



Teaming up to improve transition heifer health

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First-calf heifers deserve everything necessary to make it through the difficult transition from life as a replacement to that of a cow.

by Steve Martin and Jesse Goff

NUTRITIONISTS working on dairy farms get pulled in many different directions and, at times, those serving in that role can feel a bit like a generalist when it comes to feeding cows. After all, someone needs to be the talented technician to finally put it all together at the farm level. But what about all of the intricate details that are involved?

Dedicated nutritionists in the field often seek out and befriend those specialists in our dairy world who focus on particular detailed facets of dairy nutrition. We all have these people to whom we owe a great deal of gratitude. It's true no one can be an expert at everything, though occasionally, one meets a brilliant mind that might challenge a long-standing notion. I (co-author Steve Martin) also need advisers. I often call these advisers "smart guys," although they aren't always guys.

The idea for this article came about after a routine consultative conversation with one of my favorite "smart guys." In the summer of 2000 at the American Dairy Science Association (ADSA) meeting, I had been in the industry for nine years and was beginning to understand just how much I needed to learn about feeding transition dairy cows. That's when I sat in a half-day long session led by Jesse Goff, D.V.M., on the art of successfully transitioning dairy cows and how to best employ acidified close-up feeding principles on a commercial farm.

Since that first meeting, Goff

became my "go-to" for all things related to transition cow health and nutrition. After 21 years of interaction between us, we decided to capture our recent conversation about a dairy farmer's concern regarding edema in precalving first-calf heifers in this article.

Common, but not easy

Udder edema in prefresh heifers is not an uncommon problem and is not always easily solved. We know a few risk factors, such as excessive potassium and energy intake, reduced exercise when moved to smaller pens, and even the role of the animal's age at first calving. That begs the question, "Are these four items just the beginning of a much longer list?"

That's when an email went out to Goff. "In so many situations, cows on the same or nearly the same close-up diet are doing great with none of the potential fresh cow metabolic diseases while the heifers' udders make you cringe since they are painful. With that in mind, is there any definitive research related to edema in close-up heifers and its potential risk factors?" I asked him. "What are we missing here?" With that stated, some additional questions and answers continued between us. Martin's questions are in bold followed by Goff's responses.

Should we remove the chloride and sulfur from this acidified diet and build a specific close-up heifer ration? This could easily be done on this farm but there has been some resistance

to the idea. Should I push them on the suggestion?

Heifers should not be fed an anionic diet. The small benefit the chloride salts might provide on udder edema is offset by the larger effect these diets might have on dry matter (DM) intake.

A recent meta-analysis suggests heifers fed anions produce 1.4 kilograms or 3 pounds less milk per day than heifers not fed anions. I suspect this is due to poor intake at calving, and this poor intake carries throughout the ensuing lactation. We have no evidence heifer blood calcium (Ca) is significantly improved by placing them on anions.

If I can convince my client to let me build a specific close-up diet for the heifers, what should be the goals? Do I need to run protein at higher levels since they are still growing? Do I need to do anything special with the macro minerals? Should I keep the low-energy approach with chopped straw like we do in the older cows?

Per pound of body weight, the heifer has higher protein and energy requirements than the older cows since these younger herd-mates are still growing in frame size and also must develop udder tissue. Pregnant heifers eat 1.7% dry matter on a body weight basis, less dry matter when compared to older cows at 2% body weight.

A reasonable estimate is that cows need about 11% to 12% crude protein diets and heifers 14.5% to 15.5% crude protein close-up diets.

However, we should be thinking of meeting the metabolizable protein needs of the animals rather than crude protein of the diet. Close-up heifers and cows need about 1,100 grams of metabolizable protein per day. Since heifers eat less than cows, they will need a higher protein diet to meet this goal.

Heifers and cows readily meet their energy requirements with the high straw and lower energy type diets. At typical DM intakes of 22 to 24 pounds per day for heifers, the steam-up type of diets with higher energy — typically 0.70 to 0.73 megacalories (Mcal) of net energy (NEL) per lactation per pound — actually exceed the energy needs of the heifers by 20% to 25%. This can make it more challenging to keep DM intakes at necessary levels during the final two to three days of pregnancy. This is made worse if overcrowding, heat stress, or cow comfort issues are taking place. The close-up cows and heifers would rather live off their fat than get up to compete at a bunk.

Straw diets are typically 0.60 to 0.64 Mcal NEL per pound, and cows seem to eat them more consistently right up until calving. One challenge with the straw diets is the lower energy available to bacteria within the rumen, which may reduce microbial protein production, necessitating use of sources of rumen bypass protein to reach metabolizable protein requirements.

As for other components of a heifer close-up diet, it might be best to include macrominerals at levels that meet National Research Council (NRC) requirements. Don't worry if the feedstuffs bring more than is required. Those numbers would typically be about 0.5% Ca, 0.25% phosphorus, 0.2% sulfur, 0.15% sodium, and 0.15% chlorine.

GOOD SCIENCE, GOOD PROTOCOLS, and good cow-sense are the winning trifecta for a solid transition. Miss any one of these three and a promising heifer can quickly become a cull.

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It might be best to go above NRC for magnesium (Mg) and feed 0.35% to 0.4%, as there are often items in diets that prevent efficient use of Mg. Another consideration would be to include an ionophore in every ration and feed more vitamin E than NRC recommendations . . . try 3,000 international units (IU) per day. It pains me to go against the NRC tables, but this has been my experience.

What about using a blended approach? Some dairies put a base level of a dietary cation-anion difference (DCAD) product into a ration fed to cows and heifers and then add a bagged DCAD product on-farm to keep urine pH in line in just the second-lactation-plus cow pens. Is this “partial” DCAD approach helpful, hurtful, or neutral for the first-calf heifers?

This approach is a compromise to reduce the number of mixes made on the farm. It can work better than fully acidifying the diets for heifers, which we now know causes reduced heifer intake and performance. However, this approach means you also overfeed protein to the cows by feeding the same ration to meet the protein needs for heifers. As farms grow in size, they really should consider separate diets for close-up heifers and cows, especially if they have the facilities to house them separately.

We know that 21 days is a good goal for days in the close-up pen for cows. Is this the same for heifers? We have debunked the previous steam-up approach from days of old, but is this also best for the first-calving animals?

The target for heifers to be in the close-up pen would be 28 days. Much of this is for socialization reasons. Maybe they have never been in a freestall before, or never been mixed with older cows. And then there is the problem that heifers often calve earlier than predicted. We don't want to deprive them of enough time in a close-up pen.

The big picture

We won't even discuss the obvious questions related to keeping transitioning heifers on both sides of calving in pens separate from older cows. This is a must-do whenever possible. There is a downside here when loading a fresh-only heifer pen into the milking parlor. Not having their older “sisters” to lead the way will require a bit more special attention. We will also assume that generous amounts of nutrients like vitamin E, zinc, and selenium that can help the first-calf heifer's immune status are also needed. If you must cut corners to curb costs,

find somewhere else to do it.

What is needed on farms is a team that includes the veterinarian and nutritionist working in concert to be sure we are giving these first-calf heifers everything needed to make it through the difficult transition period, both metabolically and logistically. In this journey, there is good science, good protocols, and good cow-sense. Missing any one of these will set a promising springing heifer up for failure and, regrettably, an early culling.

Future questions

Long term, we need to do more research on the fresh cow diet to answer unresolved questions, such as:

- Is there an advantage over placing fresh cows on the high milk production diet?
- If we do make a fresh cow diet, should we increase fiber levels?
- Should we elevate protein levels?
- Should we include more sugars in these diets? 🐄

Martin is the founder of DNMCmilk, which works with dairy producers and heifer growers in several regions of the U.S. and around the world. Goff is a retired researcher with USDA's Agricultural Research Service and a professor emeritus at Iowa State University.