

by A.F. Kertz

# New thoughts on calf and heifer raising

THE 2018 American Dairy Science Association (ADSA) annual meeting was held in Knoxville, Tenn., in June 2018.

Nearly 1,800 attendees from the U.S. and from 66 other countries participated. Four abstracts related to calves and heifers have been



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selected to briefly review. There were many more such abstracts this year, as with last year too, with many from other countries as well. That is a very promising development for calf and heifer research.

## Calf behavior predicts health

**Summary:** Studies with cows have found their behavior and activity can serve as an early predictor of health disorders. This study used calf behavior as an early predictor of health disorders. A total of 325 calves (male calves from 30 to 90 days of life) were fitted with pedometers (Trackacow, ENGS system, Israel) to measure calf steps, lying time, standing time, changing position from lying to standing (swaps) and access to the feedbunk (number of times and time per access).

Incidence of health problems, weaning time, and preventive treatment time (vaccine and antibiotics in water) were recorded. On average, calves spent 16.3 hours daily lying, 4.7 hours standing, changed position from lying to standing 19.3 times, and did 1,468 steps. They accessed the feedbunk 10.4 times daily for a total of three hours with an average of 17.3 minutes per visit.

Sick calves (sample size equals 24, with 80 percent respiratory diseases), when compared to healthy calves, spent more time lying (plus 5 percent), less time eating (minus 5 percent), and took fewer steps (minus 5 percent) during three to four days before being diagnosed ill. These behavior changes predicted occurrence of health disorders with 73 percent accuracy three days before actual diagnosis.

Weaning raised eating time by 15 percent, number of feedbunk visits by 13 percent, and step numbers by 7 percent. Preventive treatments reduced intake time by 20 percent, dropped feedbunk visits by 5 percent, and cut back step numbers by 11 percent, while increasing the number of swaps by 9 percent.

**Take home message:** Care must be taken to avoid false alarms. Calf behavior monitored with pedometers can help predict sick calves before they manifest clinical symptoms, allowing for early treatment.

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## Overstock heifers carefully

**Summary:** This study was conducted to evaluate effects of feedbunk overstocking on intake, growth, feedbunk-sorting behaviors, feedbunk displacements, and hygiene of 128 pregnant Holstein heifers averaging about 1,050 pounds body weight.

Their total mixed ration contained alfalfa haylage and corn silage diluted with processed wheat straw at an inclusion rate of 25.2 percent (dry matter basis). The 91-day feeding trial included 16 pens with eight heifers per pen that were assigned on the basis of bodyweight, such that size differences within each pen were minimized. Feedbunk stocking rates were 100, 133, 160, or 200 percent of capacity.

Daily intakes (23 to 24 pounds dry matter) were not affected by feedbunk stocking rates. Overall effects of feedbunk stocking rate on growth were minor, with only trends for linear increases in total weight gain and body condition. Overstocked rates also exhibited a trend for better feed to gain ratios than pens stocked at 100 percent of feedbunk capacity.

Heifers sorted against large (greater than 19 mm [millimeter] particles and neutral detergent fiber [NDF]), and exhibited preference for short (greater than 1.18 mm, and less than 8 mm) and fine (less than 1.18 mm) feed particles, as well as crude protein over time. However, these responses were not affected by feedbunk-stocking rate.

During the first hour after daily feed distribution, heifer displacements from the feedbunk were greater for overstocked pens, and went up linearly (P less than or equal to 0.03) with stocking rate for most evaluation periods of the 12-week trial. Displacements exceeded 70 per hour during the first hour after feed distribution in pens stocked at 200 percent of capacity during week one, two, and 12. Heifer hygiene of legs and flanks was not affected by competition at the feedbunk.

**Take home message:** While overstocking of the feedbunk alone did not affect heifer performance, it should not be practiced blindly without attention to other critical components of animal welfare. For instance, overstocking freestalls or housing at the same time as feedbunk overstocking may have an additive and cumulative negative effect.

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## Colostrum handling matters

**Summary:** A single feeding of colostrum was made from cows in the Pennsylvania State University dairy herd and divided by quality (high, medium, or low) based on colostrometer measurement. Colostrum within each quality was pooled to create three unique batches. Each batch was further divided into thirds as follows: frozen to be fed without heat treatment, heated at 140°F (60°C) for 30 minutes, or heated at 140°F for 60 minutes.

Colostrum samples from each treatment were collected and tested for standard plate count, gram-negative noncoliforms, coliforms, and total IgG (immunoglobulin G) concentration. Serum samples were collected from 108 Holstein calves before feeding colostrum and 24 hours after birth.

These were analyzed for total protein, total IgG, and hematocrit. Colostrum IgG was different between colostrum quality groups (92.5, 59.4, and 48.1 mg/mL [milligrams per milliliter] of IgG). Heating colostrum reduced IgG concentration compared with the control by 9 percent when heated for 30 minutes and by 12 percent when heated for 60 minutes. But colostrum heated for 60 minutes had a lower standard plate count than colostrum heated for 30 minutes or not heated (3.6, 2, and 1.8 log cfu/mL [log value of colony-forming units per milliliter]).

Blood serum IgG concentration at 24 hours climbed as colostrum quality improved (18, 22.2, and 24.8 mg/mL) and tended to rise as heat treatment time went up (19.7, 20.3, and 25 mg/mL). Apparent efficiency of absorption was greater in calves that received medium-quality colostrum compared with calves fed high-quality colostrum (38.1 and 25 percent).

**Take home message:** These results suggest that there may be an upper limit to the amount of IgG absorption in a given time period. Additionally, medium- or high-quality colostrum yields similar blood IgG absorption given the same volume of intake.

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## Give water early

**Summary:** Offering drinking water at birth could improve growth performance and fiber digestibility in Holstein heifer calves. The average age of dairy calves when first offered drinking water is 17 days in

the U.S., based on the 2014 National Animal Health Monitoring System report. This study examined impact of the 17-day delay on water and starter intake, nutrient digestibility, health, and growth in dairy calves during the first 70 days of age.

Thirty newborn Holstein heifer calves, balanced for parity of the dam, birth weight, and month of birth, were randomly assigned to receive water at birth or at 17 days of age. Calves were bottle-fed with pasteurized whole milk three times daily (2 to 3 liters per feeding), and partially and completely weaned on day 42 and 49, respectively.

Calves drank a significant amount of free choice water, about 0.8 quarts, daily during the first 17 days. Calves not fed water until 17 days drank a half a quart more water but ate a similar amount of starter from day 18 to 42 as compared to calves fed water right away.

Starter intake was similar between both treatments of calves from day 43 to 70. Scours prevalence was significant in both groups between day 7 and 21, and the scouring days, scours severity, hematocrit, and plasma haptoglobin concentrations were similar between the groups.

Weekly body weight and average daily gains were similar between both treatments of calves throughout the 70 days, but calves receiving water from birth tended to have higher body weights (145 pounds versus 141 pounds) at the beginning of weaning (day 42).

Body length and hip height were similar between groups before weaning, but calves fed water early had greater body length and hip height than delay-fed-water calves after weaning (days 50 to 70).

Despite the similar grain intake, NDF and ADF (acid detergent fiber) digestibility of early-water-fed calves was greater than later-watered calves on day 69 and 70. Additionally, calves having access to drinking water from birth achieved greater body weights at five months of age (440 pounds versus 416 pounds), suggesting long-term positive effects of offering water to newborn calves as early as possible.

**Take home message:** Relatively high water consumption occurs within the three days after feeding colostrum. After that period, water intake is directly related to starter intake in a ratio of about 4 pounds water intake to 4 pounds dry matter starter intake. Starter intake, and its physical form, are the keys to rumen development and the weaning transition program and results. So why wait until 17 days of age to begin feeding calves water?

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