



by A.F. Kertz

Calves return the highest dividends on feed

TO SOMEWHAT paraphrase an old saying . . . there is more than one way to feed a calf. In fact, the 2007 (NAHMS) National Animal Health Monitoring System found seven different feeding program categories: medicated milk replacers, nonmedicated milk replacers, pasteurized waste milk, unpasteurized waste milk, saleable pasteurized milk, saleable unpasteurized milk and the all-encompassing other category.

When these categories are summed, the total equals 135 percent.

What does that tell you? Many dairies were feeding a combination of these liquid sources. Now, if you also add other variables such as nutrient content of liquid sources, solids level, fed daily amounts, and length of feeding before weaning, it would take a huge spreadsheet to account for all possible variations. What might look like a simple program can actually be quite complex.

But it gets even more complicated when considering the dry feed: textured, meal or pelleted starter; whether forage is fed; what kind of forage and how much; when forage feeding was initiated; was forage processed; and so forth? The best way to wade through this situation is to look at some principles or axioms of feeding calves.

Start with milk

The amount of liquid fed is the first factor. The more liquid fed, the more nutrition calves will get, and greater

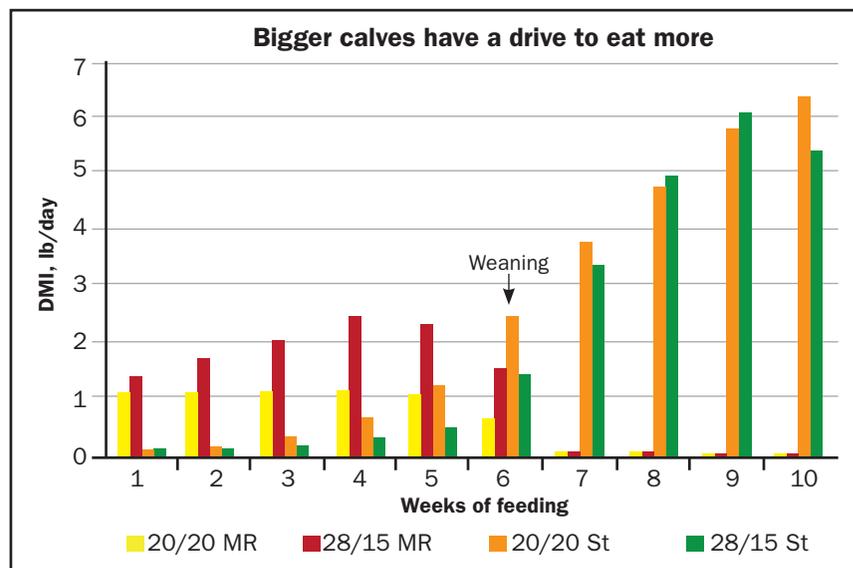
daily gain should result. But, if there is more fat relative to protein level, more fattening could result.

Nutrient composition of liquid is another factor. Research at Cornell about 15 years ago found the best protein to fat range in a milk replacer was 28 percent protein and 15 percent fat. This mixture was fed at a higher level than the traditional 1 or 1.25 pounds of a 20/20 milk replacer.

A biological factor comes into play. Early excess fattening raises the number of fat cells (hypertrophy) whereas later fattening raises fat cell size (hyperplasia). So earlier fattening can create a propensity for easier fattening later. That is why there is such concern for fattening of infants, toddlers, and children.

Other research at Cornell indicated that protein deposition (provided there is adequate dietary protein) reaches a maximum at about 2.2 pounds (1 kilogram) daily gain. Over short periods of time, this gain may be exceeded because growth can be sporadic since it is closely related to episodic growth hormone release. You may have noticed a similar growth spurt in children.

While waste milk has been fed on more farms, its nutrient composition, solids level and availability are major variables. Over a five-year period, I worked with a large Southeast U.S. dairyman as he modified and developed an excellent calf program, including facilities. Near the end of that five-year transformation, I visited his office and noticed on the white board weekly somatic cell counts and a list of hospital string cows. The for-



mer was at 100,000 while the latter was 0.25 percent of the herd.

When I commented about those low numbers, he read my mind, looked me in the eyes and said, "And I do not want those numbers to go higher!"

What's the focus?

It is more common that, if I have more waste milk, I can always feed it to my calves. He obviously chose to minimize those numbers and felt that was the best for herd health and economics even though that meant he had to buy more 28/15 milk replacer. Another resulting benefit is a consistent liquid feeding program.

Calves, like human babies, like consistency. Related to this consistency is solids level and osmolality. Veterinarians are more attuned to

this situation than many nutritionists. Those who have experienced the dreaded liquid intake response prior to a colonoscopy also realize this principle. Quite simply, solids levels over 15 percent are in the red flag zone for digestive upsets.

Daily gain is another factor. If Holstein heifer calves weigh about 90 pounds at birth (lower for calves born to first-time dams and greater for later lactation cows), to double birth weight by the end of 2 months requires an average daily gain of 1.5 pounds. This rate of gain results in better lactation yields after calves become lactating cows. This premise is based on a number of studies.

Bottom line, calves are the most efficient animals on a dairy in converting nutrients to growth — not far off from pigs and chickens. And that efficiency improves with higher rates of gain.

For example, if calves were only fed enough to maintain body weight, no energy is available for weight gain. If fed more to gain 0.44 pound daily, 21 percent of energy intake is available for gain. At 0.88 pound daily gain, 38 percent of energy intake is available for gain, while energy utilization climbs to 50 percent for 1.32 pounds daily gain and 58 percent for 1.76 pounds daily gain.

This is the same principle that you use when you try to maximize the number of cows you can milk through your milking parlor in making it the most cost efficient. In a Michigan State study, calves fed an intensive versus traditional milk replacer feeding program also had the lowest cost per pound gain. This will vary depending on local feed costs at any given time.

The starter and feeding program is the other major factor. In general, the more milk or milk replacer fed, and the higher its fat level, the less calves will eat the starter. This leads to the need to more closely manage the weaning transition program — the two weeks before and two weeks after full weaning.

The author is the principal in Andhil, LLC, a St. Louis-based consulting firm.

The level of starter intake and how well the weaning transition is managed largely determines how well calves will wean and grow after weaning.

Size, not age, drives intake

It is not the age at weaning that is the main determinant. The graph illustrates an Illinois study done in which I was involved and for which I formulated the texturized calf starter. We purposely weaned calves at the end of six weeks and continued the trial for another four weeks.

The yellow columns represent the daily 1.25 pounds of a 20/20 milk replacer fed, while the tan column shows starter intake for those calves. While the 20/20 milk replacer was fed more traditionally at a fixed level, the 28/15 milk replacer was fed at 2 percent of calf body weight.

Starter intake for those calves is represented by the green column. Clearly, the 20/20 fed calves began to eat more starter sooner and ate more starter by weaning. And starter intake approximately doubled each week, for both treatments. For Week 5, calves fed 20/20 milk replacer averaged over a pound daily of starter intake — a good reference point before reducing milk replacer in half for Week 6. And then starter intake doubled during Week 6 along with a 50 percent jump during Week 7.

With more 28/15 milk replacer being fed, calves were eating less than a pound of starter during Week 5. However, this same group more than doubled their intake during both Weeks 6 and 7 versus the previous week. Why these greater improved starter-intake patterns for the 28/15 calves?

These calves were bigger than the other treatment calves, and the reduction in nutrient intake was greater when the 28/15 milk replacer was reduced. Bigger calves have a drive to eat more of what is fed as long as it is available. By the end of two weeks, calves on the 28/15 milk replacer already were 5 pounds heavier and doubled their birth weight at 8 weeks of age when they weighed about 22 pounds more than 20/20 milk replacer fed calves.

Form matters

The other major factor is form of starter. I recommend a well-texturized calf starter because then there really is no need to feed hay or straw, long or chopped. That also standardizes and simplifies not having to source, chop, and feed forage. Adding another factor to manage in a calf program is not something most dairies relish . . . to say the least.

When choosing how and what to feed calves, do what you can to make the program most consistent and simple while targeting doubling birth weight at the end of 2 months of age. And be sure to have a good weaning transition program for the two weeks before and two weeks after weaning. 🐄