Feedstuffs, July 5, 2017

Feedstuffs Reprint

Weaning transition program key to success of dairy calves

THERE are three critical calf periods: (1) around calving, including the cow condition/environment and colostrum management; (2) the first two weeks of life, when most deaths occur, and (3) the two weeks before and after weaning.

This article will be about the weaning transition program because it is an area that I find is often poorly managed on dairy farms. Ironically, while dairy farms in the U.S. are now feeding more milk or milk replacer for a longer period — based on changes in National Animal Health Monitoring System reports from 2007 to 2014 — this can exacerbate weaning transition problems (*Feedstuffs*, March 7 and Sept. 5, 2016).

That is because of the inverse relationship between milk/milk replacer intake and starter intake (Figure). I originally noted that effect in 1979 (Kertz et al., 1979), and it has been further quantitated more recently by Gelsinger et al. (2016). Within the range of those data and the studies summarized, there is about a 2:1 ratio decline for each additional amount of milk or milk replacer solids fed and starter consumed. This is additionally affected by higher fat levels that further reduce starter intake (Kuehn et al., 1994).

Implicit in this relationship between milk/milk replacer intake and starter intake is that the latter is key to the calf's rumen development and weaning. If starter intake is inadequate for a long enough time and no well-texturized starter is fed — or at least some roughage with an all-pelleted starter — rumen development will not be adequate for a good weaning program.

A recent study by Rosenberger et al. (2017) used different levels of milk feeding to study calf behavior and performance. The study used 32 female and 24 male Holstein calves that were separated from their dam within six hours after birth and fed four liters of colostrum containing more than 50 g of immunoglobulin G per liter.

Calves were moved into individual, 2 ft. x 4 ft., sawdust-bedded pens. At about seven days of age, they were moved into a group of eight calves in sawdust-bedded pens with a partially slatted floor.

*Dr. Al Kertz is a board-certified, independent dairy nutrition consultant with ANDHIL LLC based out of St. Louis, Mo. His area of specialty is dairy calf and heifer nutrition and management.

Bottom Line

with
AL KERTZ*

Each group had one automatic feeder for pasteurized milk (12% dry matter, 3.2% protein and 3.8% fat), a texturized starter (89% dry matter, 19.8% crude protein, 6.3% fat, 15.4% neutral detergent fiber, 9.4% acid detergent fiber and 37.6% starch) — although no measures such as percent grains or particle size distribution were available or taken — another automated feeder used for a mixed grass hay (85.7% dry matter, 18.9% crude protein, 52.8% neutral detergent fiber and 32.1% acid detergent fiber) and water.

A minimum amount of 500 mL of milk was allowed at each visit, but otherwise calves were allowed to split their milk allowance per visit however they wished. Treatments were daily allowances of 6, 8, 10 or 12 liters.

At day 42, daily milk allowance was reduced to 50%; then, the allowance was reduced 20% daily from day 50 to full weaning at day 55, followed by postweaning to day 68 (Table).

As expected, as more milk was allowed, calves had fewer unrewarded visits to the automatic feeder both preweaning and during weaning (data not shown). As also might be expected, unrewarded visits were higher during weaning for all treatments within treatments.

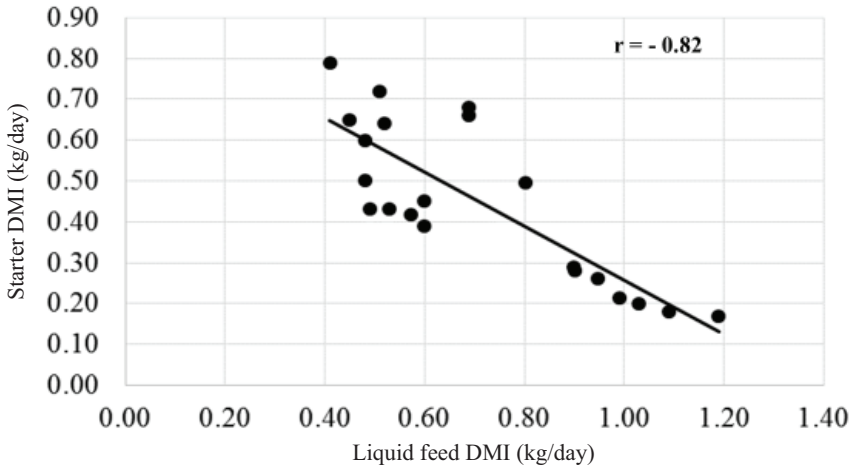
Starter intake was inverse to milk intake both preweaning and during weaning but was not different (P = 0.13) postweaning. Hay intake was not measured, only how many minutes calves were in the hay feeder. Hay is a confounding factor since there were no measures of gut fill. If the starter was well texturized, there was no need to provide hay.

Preweaning daily gains were different (P < 0.001) among treatments, with increased gains beyond the eight liters of milk allowance. However, they were similar among treatments during weaning and postweaning. Daily gains beyond 1 kg (2.2 lb.) can be problematic, because that has been found to be the maximum rate of protein deposition; gains greater than that are fattening.

However, the 14-day postweaning daily gains may have been greater simply because of some gut fill with greater dry matter intakes. Overall daily gains would approximately double birth weights (90 lb.) by the end of two months of age, even at the low milk allowances of six and eight liters daily.

A key element in this study is that there was a 12-day weaning period and a 14-day postweaning period. That more closely fits the two weeks before and two weeks after the weaning transition period that I recommend. Finally, it is known that it takes about two to three weeks for rumen papillae and microbial populations to fully adjust to significant dietary changes. That is what occurs during the transition period before and after calving, and that is why producers, likewise, need to carefully manage the

Inverse relationship between calf liquid intake and starter intake



Source: Gelsinger et al. (2016).

weaning transition period for calves too.

The Bottom Line

The inverse relationship between the amount of milk or milk replacer fed and starter intake must be taken into account when implementing a weaning transition program — the two weeks before and two weeks after weaning. That is particularly important when feeding more than six to eight quarts/liters daily, as seen in the Rosenberger et al. study reviewed here.

In this case, a 12-day weaning process through automatic milk and starter feeders and a 14-day postweaning period served the weaning process well.

References

Gelsinger, S.L., A.J. Heinrichs and C.M. Jones. 2016. A meta-analysis of the effects of preweaned calf nutrition and growth on first-lactation performance. J. Dairy Sci. 99:6206-6214.

Kertz, A.F., L.R. Prewitt and J.P. Everett Jr. 1979. An early weaning calf program: Summarization and review. J. Dairy Sci. 62:1835-1843.

Kuehn, C.S., D.E. Otterby, J.G. Linn, W.G. Olson, H. Chester-Jones, G.D. Marx and J.A. Barmore. 1994. The effect of dietary energy concentration on calf performance. J. Dairy Sci. 77:2621-2629.

Rosenberger, K., J.H.C. Costa, H.W. Neaves, M.A.G. von Keyserlingk and D.M. Weary. 2017. The effect of milk allowance on behavior and weight gains in dairy calves. J. Dairy Sci. 100:504-512. ■

Experimental design

	Daily milk allowance, liters			
	6	8	10	12
Preweaning, 7-41 days				
Milk, lb.	12.5	15.8	18.3	20.3
Starter, lb.	0.67	0.22	0.22	0
Hay, minutes/day	15.5	14.7	10.4	12.7
Daily gain	1.28	1.25	1.43	1.94
Weaning, 42-54 days				
Milk, lb.	5.3	7.3	8.8	10.8
Starter, lb.	2.64	2.20	1.54	1.10
Hay, minutes/day	27.2	27.7	21.9	20.1
Daily gain, lb.	2.00	1.76	1.36	1.36
Postweaning, 55-68 days				
Milk, lb.	0	0	0	0
Starter, lb.	5.94	6.16	6.38	6.38
Hay, minutes/day	27.5	30.2	30.4	27.1
Daily gain, lb.	2.79	2.71	2.90	2.77
Gain (days 7-68), lb./day	1.70	1.72	1.78	1.98