ABSTRACTS
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Dairy Extension

61 Research in applied dairy cattle nutrition. M. L. Eastridge*, *The Ohio State University*, *Columbus*.

Over the past several years, research has provided advancements in improving feed efficiency and animal health by improving quality of feeds, increasing feedstuff and overall diet digestibility, better defining interactions among feedstuffs in diets, identifying alternative feed ingredients, better defining nutrient requirements, and improving efficiency of ruminal fermentation. Forages have been studied more extensively than any other type of feed. Cereal grains continue to be the primary contributors of starch to diets, and processing of cereal grains has improved their utilization. Many by-products provide a considerable amount of protein, nonforage fiber, fat, and minerals (sometimes a detriment as in the case of P) to diets. The primary feeding system today is the total mixed ration, with still considerable use of the pasture system. Advancements have been made in feeding practices to minimize the risk of metabolic diseases, yet the periparturient period continues to present many challenges. Continued research in applied dairy nutrition is needed: 1) although milk production per cow increases about 2% per year and efficiency of this milk production has increased immensely, more efficient use of nutrients must occur to provide the metabolic needs of the animal and to control the costs of milk production, 2) feedstuffs continue to change with new cultivars and processing methods, 3) costs of production have been increasing with minimal improvement in prices paid to producers, and 4) new forces in animal welfare and environmental stewardship (air and water) will affect the design of feeding systems and dietary formulations. However, these needs for research continue to face challenges from lack of independent funding, rising costs of conducting research (direct and indirect costs), and less availability of resources (facilities and human capital) for controlled research. An inadequate number of students are being trained as scientists and for employment in the feed industry. Additional partnerships among universities and industry are necessary to identify the specific research needs and funding sources and to recruit students into dairy cattle nutrition programs.

Key Words: nutrients, feeding systems, research

62 Challenges for feeding dairy cows in the next decade. M. Hutjens*, *University of Illinois*, *Urbana*.

A survey of extension educators, consultants, and veterinarians was conducted in spring of 2006 to evaluate feeding challenges in the next five to ten years. A total of 54 electronic responses was summarized from 27 veterinarians, 17 consultants, and 16 educators (several individuals indicated more than one occupation). Each individual listed up to five feeding challenges and selected one topic that was their most important focus area. Forage quality was listed as first choice by 16 individuals with nitrogen and phosphorous excretion as the second choice (10 votes). Other areas were ethanol and distillers grain opportunities, ration formulation, and fiber digestion. A total 270 individual topics were listed by 54 respondents and summarized in the following broad areas (value listed in parenthesis indicate number of votes).

Feed nutrient applications (68)
Forage considerations (48)
Feed bunk management (44)
Economics of feeding (38)
Health applications (28)
General areas of interest (21)

Additional survey information will be presented based on a Hoard's Dairyman article and groups using the survey instrument. A parallel survey conducted in 2001 will be compared to the 2006 survey. Applications for dairy managers, researchers, agri-business personnel, and teachers will be discussed.

Key Words: dairy, survey, challenges

63 Evaluation of carnitine for fatty liver prevention in dairy cows. D. B. Carlson* and J. K. Drackley, *University of Illinois*, *Urbana*.

Key metabolic and physiologic adaptations occur during the periparturient period of dairy cows in preparation for the metabolic demands of lactation. Suboptimal adaptation to lactation can result in excess liver triglyceride (TG) accumulation and a myriad of related metabolic disorders. Liver TG accumulation is influenced by the degree of adipose tissue lipolysis and the balance between hepatic fatty acid oxidation and TG export. Carnitine stimulates both hepatic fatty acid oxidation and gluconeogenesis in liver of nonruminants. We postulated that carnitine supplementation would stimulate hepatic oxidation of nonesterified fatty acids (NEFA), decrease liver TG accumulation, and enhance hepatic glucose output. To establish the effects of carnitine during negative energy balance, carnitine (20 g/d; 9-d duration) was infused into the abomasum of lactating cows fed for either ad libitum or restricted feed intake (50% restriction; 5-d duration). Carnitine infusion increased in vitro fatty acid oxidation by liver slices and prevented liver TG accumulation in feed-restricted cows. Abomasal carnitine infusion markedly increased carnitine concentrations in liver, muscle, milk, and plasma. Feed restriction increased carnitine concentrations in muscle and milk, but not liver, from cows infused with water. In periparturient dairy cows, carnitine was supplemented in the diet at 0, 6, 50, or 100 g/d from d -14 until d 21 relative to calving. All amounts of carnitine decreased liver TG accumulation, which resulted from enhanced hepatic fatty acid oxidation because carnitine did not affect serum NEFA concentration. Dietary carnitine increased in vitro conversion of alanine to glucose by liver slices as well as concentrations of liver glycogen and serum insulin. Dietary carnitine supplementation (50 and 100 g/d) markedly increased liver, muscle, milk, and plasma carnitine. Supplementation of 6 g/d increased milk carnitine and numerically increased carnitine in liver and muscle. By decreasing the incidence of fatty liver, peripartal carnitine supplementation might improve health and productivity of dairy cows.

Key Words: L-carnitine, dairy cow, liver

64 Utilization of amino acids for milk protein synthesis by lactating dairy cows fed distillers grains plus solubles (DDGS). D. H. Kleinschmit*[1] and D. J. Schingoethe[2], [1]*Agri-King, Inc.*, *Fulton, IL*, [2]*South Dakota State University*, *Brookings*.

The rapid growth of the ethanol industry in the Midwest has generated large quantities of DDGS that are available for dairy cattle. As a result, this coproduct is relatively inexpensive compared to other commonly used protein sources. However, manufacturing practices, particularly the drying process, vary among ethanol plants; therefore, the DDGS produced in one may differ considerably from that produced in another. Lysine is the first amino acid (AA) damaged during the drying process, which is a major concern in this coproduct because Lys is already the first-limiting AA in corn for milk protein synthesis. In a series of experiments, ruminal CP degradability and intestinal digestibility varied among sources of DDGS and Lys was the first-limiting AA in all sources, but no differences on lactation performance were observed among three of the DDGS sources when fed to dairy cattle. All three sources increased yields of milk, 4% fat-corrected milk, and energy-corrected milk and improved feed efficiency compared to soybean meal. Some field reports suggested milk fat depression when cows were fed DDGS, but our research and that of others showed no fat depression unless diets contained insufficient amounts of effective fiber. Feeding DDGS can decrease milk protein percentages, which, based on arterial Lys concentrations, was due to an AA deficiency. Past research indicated that DDGS may be complementary to alfalfa-based diets because alfalfa provides more Lys and RDP compared to that in corn silage. A final experiment evaluated diets containing increasing concentrations of alfalfa in place of corn silage when fed with DDGS at 15% of the diet. Milk yield, protein yield, and feed efficiency increased linearly with increasing alfalfa due to an increased uptake of essential AA, particularly Lys, by the mammary gland. Overall, good quality DDGS can be successfully used in dairy feeding programs as long as the diets are not limited in RDP or Lys and adequate effective fiber is provided.

Key Words: dried distillers grains plus solubles, amino acids, dairy cattle

65 Conducting on-farm research to generate good data. M. T. Socha*, D. J. Tomlinson, J. M. DeFrain, and T. L. Ward, *Zinpro Corporation*, *Eden Prairie, MN*.

Companies have interest in conducting research on commercial dairies. First, access to a large number of cows enables researchers to obtain sufficient replications to generate statistical power on parameters such as fertility and lameness while reducing the amount of time to obtain required cow numbers. Many universities are unable or unwilling to commit large numbers of cows to a single study. Secondly, researchers are able to examine response to products under commercial management, environmental and nutritional conditions. Tie stall/stanchion facilities used in some universities do not reflect housing conditions and social interactions encountered by cows on most commercial dairies. Finally, some dairy professionals desire data obtained on commercial dairies. Obtaining meaningful data from studies conducted on commercial dairies present a number of challenges including replication, obtaining equally matched treatment groups and having sufficient labor to insure study protocol is followed. A limited number of commercial dairies are capable of conducting adequately controlled studies. Commercial dairies that are good candidates for conducting research have the capability of assigning two or more groups of cows to each treatment or have computer feeders in pens to deliver treatments individually to cows, enabling cows from different treatments to be housed in the same pen. These dairies have a high level of management enabling them to carry out study protocol and devote either a full or part-time employee to the study to insure protocol is followed. These dairies are capable of collecting daily milk weights and are willing to collect milk samples, monthly if not biweekly. In the experience of the authors, equally matched groups of cows are best obtained when a large number of cows are randomly assigned to the study prior to calving. Due to research constraints and the requirement for extra labor, companies assessing efficacy of products on commercial dairies must provide financial support to commercial dairies conducting research, beyond providing product.

66 Statistical issues pertaining to on-farm and experiment station research. R. J. Tempelman*, *Michigan State University*, *East Lansing*.

Animal science research has been conducted under various environmental and management conditions, ranging from highly controlled agricultural experiment stations to somewhat more variable on-farm settings. There are statistical issues raised in evaluating both types of research, such as inference space, experimental protocol compliance, definition of experimental units, randomization, validation of results, treatment by environment interaction and the nature and extent of response and concomitant variables recorded. A discussion of these and other topics, including the utility of combining both types of research, will be addressed.

Key Words: on-farm, statistical inference, experimental units

67 Best management decisions about the use of co-products from production of ethanol, bio-diesel, or human foods for managers of beef or dairy farms in Indiana. T. Johnson*, M. Schutz, K. Ileleji, K. Foster, and B. Joren, *Purdue University*, *West Lafayette, IN*.

Co-products from the production of bio-fuels and human foods like corn sweeteners and starch, has led to a highly distributed delivery of wet co-product feeds in a 50 to 70 mile radius around the site of co-product production. Grain producers located near sites of production have the opportunity to engage in marketing and distribution and setting up bagging and storage of corn co-products and other by-product feeds. This business practice has been successfully instituted by several producers in different area of Indiana. The great influx of new ethanol distilleries and the establishment of at least one large soy oil bio-diesel plant in Claypool, IN present a unique opportunity for additional parties to provide trucking, storage and feeding consultation services. The storage of wet distillers' grains becomes necessary because of it's short shelf life. The addition of fibrous diluents is needed to allow storage in silo bags for longer term storage on small and medium sized beef and dairy operations. Balancing diets fed on a dry matter, effective fiber and available P and N basis, and adjusting the amounts of diluent feeds included with wet DGS is necessary to manage diet N to P ratio, mineral and total ash level and encourages use of the Beef NRC 2000, Dairy NRC 2001, CPM 3.0, and other software for diet formulation or calculation of whole farm nutrient flows.

Key Words: dairy cattle, co-products, distillers' grains

68 Effect of feeding a commercial colostrum substitute on risk for transmission of mycobacterium avium subsp. paratuberculosis in newborn calves— descriptive preliminary data. P. Pithua*, S. M. Godden, and S. J. Wells, *University of Minnesota*, *St. Paul*.

The objective of this study was to determine the effect of feeding fresh bovine colostrum versus a commercial colostrum substitute on risk of onset of subclinical Mycobacterium avium subsp. paratuberculosis (MAP) infection. Participation was solicited from 12 commercial dairy herds from which calves were enrolled into the study between July and September, 2003. Within 30 to 60 minutes prior to having an opportunity to suckle, calves were separated from their dams and systematically assigned to be fed either 4 liters of fresh bovine maternal colostrum or 2 liters of a commercial colostrum substitute (Secure®, American Protein Corporation. Ames, IA), mixed and fed as per the manufacturers instructions. Calves were assigned to one of two treatment groups based on the colostrum received. The treatment group comprised of calves that received commercial colostrum substitute and the control groups were those calves that received fresh maternal colostrum. A total of 433 calves were recruited to the study at time of enrollment of which 232 (54%) were fed maternal colostrum (control group) while 201 (46%) were fed colostrum substitute (treatment group). Of these initial total, 103 (23.8%) were lost to follow-up due to a variety of reasons ranging from routine culling to death. At approximately 24 months of age, 330 (76.2%) cows were tested using conventional culture method for the isolation of MAP and ELISA (IDEXX Laboratories, Inc. Westbrook, ME) for detection of serum antibodies for MAP. Three hundred and twenty-two (322) cows had results for both ELISA and culture tests while 8 cows had results for fecal culture only. All the latter samples tested negative. The distribution of serum ELISA and fecal culture test results by group are shown (Table 1).It is worth noting that no conclusions can be drawn from the data presented here until the study is completed.

Distribution of fecal culture and serum ELISA test results by group

	Serum ELISA		
Group	Positive(%)	Negative(%)	Total
Maternal colostrum	9 (5.3)	162 (94.7)	171
Colostrum substitute	5 (3.3)	146 (96.7)	151
Total	14 (4.4)	308 (95.6)	322
	Fecal culture		
Group	Positive(%)	Negative(%)	Total
Maternal colostrum	14 (8.2)	157 (91.8)	171
Colostrum substitute	8 (5.3)	143 (94.7)	151
Total	22 (6.8)	300 (93.2)	322

Key Words: mycobacterium avium subsp. paratuberculosis, commercial colostrum substitute, fresh maternal colostrum

69 Statistical analysis of the effect of bovine somatotropin on reproduction and calving ease in commercial Holstein herds. M. Geha*[1], J. F. Keown[1], and L. D. Van Vleck[1,2], [1]*University of Nebraska*, *Lincoln*, [2]*U.S. Meat Animal Research Center*, *Clay Center, NE*.

Records involving 134 Holstein herds, having both bovine somatotropin (BST) treated and non treated cows, totaling approximately 100,000 cows in their second, third and fourth lactations from 1994 to 2002, were used to analyze the effect of BST on reproduction and calving ease. Using SAS MIXED and GLIMMIX procedures, records of cows in the same lactation with herd by year, season and milking frequency as a random factor, were analyzed for number of days open (DO),

number of services (NS) and culling for reproductive problems (CRP). Similarly, records of cows, with herds by year treated as a random factor, were analyzed for calving ease (CE). The analyses showed that for all lactations, there was a significant treatment by year interaction ($P<.05$) for DO and NS, with noticeably greater estimates for the years 1994-1997 compared to later years, which could be interpreted as how long it took management practices to adapt to requirements of treated cows, rather than as a direct impact of the treatment itself. For all lactations, treated cows had more days open and more services per breeding cycle than non treated cows. Year by treatment interaction was significant for CRP for lactation 2 ($p<0.01$) with slightly higher probabilities of problems for BST treated cows, but with no significant differences for later lactations. This result can be interpreted as a negative response of younger cows to higher production stress on their reproductive performance as compared to older cows. Culling frequencies seemed to drop after 1997 which may also indicate management adjustment. For calving ease, there was no direct treatment effect, but rather the sex of the calf had the greatest impact with twin calves having most calving difficulty followed by bull and heifer calves. Because of lack of data, it was not possible to look at the effect of BST on the size of the calf born.

Key Words: bovine somatotropin, reproduction, calving ease

70 Comparison of reticular and rectal core-body temperatures in lactating dairy cows. J. M. Bewley*[1], M. W. Grott[1], D. C. Batson[2], and M. M. Schutz[1], [1]*Purdue University*, *West Lafayette, IN*, [2]*MaGiiX Inc.*, *Post Falls, ID*.

Automatic temperature recording may be used for dairy management and allow early detection of disease, estrus, heat stress, pregnancy, and the onset of calving. The MaGiiX™ Cattle Temperature Monitoring System (CTMS, MaGiiX Inc., Post Falls, ID) utilizes a passive bolus equipped with a temperature sensor, a panel reader placed at a parlor entrance or exit to query the bolus, and a software package to collect, analyze, and view data. The biologically inert bolus resides in the cow's reticulum and is queried each time the cow passes the reader (e.g. two or three times per day after milking). Reticular and rectal temperatures were recorded simultaneously in the exit lane from the milking parlor for eight milkings on four days (5/30/06, 5/31/06, 9/27/06, and 9/28/06) for all cows at the Purdue Dairy Research and Education Center. Reticular temperatures (CTMS) were obtained using the MaGiiX CTMS while rectal temperatures (GLA) were obtained manually with a GLA M750 thermometer. Data was cleaned by removing any observations where either CTMS or GLA differed by more than 3 standard deviations from the unedited means for the study period or where the time between recording of the two temperatures differed by more than 30 minutes. Unadjusted mean CTMS and GLA for the remaining 905 observations were 39.4°C (±0.4) and 38.9°C (±0.3), respectively. The CTMS and GLA were strongly and significantly correlated ($r=0.642$, $p<0.0001$). As dairy producers and veterinarians are accustomed to viewing rectal temperatures, equations to adjust reticular temperatures to a rectal-based scale may increase the utility of the MaGiiX CTMS. PROC GLM of SAS was utilized; and the following conversion equation was obtained: $GLA=415.95436-19.72644*CTMS+ 0.25776*CTMS^2$ ($R^2=0.44$). The effects of both the linear and quadratic coefficients were highly significant ($p<0.0001$).

Key Words: temperature monitoring, reticular temperature, biosensors

71 Animal identification on the farm: Past, present, and future. E. D. Reid*, *University of Illinois*, *Urbana*.

Producers have used identification (ID) of livestock for over 3,800 years as a method of assigning ownership. However, the methods used to identify animals have seen little change during the past four millennia. In contrast, the past two decades have brought about the widespread use of personal computers, animal databases, genetic tracking, and new ways to use ID to manage animals on the farm. Despite the trend for production units to increase in size to capture efficiencies of scale, the need to provide individual attention to animals remains the same. Individual animal ID allows for efficient movement of animals at each stage of production in and out of contemporary groups or facilities as needed. This also allows producers to tailor programs to ensure each animal receives optimal management, but that level of decision making involves tremendous labor input. New technologies, such as radio frequency identification (RFID), allow for greater efficiency of data collection and also a reduction in the error involved with data collection. Today, it is possible to segregate individual animals within a large group at a walk-through collection point without someone present. In addition, current data can be linked to past data and be used cow-side to provide decision support to manage those animals more efficiently in real time. The technology continues to evolve and allows for additional value beyond individual ID. For example, previous work has shown a negative correlation between rectal temperature and the temperature of implanted microchips during a fever response in steers as well as positive correlations between the two methods during periods of heat stress in cows. Less labor is used collecting temperature data with RFID and allows more time to be spent on animal care. Future opportunities may allow for the ability to monitor real-time hormone fluctuations as well as for foreign DNA (disease identification). As these technologies advance, producers will be able to identify issues and opportunities faster and become more efficient in the management of their animals.

Key Words: identification, RFID, biosensors

72 The fire within: Does inflammation contribute to periparturient metabolic dysfunction? N. A. Janovick-Guretzky* and J. K. Drackley, *University of Illinois*, *Urbana*.

Despite several decades of research focused on management of cows during the transition period, there is still no consensus on how to nutritionally manage these cows. Increasing energy intake prepartum has been recommended to combat drops in dry matter intake that occur before parturition. Recent research, however, suggests that controlling

energy intake before parturition results in a more favorable metabolic state postpartum. Over-consumption of energy prepartum is linked to greater risk for metabolic disease, even when cows are not over-conditioned during the dry period. But what is driving the problems observed with over-consumption of energy prepartum? In human and rodent research, overnutrition results in immunoactivation, triggering a catabolic state that ultimately interferes with insulin signaling. Adipose tissue contributes to circulating inflammatory cytokines such as TNF-α, IL-1, and IL-6, which are linked to insulin resistance. Over-consumption of energy prepartum might increase the release of cytokines from adipose tissue around parturition, creating an insulin resistance-like response and excessive lipolysis in adipose tissue. These conditions ultimately contribute to fatty infiltration of the liver, causing tissue damage and interfering with the liver′s ability to perform needed functions. We have conducted longitudinal studies of mRNA transcripts in liver from transition cows fed different amounts of energy prepartum. Our data have revealed evidence for an inflammatory-like response in the liver around parturition. It remains unclear if inflammation leads to fatty infiltration of liver and metabolic dysfunction, or if fatty liver results in inflammation which induces metabolic distress. Research is ongoing to sort out this puzzle and to discover the links among energy intake prepartum, liver health, and the role of adipose tissue in metabolic dysfunction.

Key Words: periparturient cow, energy intake, inflammation

73 Direct measure of the depression between *Ischial tuber* (hook) and *Coxae tuber* (pin), as an alternative to change in body condition score in assessing body tissue mobilization. M. J. Daehnert*, N. E. Lobos, R. R. Rastani, and M. A. Wattiaux, *University of Wisconsin*, *Madison*.

Our objective was to determine the feasibility of using the Ischium Ilium depression (IID) as an indicator of body tissue mobilization during the transition period. Ten primiparous and 11 multiparous Holstein cows were housed in tie-stall barn and fed the same pre- and post-calving diets. A measuring device was placed across the dorsal tips of the Ilium and Ischium. The distance and mid point between the bones was recorded. The vertical distance between the ruler and the surface of the skin was recorded at the midpoint and 10 cm on each side to capture the deepest depression. Measurements were performed on the right and left sides of the standing cow at -14, + 1, +21 d relative to calving. Body weight was recorded on the same day. In addition, body condition score (BCS, on a scale of 1 for emaciated to 5 for obese) was assessed weekly by two individuals. Statistical analysis was conducted using a mixed model with parity, time and interactions as fixed effects and cow within parity as the random effect. Spearman correlations were also determined. For multiparous cows, IID was greater than primiparous cows (5.45 and 4.37 cm, respectively; $P < 0.02$) and was 4.26, 4.84, and 5.64 cm at -14, +1, and +21 d respectively ($P < 0.001$). P value for interaction was 0.26. For multiparous cows, BCS was less than primiparous cows (3.0 and 3.2, respectively; $P < 0.10$) and was 3.3, 3.0, and 3.0 at -14, +1, and +21 d respectively ($P < 0.001$). P value for interaction was 0.52. The IID (n=63) was correlated with BCS (r= -0.44; $P < 0.001$), but not with BW (r= 0.11; P= 0.41). The difference in IID over time (from -14 to +21 d) was correlated with the difference in BCS over the same time period (r= -0.55; $P < 0.001$), but not with the difference in BW (r= -0.25; P= 0.27). The IID is less subjective than BCS. Validation of IID is required before using it as a tool to assess short term changes in body tissue reserves.

Key Words: body weight, body condition score, dairy cow

Graduate Student Competitive Research Papers, M.S. Oral Division

84 Conjugated linoleic acid (CLA) in milk increases in cows fed condensed corn distillers solubles and fish oil. M. Bharathan*, D.J. Schingoethe, A.R. Hippen, and K.F. Kalscheur, *South Dakota State University*, *Brookings,SD,USA*.

Twelve lactating Holstein cows were randomly assigned to one of four experimental diets in a replicated 4 × 4 Latin square design with 4-wk periods to ascertain the effect of feeding 0.5% fish oil (FO), 10% condensed corn distillers solubles (CDS) or both on milk production, milk composition including fatty acid profile of milk fat, feed intake, and feed efficiency. Diets contained either no FO or FO and either no CDS or CDS in a 2 × 2 factorial arrangement of treatments. Diets were fed as TMR for ad libitum consumption. The forage to concentrate ratio was 55:45 on DM basis for all diets. All diets were balanced for 17% CP. The ether extract concentrations for control, FO, CDS and FOCDS diets were 3.3, 3.8, 4.7, and 5.4%, respectively. Feeding FO and or CDS had no effect ($P > 0.05$) on dry matter intake (DMI), feed efficiency, body weight and body condition scores compared to diets without FO and CDS, respectively. Dietary factors had no effect on milk yield (32.6, 33.2, 35.0, and 32.3 kg/d), energy-corrected milk, protein yield and percentage, lactose yield, SCC and milk urea N. Feeding FO and CDS caused reductions ($P < 0.05$) in milk fat percentage (3.85, 3.39, 3.33, and 3.12%) and yield compared to diets without FO and CDS. Addition of FO to diets decreased ($P < 0.05$) 3.5% fat-corrected milk compared to diets without FO. No interactions were observed between FO and CDS. Inclusion of FO and CDS to diets increased ($P < 0.05$) proportions of vaccenic acid, trans-10 cis-12 CLA (0.07, 0.14, 0.13, and 0.16g /100g of fatty acids) and cis-9 trans-11 CLA (0.52, 0.90, 1.11, and 1.52g /100g of fatty acids) in milk fat compared to diets without FO and CDS. Increase in trans-10 cis-12 CLA was consistent with the observed milk fat depression for supplemental FO and CDS; however, addition of CDS to diets increased ($P < 0.05$) trans-10 C18:1 compared to diets without CDS. Feeding fish oil at 0.5% of diet DM with a C18:2n6 rich source such as CDS decreased milk fat percentages and increased the milk CLA content.

Key Words: fish oil, condensed corn distillers solubles, cows

Ruminant Nutrition

266 Feeding fats for regulation of milk fat and fatty acid profiles. A. R. Hippen*, K. F. Kalscheur, and D. J. Schingoethe, *South Dakota State University*, *Brookings*.

The impact of lipids in diets of dairy cows on milk fat has been recognized for some time. Feeding marine oils has been observed to decrease milk fat dramatically, but may also alter the fatty acid composition of milk fat. Likewise, dietary sources of vegetable oils, blends of animal and vegetable fats, grease, and tallow have been demonstrated to have similar effects, though to lesser degrees as saturation or hardness of the fat increases. With decreasing concentrations of fat in milk as unsaturation of dietary lipid increases, spreadability of butter from milk increases. The first effect, milk fat depression, has long been attributable to effects of polyunsaturated fats on ruminal organisms, fiber digestion, and fermentation profiles that were less amenable to milk fat synthesis. The second effect, lower melting point for butters, has been attributed to increased content of dietary unsaturated fatty acids and decreased content of fatty acids from mammary de novo synthesis as available substrate decreased. As researchers abilities to identify isomers of fatty acids along with methods to define processes of fatty acid synthesis have evolved, so has understanding of mechanisms of milk fat depression and alteration of milk fatty acids. These advances have included identification of isomers of 18 carbon fatty acids having trans and conjugate configurations that have profound effects on milk fat synthesis. These isomers are the result of a combination of ruminal biohydrogenation of dietary lipid and mammalian cellular processes. Manipulation of these processes is possible by feeding sources of lipids with varying content of precursor fatty acids, specifically linoleic and linolenic acids, allowing regulation of milk fat concentrations and milk fatty acid profiles. Fortunately for the dairy industry, some of the unique fatty acids that result from these alterations have positive impacts on human health. The dairy industry is entering an exciting age of designer dairy products with enhanced fatty acid profiles by manipulation of lipid nutrition of the dairy cow.

Key Words: lipid, diet, dairy cow

267 Modification of insulin resistance in dairy cattle by manipulation of plasma nonesterified fatty acids. J. A. Pires and R. R. Grummer*, *University of Wisconsin*, *Madison*.

Periparturient dairy cows may develop fatty liver during elevated plasma nonesterified fatty acids (NEFA). Elevated plasma NEFA is primarily due to increased adipose lipolysis and reflects changes in endocrine status of the cow. Insulin resistance (IR) at or immediately after parturition is well documented in nonruminant mammals and appears to occur in ruminants. The ability of insulin to inhibit hormone sensitive lipase and suppress NEFA release from adipose tissue is impaired in IR states. IR probably contributes to elevated plasma NEFA in periparturient dairy cows. Both short and long term elevation of plasma NEFA causes IR in nonruminants. If this occurs in ruminants, IR could lead to a vicious cycle where higher plasma NEFA would promote greater mobilization of body reserves, potentially leading to metabolic disorders such as fatty liver. To test this hypothesis, we used five nonlactating, nongestating Holstein cows in a crossover design. Treatments were iv infusion of saline or triglyceride (TG) emulsion derived from tallow. Infusion of TG emulsion induced IR. Because infusion of TG emulsion increased plasma NEFA and TG, NEFA couldn't specifically be implicated as the causative agent for IR. Next, we feed restricted cows to elevate plasma NEFA, and examined insulin responsiveness after postruminal infusion of saline or nicotinic acid (NA) to lower plasma NEFA. NA treatment reduced NEFA and increased insulin sensitivity, as measured by glucose tolerance test. NA is a possible feed additive to reduce plasma NEFA; however, it is degraded in the rumen and must be supplied postruminally. Additionally, after a pulse dose of NA to the abomasum, there was an initial decline followed by a dramatic increase in plasma NEFA (> 1000 uEq/L). Therefore, NA must be continuously supplied postruminally to achieve a sustained reduction in plasma NEFA. Using this approach, plasma NEFA of feed restricted cows were 553 and <100 uEq/L during an 8 h postruminal infusion of saline or NA (6 mg/kg/h). Reduction of plasma NEFA may decrease the likelihood of fatty liver directly by reducing hepatic uptake of NEFA and indirectly by modifying IR.

Key Words: insulin resistance, fatty acid, niacin

270 Fat from corn coproducts and dairy cow performance. M. Abdelqader*, *South Dakota State University*, *Brookings*.

Feeding fat to dairy cows is a common practice to increase the energy density of the ration. Vegetable oil, oilseeds, and soaps of long-chain fatty acids (FA) are common fat sources used in dairy cow diets. Feeding fat supplements often alter rumen fermentation that results in alteration of the ruminal biohydrogenation process. The extent to which fat supplements can alter the ruminal microbial ecosystem is highly dependent on the amount and form of fat being supplemented. Feeding fat supplements rich in linoleic and linolenic acids cause modifications in milk FA profile with increased concentrations of unsaturated FA and decreased concentrations of saturated FA. It is well documented that these changes in milk FA profile will increase the concentrations of health-beneficial FA such as conjugated linoleic acid (CLA) and vaccenic acid. Unfortunately, fat supplementation is frequently linked to a decrease in milk fat percentage. Milk fat depression has been highly correlated to an increase in the concentrations of trans-10 C18:1 FA and trans-10, cis-12 CLA. Several dietary factors can influence the response of milk fat to increasing concentrations of both trans-10 C18:1 FA as well as trans-10, cis12 CLA. Alternative fat sources are becoming available in the form of corn coproducts such as corn germ (CG), and dry and wet distillers grains (DGS). Corn coproducts are major sources of linoleic acid, which is a precursor of CLA and C18:1 isomers. Feeding DGS in properly formulated rations has shown no adverse effect on milk fat percentage or yield. Milk fat depression, however, was reported when DGS was fed in combination with low forage diets. Research data on CG is lacking and no data have been published evaluating the potential of CG as a fat source in dairy feeds. The potential of using CG as an alternative fat source and its effect on milk fat and milk FA is currently under investigation. Preliminary results demonstrated that CG could

be used as an alternative fat source in dairy diets, providing as much as 2.8% additional dietary fat without causing milk fat depression.

Key Words: DGS, corn germ, dairy cows

276 Effect of cane molasses on ruminal absorptive capacity of dairy cows during the periparturient period. W. F. Miller*, B. J. Johnson, E. C. Titgemeyer, J. F. Smith, J. E. Shirley, and T. G. Nagaraja, *Kansas Sate University*, *Manhattan*.

Six multiparous Holstein cows with rumen cannulas were used in a randomized complete block design to evaluate ruminal absorptive capacity in response to the addition of cane molasses to diets during a 60-d dry period. A control diet without molasses or a diet containing molasses was individually fed during the far-off period (d -60 to -30) and the close-up period (d -29 to 0 relative to projected calving date). During lactation all cows were individually fed a common lactation diet. Molasses was 3.3% of DM in the far-off molasses diet and 3.6% of DM in the close-up molasses diet. Rumen absorptive capacity was measured on d -60, -30, -3, 2, 16, 30, 44, 58, and 72 relative to calving by bolus dosing a 1-L solution containing 2 mol valerate and 4 g Co-EDTA adjusted to pH 6.0 with NaOH. Ruminal fluid was collected over an 8-h period to determine liquid passage rates and valerate disappearance. Valerate absorption was greater (P = 0.02) during the close-up than the far-off period but did not differ for cows fed control (31.2%/h) or molasses (32.8%/h) diets. During lactation, valerate absorption did not differ for cows previously fed control (35.3%/h) and molasses (43.2%/h) diets. Ruminal liquid volume, dilution rate, and outflow were similar between diets during the dry period. Total VFA concentration during the dry period did not differ between cows fed control and molasses nor did molar percentage of acetate, propionate, butyrate, or isovalerate. Total VFA concentration and molar percentage of propionate were greater whereas acetate molar percentage was less during the close-up period versus the far-off period. DMI was greater (P = 0.002) during the close-up period for cows fed molasses diets. DMI during lactation tended (P = 0.08) to be greater and milk production was greater (P = 0.02) for cows previously fed molasses diets. Inclusion of cane molasses in diets for non-lactating cows did not significantly improve ruminal absorptive capacity but had positive effects on DMI and milk production.

Key Words: rumen, valerate, absorption

294 Growth performance by fall-calving cows grazing stockpiled tall fescue pastures with different proportions stockpiled until late fall. J. D. Caldwell*[1], K. P. Coffey[1], W. K. Coblentz[2], R. K. Ogden[2], J. A. Jennings[1], T. F. Smith[1], D. S. Hubbell, III[1], and C. F. Rosenkrans, Jr.[1], [1]*University of Arkansas*, *Fayetteville*, [2]*USDA-ARS*, *Marshfield,WI.*

Tall fescue [*Lolium arundinaceum* (Schreb.) Darbysh.] is often stockpiled to reduce winter feed costs for cattle, but the optimal proportion of the total hectares to stockpile is not known. Over two consecutive years, a total of 158 Gelbvieh x Angus fall-calving cows (599 ± 6.0 kg initial BW, 6.5 ± 0.04 initial BCS) were stratified by weight and age and allocated randomly to one of eight 10-ha tall fescue pastures at a stocking rate of one cow/ha to determine the impact of stockpiling different proportions of total pasture area on cattle performance. All pastures were subdivided into six 1.6 ha paddocks. Treatments consisted of no area stockpiled (S0), or 33 (S33), or 50% of the total area stockpiled (S50). Cows assigned to S0 were rotated through all six paddocks using 5 to 6-d grazing intervals. Cows assigned to S33 and S50 were rotated through 33 or 50% of the paddocks until September 10 in both years, then were rotated through the remaining paddocks to allow the early-grazed paddocks to stockpile until mid-November. Stockpiled paddocks were strip-grazed at the start of the breeding season in mid-November of both years. Cow weights (P= 0.85) and BCS (P = 0.41) did not differ across treatments. Calf ADG tended to be greater (P = 0.08) during the breeding season and calf weights were greater (P = 0.04) at the end of the breeding season for S33 than S50. Total hay offered tended (P = 0.09) to be greater for S0 than S33 and S50. Available forage was lower (P =0.01) from S33 than S50 and forage CP tended (P = 0.09) to be higher for S0 compared with S33 and S50. In vitro dry matter disappearance and ergot alkaloids did not differ (P ≥ 0.60) among treatments. Therefore, 33 % of tall fescue pasture area can be stockpiled to help meet the nutritional needs of fall-calving cows and reduce supplementation costs through the winter.

Key Words: cows, fescue, stockpile

298 The effect of feeding milk replacer with psyllium or whole milk on calf growth and health. T. J. Earleywine*, T. E. Johnson, H. B. Perry, and B. L. Miller, *Land O'Lakes, Inc.*, *Webster City, IA*.

Calf milk replacer containing psyllium or whole cow′s milk was evaluated to determine the effect on performance and scour data when fed to Holstein bull calves. A total of 72 calves with an average initial weight of 44.8 kg were randomly assigned according to body weight and blood gamma globulin concentration to one of two treatments: 1) 22% CP / 20% fat all milk protein milk replacer providing 5 g of psyllium per feeding or 2) whole cow's milk. The solids content of the whole milk was determined weekly so that intake of milk replacer and whole milk was equalized. Calves were individually housed in crates and fed twice daily at 700 and 1615 hours through 28 days. Calf milk replacer or whole milk was fed averaging 401 g of solids per calf daily. Starter (18% CP texturized) was offered to all calves throughout this 42 day trial. Weight gain, daily scour scores (1-4 scale: 1=normal, 2=loose, 3=water separation, 4=3 with severe dehydration) and scour days were calculated weekly. Calves fed the milk replacer containing psyllium had improved starter intake and experienced a reduced incidence and severity of diarrhea.

Item	Trt 1	Trt 2	S.E.M.	P-Value
BW gain, kg	17.99	17.59	0.794	0.803
CMR/Milk Solids, DM, kg	11.22	11.17	0.024	0.339
Starter, DM, kg	26.92	20.42	1.186	0.0044
Total DM Intake, Kg	38.14	31.59	1.192	0.0043
Scour score	1.15	1.23	0.020	0.0405
Scour days	3.21	4.48	0.368	0.0841

Key Words: calf, milk replacer, psyllium

299 The effect of supplementing milk replacer with synthetic amino acids on calf performance and health. B. L. Miller*, T. E. Johnson, H. B. Perry, and T. J. Earleywine, *Land O'Lakes, Inc.*, *Webster City, IA*.

Calf milk replacer supplemented with lysine and methionine was evaluated to determine the effect on performance and scour data when fed to Holstein bull calves. A total of 45 calves with an average initial weight of 45.79 kg were randomly assigned according to body weight and blood gamma globulin concentration to one of three treatments: 1) 18% CP / 20% fat all milk protein milk replacer; 2) 18% CP / 20% fat all milk protein milk replacer supplemented with lysine and methionine equal to 20% CP; and 3) 20% CP / 20% fat all milk protein milk replacer. Calf milk replacer was fed averaging 780 g of powder per calf, daily. Milk replacers were medicated (280 mg neomycin / kg, 140 mg oxytetracycline / kg). Calves were individually housed in crates and fed twice daily at 700 and 1615 hours through this 28 day trial. No calf starter was offered to calves during this trial. Weight gain, feed efficiency, daily scour scores (1-4 scale: 1=normal, 2=loose, 3=water separation, 4=3 with severe dehydration) and scour days were calculated weekly and for the entire trial. Addition of supplemental amino acids to an 18% CP milk replacer did not improve performance or scour score of calves in this trial.

Item	Trt 1	Trt 2	Trt 3	S.E.
BW gain, kg	12.01[b]	10.87[b]	14.09[a]	0.53
CMR, DM, kg	21.41	20.72	20.85	0.34
Feed/gain	1.80[b]	2.01[b]	1.50[a]	0.09
Scour score	1.33	1.27	1.19	0.05
Scour days	6.50	5.20	4.08	1.00

[a,b] Means within a row differ (P<.05)

Key Words: calf, milk replacer, amino acids

300 *In situ* ruminal phosphorus availability from corn and soybean feedstuffs. K. MJOUN*, K.F. KALSCHEUR, D. J. SCHINGOETHE, and A.R. HIPPEN, *SDSU*, *Brookings, SD, USA*.

Byproducts of corn and soybeans have high phosphorus (P) content, but little is known about their P ruminal disappearance kinetics in lactating dairy cows including water soluble fraction (Ap), slowly available fraction (Bp), rate of phosphorus disappearance (Kd), and effective disappearance of phosphorus (EDp). *In situ* availability of P from corn and soybean feedstuffs was determined in two experiments. In experiment 1, three sources of dried distillers grains with soluble (DGS) and one wet DGS source were incubated for 3, 6, 12, 24, 36 h on replicate days in the rumen of two cannulated lactating dairy cows. Fraction Ap varied from 82.7 to 90.3% with the wet DGS being the least soluble. Wet DGS had a greater (P<0.05) Bp fraction (15.8%) compared to dried DGS (9.5%).Wet DGS had the lowest EDp (88.1%), whereas dried DGS ranged from 89.7 to 92.7%. In experiment two, three ruminally cannulated lactating dairy cows were used to estimate *in situ* P disappearance of nine feed ingredients that include three sources of dried DGS, corn, corn germ, solvent extracted soybean meal (44% CP; SBM), expeller soybean meal (SoyPlus®; SP), extruded soybeans (ES), and soyhulls (SH). Nylon bags were incubated in the rumen of each cow for 2, 6, 12, 18, 24, 36, and 48 h. Fraction Ap was greater (P<0.05) in dried DGS (82.1%) and lesser in corn germ (77%), whereas SH had the least Ap among the feedstuffs (45%). The remaining feedstuffs (SBM, SP, ES, and corn) were similar in Ap (64.2%). Fraction Bp was greater in SH (45.6%), lesser in DGS (13.5%), and intermediate (31.4%) in SBM, EB, SP, and corn. Effective disappearance of P in the rumen was greater for dried DGS (93.5%), whereas corn germ, ES, SBM, and SP followed with an EDp of 93.3, 88.0, 87.5, and 87.0%, respectively. Corn and SH were lower (P<0.05) than the other feedstuffs in EDp with 83.3 and 69.1%, respectively. Rate of phosphorus release (Kd) was similar for all feedstuffs (0.162/hr). Corn and soybean byproducts tested with the exception of SH have high ruminal P availability as measured with the nylon bag technique.

Key Words: phosphorus availability, *in situ*, feedstuffs

303 *In vitro* examination of rumen biohydrogenation (BH) of four dietary fats. M. Carriquiry*[1], W. J. Weber[1], L. H. Baumgard[2], and B. A. Crooker[1], [1]*University of Minnesota*, *St. Paul*, [2]*University of Arizona*, *Tucson*.

Rumen microbial BH of unsaturated fatty acids in dietary fats (Alifet High-Energy® (**AHE**), Alifet-Repro® (**AR**), Megalac® (**MG**), and Energy Booster® (**EB**)) that differ in fatty acid content, method of protection from rumen BH, or both factors was assessed. Fats (20 mg) were incubated at 37°C with strained rumen fluid diluted 5-fold with 16 mL of medium, 0.8 mL of reducing solution buffer and 200 mg of a purified, synthetic diet. Total contents were collected after 0, 6, 24, and 36 h and change in fatty acid content used to estimate rate of BH. For oleic acid, loss after 36 h (about 60%) and rate of BH (4.0 ± 1.3 vs. 6.1 ± 1.9 %/h) did not differ between EB and AHE. For MG, rate of BH was 4-times greater for linoleic than for oleic (4.0 ± 1.3 vs. 0.9 ± 0.2 %/h) acid. Only 20% of the oleic acid but 65% of the linoleic acid disappeared from MG after 36 h. In contrast, BH of oleic, linoleic and linolenic from AR were similar (2.6 ± 1.1, 2.5 ± 1.1, and 2.4 ± 0.9 %/h, respectively) and 95, 65, and 65% of these fatty acids remained after 36 h. Only AHE and AR contained *trans*-18:1 but total *trans*-18:1 increased with time of incubation for all dietary fats. *Trans*-10 and *trans*-11 were the predominant *trans*-isomers in AHE and AR incubations whereas *trans*-9 and *trans*-10 were the predominant isomers in EB and MG incubations. None of the fats contained conjugated linoleic acid (**CLA**) but CLA was in the inoculum. Although not affected by fat source, the amount of CLA decreased with incubation time. Only AR contained eicosapentaenoic (**EPA**, 20:5) and docosahexaenoic (**DHA**, 22:6) and loss of EPA and DHA was minimal (10 and 5%, respectively). The expected increase in BH of fatty acids with degree of saturation occurred with MG but neither degree of saturation nor chain length affected BH of fatty acids in AR. Results suggest that fatty acids in AR are protected from rumen metabolism and that AR can deliver significant amounts of EPA and DHA to the ruminant intestine.

Key Words: biohydrogenation, protected fats, *in vitro*

307 Evaluation of a diet containing mustard bran for lactating dairy cows. H. A. Maiga*[1], C. Dahlen[2], P. Nester[3], M. L. Bauer[3], and M. Badaruddin[4], [1]*University of Minnesota*, *Crookston*, [2]*Northwest Research and Outreach Center*, *Crookston, MN*, [3]*North Dakota State University*, *Fargo*, [4]*Minn-Dak Growers, Ltd.*, *Grand Forks, ND*.

Thirty four lactating Holstein cows (DIM ≥ 50 d) were used in a switch back design to determine the lactational and DMI responses to a diet containing 8% oriental mustard bran (MB) versus a control diet (CONT). A by-product of mustard seed milling industry, oriental mustard bran is a good source of crude protein (17.5%), crude fat (16.5%) and NDF (45-60%). Mustard bran replaced 26% of CP from soybean meal in the CONT diet. Treatment periods were 14 d with each period preceded by a baseline period of 14 days of which the last seven days were used as a covariate to adjust treatment means if P ≤ 0.15. DMI and daily milk yield data were collected during the entire baseline and treatment periods. Milk composition data were collected during the last five days of baseline and treatment periods. Milk organoleptic evaluation was conducted only during the last five days of the second period. Milk yields (43.0 and 44.7 ± 0.3 kg/d) were higher (P = 0.007) for cows fed the MB diet; however, the 3.5% FCM yields (42.8 and 43.5 ± 0.4 kg/d) were similar (P = 0.29) for cows fed CONT and MB diets, respectively. Percentages of milk fat, protein, lactose, SNF, and total solids were not affected (P ≥ 0.07) by treatment. Milk fat yields (1.49 and 1.48 ± 0.02 kg/d) were similar (P = 0.80). Milk protein yields (1.22 and 1.27 ± 0.01 kg/d), lactose yields (2.10 and 2.18 ± 0.02 kg/d), and SNF (3.33 and 3.45 ± 0.03 kg/d) were higher (P < 0.004) for cows fed the MB diet. Milk urea N (13.2 ± 0.2 mg/dL) and SCC (208 ± 63x10^3/mL) were not affected (P ≥ 0.13) by treatment. There were no differences (P ≥ 0.07) between the organoleptic qualities (odor and taste) of milk from cows fed either diet. DMI (24.0 and 24.1 ± 0.2 kg/d) were similar (P = 0.70). Adding mustard bran to lactating cow diets increased daily milk production, but did not affect DMI or adversely affect milk components or quality.

Key Words: mustard bran, DMI, lactating cows

308 Altering milk production and composition of early lactation dairy cows fed flax seed. P. L. Nester*, J. W. Schroeder, K. A. Vonnahme, M.L. Bauer, W. L. Keller, and D. E Schimek, *North Dakota State University*, *Fargo, North Dakota, USA*.

The objective of this study was to measure the effects of feeding ground flax seed on body weight (BW), body condition score (BCS), milk yield, and milk composition of early lactating dairy cows. Twenty-four multiparous Holstein cows (644.4 ± 21.9 kg BW and 7 ± 3 d in lactation) were assigned to one of three treatments in a randomized complete block design of 12 cows/block. Experimental diets containing whole sunflower seed (CON; 8.32% of diet DM), ground flax seed (FLX; 10.06% of diet DM), or linseed oil (LIN; 3.37% of diet DM) were fed from d 7 through d 105 in lactation. Diets were balanced to be similar in energy density (1.68 Mcal/kg of NE_L), crude protein (CP; 17.4%), and CP degradability by combining corn gluten meal, blood meal, feather meal, sunflower meal, and urea with ground corn and equal portions of vitamins, minerals, and monensin (13 mg/kg of DM). Experimental diets contained equal portions of alfalfa hay, alfalfa haylage, corn silage, and beet pulp. Cows were housed individually in tie-stalls and fed twice daily. BW, BCS, and milk samples were collected at d 7 and every 14 d of the experiment. Cows were milked and weights recorded twice daily. Initial BW and BW change were similar ($P \geq 0.12$) among treatments. Cows fed LIN had higher initial BCS ($P = 0.002$) and lost more body condition ($P = 0.02$). Milk yields were similar ($P = 0.23$) among treatments, but yield of 3.5% fat-corrected milk (FCM) and solids-corrected milk (SCM) were higher ($P \leq 0.03$) for cows fed FLX. Concentrations of milk fat ($P = 0.06$) and milk urea nitrogen ($P = 0.01$) were greater for cows from the FLX treatment. However, cows fed FLX or LIN had lower percentages of milk protein, lactose, and solids-not-fat ($P \leq 0.05$) when compared to CON. Diets for early lactating dairy cows supplemented with 10% ground flax seed increases milk fat concentration and yields of FCM and SCM when compared to diets supplemented with linseed oil or whole sunflower seed, although the mechanism is unclear.

Key Words: flax seed, linseed oil, sunflower seed

313 Production responses of dairy cows fed wet distillers grains during the transition period and early lactation. G. S. Mpapho*, A. R. Hippen, K. F. Kalscheur, and D. J. Schingoethe, *South Dakota State University*, *Brookings, SD, USA*.

Thirty-four multiparous Brown Swiss (n = 16) and Holstein (n = 18) cows were used in a randomized block design to determine the effects of feeding wet corn distillers grains (WDG) on transition cow performance. Cows were randomly assigned to one of two treatments and blocked by breed and expected calving date. Experimental diets contained 25% corn silage and 25% alfalfa hay (DM basis). The treatment group was fed WDG at 15% of diet DM. In the control diet (CON), WDG was replaced by corn grain, soybean meal, and extruded and expeller soybean meals. The energy density and crude protein were 1.44 and 1.58 Mcal NEl/kg and 14.5 and 17.2 % for pre- and postpartum diets, respectively, and were similar for CON and WDG. Prepartum diets were fed from -28 days in milk (DIM) until calving whereas postpartum diets were fed from calving to 70 DIM. Prepartum dry matter intake (DMI) tended to be greater for cows fed CON than WDG (14.2 and 12.2 kg; P = 0.10) whereas postpartum, DMI did not differ between treatments (22.5 and 23.2 kg; P = 0.46). Cows fed WDG had a shorter transition period than those fed the CON diet (22.2 vs 27.0 d). Milk production during the first 70 DIM for CON and WDG (41.6 and 40.1 kg/d; P = 0.41) and 4% fat-corrected milk (42.2 and 40.1 kg/d; P = 0.21) were not different. Concentration and yield of milk components were also not affected by diet, except for milk protein percentage which was decreased for CON diet (2.98 and 3.10 %; P = 0.03). Milk urea nitrogen did not differ between the two treatments but was greater for Brown Swiss than Holstein cows (13.6 and 11.8 mg/dL; P = 0.04). Body weight (BW) at the beginning of the transition period for CON and WDG was not significantly different; however, cows fed WDG lost less BW relative to those fed CON diet (52.6 vs 66.2 kg; P < 0.05) postpartum (0 to 21 DIM) and tended to increase BW (21 to 70 DIM) at a greater rate (39.3 vs 17.7 kg; P < 0.05). Feeding wet distillers grains throughout the transition period did not effect production but improved BW.

Key Words: transition cows, distillers grains, milk production