



FEEDING FOR PROFIT

Calf weaning, feeding behavior focus of UBC study

The nature of calf behavior can greatly affected starter intake and weaning.

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Weaning is not a simple process with many variables and largely unknown consequences. Consequently, a rather comprehensive study was designed and conducted by the University of British Columbia which has focused on better understanding calf behavior and implications for calf rearing and management (Neave et al., 2019).

This study required implementation of a rather intricate experiment, so I will quote directly from much of the protocol so readers can better understand how result and key findings were developed and interpreted. "Forty-eight Holstein calves (45 females and 3 males) were selected on the basis of achieving sufficient variability in weaning ages, with a target of at least 8 calves weaned between 6 to 7 weeks, 7 to 8 weeks, 8 to 9 weeks, and after 9 weeks of age. Based on the data from a previous experiment, we expected the fewest number of calves to wean during week 6 to 7 (approximately 19% of calves); therefore, a population of 43 calves was required for this experiment. Calves remained with their dam for 5 hours after birth, and were then separated, weighed (mean 94.7 ± 13 lb —my comment is that this a wide range of body weights), and moved into individual pens where 4 liters of colostrum was fed using a nipple bottle within 6 hours after birth. At the next a.m. or p.m. feeding following the colostrum meal, 4 liters of whole milk was fed through a nipple bottle in the individual pen. Calves were moved into a sawdust-bedded group pen (16 × 24 feet) 1 hour before

their second milk meal (nominally 1 day of age). Group pens were filled to 8 calves based on birth date, and then a new pen was started (for a total of 6 group pens). After their first milk meal in the group pen (24 to 30 hours after colostrum feeding), a blood sample was collected from the jugular vein for serum analysis.....and all calves achieved passive transfer as identified by serum total protein >5.2 g/dL.”

“Each group pen was equipped with an automated milk feeder with one teat providing access to pasteurized whole milk. The milk feeder delivered milk in 0.5-L portions. The milk allowance accrued hourly at a rate of 5% of the daily value every hour from midnight to 2000 hours. Calves were otherwise allowed to split their milk allowance in as many visits as they wish. Calf starter was fed ad libitum and controlled from the same automated feeder. The feeder recorded intake, time, and duration of each milk and calf starter visit. Farm hay (mixture of tall fescue × ryegrass, orchard grass, and ryegrass) and water were available ad libitum from automatic feeders. *Feeding behavior at the hay feeder and hay intake could not be reliably measured throughout the experiment and thus is not reported.* Calibration of all automated feeders was performed every second week for each group pen to verify accurate dispensing and intake of milk and calf starter portions. All calves were assigned to a weaning plan that combined 2 weaning techniques: a step-down reduction in milk at 30 days, and subsequent milk reduction based on individual calf starter intake. Calves were offered 12 L/day of milk from day 1 until nominally day 30 of age (mean 31.3 ± 1.15 days). On day 31, milk was reduced by 25% relative to each individual’s average milk intake over the previous 3 days. The timing of subsequent 25% reductions in milk were based upon when the calf consumed specific amounts of calf starter of approximately 0.5, 1.5, and 3 lb, respectively, as recommended by the Bovine Alliance on Management and Nutrition (2017). To qualify for the milk reduction, the calf needed to consume the target calf starter consumption on average across the preceding 3 days, but with a daily minimum of 50% of the target. Calves were permitted up to day 84 of age to reach all 3 intake targets; if a calf did not consume nearly 3 lb/day of calf starter by day 84, the calf was gradually weaned by reducing the milk over 7 days, beginning from the calf’s current milk allowance until weaning was completed at day 91. Calves remained in their group pen until the last calf from the group reached 105 days of age.”

For the remaining synopsis of results and findings, I am relaying on comments made by Maggie Seiler Gilles (2019). Five early life individual characteristics of calves that impact that animal’s feeding behavior, intake, and growth were described as: low vitality, fearful, strong drinker, slow learner, and

exploratory-active (I think most of us who have been around calves much can relate to these categories).

- Calves that were characterized as slow learners eventually weaned at a later age in a system where calves were fed with an automated system and were weaned based on starter intake.
- “Calves that required extensive training to learn to use the automated milk feeder and had reduced milk intake in the first week, were termed slow learners,” the researchers explained. “We found that these slower learners weaned at a later age.”
- Those calves also lagged behind their counterparts in milk intake, drinking speed, visits to the milk feeder, and growth before weaning.
- Fearful eaters preweaned themselves.
- Interestingly, calves that were deemed fearful eaters tended to wean themselves at an earlier age. These were calves that scored as more attentive and responsive when confronted with novel people or objects.
- Calves that were categorized exploratory-active did not have faster development or quicker solid feed intake, but they did have greater weight gains throughout the experiment, which researchers correlated to a behavioral trait of this group to better cope with the weaning transition.
- Calves that had high colostrum and first milk intakes were considered strong drinkers, and these young bovines visited the automated feeder less often than other groups through the preweaning period. They also struggled to gain weight when weaned based on starter intake – a factor that made researchers suggest this group might need a more moderate step-down approach to weaning from milk.
- The final group, low vitality, was made up of calves that took longer to stand up, walk, and suckle the dam after calving. These calves did not have delayed solid feed intakes or weaning, but they did consume less milk preweaning than other calves.

Across the board, the best indicator of calves that would wean early based on starter intake was a very simple factor. If calves started eating solid feed early and were eating a lot of starter, they generally weaned earlier, with the fastest of the group of 48 calves being weaned at 44 days of age.

The Bottom Line

The nature of calf behavior greatly affected starter intake and weaning. The weaning transition period—2 weeks before and 2 weeks after full weaning—is critical for performance at and following

weaning. The 2018 NAHMS study (Kertz 201) showed that Holstein calves averaged 1.61 lb daily gain before weaning, but only 1.32 lb after weaning. This is indicative of good daily gain before weaning, but also indicative of poor starter intake both before and after weaning. Weaning is not tied to an age *per se* (Kertz 2016, Eckert et al., 2016), but rather to length and amount of starter intake before and after weaning for adequate rumen development prior to weaning and better rumen function after weaning. And this response is better when a well-texturized starter is fed. Another major factor is the inverse relationship between liquid dry matter intake and starter intake (Gelsinger et al. 2016). If too much liquid is consumed for adequate amount and length of starter intake before weaning, this can reduce performance and digestibility after weaning (Hill et al., 2016a,b).

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