus.com/enewsletter/nutrition-plus/2015-september.asp>)

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HAPPENINGS

Kick Off Your DCAD Program with Free pH Test Kit

Managing DCAD doesn't have to be hard. SoyChlor® and Dairy Nutrition Plus™ offer you the tools you need to begin a successful partial or full DCAD management plan. Request a free pH test kit from your Dairy Nutrition Plus representative and learn how to take control of DCAD in your herd.

Each pH Test Kit Contains

- Laminated information and procedural guide.
- 10 snap-cap sample vials.
- Bottle of pH test strips.
- SoyChlor® sharpie.
- Flash drive containing research and information on SoyChlor and DCAD management.



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CONSULTANTS CORNER

How to Investigate Transition Cow Problems



BY TODD DUFFIELD
DEPARTMENT OF POPULATION
MEDICINE
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Unraveling the cause of transition cow problems is a complex task. Too often the investigation stops after finding one issue to fix. But how do you

BEYOND BYPASS

Amino Acid Balancing Pays

If you still balance diets for crude protein instead of amino acids you are missing out. The benefits of balancing cow diets for essential amino acids are well-documented and quite frankly, are well worth it.

Today, because of advancements in nutritional science, including the development of more advanced nutrition models, we have the ability to more precisely predict what goes on inside and beyond the rumen. That means we know how to more precisely feed the cow using rumen-degradable protein (RDP), rumen-undegradable protein (RUP), and increasing Lysine and Methionine in metabolizable protein to more optimum levels.

The benefits of amino acid balancing may be the most noticeable in transition and early lactation cows, explains Charles Schwab, Schwab Consulting, Boscobel, Wis. But formulating rations for amino acid balance yields benefits throughout lactation. The hard part can be "letting go" of balancing for crude protein, but when you do, that's when you can truly achieve success with amino acid balancing.

Research has shown that Lysine and Methionine are the two most limiting amino acids in the cows' diet. When you balance rations for these two limiting amino acids the resulting benefits typically include:

- Reduced risk of cows experiencing an amino acid deficiency.
- Improved transition cow health.
- Increased milk yield and milk component yield.
- Reduced need for RUP, particularly in mid- and late-lactation cows.
- Feeding less RUP allows for increased carbohydrate feeding and lowered feed cost.
- Reduced N excretion per unit of milk or milk protein produced.
- More predictable changes in milk and milk protein production to changes in RUP supply (because of improved quality).
- Improved herd health and reproduction.
- Increased herd profitability. Increases in milk protein and fat concentration of 0.1-0.25 percentage units for protein and 0.1-0.15 for fat. Returns on investment of 2.0 to 3.5 are typical.
- Increases in milk yield are more common in early lactation, and can be significant when balancing for Lys and Met is started before calving.

Amino acids are the required nutrients, not crude protein. More research is needed to better identify the ideal amino acid balance and determine its impact on health, reproductive efficiency and milk production. However, according to Schwab, "balancing for amino acids using current knowledge has, without question, been a contributing factor to higher milk yields, higher milk component levels, and greater dairy herd profitability for many dairy producers."

know if that issue is the "right" issue to address, or if it is the cause of the transition cow problem, asks Todd Duffield, professor of veterinary medicine at the University of Guelph.

With transition cow problems, the cause will always be multifactorial – cows, environment and nutrition. Recognizing the multifactorial nature of disease and using a systematic approach to problem solving can help make the diagnosis and resolution of such problems much more efficient. The challenge says Duffield, is to identify and address the most critical factors that contribute to the problem.

Here's what Duffield recommends:

1. **Define the problem.** Determine if it actually is a problem. Calculate the incidence. Compare results to your herd goal or to an industry standard. Identify if this is a new problem, or an ongoing one. If new, look for what changed. Good records make it much easier to see if the problem is new this month, new this year, or has slowly grown into a bigger problem.
2. **Identify where the problem occurs.** Who, where when and why are important questions to ask.
 - Who** has the problem, what parity, how many days in milk, home raised or purchased animal?
 - Where** does the problem occur? In a specific calving area, transition pen, fresh- cow pen?
 - When** does it occur? Certain calendar times, certain days in milk either before or after calving? Look for a pattern for when it occurs.
 - Why** is the most difficult to understand. Ask what might have changed. Did you open a new silo? Do you have a new feeder? Has a key manager been on vacation? Have you had an increase in the number of cows calving?
3. **Look at the big picture.** Having asked a lot of specific questions, next I like to step back and look at the overall dairy. Conduct a general inspection from the cows' perspective. Walk through a day in the life of the cow, their routine. Then also understand a year in the life of the cow – management flow from dry to calving to lactation. During this general inspection look for the following signs: empty bunks, overcrowding, low or high body condition scores, cow-comfort issues, fine rations or sorting at the bunk.
4. **Detailed herd assessment.** The next step requires an in-depth investigation and should include revisiting any areas found to be abnormal in the general inspection. This is a systematic approach to walking through the farm that addresses issues relative to solving the problem. In this step you should examine:
 - Cows.** Evaluate BCS, grouping, frequency of group changes, etc.
 - Feeds and feeding.** Assess quality, particle size, diet changes, etc.
 - Bunk management.** Gather information on frequency of feeding, push ups, etc.
 - Headlocks/stalls.** Assess overcrowding.
 - Environment.** Evaluate ventilation, air quality, stall design, bedding, floors, water.
 - Management.** Examine routines, prevention and treatment protocols.
5. **Clinical tests.** The final step in problem-solving is clinical tests. Use them to confirm or refute the diagnostic hypotheses. Tests may include post mortems, serum or blood parameters, forage and volatile fatty acid analysis, rumen pH, urine pH are a few depending on the problem being investigated.

This article was adapted from Todd Duffield's paper "Update on Management of Transition Cows," presented at the Western Canadian Dairy Seminar. The paper also includes information on monitoring tests and management strategies for prevention. You can read it online at:

<http://wcds.ca/proc/2015/Manuscripts/Chapt%2023%20-%20Duffield.pdf>
(<http://wcds.ca/proc/2015/Manuscripts/Chapt%2023%20-%20Duffield.pdf>)

Nutritional Challenges

One of the strategies used to help prevent transition cow problems is dietary cation anion balance. While a good tool, the attention to detail needed to do it right can be challenging for some farms.

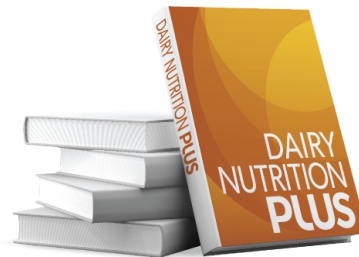
That's where implementing a partial DCAD diet can help. Learn how North Carolina producer Andrew Vail used partial DCAD to minimize transition cow problems in his herd. You can read his story in the July issue of Nutrition Plus at:

<http://dairynutritionplus.com/enewsletter/nutrition-plus/2015-september.asp>
(<http://dairynutritionplus.com/enewsletter/nutrition-plus/2015-september.asp>)

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UPDATES TO CNCPS IMPROVE ACCURACY OF FEED LIBRARY

When it comes to formulating rations, accuracy of nutrient profiles is paramount to success. That's why West Central works closely with Cornell University to ensure that the nutrient profiles for SoyPlus® and SoyClor® included in the Cornell Net Carbohydrate and Protein System (CNCPS) are accurate, explains Tim Brown, on-staff nutritionist, West Central Cooperative. "Quality has always been the cornerstone of what we do."



The recent release of CNCPS ver. 6.5 includes comprehensive updates to the feed library. The entire 800 ingredient feed library, including forages, concentrates, vitamins, minerals and commercial products, was updated to provide the most accurate information possible. Each feed in the library was evaluated against data from two commercial laboratories and updated when required to enable more precise predictions of dietary energy and protein supply.

While regular laboratory analysis of samples that are taken on farm remains important, these updates make the feed database consistent with current laboratory data and can be used as a platform to both formulate rations and improve the biology within the model.

To learn more about the updates to CNCPS check out these articles in the September *Journal of Dairy Science*.

"Updating the Cornell Net Carbohydrate and Protein System Feed Library and Analyzing Model Sensitivity to Feed Inputs." [journalofdairyscience.org/article/S0022-0302\(15\)00449-X/pdf](http://journalofdairyscience.org/article/S0022-0302(15)00449-X/pdf) ([http://journalofdairyscience.org/article/S0022-0302\(15\)00449-X/pdf](http://journalofdairyscience.org/article/S0022-0302(15)00449-X/pdf))

"The Cornell Net Carbohydrate and Protein System: Updates to the Model and Evaluation of Version 6.5" [journalofdairyscience.org/article/S0022-0302\(15\)00448-8/pdf](http://journalofdairyscience.org/article/S0022-0302(15)00448-8/pdf) ([http://journalofdairyscience.org/article/S0022-0302\(15\)00448-8/pdf](http://journalofdairyscience.org/article/S0022-0302(15)00448-8/pdf))

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