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805 Bilingual audiovisual technology improves dairy animal care and quality assurance. B. Butler*, S. Torres, J. Valles, C. D. Reinhardt, and D. U. Thomson, *Kansas State University, Manhattan.*

The Beef Cattle Institute at Kansas State University (BCI) has developed bilingual educational tools based on audiovisual technology to improve technical knowledge within livestock operations. The Dairy Animal Care and Quality Assurance (DACQA) program is available in a package of 36 multimedia modules with a total length of 2hrs and 42 min of training material to train animal care givers in areas of animal health, productivity and well-being. This quality assurance program promotes the best management practices for dairy animal care and husbandry through each area of the milk production operation, including proper management of feedstuffs and nutrition; pharmaceutical usage and administration; cattle handling guidelines; identification; record keeping and animal marketing decisions. The information in the modules is presented in a simple and colloquial communication to assure effective transmission of information. Two of the DACQA modules (one module addressing animal health practices and one module addressing animal handling) were presented to 10 professional dairy care workers who had a preference for learning in either English (n = 7) or Spanish (n = 3); a 10-question examination with questions relating to each specific module was given before and after viewing each of the modules. Test scores improved by 28% from pre-viewing to post-viewing ($P < 0.01$; pre-viewing score = 7/10; post-viewing score = 9/10); there was no effect of module or language preference or their interaction ($P > 0.37$). These results concur with previous data we have generated which demonstrated a 25% increase in knowledge of beef quality assurance best management practices following viewing of this type of module. With the audiovisual technology available, the industry not only addresses current topics related to producing safe and wholesome dairy products, but also supports a welfare-centered and economically sustainable dairy industry.

Key Words: bilingual, dairy, training

806 Impact of a practical dairy farm management training workshop on the knowledge level of participants. E. Ashraf*¹, Z. Hayat¹, M. Z. U. Khan², S. U. Ansari¹, I. Hussain¹, F. A. Atif¹, M. Arif¹, and M. Luqman¹, ¹University College of Agriculture, University of Sargodha, Sargodha-40100, Pakistan, ²University of Veterinary & Animal Sciences, Lahore, Pakistan.

The dairy industry is an important part of the economy in developing countries. There is a dire need for trained human resources for the development of this sector. Five d training workshop was organized for demonstration of dairy management practices. Participants (n = 36) were randomly selected across the country. The objectives were to evaluate the knowledge level of participants after making them aware of the latest feeding and management techniques practiced in the dairy industry, and to identify factors that are directly related to their learning. The pre and post test each comprising of 20 multiple choice questions was given to the participants at the start and end of the training. There was a significant improvement in the knowledge level after attending the training since the Mean = 5.03, $t = 9.39$, SE = 3.21 with p-value < 0.1. On average there was a 25% increase in the marks of the participants. Complete regression model was run with the independent variables of age, experience, and education on the difference of the pre and post tests and model was statistically significant $F(3, 32) = 2.75 P < 0.1$. Age was the only significant predictor in the model and showed negative effect on the difference of marks of the participants, and explains 20% of the

total variance. This explained the phenomenon that as age increases the impact of training on the knowledge level decreases. Another regression model was run on the marks after the training. The model was statistically significant $F(3, 32) = 4.20 P < 0.1$. It was revealed that education level plays a central role in the knowledge improvement and was a good predictor which explained 28% of the total variance in the data. Correlation of the variables also confirmed the results and showed that only education is positively significantly correlated with the marks of the participants after completing training. The other 2 variables, age and experience, showed a negative relationship with the marks of the participants. It is concluded that older participants with lower education levels could not perform well in short training programs and need separate extensive and long-term training sessions.

Key Words: training, knowledge, dairy

807 A stochastic evaluation of reproductive management programs for dairy herds. J. O. Giordano*, P. M. Fricke, M. C. Wiltbank, and V. E. Cabrera, *University of Wisconsin, Madison.*

A Markov-chain simulation model was developed to compare the net present value (NPV, \$/cow/d) generated by different reproductive management programs (RP) in a dairy herd. The daily NPV of a specific RP was calculated by adding the discounted expected monetary values (DEMV) of that proportion of cows that become pregnant at each successive AI service until a maximum predefined DIM plus the DEMV of that proportion of cows not becoming pregnant to the RP. The DEMV for a lactation defined by DIM at pregnancy was calculated based on the value of milk produced, feed cost, expected value of a new born calf, and cost of culling. Economic, productive, and reproductive values were user-defined for each RP evaluated. The model sequentially estimated the percentage of cows eligible for breeding, becoming pregnant, and not becoming pregnant at each AI service based on the service rate (SR) and conception rate (CR) of each RP. Total AI service cost including pregnancy diagnosis (PD) was applied to all cows until pregnancy or culling for reproductive failure. For synchronized AI services, total cost was calculated by adding the individual cost of: treatments, labor, AI, and PD. Total cost for estrous services was calculated by adding the individual cost of heat detection, AI, and PD. A decision tree then compared the NPV for different RPs. A comparison among commonly used programs with typical reproductive values (Table 1) indicated that a Presynch-Ovsynch (PS-Ov) protocol with 100% TAI (A) for 1st service was stochastically dominant over RP (B) and (C). Utilization of this model by commercial dairy herds may facilitate selection of economically optimal RP based on farm-specific parameters.

Table 1. Net present value for commonly used reproductive programs

Program	1st AI		NPV (\$/cow/d)	NPV (\$/1000-cow/y)
	ES	TAI		
	(%)	(%)	Mean±SD (Range)	Difference from maximum
(A)100% TAI PS-Ov & Ovsynch	-	100	[36,43,50] 6.93±0.03(6.87-6.99)	Max
(B)ES ¹ + TAI PS-Ov & Ovsynch	[26,49,55]	[30,35,39]	[74,51,45] [20,30,41] 6.83±0.03(6.76-6.89)	-36,500
(C)100% ES ¹	[45,55,65]	[28,33,36]	- - 6.81±0.02(6.77-6.84)	-43,800

¹ES = estrous service, ²Triangular distribution [min, most likely, max].

Key Words: economics, simulation, stochastic

808 Optimization of insemination and replacement decisions under herd constraints. A. De Vries*, *University of Florida, Gainesville.*

Existence of herd constraints such as a limited number of replacement heifers or a milk quota implies that optimal insemination and replacement decisions for individual animals are not independent. Historically, calculation of such optimal decisions has shown to be difficult. A linear programming model was developed to evaluate optimal replacement and insemination decisions for dairy heifers and cows considering herd constraints. The model considered 3 semen types (for example sexed dairy, conventional dairy, conventional beef), 5 levels of milk production, and 10 parities including heifers. Each parity had 20 voluntary culling opportunities for non-pregnant animals. Heifers and cows were allowed a maximum of 18 insemination opportunities. Time step between insemination decisions depended on service rate. Time step for culling decisions include the start of the parity and before each insemination opportunity. The model contained 3,700 decision variables. Genetic value of heifer calves was a function of service sire net merit, age of the dam, and level of milk yield of the dam. Inputs were lactation curves, milk price, feed costs, insemination costs, service rates, conception rates, dystocia costs, involuntary culling risks, and other variable and fixed costs. To illustrate, profit/cow per yr in a closed herd with choice from 3 semen types was \$368. Conventional semen was used in 13% of the heifer inseminations and 47% of the cow inseminations. Sexed semen was used in 74% of the heifer inseminations and 11% of the cow inseminations. Average milk yield was 32 kg/cow per d. Setting the milk quota to 30 kg/cow per d resulted in \$293 profit/cow per yr with 97% of all slots filled. The optimum insemination mix included less conventional semen, more beef semen, more sexed semen in cows but less in heifers. The linear programming model formulation allows for exploring realistic optimal replacement and insemination decisions when herd constraints need to be considered.

Key Words: culling, insemination, herd constraint

809 Animals and Food Security: Blending land-grant missions through international engagement in Romania. P. D. Ebner* and M. A. Russell, *Purdue University, West Lafayette, IN.*

This international service-learning course works in villages with Heifer Project Romania and uses extension activities to enhance the capabilities of US land grant universities to better conduct their missions domestically and abroad. Students work in bi-national teams across agricultural and community disciplines to apply their knowledge and experience to make a difference. This course builds upon established collaborations with Heifer Project Romania and 3 agricultural sciences and veterinary medical universities in Romania to develop intercultural competencies. Extension educators have the expertise to facilitate the organization of local associations to better prepare the community for the future. Funding agencies around the globe seek to serve private or public organizations that have the capacity to implement their projects. Through these activities, teams bring home the ideas and technologies of other countries and develop international networks to make our domestic clientele competitive in the future. The authors have conducted similar courses and experiences in Paraguay and Ecuador. Students develop an ability to effectively communicate with others regardless of culture and backgrounds, the capacity to work effectively as part of bi-national, problem-solving teams, and the capability to apply social, economic, political, and environmental principles to serve in an international rural village or their own county. With focus on environmental stewardship and protection systems, participants learn and apply topics of large scale composting (with manure), swine and poultry nutrition, ruminant nutrition,

livestock diseases, livestock care standards, and environmental regulations for livestock production (European Union). Students develop experience in designing smaller-scale management systems and facilities that provide more flexibility to their livestock owners in their home counties. We will share both qualitative and quantitative methods of assessing learning and the development of intercultural competencies as well as the agronomic practices.

Key Words: international extension, environmental protection, intercultural competencies

810 Avian embryology posters as a teaching aid. T. A. Hess*¹, J. P. Blake², W. D. Berry², and R. A. Voitle², ¹*School of Forestry and Wildlife Sciences, Auburn, AL,* ²*Auburn University, Poultry Science Department, Auburn, AL.*

A project was undertaken that documented the embryonic development of both chickens and game birds (bobwhite quail and ringneck pheasants). There is a vast amount of information about the developmental stages of avian embryos (due primarily to the ability to incubate eggs away from the dam); this project condensed an enormous amount of knowledge into a readily accessible visual source for educational purposes. After incubating eggs in a staggered schedule, embryos were extracted from the shells at specific stages of development. Embryos were collected for each day of incubation for each species (chicken, bobwhite quail, ringneck pheasant). Pictures were taken of the embryos (Nikon D70S Camera; AF Micro Nikkor 60mm lens; Nikon SBR200 ring flash; CS920 Photographic Copy Stand). Posters were developed commercially incorporating photography and text describing the physiological changes, to stand as representations of the developmental stages. These posters were then provided to meet the educational needs of the poultry industry, game bird producers, and educational systems (middle through high schools) across Alabama. Knowing the many stages of avian embryonic development is useful information for both the seasoned poultry producer as well as those studying embryology. Game bird producers, often an underserved portion of the poultry community, can use these posters to train hatchery personnel or to provide game bird-based embryological training to local schools.

Key Words: embryology, chicken, game birds

811 Alternative fuel demonstrations on Pennsylvania turkey, broiler and duck farms burning poultry litter, wood pellets and wood chips vs. propane. P. H. Patterson*, R. M. Hulet, and D. E. Buffington, *The Pennsylvania State University, University Park.*

Propane costs, grower profitability and concerns about combustion gases (CO₂, H₂O) and litter quality were instrumental in establishing 4 poultry farm fossil fuel alternative demonstrations. Two turkey houses, 15.2 × 183m with 17,000 birds/house were originally fitted with 30 brooders/house. A 586kW (2 mill BTU/hr) boiler made by Bio-Fuel Technologies www.Bio-FuelTechnologiesLLC.com was installed between the houses with 8 ceiling mounted heat exchangers/house. The chain grate fuel delivery allows this farm to burn spent turkey litter. We are currently monitoring propane and litter consumption, litter and air quality and bird performance. On 2 broiler farms a FarmTek 234kW (800,000 BTU/hr) hot air furnace http://www.farmtek.com/farm/supplies/cat1a;fi1_heaters_accessories.html was installed in the middle of one house with 2 61cm air tubes and fans pushing heat to both ends. The furnaces are fueled by hardwood pellets from Energex Pellet Fuel, Inc. www.energex.com. One house per farm has the 234kW furnace, while the other has

the original propane equipment to compare fuel consumption and bird performance. Farm A houses are 14.6 × 152m with 30,000 birds each and 11 radiant tube heaters/house. Farm B houses are 13.4 × 152m with 27,000 birds each and 4 wall mount space heaters. A duck farm with 2 houses 13.7 × 137m upgraded the original 6 propane space heaters/house with 12 hot water heat exchangers and a 264kW (900,000 BTU/hr) boiler made by Total Energy Solutions LLC www.gototalenergy.com. The fuel is a course hardwood chip. The farm broods 9400 birds in the first 45.7m to 18d, and finishes at 39d in the remaining 91m. They grow 13 flocks/house/yr, and finish birds at 3.3kg. Monitoring continues and outreach has included 3 field days and 2 presentations to state government and sponsors. An overview of the farms, their installations and YouTube videos are planned for our extension webpage <http://poultryextension.psu.edu/>. Further descriptions of the alternative fuel systems and their performance will be submitted for publication and presented at in-state meetings.

Key Words: alternative fuel, demonstrations, poultry performance

812 Equine rotational grazing demonstration: Field observations and extension program impact. A. O. Burk*, N. M. Fiorellino, K. M. Wilson, T. A. Shellem, and M. E. Dwyer, *University of Maryland, College Park*.

An equine rotational grazing demonstration site was constructed to temporally assess performance of the vegetation and horses within the rotational system and to train horse farm operators to adopt environmental protection best management practices (BMPs). Four Thoroughbred geldings (initial BW 476.4 ± 5.4 kg; initial BCS 4.9 ± 0.9 units) were

rotationally grazed between April 2009 and January 2010 using 4 0.49 ha mixed grass/legume pastures, one 0.08 ha mixed grass heavy use paddock, and one 0.04 ha sacrifice area. Mean pasture vegetative cover over the observational period was 78 ± 3% with the majority represented by grasses (69%), and to a lesser extent legumes (6%) and weeds (3%). Horses spent an average of 80.1 ± 6.5% of days grazing pasture with June and July having the most days grazing (100%) and December and January having the least days grazing (38.8% and 51.6%, respectively). Horses were moved onto and off of pasture when grass height averaged 11.1 ± 1.1 and 6.9 ± 1.3 in, respectively. Horse BW peaked in November ($P = 0.009$) while BCS remained unchanged. Assuming 2% DM intake, pasture or supplemental hay met nutritional requirements for horses at maintenance, with the exception of sodium, zinc and copper. Amount of hay offered when horses were housed in the sacrifice lot was highest during May, December, and January. In regards to extension education, 3 2 h events were held at the site in April, June, and August drawing 141 participants. After attending the events, the majority of participants (≥51%) indicated a significant to very significant increase in their knowledge of 9 of 16 topics related to environmental protection BMPs. More than 80% of participants indicated they would adopt 12 of 15 BMPs with lowest rates observed for maintaining a stocking density of 0.6 ha horse⁻¹ (58.1%), applying herbicides as needed (69.8%), and use of heavy use pads in muddy areas (79.5%). Use of the equine rotational grazing demonstration site has been a valuable tool to increase our knowledge of the performance of a rotational grazing system for horses and in increasing the adoption of environmental protection BMPs by horse farm operators.

Key Words: extension, horse, environment