

Achieving excellence in fresh cow performance

Dr. Enrique Schcolnik, Matt Budine and Luciana Jonkman for *Progressive Dairyman*

Optimizing fresh cow health and performance in our modern dairies is one of the most challenging and, at the same time, one of the most rewarding tasks for veterinarians, nutritionists and dairymen. For the few that achieve excellence in the area of fresh cow health and performance, it has required a combination of perseverance, open-mindedness, attention to detail and, most importantly, cow sense.

When transition programs are properly designed and fresh cows perform at a high level, collecting the fruits of that labor has been one of the proudest accomplishments for dairymen. Those accomplishments have come with substantial financial benefits through lower fresh cow loss (first 60 DIM turnover rate), lower calf DOA rates, higher peak milks, increase total lactational milk and greater reproductive success.

I am often asked what has enabled certain dairies to achieve excellence in fresh cow health. There are two factors that are indispensable: prepartum and postpartum ration design and cow management during the entire transition period. Within those two areas, there are key points you should focus on in order to maintain or achieve excellence in fresh cow performance.

Transition nutrition and ration design

Focus on the four Cs of transition ration design:

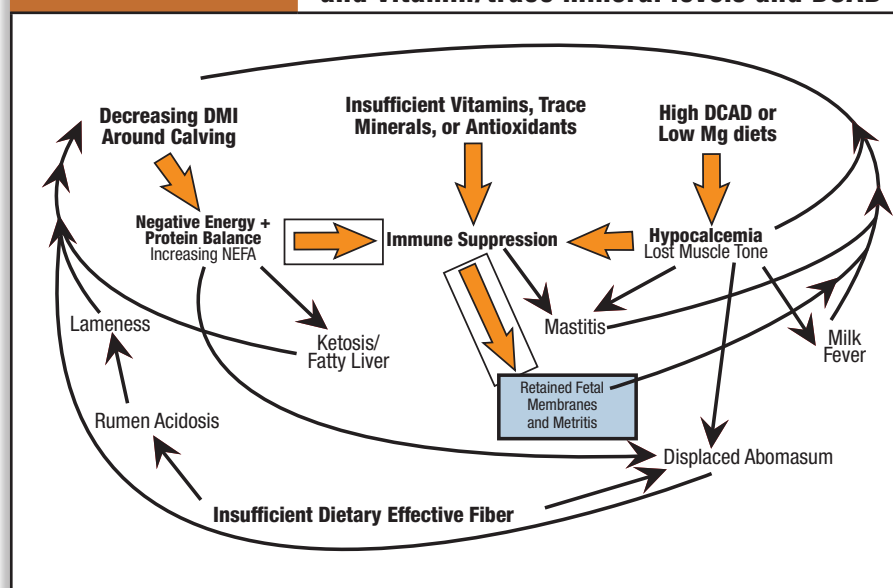
- 1 Transition rations should be within Context of each other
- 2 Correct use of Concentrates to supply carbohydrate, energy, amino acid and vitamins/trace minerals

3 Consistent and high dry matter intake of digestible and palatable feeds must be monitored

4 Calcium metabolism (DCAB diets)

When evaluating fresh cow nutrition, I often find that the ration design has been taken out of the context of the other two transition diets (far-off and close-ups). We cannot design a fresh cow ration without knowing what is being fed to far-off and close-up cows. The changes that occur in the rumen when cows go from a dry cow ration to a milk cow ration are enormous. For example, rumen papillae, the hair-like projections that line the rumen wall and absorb nutrients, are shorter on a high-forage dry cow diet than on milk cow diets. Once we transition cows to the fresh ration, they will be producing a large volume of volatile fatty acids (VFAs), which serve as their main source of energy. Rumen

Figure 1 The links between DMI, proper amino acid and vitamin/trace mineral levels and DCAB



papillae must grow much longer in order to absorb the large quantity of VFAs the rumen bugs produce. This and many other changes in terms of rumen environment and bacterial

fermentation are critical in preparing the rumen for transition diets. Failure in rumen transition results

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in poor feed efficiency and leads to indigestions, which can snowball into a myriad of fresh cow diseases (Figure 1). Make sure your transition diets are designed in context of each other so that the necessary rumen adaptations occur during this six-week period.

"Carbohydrates and energy are two major components of transition ration design," says Matt Budine, a practicing dairy nutritionist with 23 years experience feeding cows. Energy requirements of the dry cow start to increase about three weeks pre-calving. During those last three weeks of the dry period, the weight of the calf and metabolic rate of the cow dramatically increase. The challenge

during this period is to meet the increased energy demands despite a natural drop in dry matter intakes. Carbohydrates are key to maintaining increased energy demands in the face of lower intakes. By providing carbohydrates at 34 to 36 percent non-fiber carbohydrates (NFC), we can ensure that close-up cows have adequate levels of energy. Furthermore, this level of NFCs has been shown to reduce NEFAs prepartum and BHBs postpartum, which are two very valuable measures of fresh cow health. Over-supplementing energy during the close-up period will increase NEFAs and BHBs and result in a higher risk of metabolic diseases.

Current recommendation for close-ups is 19 MCal of energy to maximize postpartum performance. The key here is to make sure you know what your close-up dry matter intakes are. If you look at Table 1, in order to deliver 19 MCal of energy at 30 lbs DMI, you will need a ration with 0.63 NEL (energy). However, if your cows are only eating 24 lbs of dry matter, energy density of the close-up ration will need to be a lot higher (Table 1). We can get most close-up Holsteins to eat 28 to 30 lbs of dry matter; therefore, most close-up rations will be designed for 0.69 NeL. While keeping energy density high, it is also important that we limit starch content to less than 20 percent, while at the same time maintain fiber for optimal rumen health. By using energy sources that are high in digestible fiber such as soyhulls and beet pulp, we can meet critical nutritional needs and set the rumen up for success.

The next consideration is protein balance of the transition diets. Protein and amino acid balance can be better achieved if the diet is properly formulated for carbohydrates. We cannot forget that rumen bugs digest

carbohydrates and provide a lot of protein and amino acids. If the diet is properly balanced for carbohydrates, our target of 1,100 to 1,200 grams per day of metabolizable protein for your close-up diet can be achieved with approximately 14 percent crude protein.

Also, make sure your transition diets use chelated minerals. Standard rock minerals have *** absorption rates of only 15 to 20 percent. On the other hand, chelated minerals have absorption rates in the 70 percent range. Thus, with relatively low DMI in the close-ups, it would be easy to short these cows in minerals, which play an extremely important role in overall fresh cow performance. Last, make sure that vitamins A, D and E are at 100,000 IU/d, 30,000 IU/d and 1,500 IU/d.

Keeping intakes consistent and high for the close-ups is one of the biggest and most challenging factors affecting fresh cow performance. Luciana Jonkman, a nutritionist in California's San Joaquin Valley, points out that even the healthiest cows may experience a dry matter intake decrease of 30 percent during the last three days approaching calving. In addition, research done by Dr. Von Keyserlingk at UBC looked at retrospective individual DMI of three groups of animals (n=101) – healthy, mild metritis and severe metritis – and showed that animals that went on to have severe metritis had a significant drop in intake as far back as 13 days prior to calving. It is clear that consistent and high dry matter intake from palatable digestible forages is key to fresh cow performance.

Another very important aspect of close-up diet design centers around maximizing calcium metabolism in order to minimize milk fevers. Clinical and/or subclinical milk fever has tremendous negative effects on fresh cow health and can be the precursor to many other secondary metabolic problems. Calcium is required for muscle function primarily in the heart, rumen, udder, abomasum and uterus. Cows with low calcium post-calving lose muscle tone in these organs and are therefore at higher risk of displaced abomasums, rumen indigestions, retained placentas, metritis and mastitis. Acidification of the close-up diet via the use of anionic salts (DCAB diets) is helpful for milk fever prevention. Studies have shown that milk fever rates were reduced from 26 percent to 4 percent through proper use of DCAB diets. Anionic salt diets and modified anionic salt diets work by acidifying the urine, which in turn stimulates parathyroid hormone and calcitonin, the two key hormones that regulate calcium metabolism. The effect of these two hormones happens through increased resorption of calcium from bone, increased retention of calcium in the kidneys and increased absorption of dietary calcium in the gut. One of the

Lbs. of DMI	NEL 3X	MCal
30	0.63	18.90
28	0.68	19.04
26	0.73	18.98
24	0.79	18.96

A look at how energy-dense your close-up ration must be in order to provide 19 Mcal per head per day.

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potential problems with these diets is poor-quality anionic salts used to lower urine pHs are very bitter and tend to decrease dry matter intakes. There are palatable sources of anionic salts that have very little impact on intakes. Close-up groups represent a small percent of the herd, thus feeding the more palatable but more expensive sources of anionic salts has little impact on total feed costs. Investing your resources in this small group of animals will prevent you from costly events such as milk fever, digestive disease, uterine disease and mastitis.

In summary, let's make sure we get our transition diets designed in context of each other, appropriately formulated for carbohydrates, energy and maximize dry matter intake in order to prevent fresh cow disease. So get excited about transition ration design and get your nutritionist excited as well. They will pave the way to achieving excellence in fresh cow health and performance.

Transition cow management

A recent study published in the *Journal of Dairy Science* has shown that environmental factors other than diet are responsible for more than 50 percent of the observed variation in dairy herd performance. Great transition cow management and husbandry through excellent housing, stress-free grouping and cattle movement, superior feed management and having a solid training program for employees makes up the remaining 50 percent of influence on performance.

When our industry made the shift from pasture to housing cows in barns about 40 years ago, we had a very dark period of misunderstanding normal transition cow behavior and needs. This misunderstanding contributed significantly to the emergence of diseases such as DAs, ketosis and metritis. When it comes to close-up housing needs, there are four provisions necessary in order to achieve excellent fresh cow performance:

- 1 28 in. minimum of clean feedbunk space per cow
- 2 200 sq. ft. of clean and dry resting area per cow
- 3 effective shade and cooling areas
- 4 3.5 linear inches of fresh clean water trough space per cow

Stress is caused when we interfere with normal cow behavior; therefore, stocking rate at the feedbunk and in the resting area, along with ample water sources, will allow cows to express the normal behavior essential to achieve peak performance. Cows are social animals that live within a herd that keeps a relatively constant population. When a new animal enters the herd, a very stressful

rearrangement occurs in order for the establishment of a new hierarchy. Stress in turn can depress the immune system, lower feed intake, negatively impact productive and reproductive performance. Cows have evolved to survive stress by staying together, and as a result the effects of regrouping a cow may be compared to the most stressful events in our lives. Minimizing cow movements, especially five to seven days prior to calving, is extremely important. Ideally then, a cow would enter a far-off pen with a group of other cows being dried off and stay there through

calving. Instead of moving cows to a different pen in order to change the ration to a close-up ration, we would bring a close-up ration to the cows. As cows calved, that pen would empty out completely and a new group of dry cows would come in. Movement would be similar to an all-in/all-out system.

Cattle movement is not the only management factor affecting fresh cow performance. Appropriate feed management of transition cows is a requirement if we want to unleash fresh cow potential. Managing close-

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“ Everything happens through people; we must invest in proper employee training if we want excellence in performance. ”




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