HOARD'S DAIRYMAN

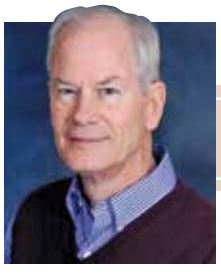
WHEN ADDING A LOWER QUALITY roughage to heifer diets, be mindful of the amount of sorting that occurs, as it could affect intake and daily gain.

Protein and energy drive heifer performance

Whether it's calf starter, low-energy forages or protein sources, our picture of how to best feed young stock is still developing.

by A.F. Kertz

THERE was record attendance at the 2015 joint annual meeting of the Animal and Dairy Science Societies in Orlando, Fla., in July. A number of calf and heifer presentations were given, and four abstracts from posters, orals or other presentations have been selected to briefly review below.



KERTZ

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

Starter protein level affects performance

A total of 104 Holstein heifer calves were used in a trial at the University of Minnesota-Waseca. Calves were fed 1.25 pounds of a traditional 20 percent protein/20 percent fat milk replacer twice daily for the first five weeks, once daily for a week, weaned and then measurements continued for another two weeks. The four treatments were texturized starters with 15, 18, 21 or 24 percent protein as-fed. Starter intake declined linearly with greater protein percent both after weaning and overall.

The most significant responses were quadratic for weight gain and feed efficiency; that is, the lowest responses were seen both at the lowest and highest percent protein. That indicates that the lowest protein level was below requirement, and the highest protein level was above requirement. The latter is most likely due to the calf needing to expend energy to process excess protein, which ends up in the urine and is wasted.

Take-home message: Feeding 22 percent or higher protein level calf starters is not beneficial to the calf and may actually reduce performance. No research data supports this practice.

Contact: Hugh Chester-Jones, phone: 507-837-5618; email: chest001@umn.edu

Soy oil impacts digestion

All study calves were Holstein bulls coming from one large dairy where they had been fed 3 quarts of colostrum. They were fed a total of 1.45 pounds of a 27 percent protein/17 percent fat milk replacer twice daily for Days 1 to 39, and then fed 0.725 pound once daily for Days 40 to 42 before full weaning. A texturized 20 percent crude protein starter was fed with no fat, 2 percent tallow or 2 percent soy oil treatments. The fat sources used were tallow because it did not alter the concentration of linoleic and linolenic fatty acids, while soy oil was higher in linoleic fatty acid.

Per pound of intake, there was a numerical trend for lower daily and lower gains overall for the fat treatments. For the two weeks post-weaning, soy oil reduced daily gain and starter intake versus the no fat control. Both fat treatments also elevated body condition score versus no fat. Digestibilities were also dropped, especially for soy oil. Two other trials were done starting with 2-month-old calves for another eight weeks. Generally, soy oil had the most negative effects on intake and daily gain.

Take-home message: While it may seem intuitive that adding fat to a calf starter should elevate energy intake and performance, it does not, at least for the first 2 to 4 months of age. Unsaturated oil, such as the soy oil in these studies, had the most negative effects, with tallow being intermediate in response versus the no fat control.

Contact: Mark Hill, phone: 937-770-2400; email: mhill@provimi-na.com

Low-energy forages encourage sorting

For years, we have selected for cows that will produce more milk, and along with that generally comes higher intakes. Not surprisingly, heifers now can eat more, too. Even with high-forage diets, heifers can get fat when fed free choice. That has led to including some straw in their diets, which heifers may then sort out.

This was evaluated by a Wisconsin study with a high-quality forage diet or other diets containing one of three diluting agents: eastern gamagrass haylage (EGG), chopped wheat straw or chopped corn fodder. The sorting behaviors of heifers offered these forage diets were evaluated. Holstein heifers (128 total) were stratified on the basis of initial body weight (heavy, 1,235 pounds; medium-heavy, 1,060 pounds; medium-light, 972 pounds and light, 880 pounds); and then assigned to one of 16 identical research pens.

Diets were offered in a 118-day feeding trial with heifers crowded to 133 percent of capacity at the feedbunk. Compared to control heifers, inclusion of low-energy forages was effective in reducing dry matter intake (24.4 versus 22.1 pounds per day) and energy intake (16.3 versus 13.1 pounds total digestible nutrients per day). Straw was most effective in maintaining average daily gains within normal targets for heifers of this size and weight.

Sorting against physically effective fiber particles was detected for straw as a linear function of time from feeding and much more severely for the fodder diet. Sorting of forage particles by heifers could not be related directly to heifer performance. Sorting characteristics for straw were intermediate between EGG and fodder. Daily gain was reduced by dilution in all cases (2.55 versus 2 pounds per day), but daily gain for straw was about 0.41 pound per day less than EGG (2.16 pounds per day) or fodder (2.14 pounds per day), despite exhibiting sorting characteristics intermediate between those diets.

Take-home message: When adding straw or other lower quality roughage to heifer diets fed free choice, be observant as to whether and how much heifers may sort out larger particles and whether or how much this may affect intake and daily gain.

Contact: Wayne Coblentz, phone: 715-384-5784; email: wayne.coblentz@ars.usda.gov

Nitrogen source, forage levels interact

Ruminally fistulated heifers weighing 850 pounds were fed either 75 or 25 percent forage diets. Dietary protein was 0, 33 percent, 67 percent or 100 percent nitrogen from urea, with the balance coming from casein. Feeding periods were 21 days each with the first 16 days for adaptation and the subsequent days for sampling. Diets were formulated to provide equal caloric and protein intake.

This resulted in greater dry matter intakes for high-forage fed heifers to provide the same energy intake. Of course, the high-forage diet had greater NDF (neutral detergent fiber) and ADF (acid detergent fiber) intakes with lower fiber digestibility. ADF digestibility was greater with the low-forage diet and rose linearly with greater urea levels.

Starch digestibility was greatest with no urea, lowest with 33 percent urea diet and then rose with 67 and 100 percent urea diets. Nitrogen excretion was lower with low-forage versus high-forage diets which also translated into greater body nitrogen retention with the low-forage diet. The low-forage diet had the lowest rumen pH but greater microbial protein flow.

Take-home message: Extremes in forage level and urea levels accentuated differences in intake, digestibility, nitrogen utilization and rumen microbes. This can help target dietary levels which could be the most efficacious.

Contact: Gustavo J. Lascano, phone: 864-656-1745; email: glascan@clemson.edu

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