



STRIKING THE BALANCE OF milk and forage with young calves is critical to developing their rumens.

ing. This was most likely due to inadequate starter intake prior to weaning and inadequate rumen development by weaning time, plus other changes like grouping, housing, and too much forage.

How much milk is right?

Several more recent studies published by the Provimi Nurture Research Center in Ohio shed further light on what happens with high milk replacer feeding. A reference in a former *Hoard's Dairyman* article, "Win at weaning; jump-start the rumen," October 10, 2018, provides more details on two studies.

In one study, calves were fed a daily average of either 1.3 or 2.3 pounds of milk replacer solids with weaning occurring at 49 days. Starter intake was lower with higher milk replacer intake than the lower solids group. The calves fed lower solids gained about 0.25 pound less than the double birth weight goal of 1.5 pounds.

The calves fed more milk replacer gained 0.25 pound more than that target. However, right after weaning, the higher solids calves showed lower dry matter, NDF, and ADF digestibilities. In the following 56 days, calves that had been fed more milk replacer solids before weaning had 0.11 pound less daily gain, ate 0.53 pound less dry matter, and had 12% lower feed efficiency.

In a second trial, daily milk replacer solids intakes averaged 1, 1.67, and 1.92 pounds for three treatments before weaning at 49 days. Again, starter intake was inverse to milk replacer intake. Even on the lowest fed milk replacer treatment, average daily gain averaged 1.54 pounds — this is enough to double calf birth weight at the end of two months.

The contrast between these two treatments during the following 56-day feeding period was notable. The highest milk replacer fed treatment had 0.2 pound less dry matter intake, 0.09 pound less average daily gain, and 9% lower feed efficiency than the low solids milk replacer group. Additionally, they had lower dry matter intakes and NDF and ADF digestibilities at 11 weeks on trial.

In other studies, more gut fill occurred when long hay was fed. Additionally, greater long hay intake reduced calf starter intake and resulted in lower average daily gain and hip width. Both daily gain and hip width declined for pelleted starter versus the textured starter treatment. This is indicative that too much forage fed too soon is not well-handled by calves within this age range.

In months three and four following weaning, calves did not perform as well when they were allowed to have free-choice long hay versus limited access to chopped hay, as it reduced average daily gain and bone

Ease the weaning transition

by Al Kertz

THERE are three critical periods for dairy calves. The first is around calving and includes the cow, the environment, and the colostrum feeding and management. The next is the first two weeks of life, which is when most diarrhea and deaths occur.

The third critical period is the weaning transition, which is the two weeks before and two weeks after full weaning. This period is too often not recognized by caretakers and much less measured or monitored on dairy operations.

A rough change

The month after full weaning should really be viewed and managed as another transition period. Too many changes at that time, such as more than six to eight calves in a group and major ration changes, will cause stress that often results in respiratory problems. This is the major cause of death and morbidity after weaning based on data from the National Animal Health Monitoring System (NAHMS)'s most recent survey from 2014.

A retrospective analysis of records from 25 New York herds found that if a calf had a recorded respiratory incident not clinically determined as pneumonia by a veterinarian, it was less likely to enter the milking herd. It also took those animals six months longer to get to first calving, they had more dystocia, and they were culled sooner. Within two weeks of birth, 10% of those calves had diarrhea and 7.4% experienced respiratory illness.

In a Norwegian study, 72 male and female Norwegian Red calves were divided into six groups with the youngest calf in each group being 5 weeks old. Three groups

consisted of 12 calves of a similar age (homogenous groups) while the other three groups consisted of six young and six older calves (heterogeneous groups).

Average daily gain was 29% greater in the homogeneous groups versus the heterogeneous groups. In both kinds of groups, on the first day of grouping, the calves spent more time exploring their new environment, and less time was spent eating and lying down.

A study of feed intake

A western U.S. large herd study analyzed individual calf feed intakes during the last three weeks of the 56 days spent in hutches and classified calves into the highest quartile and lowest quartile for intake. Then, 480 calves were grouped as follows:

- 20 calves randomly chosen (control)
- 20 highest quartile (HH)
- 20 with lowest quartile (LL)
- Five calves from lowest and 15 from highest quartiles (LHH)
- 15 calves from the lowest and five from highest quartiles (LLH)
- 10 calves from each highest and lowest quartiles (HL)

Calves were fed a total mixed ration (TMR) of 95% starter with 5% alfalfa hay, and intake was measured for four weeks in the pens. Average intakes and daily gain are listed here in descending order: HH, HHL, HL, control, LLH, and then LL with the exception of a switch between the control and LLH in daily gain versus intake.

Similarly, variation in final body weight was lowest for HH, and then increased in the following order: LL, control, LLH, HHL, and HL.

The first grouping of calves post-

weaning is most critical. This study found that minimizing variation in that first grouping improved overall heifer performance and diminished variation in outcomes.

A look at forage

To address the question of when to begin feeding forage and how much, a University of Guelph study used 48 male Holstein calves with four treatments after weaning following 52 days on a trial conducted for 12 weeks. The four feed treatments consisted of:

- TMR with dry matter comprised of 37% corn silage, 34% red clover hay, 16% high moisture corn, and 13% protein concentrate along with an ionophore resulting in 15.2% protein, 21.4% acid detergent fiber (ADF), and 31.7% neutral detergent fiber (NDF) on an as-fed basis
- A texturized starter with 20% protein fed alone
- A starter mixed with grass hay
- Separate starter and grass hay

After full weaning, calves struggled on the TMR treatment with considerably lower intake and daily gain compared to the other three treatments. This is indicative of its 71% forage content, lower digestibility than other treatments, and lower intake. The latter is due to longer residence time in the rumen, its slower rate of rumen fermentation, more gut fill, and slower rate of passage.

Rumination times were similar among treatments. A major caveat with this trial is that the starter was texturized. Consequently, there was no advantage in including hay among the three non-TMR treatments.

Data from a 2018 NAHMS study showed a slump in Holstein calves in daily gain from 1.6 pounds preweaning to 1.3 pounds postwean-



growth. Further, that likely created more gut fill, which distorts true body growth as measured by daily body weight gain.

In addition, this study found that pelleted starter (grower) versus textured starter reduced intake, daily gain, and hip width bone growth.

Promote rumen development

It is best to limit hay intake to about 0.5 to 1 pound in the month after weaning. Chop the hay, and use a textured versus a pelleted starter.

Also, limiting milk solids to about 1.5 pounds daily prior to weaning will help avoid a post-weaning slump if starter intake averages at least 2 pounds daily over the two weeks prior to weaning. Starter intake should more than double during the two weeks after weaning. This will help facilitate rumen development. 🐄

The author is the executive vice president for the American Registry of Professional Animal Scientists (ARPAS). Learn more at www.arpas.org.

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