

and as undergraduate students embark on research, graduate students can be intermediates between large undergraduate classes and the professor. Graduates who are actively conducting research understand the plight of the over worked researcher/professor. Graduate students also display a strong commitment to assisting undergraduates in understanding course material. At the University of Alberta, student based learning where they cooperate to solve complex real world problems has replaced simple memorization. In order to facilitate this type of learning, graduate students and senior level undergraduates are utilized to assist junior students with solving inquiry type problems. Senior students have a broad range of experiences which allows for the integration of both scientific knowledge and life experiences to provide undergraduates with necessary insights to solve these complex issues. When undergraduates desire a greater proportion of an academics time tasks such as research and administrative responsibilities are sacrificed however, teaching assistants can field questions and answer concerns as they arise. Teaching assistants can address student concerns and make undergraduates cognizant of the many responsibilities of an academic; therefore graduate student's can bridge the gap between busy academics and concerned undergraduates. While assisting in the educational process graduate students have opportunities to teach, receive mentored training, and are eligible for graduate student teaching awards. Some of the negative consequences of a teaching appointment include increased work loads which may delay graduation or increase graduate student stress. A teaching appointment can provide necessary financial support during a graduate degree and, the sense of satisfaction from a positive teaching appointment may propel graduates to investigate careers in education.

Key Words: Graduate Teaching Assistant, Undergraduate Research, Teaching Experience

369 Researching teaching. C. K. Varnhagen*, *University of Alberta, Edmonton, Alberta, Canada.*

As animal scientists, we apply a range of methodologies to address research technique and solve applied problems. As teachers, however, we seldom even examine our teaching critically and objectively, much less scientifically. A key component of integrating teaching and research is researching teaching. Researching teaching involves applying the scientific method to understanding and improving teaching and learning. One viewpoint from which to consider research on teaching is as a pyramid of empirical evidence regarding teaching and learning. According to this conception, we can organize research on teaching according increasingly sophisticated scholarly and empirically based methods. At the base of the pyramid is scholarly reflection involving a critical examination of personal goals and objectives for teaching and learning and rational consideration of effectiveness of teaching methods. The next level in the pyramid of research on teaching is rational ideas and opinions. This involves reflecting on and applying the often empirically based ideas and opinions expressed by others. Moving up through the levels of the pyramid are increasingly controlled and generalizable methods for empirically investigating teaching and learning, from case studies to correlational and cohort analyses, to quasi-experimental designs to meta-analyses of a wide range of studies conducted at a wide range of institutions. Work at these levels of the pyramid o generates presentable and publishable results that stimulate scholarly discussion among researchers and educators and promote research-based teaching methods. Adopting a pyramid of evidence approach to research on teaching brings these often-disregarded endeavors into scholarly focus at the same time as documenting important improvements and innovations in teaching and learning.

Key Words: Research, Teaching, Evidence

ADSA-SAD Undergraduate Competition - Original Research

370 Probiotic ice cream manufactured with honey, a natural sweetener with several health benefits. A. Greenbaum*¹ and K. J. Aryana², ¹*Louisiana State University, Baton Rouge,* ²*Louisiana State University Agricultural Center, Baton Rouge.*

Lactobacillus acidophilus offers several health advantages. Honey is a sweetener which aids in the prevention of seasonal allergies, is effective in treatment of stomach ulcers. Honey is also a good source of antioxidants which play a big role in prevention of cancer and heart disease. Darker the honey more is the level of antioxidants. Moreover, honey increases counts of probiotics namely bifidobacteria and lactobacilli in the colon. Objective was to study the effect of light, amber colored and dark honey on the physico-chemical, microbiological and sensory characteristics of probiotic ice creams. Ice cream mixes were made using light, amber colored and dark honeys separately. Mixes were pasteurized, homogenized, cooled and aged overnight. Mixes were inoculated with *Lactobacillus acidophilus* in the amount of 0.7% w/v mix. Mixes were flavored with vanilla and frozen using a batch freezer. Product manufacture was replicated three times. The mean L^* (lightness) value of ice creams mixes with light and dark honeys were 55 and 25 respectively. The mixes with the darker honeys had a lower pH (6.5) compared to the lighter honeys (6.7). There were no differences in the viscosities of the mixes. Neither were there any differences in lactobacilli counts of the ice creams with the use of different colored honeys. Average meltdown volume

in 1 hour for the ice creams with darker honey was significantly more (76 mL) compared to the ice creams with light honeys (44 mL). As expected the lighter honey resulted in lighter colored ice creams and the dark honeys resulted in darker ice creams. Use of different colored honeys altered some characteristics of the probiotic ice creams.

Key Words: Honey, Sweetener, Ice Cream

371 Determining the efficacy of infra-red technology as part of a mastitis preventitive routine. D. M. Tearney*¹, T. R. Lane², D. R. Bray¹, and R. P. Natzke¹, ¹*University of Florida, Gainesville,* ²*Spirit Solutions, Dayton, OH.*

Mastitis is the major economic loss in the dairy industry today. To ameliorate this problem, a good routine of early mastitis detection and adjustment of management is needed. Infra-red technology is a promising tool for early mastitis detection. Hand-held infra-red cameras may become a convenient tool to measure the temperature of cows instantaneously. The ultimate goal of the project is to be able to integrate routine recording of cow temperatures as a tool to monitor udder health. Therefore, the primary objective of this preliminary study was to find an area on the body that would accurately reflect the rectal temperature. The rectal temperatures of 200 cows were compared to

the IR camera measurements of: flank, rear udder, side udder, eyes, and shoulder. Prior to data collection, the IR device was calibrated by using a can filled with hot water and comparing a mercury thermometer reading with the IR camera reading. Data was recorded and analyzed using Microsoft's Excel program. All body areas had relatively low correlations with rectal temperature. The rear udder provided the highest correlation with rectal temperature. The side udder was shown as a close second. While the correlation between rectal temperature and rear udder temperature was relatively low, it is quite possible that an udder infection remains localized and thus does not always result in an elevated rectal temperature. Further investigation is needed to correlate the rear and/or side udder temperature with the somatic cell count of the milk.

372 Genetic analysis of the relationship between ketosis and milk fat in Holsteins. E. E. Yeiser^{*1}, C. D. Dechow¹, J. Vallimont¹, C. G. Sattler², and J. S. Clay³, ¹The Pennsylvania State University, University Park, ²Select Sires, Inc., Plain City, OH, ³Dairy Records Management System, Raleigh, NC.

Excessive body fat mobilization during periods of early lactation negative energy balance is associated with metabolic disorders and high milk-fat percentages. The objectives of this study are to estimate genetic parameters for ketosis and to estimate the genetic relationship of ketosis with the following milk-fat percentage (MFP) traits: fat % on test-day 1 (F1), ratio of fat % on test day 1 to fat % on test day 3 (F1/F3), fat to protein ratio on test-day 1 (F1/P1), average fat to protein ratio across lactation (F/P), and fat % for the entire lactation (F). Test date, days in milk, fat %, protein % and disease records from progeny test herds that use PCDART to record health events were provided by Dairy Records Management System (Raleigh, NC). There were 19,201 ketosis observations for cows calving between 20 to 120 months of age in lactations 1 through 5. A total of 74,479 observations were available for F1 and F1/P1; 85,304 observations were available for F and F/P; and 57,995 observations were available for F1/F3. Two-trait animal models with ketosis and one MFP trait were analyzed using ASReml. The fixed effects were contemporary group and age within parity. Contemporary groups were herd-year-season of calving for ketosis, F, and F/P, and herd-test-date for F1, F1/F3, and F1/P1. The random effects were animal and error. The heritability estimate of ketosis was 0.04. Heritability estimates for MFP traits ranged from 0.04 for F1/F3 to 0.31 for F. Significant genetic correlation estimates were 0.32 for F1/F3 and F1/P1, and -0.30 for F. Genetic correlation estimates for F/P (-0.12) and F1 (0.15) were not significant. The genetic correlations indicated that higher average fat % over the lactation is associated with less ketosis. However, a high fat/protein ratio on test day 1 and a large decrease in fat % from test-day 1 to 3 were associated with more ketosis. Producers can continue to select for higher fat % across lactation without compromising metabolic health of lactating cows. Additionally, early lactation fat % may be useful as a genetic selection tool for resistance to ketosis.

Key Words: Ketosis, Milk Fat, Heritability

373 Short-interval unilateral frequent milking during early lactation of dairy cows results in acute and persistent increases in milk yield. A. C. Kissell*, E. H. Wall, and T. B. McFadden, *Lactation*

and Mammary Gland Biology Group, Department of Animal Science, University of Vermont, Burlington, VT.

A short-interval unilateral frequent milking model (UFM) involving twice daily milking (2X) of the left udder half and four-times daily milking (4X) of the right udder half with 1.0 ± .3 h between regular and extra milkings was imposed during early lactation to test the hypothesis that remilking after a short interval would stimulate both acute and long-term increases in milk yield from the 4X half of the udder. Eight multiparous Holstein cows were assigned to UFM for d 1 to 21 of lactation, and were milked 2X thereafter. At the first milking post-calving, cows were quartermilked to verify similar milk production between the right and left halves of the udder. In order to quantify the milk yield response to UFM, cows were quartermilked on d 3, then weekly through 5 wk and once at 8 wk of lactation. Milk samples were collected during quartermilking and fat percent, protein percent, and SCC were measured by Vermont DHIA. During UFM, the 4X udder halves produced 1.3 ± .6 kg/d more milk than the 2X halves ($P < 0.05$). The difference in milk yield during UFM reached a maximum on d 21 (2.0 ± .6 kg/d; $P < 0.001$). After cessation of UFM, milk production from the 4X halves decreased slightly, but remained 1.6 ± .3 kg/d greater than the 2X halves through 55 DIM ($P < 0.05$). Milk SCC, fat percent, and protein percent were not affected by UFM ($P > 0.20$). We conclude that, although the interval was only 1 h, UFM increased milk production of the frequently-milked udder halves through 8 wk of lactation. Our results indicate that short-interval frequent milking during early lactation could increase milk production efficiency on small dairy farms.

Key Words: Frequent Milking, Half-udder, Milking Interval

374 Planting date may affect yield and nutrient composition of whole-plant small-grain forages. L. W. Manson^{*1}, M. A. Bal¹, M. Oba¹, and V. S. Baron², ¹University of Alberta, Edmonton, AB, Canada, ²Agriculture and Agri-Food Canada, Lacombe, AB, Canada.

The objective of this study was to evaluate effect of planting date on nutrient composition of whole-plant small-grain forages harvested at the mid-dough stage. Two barley (AC Lacombe and Vivar), one oat (AC Murphy) and one triticale (Wapiti) varieties were planted at the Lacombe Research Station at 7 different dates, from May 12th to June 23rd 2005, and harvested at the same physiological stage of maturity (mid-dough stage). Dry matter (DM) yield and concentrations of crude protein (CP), neutral detergent fiber (NDF), in vitro fiber digestibility (IVFD), starch, and free glucose were determined. Earlier planting dates were associated with greater DM yield for barley, but not for triticale. The DM yield was positively related with the cumulative temperature ($r = 0.67$) and cumulative precipitation ($r = 0.44$) from heading to harvest. Concentrations of free glucose, CP and NDF at harvest were not affected by planting date for all varieties. However, CP concentration was related positively with the cumulative temperature from seeding to heading ($r = 0.33$) and negatively with that from heading to harvest ($r = -0.54$). Contrarily, free glucose concentration was associated negatively to cumulative temperature from planting to heading ($r = -0.43$), but positively from heading to harvest ($r = 0.54$). Planting date affected IVFD of oat ($P < 0.01$) and starch concentration of triticale ($P < 0.01$), but did not affect nutrient composition of barley varieties. In summary, planting date affected DM yield and nutrient composition of whole-plant small-grain forages. Altering planting date may allow for increased management options to optimize forage quality by changing growing environment characterized by cumulative

temperature and precipitation. Further studies are required to determine if planting date consistently affects forage quality and to evaluate its effects on productivity of ruminant animals.

Key Words: Planting Date, Forage Quality, Cereal Grain Forages

375 Using percent of mature body weight to manage dairy heifer growth. N. Keene* and D. Winston, *Virginia Polytechnic Institute and State University, Blacksburg.*

When raising dairy replacement heifers, producers face the challenge of determining whether differences in heifer growth are caused by genetics or management. Heifer growth is generally measured using body weights at breeding and calving and growth rates are then compared with breed standards. One problem with this approach is the large genetic variance for size that may be found within a breed. To address this issue, Van Amburgh and Meyer, 2005, proposed a system to express heifer growth as a function of mature body weight. Hoffman, 2006, applied this system, which reduces the growth variance attributed to genetics, and developed a universal heifer growth chart to use as a reference for all breeds. To practically apply this system, heifer weights were collected monthly at the Virginia Polytechnic Institute and State University Dairy Center. For the first 21 days post-calving, dam's body weights were electronically measured twice daily using scales in the parlor exit lanes. Mature body weight for each dam was estimated using Hoffman's equations, which convert the average weight to a 4th lactation equivalent. Data was then compared to breed standards to analyze strengths and areas of improvement in the heifer raising program overall and to identify outlier animals. This system could be utilized by any producer with the resources to regularly weigh heifers and lactating cows and record the data. A spreadsheet to aid dairy producers with calculating and graphing growth rates by the percent of mature body weight is being developed through this research.

Key Words: Mature Bodyweight, Growth

376 Effects of Black Seed Oil (Niagra Sativa) on the life cycle and reproductive behavior of C. elegans. C. G. Gerald*, M. W. Worku, P. M. Matterson, and Z. L. Liu, *North Carolina A&T State University, Greensboro.*

Nematode drug resistance is impacting the health of grazing livestock globally. Natural alternatives that may affect the parasite life cycle, impact pathogenesis or boost the host's immune response are being sought. Niagra Sativa L (Black seed) has been reported to have antihelminthic properties and is considered an immunomodulator. The free-living nematode *Caenorhabditis elegans* (*C. elegans*) is a well established biological model. This model can be used to evaluate immunomodulation and therapeutic drug action. Chemotaxis is an important behavior in enabling it to locate food sources such as *E.coli*. This study evaluates the effects of Black Seed Oil exposure on the life cycle and chemotactic behavior of *C. elegans*. A ring of bacteria (food) on NGM agar medium served as attractive signals to encourage *C.elegans* to move. Ten nematodes were placed in the center of the agar plate in 0, 0.25, 0.50 and 0.75 microliters of black seed oil. Over the three day life cycle the reproduction (number of worms), and chemotaxis (Number migrating to the ring of bacteria through the black seed oil) was recorded. Nematodes that had reached the food were picked individually to new seeded plates and allowed to recover and reproduce. As the concentration of Black seed oil increased the number of worms on a plate increased. Following the three day life cycle the total numbers of nematodes were higher following exposure to Black seed oil. A dose dependent effect of Niagra Sativa extract was observed on the numbers of nematodes migrating to *E.coli*. The chemotactic behavior was inhibited at 0.25ul of Black seed oil. Maximum numbers of worms migrating were observed at 0.75 ul. The molecular basis for these effects and the biochemical pathways involved will be evaluated.

Key Words: Black Seed Oil, *C. Elegans*