ABSTRACTS
ADSA Student Affiliate Division

*** Author Presenting Paper**

Original Research/Independent Study
Undergraduate Paper Presentations

687 Performance of Holstein and Holstein-Jersey crossbred heifer calves when using an intensive feeding program from birth to 84 days of age. . E. E. Hammell*, M. L. Raeth-Knight, E. Ballinger, J. G. Linn, A. J. Seykora, and L. B. Hansen, *University of Minnesota, St. Paul, MN, USA*.

Fifteen Holstein and twenty-five Holstein-Jersey crossbred heifer calves were utilized to evaluate differences in calf performance and health when feeding milk replacer and starter in an intensive feeding program. Calves were born from October 2002 to January 2003. Colostrum was fed twice daily the first two days following birth. Milk replacer, containing 28% crude protein and 20% fat, was mixed with hot water to achieve a 17.6% solids solution. From day 3 to day 7, calves were offered 2 quarts of milk replacer solution twice daily. After day 7, milk replacer was increased and calves were offered 3 quarts of milk replacer twice daily until day 42. Day 43 milk replacer was decreased and calves were offered 3 quarts of milk replacer once daily until weaning at day 49. Starter (22% CP) was offered ad libitum from day 3 to 84. Intakes and fecal scores were recorded day 3 to day 56. Body weights were recorded at birth and every two weeks following birth, with additional body weights recorded at day 49 and 84. Hip height, heart girth and body length measurements were recorded at day 3, 49 and 84. Calves were housed individually in calf hutches from day 3 to 56 and then group housed (8 calves/group) from day 57 to 84. Holstein calves weighed significantly (P ¡ .01) more at birth compared to crossbred calves (41.8 kg vs. 35.7 kg). Average hip height at birth for Holstein calves was 79.8 cm compared to 76.5 cm for crossbred calves (P ¡ .01). All calves are healthy and performing well.

Key Words: Crossbreeding, Calf, Growth

688 Effect of Prepartum Dietary Carbohydrate Source and Monensin on Postpartum Immuune Function. H. R. Springer*[1], G. A. Varga[1], M. M. Pickett[1], J. P. Goff[2], J. R. Stabel[2], and T. W. Cassidy[1], [1] *The Pennsylvania State University, University Park, PA,* [2] *USDA-ARS, National Animal Disease Center, Ames, IA*.

Thirty two multiparous Holstein cows were used in a complete randomized block design to evaluate the effects of carbohydrate source and prepartum monensin supplementation on postpartum immune function. Immune function was assessed by *in vitro* antibody production and phenotyping using flow cytometry for CD3, CD4, CD8, B cells, monocytes, $\gamma\delta$ T cell receptor (gdTCR), MHC-II, and IL-2 receptor. Two diets with (+) or without (-) supplemental monensin (0 or 330 mg/d) were evaluated in a 2 X 2 factorial arrangement. The prepartum CONV diet contained 70% forage and the NFFS diet contained nonforage fiber sources such that 28% of the forage was replaced with cottonseed hulls and soyhulls. Treatments were designated CONV-, CONV+, NFFS-, and NFFS+. The prepartum diets were formulated to contain 1.55 Mcal/kg NE_L, 40% NDF, and 14% CP. Dietary treatments began at dry off and continued until parturition. Monensin was top dressed daily starting 28 d prior to expected calving date. Jugular blood samples for immune function were collected on day 1, 14, and 42 postpartum. *In vitro* antibody production was lower for cows supplemented with monensin compared to cows not receiving monensin ($P \leq 0.05$; 1732.3, 2625.5 $\pm$ 279.0). Antibody production increased from d 1 to 42 ($P \leq 0.05$; 831.5, 2463.4, 2820.9 $\pm$ 818.0). Percentage of cells positive for CD3, CD4, CD8, B-cells, gdTCR and IL-2 were not different across treatments ($P \geq 0.15$). There was a treatment by day effect such that monensin treatment resulted in lower monocyte populations on d 1 ($P \leq 0.05$; 6.2 vs. 2.9 $\pm$ 0.99). Day was significant for MHC-II populations which were higher for d 1 and 14 compared to d 42 ($P \leq 0.05$; 31.7, 33.4, 23.3 $\pm$ 4.8). Based on this study if the prepartum ration is properly balanced, postpartum immune function should not be affected. Monensin supplementation may effect monocyte populations and antibody production postpartum.

Key Words: Immune function, Monensin, Transition Cow

689 Growth and incidence of scouring in Holstien calves fed high fat (28%) milk replacer (MR) compared to those fed lower fat (20%) milk replacer. H. E. Carpenter*, J. S. Birney, and K. A. Koudele, *Andrews University*.

The replacement heifer calves at the Andrews University Dairy were switched from a diet of whole waste milk (3.06% protein, 3.35% fat) to MR (22% protein, 20% fat, or 2.8% protein, 2.5% fat on as-fed basis) due to concerns about the spread of Johne/s disease and other pathogens. There was concern following the switch that the calves were not growing as well on the MR since it was not equivalent to whole milk in protein

and fat. But there were also concerns that a higher-fat MR would increase the incidence of scouring especially in warm weather, and also reduce pre-weaning grain consumption. During the late summer and fall of 2002 forty-eight heifer calves were paired by birth weight and fed either the regular MR, or a high-fat (17% protein, 28% fat or 2.1% protein, 3.6% fat on as-fed basis) MR. The calves were housed outside in individual hutches and fed 2L MR twice a day until weaning at 7 weeks of age, when they were weighed again. They received free-choice water, grain and hay. Grain intake was tracked weekly and environmental temperatures were monitored daily. The frequency and duration of scouring and treatments were recorded daily. The weight gained from birth to weaning was significantly higher in the high-fat MR group (43.55 kg vs. 31.76 kg; p≤ .001). The % of birth weight gained by the high-fat MR group was also significantly higher (105% vs. 75%; p≤ .001). There were no significant differences in grain intake by either group (2.26 kg/d). The cost of feed intake was less in the high-fat MR group by $.02 per calf per day. Although the environmental temperature ranged from 37.1°C to -7°C during the trial period, there were no significant differences in the incidence or duration of scouring (8 cases/group, treated for 3 d). The data from this pilot study suggests that high-fat MR can be cost-effective to feed to calves even during warmer months resulting in higher weight gains with no reduction in grain consumption, and with no increased incidence of scours.

Key Words: Calf raising, High fat milk replacer, Weight gain

690 Evaluation of intensified liquid feeding programs for dairy calves. B. C. Pollard*, H. M. Dann, and J. K. Drackley, *University of Illinois, Urbana, IL*.

Our objective was to compare growth between two intensified liquid feeding programs (E) and a conventional early weaning (C) program. At 3 d of age, female Holstein calves in individual hutches were assigned to C (milk replacer [MR; 22% CP, 20% fat] plus starter [18% CP], as fed) or E (MR [28% CP, 20% fat] plus starter [22% CP], as fed). Trial 1 used 12 calves on C (C1) and 11 calves on E (E1). For E1, calves were fed MR at 2% of body weight (BW) during wk 1 and 2.5% of BW during wk 2-5 (adjusted weekly). During wk 6, calves were fed half the amount offered during wk 5 and were weaned at the end of wk 6. In trial 2, 21 calves received each diet (C2 and E2). For E2, calves were fed MR powder at 2% of BW during wk 1 and 2.5% of wk 2 BW during wk 2-5. During wk 6, calves were fed half the daily amount offered during wk 2-5 and were weaned at the end of wk 6. In both trials, C calves were fed a constant amount of MR (1.25% of birth weight as powder) through wk 4, one-half of that amount during wk 5, and were weaned at the end of wk 5. All calves had ad libitum access to water and starter. Total MR consumed was greater (P¡0.01) for E (16.4, 38.9, 16.3, and 40.0 kg DM for C1, E1, C2, and E2, respectively). Total starter intakes through wk 8 were lower (P¡0.01) for E (49.8, 22.4, 54.1, and 25.3 kg). In trial 1, BW (57.0 vs 47.0 kg) and heart girth (HG) were greater (P¡0.01) for E1 at wk 4; at wk 8 body length (BL) was greater (P¡0.01), and wither height (WH) and HG tended (P¡0.10) to be greater, for E1. In trial 2, BW (63.5 vs 51.1 kg), BL, and HG were greater (P¡0.01) for E2 at wk 4 and tended (P¡0.10) to remain greater at wk 8. Average daily gain (ADG) was greater (P¡0.01) for E in both trials through wk 4 (0.303, 0.709, 0.360, and 0.714 kg/d for C1, E1, C2, and E2, respectively) and through weaning (0.519, 0.747, 0.562, and 0.671 kg/d). The ADG through wk 8 was greater for E1 than for C1 (0.690 vs. 0.560 kg/d, P¡0.01) and tended (P¡0.08) to be greater for E2 than for C2 (0.671 vs. 0.591 kg/d). Intensified liquid feeding programs resulted in greater early gains of BW and frame.

Key Words: Calves, Growth, Milk replacer

691 The effect of cobalt supplementation in free choice salt on fiber digestion by cattle. L. J. Odens*, C. L. Steigert, J. J. Michal, K. A. Johnson, and R. L. Kincaid, [1]*Washington State University, Pullman, WA*.

The objective of this study was to determine the intake of cobalt (Co) that optimizes fiber digestion in a ruminant. Four ruminally fistulated cows were fed a diet of approximately 50(BGS). Treatments were arranged according to a Latin square design in which each cow was fed a trace element salt that contained 0, .5, 4 , or 10 ppm of added Co. Squares were randomized to avoid a carry-over effect when the next concentration was applied. The Co concentrations were achieved by adding cobalt glucoheptonate to a basal mineralized salt. Cows were adapted to each treatment for 7 d, ruminal fluid was collected (approximately 4 h after feeding) and transported to the laboratory to be used as an inoculant for the Daisy Incubator (ANKOM Technology). To examine dry matter and fiber digestion, the forage used in the diet was collected, dried at 60 C, ground through a 1 mm screen, weighed into small bags and placed into the incubator. Ground alfalfa hay (AA) was used as a reference standard. After 48 h, the incubation was ended; the bags were washed and dried at 100 C for 4 h to determine dry matter disappearance (DMD). Duplicate incubations from each cow at each Co level were conducted. The content of neutral detergent fiber (NDF) in the dry residue was determined. The impact of cobalt level on in vitro ruminal digestion of DM and NDF was evaluated using the SAS statistical package for a Latin square. Salt was fed free choice and intakes varied dramatically by cow. Preliminary evidence suggests Co intake had no effect on DMD or NDF disappearance (NDFD). Mean DMD was 58BGS and 5238fiber digestion.

Key Words: Cobalt, Fiber digestion, In vitro

692 The costs and returns associated with select Wood Model lactation lengths. E. A. Vaaler* and G. L. Hadley, [1]*University of Wisconsin-River Falls*.

The objective of this study is to determine the costs (returns) associated with extended days open and longer lactation lengths using curves developed by the Wood Model. Production profitability is at the heart of dairy farms. Therefore, the importance of this study is enabling the producer to select the lactation length that captures the highest return. Curves were developed for five calving intervals (40, 44, 48, 52, 56 weeks) for each of the three lactations (1, 2, 3). Costs include breeding, housing, labor, and feeding, as well as, other costs associated with the lactation. Cost, revenue, and profit were determined on a per day basis. They were also determined using the University of Wisconsin-Extension and Center for Dairy Profitability Agricultural Financial Advisor (AgFA) farm financial records database. The Net Present Value (NPV) associated with each series of lactation was calculated. To account for the different time frames, each lactation series was replicated to infinity by converting the NPV to an equivalent annuity. By applying a profit function to a Wood Model of various lactation lengths, we found that the cost of an average day open increases as lactation length increases. The return to the farm decreases as lactation length increases. Therefore, if a farm's lactation curve is similar to those generated by the Wood Model, these results mean that a farm should decrease lactation length (calving interval) to increase return.

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693 Effects of seasonality on the incidents of double ovulation in lactating Holstein cows. K. L. Genho*, R. W. Silcox, and D. L. Eggett, *Brigham Young University*.

Twinning has a dramatic negative effect on subsequent health and reproductive performance of dairy cattle. Double ovulation is the primary cause of twinning. A study was conducted to evaluate the effect of seasonality on the incidence of double ovulation in lactating dairy cows. The study, designed to evaluate the effect of season (summer versus winter) on the incidence of double ovulation, utilized 590 non-pregnant, high producing (¿42 kg/day) Holstein dairy cows located at two different farms under similar management practices owned by a single entity. Observations took place in July-August (summer) and January (winter). There were 315 cows observed in summer and 275 cows observed in winter. The ovaries of each cow were examined once using a Corometrics 500V ultrasound machine to determine the number of corpora lutea present. Overall ovulation rate was not affected by location or lactation number (P¿.05), so data were pooled. Incidence of double ovulation was affected by days in milk (P=.0382) and by rate of milk production (P=.0061). In addition, season was found to have an effect (P=.0113) on the incidence of double ovulation (22.2%) in this experiment. How-