

DAIRY VETERINARY NEWSLETTER

May 2017

National Mastitis Council Meeting Coming in Boise, ID - Main Session July 20, 2017

The General Session of The **National Mastitis Council (NMC)** 2017 Regional Meeting **in Boise, ID is now available.** The NMC Regional Meeting will be **July 19-20 at The Grove Hotel in Boise.** July 19 features a variety of short courses and dairy farm and packing plant tours. The general session on July 20 is shown below:

General Session

Thursday, July 20, 2017

7:00 a.m. Registration opens

Morning Session

Moderator: Justine Britten, Udder Health Systems Inc.

8:00 a.m. - Welcome - Mario Lopez, National Mastitis Council President

8:10 a.m. - Welcome to Idaho - Tony Vanderhulst, West Point Farms and United Dairymen of Idaho president

8:15 a.m. - Processor's Role in Milk Quality - Mark Wustenberg, Tillamook County Creamery Association

8:55 a.m. - Efficient Parlor Throughput with Milk Quality in Mind - Juan Pedraza, Zoetis

9:45 a.m. - Break

10:05 a.m. - Milking Dairy Cows with Robots - Marcia Endres, University of Minnesota

10:40 a.m. - Bovine Milk Bacterial Diagnostic Results - Blind Comparison between Conventional Culture, MALDI-TOF and 16S rRNA for Test Agreement - David Wilson, Utah State University

11:20 p.m. - Zero Tolerance for Contagious Mastitis - Allan Britten, Udder Health Systems

Noon - Lunch

Afternoon Session

Moderator: Mark Kirkpatrick, Zoetis

1:15 p.m. - Practical Dairy Workforce Training to Preserve Beef Carcass Quality - Robert Hagevoort, New Mexico State University

1:45 p.m. - Mastitis and Animal Health in Organic vs. Conventional Dairy Herds - Mike Gamroth, Oregon State University

2:15 p.m. - Challenges to Producing Low Somatic Cell Count Milk on Today's Large Dairies - Robert Corbett, Dairy Health Consultation

2:55 p.m. - Break

3:15 p.m. - Milk Somatic Cells: Is there a Threat that They Will Go Too Low? - Larry Fox, Washington State University

3:45 p.m. - Panel Discussion: Living with a 400,000 SCC Limit - Marv Patten, Idaho State Department of Agriculture; Lindsey Dimond, Dairy Farmers of America; Mark Wustenberg, Tillamook County Creamery Association; Bob Naerebout, United Dairymen of Idaho; Toy Smith, Darigold

4:30 p.m. - Adjourn

Comparison of Bedding Materials for Dairy Calves - is there a "Best Bedding"?

An interesting bedding study by Sutherland et al. was reported on in J Dairy Sci, March 2017. Wood shavings (WS), pea gravel (PG), rubber chip (RC) and sand (SA) were compared as bedding materials for female dairy calves from 1 to 6 weeks old. I have had experience with all of those beddings being used for dairy calves on client farms except for rubber chip. The authors investigated a practical question/issue for calf raising.

The paper includes a good summary of bedding types and some earlier studies, and the authors point out that, "studies investigating the effect of rearing substrate on calf health, physiology, and behavior have predominantly focused on individually housed or pair-housed calves."

Materials and methods

The study was conducted between July and September in New Zealand (Southern hemisphere winter) at a dairy research farm. Holstein cross (n = 80) female calves were moved at 1 d of age to pens of 15 calves bedded with wood chips, but then at "approximately" 5 d old they were moved to the study pens. N = 20 calves/bedding type: 5 pens/bedding type (WS, PG, RC, or SA), 4 calves/pen. Colostrum was fed 2X for the first 4 d after birth; this practice was not an object of the study, but is something relatively new in dairy press recently. Calves were then fed milk replacer using a 5-teat milk feeder, and offered a free choice calf starter. "Experimental pens [8 ft x 8.5 ft] were located in the middle of the facility and were separated by wooden panel fences that allowed - - some - - contact between animals in adjoining pens." Depending on bedding type, particle size ranged from 3 - 10 mm except for the SA granules. Bedding materials in each pen were approximately 16" deep. "WS and SA pens were topped up with dry, clean substrate when pens became damp (approximately once a week), - - however, PG and RC were not cleaned during the experimental period as these pens remained relatively clean and dry throughout the experimental period.", the paper states.

The study design was apparently a completely randomized block design, but the exact design was not specified. It seems that the authors blocked calves in groups by day of age when moved to experimental pens (age range not reported) and by body weight (range not reported), which averaged 84.4 lb when calves were moved. Then within each block of age and body weight range, they allocated calves to the 4 bedding pens; this was probably at random, but randomization was not mentioned.

Air temperature, humidity, vaginal temperature (measured every 10 min), and DM% of each bedding material were measured during wk 1, 3, and 6 of the study. Also during those same weeks, blood was sampled for total WBC and differential counts, PCV, cortisol, lactate and IgG. Calf running and self-grooming behavior was recorded

continuously for 8 h during daylight hours using overhead camcorders, also when calves were 1, 3, and 6 wk old. Each calf was marked using animal marking paint for ease of tracking on video. Video recordings were analyzed to calculate time calves spent in different behavior activities. The authors provided definitions of Lying down, Running, Self-grooming, Kick, Buck, or Jump. Recordings were analyzed by 4 different people; percentage of agreement between observers was between 70 and 92%. How agreement regarding calf behavior was defined was not explained. The categories of behavior were each added up to a total time spent in that behavior per 24 hr. The paper has a detailed description of some other analysis of calf behavior, for 20 min after calves were moved off of each bedding type into a new activity pen. "One experienced observer was used to analyze the video recordings [during the final 20 min] and intra-observer reliability was between 96 and 100% for all behaviors." How the intra-observer reliability was studied or calculated was not shown.

Each week, body cleanliness score was recorded for each calf: 1 = clean (only manure present at lower ends of legs), 2 = dirt/manure on tail head region and back of calf, 3 = dirt/manure "around" the tail head region, thighs, or legs of the calf, and 4 = dirt/manure "on" the thighs, legs, "and" tail head region of the calf. (The difference between scores 3 and 4 was not completely clear to me. It seems that unless all three regions are soiled, the score was 3, but if all were soiled, it was 4?) During wk 3 and 6, shoulder swab and fecal bacteria counts (composite samples from all calves in each pen) were measured and fecal fluidity scores were recorded for each calf: 1 = normal, 2 = soft and spreads slightly, 3 = runny and spreads moderately, and 4 = watery (severe scours). Scores were given at 3 and 6 wk of age at the same time as fecal samples were collected for bacterial counts. The same person always scored the calves.

Statistical analysis used ANOVA. Some variables were transformed, using either the log or the square root of the raw data to test for differences in means of the continuous variables among bedding types. For behavior in the bedding study pens, the pen was used as the experimental unit rather than individual calf. Statistical significance was $P \leq 0.05$, but P from 0.051 to 0.10 was defined as a "tendency".

Results

Air temperature and humidity in the study facility averaged 52° F and 87%. Moisture content means for WS, PG, RC, or SA over the study period were 41.9%, 3.3%, 3.4%, and 9.3%, respectively. Mean body weights at 1 wk (84.4 lb), 3 wk (92.3 lb), and 6 wk (126.2 lb) were not different among bedding types (P 0.69 to 0.93). Calves were clean; no calf scored > 2 on the cleanliness scale. The mean cleanliness score on every bedding type was 1.0, "clean". Fecal fluidity score means were 1.2 for WS, 1.3 for PG, RC, or SA, corresponding closely to "normal". Fecal scores were apparently not significantly different, but P values or significance were not reported. Vaginal temperature did not differ among bedding type, with all means either 102.6 or 102.7° F (all $P > 0.52$). Total WBC (mean 11,375/ml) and differential counts were not different among bedding types (P 0.32 to 0.79). Mean PCV was the same, 33%, for calves within each bedding type, $P = 0.65$. Cortisol (5.0 ng/ml), IgG (1,175 mg/dL) and lactate (1.05 nmol/L) were not different among bedding types either (P 0.30 to 0.52).

It was interesting to me that while *E. coli* counts from shoulder swabs were statistically higher with WS (12,500 cfu/100 cm² at 3 wk old, 7,000 cfu at 6 wk) than other bedding types (1,200 to 3,000 cfu at 3 wk, 800 to 1,200 cfu at 6 wk), $P = 0.03, 0.01$, respectively, these differences were within one log, often considered biologically not different. Also, *E. coli* counts in feces (all means approximately 10 billion cfu/100 cm²) were not different between bedding types or age of measurement (P = 0.29 to 0.82), and as might be expected, were markedly higher than the coliform counts in any bedding type.

Time spent in every type of behavior (Lying down, Running, Self-grooming, Kick, Buck, or Jump) was not different among bedding types, during the time in the study pens or during the final 20 min period in the activity pen, with one exception. The number of times that calves laid down was significantly higher with WS (19.2 times/24 hr) than the other bedding materials (15.9 to 17.5 times/24 hr, $P = 0.001$). I do not consider this to be biologically significant compared to the difference of 1.6 times/24 hr shown above for the other 3 bedding types; supporting this is the result that total lying time was 16.8 to 17.3 hr/24 hr across all bedding types, $P = 0.38$.

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Discussion/Conclusions

I commend the authors for studying an important practical question. They provided a detailed discussion regarding many of the results. One thing pointed out by the authors: "In the present study, a cost-benefit analysis was not conducted comparing the different rearing substrates tested, but availability, practicality and cost are important factors when considering rearing surface options."

My experience with bedding on U.S. farms, primarily calf hutches, "calf castle" buildings, Virginia-barn type group pens with nipple feeders for multiple calves, individual calf pens, or raised grate platforms, has rarely included observing bedding more than a few inches deep. The bedding in this study was approximately 16" deep.

The authors' final conclusion was, "- - health, physiology, and behavior of calves reared on [wood shavings, pea gravel, rubber chip and sand] were similar; therefore [all] may be acceptable options for rearing substrates for group-housed dairy calves. However, 2 other factors that are important when considering rearing surface options for calves are (1) calf substrate preference and (2) practicality of the substrate."

Please let us know your comments and also suggestions for future topics. I can be reached at (435) 760-3731 (Cell), (435) 797-1899 M-Tues, (435) 797-7120 W-F or David.Wilson@usu.edu.



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