



by Steve Martin

Feeding pounds and percentages

ONE of the funny things about feeding dairy cows is that they tell us how much they want to eat, not the other way around.

Deciding how much intake a diet should supply is one of the first and most important decisions made when formulating it. On the other hand, maybe it's not that crucial. We can just build diets in percentages and feed to appetite. This is a sound formulation approach, it works just fine, and it is used by many.

Dairy folks though like to think and talk in terms of pounds of things. It would be unusual for a dairy producer, when asked about how much cottonseed they feed, to say "10 percent." They will more likely say "four pounds." The way we feed cows total mixed rations (TMR) in modern dairies, the answer expressed as a percentage really is a better fit.

The fundamentals behind this are very important in building rations and managing how they are fed. The beauty of a TMR is that no matter whether it is built for 10, 100, or 1,000,000 pounds of intake, as long as you feed the animals to appetite you have probably done your job. This is a topic where formulating within a highly technical nutrition model meets the art of bunk management.

As mentioned above, if you are in the dairy world, you probably think in pounds of things. It is how we talk and in most cases it is also how we formulate rations.

The rub comes when you start trying to comprehend the pounds of an ingredient in a fresh cow ration that is built for 35 pounds of dry matter intake, compared to that same ingredient in a high cow ration that may be built for 60 pounds of intake.

In this case, considering the percent of alfalfa hay in a mix probably communicates better when trying to compare a fresh cow versus a high cow ration.

The same predicament is in place when thinking about rations built for Holsteins compared to those for Jerseys. Staying with the cottonseed example, the high lactation Holstein ration might include 4 pounds of

seed. It's just a big step to think that the same cottonseed inclusion in the Jersey cow diet is less than 3 pounds.

I am not suggesting that we move toward thinking and talking about ingredients in percentages like our feed-yard cousins do. But understanding why it might be a better fit can help us as we think about building diets to meet the needs of differing lactation stages, parity or breed.

This issue came up recently when a client asked me to compare two high diets I had formulated. One was to feed lactation one animals (L=1) and the another was to feed second and greater lactation (L>1) cows on the same dairy.

The conversation started when the client told me he felt the first lactation animals were out-milking the older cows. This was not about pounds of milk, as the older cows were for sure giving more milk. But the L=1 animals were knocking it out of the park, while the older cows were doing just okay.

How are they different?

So, the question came, "how is the younger cow ration different from the older cow ration?" It was a good question. When building diets in a progression over time, the current ration leads you to the next one and then the next one. You rarely ever start over from scratch on a diet.

But what was on my mind when I first built these rations years before was clearly not evident. My first answer centered around things like: mixing for an animal that is still growing and has lower intake. But isn't the younger animal's body smaller too?

The next thing you know, you are trying to decide if simply mixing one diet for an average intake for the whole herd is good enough. Then the percentages of each ingredient in the two diets would be exactly the same, only the pounds of each ingredient would be different based on the L=1 cows consuming 45 pounds of intake and the L>1 cows consuming between 55 and 60 pounds.

But wouldn't we be giving up something if we couldn't address some of the needs of those different animals based upon body weight, reproductive status, parity and production?

Yes, I think we would.

One-group TMRs are, however, an accepted way to feed dairy cows. They are common and can be as successful as any other approaches. However, the ability to concentrate certain nutrients based upon days in milk or parity, while at the same time diluting the per-head cost in later lactation animals, is certainly valuable for feed and milk economics and nutrient management. In addition, body condition loss or gain in differing situations can be better managed with a multiple ration approach.

Now, back to the question about what was different in these two diets. My ration model has a tool to help with this; I can put two diets side by side. I regularly use this screen view to communicate to clients the details involved in a ration change.

In this instance, this screen view allowed me to put both the L=1 diet and the older cow diet side-by-side. The next trick in the model is that I can tell it to adjust the intake level to whatever level I pick. The nutrients that are expressed on a percentage basis don't change, but the pounds of each ingredient do.

I took the L=1 diet that was mixed at 45 pounds of DM and expressed it at 54 pounds of DM to match the level of intake on the older cow diet. Now, we can really compare the pounds of what we are feeding and see what we think.

First, the nutrient content on a percentage basis was fairly similar, but the older cow diet had been adjusted by increasing added fat to address a body condition problem noted earlier. So, the L>1 was 79 NEL and the L=1 diet was 78 NEL. Not much different. Conversely, the younger cow diet was a little higher in metabolizable protein, presumably to aid the animal that still has a little growing to do. Both differences made sense.

What was more different, though, and it seemed pretty arbitrary, were some of the feed rates. And guess what, the ingredients that varied the most were the ones that we would most often think about in a "pounds per cow" style. Major roughages like corn silage and alfalfa hay were spot-on in the diets. Straw was lower and distillers and cottonseed were higher in the lower intake diet built for L=1

cows. Why the difference?

I think my bias towards specific ingredient feed rates was the reason. If 1 pound of straw was the right amount for the older cow diet, then about 1 pound feels right for the L=1 cows too. The matched-level, though, would have been about 0.83 pounds.

Distillers was at a higher percent in the L=1 diet because my maximum comfort level in the older cow diet was over-shot when using my intuition to build the feed rate max for distillers in the L=1 diet. Cottonseed was the same way.

Depending upon whether I thought of a particular ingredient in a "don't feed more than" way or a "need to have at least this amount" way tended to have a pretty big variance when expressing the two diets at the same level of intake. The point is that if I had built the original rations on a percentage basis instead of thinking about pounds, the diets would have been more similar and consistent with the blend of art and science I use when formulating rations.

Cows eat pounds, but...

Going through the process of answering my client's question reminded me that although cows do eat pounds of ingredients, it's the amount of and various ratios of the nutrients in those ingredients that make milk and keep them healthy.

The word "bias" has a negative connotation. When using our tendencies when building diets, I will choose to call it "experience" instead of bias. We learn as we go and the longer we feed cows the more tendencies we will have that relate to how much of various ingredients can be included in a good ration.

My point may be that we should probably develop these tendencies in a percentage approach rather than pounds. As we build diets ranging from a fresh ration for Jerseys to a high-lactation ration for big Holsteins that are eating more than 60 pounds of feed, percentages mean more than pounds.

Cows make milk, get pregnant and stay healthy by utilizing nutrients – not simply eating pounds of ingredients. Remembering this will help make sure we are truly feeding for the bottom line. **WEST**

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