Extension Education

T75   Water use efficiency on small-scale irrigated dairy farms in the Mexicali Valley, México. L. Avendaño-Reyes*[1], F. D. Alavarez-Valenzuela[1], U. Macías-Cruz[1], A. López-López[1], P. H. Robinson[2], and A. Correa[1], *[1]Universidad Autónoma de Baja California, Valle de Mexicali, Baja California, México, [2]University of California, Davis.*

The Mexicali Valley is contiguous to the Imperial Valley in the US state of California and has over 200,000 ha of irrigated land. Under a 1944 water treaty with the United States, Mexicali is guaranteed an annual quantity of 1,850,234,000 m^3 of water to be deliver from the Colorado River. Agriculture depends primarily on this annual quota of irrigation water. The dairy sector is predominantly small-scale and generates income to sustain most agricultural households. However, a proposed concrete lining in the United States on the All-American Channel would cut off billions of leaked gallons of water, which is used to irrigate several crops and livestock use in Mexicali Valley. The aim of this study was to use a survey method to investigate key factors that influence water use efficiency (WUE) in small-holders of the Mexicali Valley, Baja California, México. Descriptive statistics and regression analysis were performed. In the last 5 years there has a been a reduction in the number of dairy small holders because due to economic issues in the Mexicali Valley. Most of the small holder dairy producers are mature to old males (~55 years old), with a low level of education and with about 25 years dairying experience. The general management of the cows is supervised by professionals in less than 50% of the small dairy producers, but almost all participate in the government Brucella surveys. However, largely due to lack of milk management equipment, hygiene of milk is poor and this may lead to disease in the rural population that consumes their milk. Irrigation systems for grazing lands are deficient and a large amount of irrigation water is wasted or poorly managed. Water use efficiency is not associated with milk production or herd size, but it increased with an increase in total irrigated land area. Small dairy producers in the Mexicali Valley require more external support if they are to survive in the current and likely future economic climate, and to avoid other social problems such as migration to the USA to seek out ways to improve their families lifestyle.

Key Words: milk production, irrigation water, grazing dairy cattle

T76   Complexity graphics for complex issues in animal science. M. Boggess,* *USDA-ARS, Beltsville, MD.*

Modern scientific challenges to food animal production are increasingly complex making them difficult to visualize for academics as well as industry stakeholders. Scientists are evolving research models to tackle these complex challenges through larger comprehensive collaborations that feature interdisciplinary approaches to project management and scientific experimentation. Public funding agencies are following suit, requiring larger collaborative programs that feature funding line items for research, education and extension. Administering these programs requires superior leadership, communication and project management. Better tools are also needed to accomplish these goals. "Complexity graphics" are proposed as an innovative tool to visually convey the primary and secondary factors affecting a particular trait, concept or production challenge. Examples include animal production sustainability; sow lifetime productivity; maternal reproduction, bovine viral diarrhea and pork quality, although virtually any complex trait or concept could be illustrated. Sophistication ranges from s simple graphic to serial animation with multiple points of emphasis. These tools have proven to be beneficial with varied animal science and industry audiences to convey and illustrate the factors and relationships influencing complex traits. These tools have also proven beneficial to scientific teams attempting to visualize an interdisciplinary approach to a specific research project in the animal sciences.

Key Words: education, extension, collaboration

T77   Factors limiting productive efficiency in small dairies of central Mexico (Aguascalientes State). R. R. Lozano-Dominguez,* C. F. Arechiga, R. M. Rincon, and L. M. Escareno-Sanchez, *Universidad Autonoma de Zacatecas, Zacatecas, Mexico.*

Objective of present study was to identify the main factors compromising productive efficiency in small and familiar dairy productive systems typical of central Mexico at Aguascalientes state. Data from small dairies (n = 183) was collected including social, agricultural and animal productivity aspects. Such information was analyzed by ANOVA in which main independent variables were location and land property type. Thus, 64% of small familiar dairies are considered as "ejido" properties (communal-type property; $P < 0.01$). Labor is mainly a family responsibility (89.1%). Ejidal-type properties has a reduced number of hectares) compared with private properties (8.1 ± 1.9 vs. 15.9 ± 2.6 ha; $P < 0.01$). Forage corn is the main crop either at irrigated soils (4.0 ± 1.0 ha) as well as a seasonal crop during the rainy season at non-irrigated soils (6.3 ± 1.1 ha) in both property types (i.e., communal or ejido type vs. private property type; $P > 0.05$). Alfalfa is the second most important crop (2.4 ha); However, 79.2% of small-familiar dairies did not produced their own forage crops. Average number of dairy cows on milking line was 15.8 ± 1.4 with an average daily milk yield of 16.2 ± 1.04 kg. Showing differences within location and type of land property ($P < 0.05$). Culling (12.3%) and abortions (8.8%) rates were similar within locations ($P > 0.05$). Milk selling price was of 3.9 ± 0.46 Mexican pesos (MP); generating a daily income for milk sales of $951.50 MP per production unit (around US$75). Therefore, a negative profitability was obtained (-$0.28 cents) per liter of milk sold. Despite the fact, of being small dairy production units with reduced milk yields, when we consider a weekly labor payment for the dairy producer, profitability incomes become negatives. Nevertheless, in most cases such income represents the main and single income for the small and familiar-type diaries of central Mexico.

Key Words: small dairies, milk yield, Mexico

T78   Evaluation of on-farm forage dry matter determined by near infrared spectroscopy. M. S. Akins*[1], M. Dobberstein[2], and R. D. Shaver[1], *[1]Department of Dairy Science, University of Wisconsin-Madison, [2]Dinamica Generale US, DeKalb, IL.*

The objective of this study was to evaluate the use of near infrared spectroscopy (NIRS; Dinamica Generale, Mantova, Italy) for on-farm measurement of forage dry matter (DM) content. The NIRS also measured protein, NDF, ADF, starch, ash and fat, but only DM content was evaluated. To calibrate the NIRS to forages at the University of Wisconsin-Madison Emmons Blaine Dairy Center (Arlington, WI), 10 samples of corn silage (CS) and alfalfa silage (AS) were analyzed using the NIRS to obtain a spectral analysis, then sent to a commercial laboratory (Dairyland Laboratories, Inc., Arcadia, WI) for DM analysis using a 2 step method (microwave drying to 90–95% DM, then use

NIRS to measure total DM content). Spectral and DM analysis data were used to update calibration equations for each forage. Samples of CS and AS were obtained twice weekly on Monday and Thursday for 11 wk. A total of 94 CS samples from 6 silo bags and 2 bunker silos, and 20 AS samples from one bunker silo were analyzed for DM content on-farm using the NIRS. Samples (60–100 g) were put in the scanning tray, compressed, and scanned by moving the tray in the scanning chamber for 10 s. The sample was removed from the tray and the entire sample was dried in an oven at 60°C for 48 h to measure DM content. Bias was calculated for each sample as the difference between oven and NIRS DM. The DM contents using the oven and NIRS were 38.1 ± 4.2% and 37.2 ± 3.9% for CS, and 43.4 ± 3.8% and 41.8 ± 4.4% for AS, respectively. The minimum and maximum DM contents of CS were 27.3% and 47.1% DM using the oven, and 26.5% and 46.7% using the NIRS, respectively. The minimum and maximum DM contents of AS were 31.6% and 47.7% using the oven, and 27.7% and 45.8% using the NIRS, respectively. For CS, the regression equation developed was NIRS DM% = (0.867 × Oven DM%) + 4.23; R^2 = 0.85, and the AS regression equation was NIRS DM% = (1.1395 × Oven DM%) − 7.7; R^2 = 0.95. The NIRS accurately (bias = 0.8% units) but less precisely (standard deviation of bias = 1.6% units) measured DM content of CS, and consistently measured lower DM content of AS (bias = 1.6 ± 1.1% units). Overall, the on-farm NIRS measured DM content comparable to the oven method.

Key Words: forage dry matter, NIRS

T79 Compliance of small and medium-sized farms in adopting recommendations for improved farm productivity and nutrient utilization. L. D. Baker,* R. J. Munson, Z. Dou, D. T. Galligan, J. D. Ferguson, C. F. Ramberg, D. W. Remsburg, and Z. Wu, *University of Pennsylvania, Kennett Square.*

Ten dairy farms with less than 200 cows were identified from the Chesapeake Bay watershed in Pennsylvania to participate in an integrated nutrient management program in collaboration with herd veterinarians, nutritionists, agronomists and farm economists to improve farm profitability and to reduce nutrient and phosphorus excretion. Farms were visited quarterly for 2 years by project members to evaluate nutrition and management practices. DHIA records were analyzed monthly to monitor milk production and components, milk urea nitrogen, reproductive performance, and culling practices. Four farms substantially improved their financial situation during the study by making changes in their feeding program when they changed nutritionists, some of them longstanding relationships. Nutrient efficiency was improved on these farms as well. Recommendations by project leaders and collaborators for improvement of feeding and farm management practices were not adopted by all farms. On several farms (6 of 10) small amounts of forages with varying quality were produced and frequent forage changes prevented farms from having a balanced ration for extended periods of time. Conflicts in recommendations between project members and field nutritionists confused producers and resulted in less compliance toward project goals. For example, high quality forage was fed on one farm, but the nutritionist was reluctant to reduce the amount of supplemental grains, therefore increasing feed expense and nutrient excretion for this farm. On another farm the nutritionist was resistant to removing phosphorus from the top dress, resulting in high fecal phosphorus. Agronomists had positive effect on most of the farms, instituting cover crops and manure and soil testing for appropriate application rates and fertilization. There were 2 farms that did not comply with agronomic or project member recommendations, basing their actions on emotions rather than on sound decision making to improve profits. In general veterinarians supported systematic breeding programs recommended by project members with many farms having a positive improvement in pregnancy rate. Partially supported by National Fish and Wildlife Foundation.

Key Words: small farms, dairy farm management, nutrient management

T80 A collaborative bovine artificial insemination course for students attending a Caribbean veterinary school. J. C. Dalton*[1], J. Q. Robinson[2], and J. M. DeJarnette[3], *[1]University of Idaho, Caldwell, [2]Ross University School of Veterinary Medicine, Basseterre, St. Kitts, [3]Select Sires Inc., Plain City, OH.*

Artificial insemination (AI) is a critical career skill for food animal veterinarians. Consequently, Ross University School of Veterinary Medicine Student Chapter of the American Association of Bovine Practitioners (SCAABP), Select Sires, and University of Idaho Extension have partnered to offer an intensive 2-d course to provide AI training to students attending the Caribbean veterinary school. The program consisted of 7 h of classroom teaching followed by 10 h of live animal experience. Topics included reproductive anatomy and physiology, semen handling, estrous detection, AI technique, estrous and ovulation synchronization protocols, sexed semen, and a virtual AI stud tour. A registration fee of $EC350.00 ($US130.00) included the cost of handouts, and breakfast and lunch on each day. The AI course was held twice in 2010 and 3 times in 2011. A 25-question test was given to participants (n = 83) at the beginning and conclusion of each AI course. The overall mean test score for the pre-test was 77.7%, while the mean for the post-test was 96.2%. The mean difference was 18.5%. Eighty-one students (81/83; 98%) received a certificate of completion by demonstrating sufficient skill at semen handling and AI technique. The course has developed into a high-demand educational program in which priority is given to SCAABP members based on 1) points earned through participation in other chapter events, 2) semester of enrollment at Ross University, and 3) participation in at least 1 chapter-sponsored bovine palpation trip to a local ranch. This collaborative effort ensures students attending the geographically remote veterinary school receive the educational opportunity to increase their knowledge and develop the skill of performing AI in cattle.

Key Words: artificial insemination, cattle, veterinary school

T81 Repro money: A farmer-directed team-based extension program to improve reproductive performance in Wisconsin dairy herds. M. C. Cordoba,* P. M. Fricke, P. L. Ruegg, R. D. Shaver, K. A. Weigel, and V. E. Cabrera, *University of Wisconsin-Madison.*

Poor reproduction in dairy cattle is a multifactorial problem that includes aspects of physiology, genetics, management, health, and nutrition. Thus, improving reproductive performance requires an integrated approach among farm personnel and consultants that deal with reproduction. Our objective is to improve the reproductive efficiency and profitability of the dairy enterprise through implementation of farmer-directed team-based program called Repro Money. Each farm that enrolls in the Repro Money program agrees to conduct 4 meetings during a 6 to 8 mo period. Before the first meeting, the farm owner selects team members (e.g., veterinarian, nutritionist, AI technician, county extension agent, herd manager) and designates a team leader. At the first meeting, the team leader uses a data gathering and survey tool to analyze and identify farm-specific critical control points for successful reproductive management including: pregnancy rate, insemination risk, conception risk, detection of estrus, male and female fertility, transition cow management, synchronization protocols, and nutrition and heifer management. Based on results from

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this tool, the team sets goals, develops an action plan, assigns responsibilities, and determines appropriate evaluation strategies for individual team members. Meetings 2 and 3 are structured to ensure that team goals identified at the first meeting are on track. During the fourth and final meeting, the team reassesses the reproductive performance of the dairy using the same tool as the first meeting thereby documenting change. We are now in the process of enrolling farms into the Repro Money program. One of the early adopters of Repro Money increased their 21-d pregnancy rate from 18 to 24% resulting in an estimated $39,000 per year profit increase after implementing management changes identified during the program. With this farmer-directed team-based approach, dairy farmers can best utilize their personnel and advisers in a coordinated way to improve reproductive performance. Supported by AFRI Competitive Grant no. 2010–85122–20612

Key Words: reproduction, dairy cattle, team-based

T82   Calf-ETERIA: Using calf health and productivity as a template for extension and translation of research information for agriculture. V. Bielmann*[1], K. Leslie[1], T. Wright[2], and T. DeVries[1], [1]University of Guelph, Guelph, Ontario, Canada, [2]Ontario Ministry of Agriculture, Food and Rural Affairs, Guelph, Ontario, Canada.

There is increasing evidence from research that calf and heifer management is extremely important for long-term health, production and survival of dairy cattle. In addition, several key risk factors affecting these effects, and management programs for improvement of the situation, have been identified and refined. General adoption of these programs could be improved, and if so, would yield significant financial savings for the dairy industry. Nevertheless, leading producers, extension educators, dairy researchers and veterinarians have been largely unsuccessful in making noteworthy improvements on an industry-wide basis. The Calf-ETERIA Knowledge Translation and Transfer (KTT) project is an extension effort aimed at addressing this dilemma. A key objective of this project was to survey Ontario dairy producers on their calf and heifer management practices. The benefits of benchmarking these practices include using these levels to assess progress over the duration of the project in terms of animal well-being and financial benefit. In total, 3,145 surveys were mailed to Ontario dairy producers who were clients of the CanWest Dairy Herd Improvement program. Once the completed surveys were returned, data was entered into an Access database. The response rate for the survey was 30% (963/3,145). Survey results indicate that navel dipping is no longer routine practice on dairy farms, with only 38% of respondents implementing this practice. Thirty percent of producers indicated that colostrum quality is assessed on farm. However, of this 30%, 91% said the method of assessing quality was by visual inspection (color, consistency or volume), not by using a tool such as a colostrometer. The time of weaning on Ontario dairy farms is primarily decided by the age of the calf, with the majority of calves being weaned at 8 or 11 weeks of age (36% and 31%, respectively). The age at which fresh water is first offered to calves varied with 23% of producers offering water within 5 d of birth, 29% offering water 5–10 d after birth, 30% waited until the calves were older than 10 d of age, and the remaining 17% of producers do not offer water until after weaning. When asked what the cost of raising a heifer was, 58% of producers answered $1500-$2000, while 32% answered $1000-$1500. The remaining 10% answered $1000 (5%), $2500-$3000 (4%) and greater than $3000 (1%). This survey is the most comprehensive data set for calf and heifer management in Ontario since the 1980s and will be the first to evaluate the effect of different KTT approaches intended to positively affect change on dairy farms in Ontario. It is clear from the survey results that there are some areas of calf raising in which management practices vary widely across farms and can be improved upon.

Key Words: calf, heifer, management practices

T83   Comparison of out-of-season estrus synchronization protocols in meat goats. N. C. Whitley[1], K. Moulton*[1], R. A. Franco[1], A. E. Cooper[1], and T. J. Conrad-Acuna[2], [1]Cooperative Extension Program, North Carolina A&T State University, Greensboro, [2]North Carolina State University Cooperative Extension, Richmond County, Rockingham.

The objective was to demonstrate different methods for estrus synchronization for out of season breeding in meat goats on a producer-owned farm. The farm owner noted repeated failure of previous spring breeding attempts without hormone use. For this study, 33 mature Boer does were used in April 2011, with 10 receiving CIDR vaginal inserts (CIDR), 10 receiving CIDR inserts along with 400 IU PMSG and 200 IU hCG (5 mL PG600 sc; CP treatment group) and 13 receiving no treatment (CON; buck effect only). Does averaged 3.2 ± 0.2 years of age and were assigned to treatments such that 3 to 5 does from each treatment were represented in each of 3 single-sire mating groups. All males were kept away from sight and smell of the females for at least 3 weeks before the study. The CIDRs were inserted on d 0 and removed on d 13 for 20 does with 10 does receiving PG600 at CIDR removal. Mature Boer bucks were placed with does on d 13 and removed on d 27. On d 66, blood samples were collected via jugular vein puncture to determine pregnancy status (bioPRYN; BioTracking, LLC). Pregnancy and kidding rates were not influenced by treatment or mating group based on Fisher Exact Test analysis. Number of kids born was analyzed using Proc GLM of SAS. Pregnancy rates for CON, CIDR, and CP respectively were 69%, 90%, and 50% and kidding rates for CON, CIDR, and CP were 67, 89, and 40%, respectively. Kidding rates were 60% for 2 mating groups and 73% for the other. Number of kids born per doe kidding was not influenced by treatment, averaging 1.9 ± 0.3, 2.1 ± 0.3 and 2.5 ± 0.4 for CON, CIDR and CP, respectively. Number of kids born per doe exposed tended ($P < 0.10$) to be influenced by treatment, averaging 1.3 ± 0.3, 1.9 ± 0.4 and 1.0 ± 0.4 for CON, CIDR and CP, respectively. For this farm with small sample sizes, the use of the buck effect alone was just as effective as hormonal treatments for inducing out-of-season breeding in meat goat does, though CIDR alone tended to result in more kids born per doe exposed. More research is needed; however, based on these results, the farm owner intends to use CIDRs for out of season breeding this spring.

Key Words: CIDR, estrus synchronization, goat

T84   Using soil moisture monitoring to improve irrigation in dairy pastures. T. W. Downing,* Oregon State University, Corvallis.

Irrigating pastures on the Oregon coast has not been emphasized in the past because of the high seasonal rainfall and low return for the investment. As feed costs have risen, more emphasis has been placed on increasing the productivity of coastal pastures and this has stimulated a new interest in improving irrigation. Monitoring soil moisture tension or soil moisture content can help identify problems in irrigation water management that affect pasture yield or water use. Problems include excessive intervals between irrigations, inadequate wetting, too-frequent irrigations and differences in soil moisture type extraction patterns. This project was designed to monitor irrigation effectiveness of 2 types of irrigation systems on 4 dairies over 2 growing seasons. Watermark soil moisture probes were installed in 2 pastures on each dairy and soil

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moisture tension was recorded every 2 h at 15, 30, 45 and 60 cm deep for 2 years. Irrigation was done with either a traveling big gun irrigator or pod irrigation system. Year 1 dairy operators were asked to irrigate as they normally would and performance was recorded. In year 2 we demonstrated how to use the soil moisture monitoring system for management and reviewed the first years performance. Irrigation dates and volumes were also recorded in year 2. Irrigations done with big gun irrigators applied 4 irrigations averaging 66.25 ± 13.25mm and irrigations made with pod irrigation systems averaged 6 irrigations averaging 40.75 ± 14.87mm. Soil moisture tension measured in ranged from 0 to 97 centibars for the big gun irrigators and soil moisture from pod irrigators ranged from 10 to 62 centibars throughout the second year. Soil moisture monitoring has shown it was extremely beneficial in making decisions in dairy pastures and irrigating effectively was challenging for big gun equipment. Dairies irrigating with pods were over irrigating initially and reduced irrigations by 15% when they used soil moisture data.

Key Words: soil moisture monitoring, irrigating pastures

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