

497 A web-based, economic selection index tool for terminal Charolais sires. W. O. Herring*¹, M. D. MacNeil², and R. E. Williams³, ¹University of Florida, North Florida Research and Education Center, Marianna, ²USDA-ARS, Fort Keogh Livestock and Range Laboratory, Miles City, MT, ³American-International Charolais Association, Kansas City, MO.

Beef breed associations compute EPD for production and carcass traits. However, there is a lack of guidance for identifying sires that produce the most profitable progeny in a specified production system. Therefore, a web-based tool that uses economic selection index theory combined with EPD was developed for the American-International Charolais Association. Potential users include commercial cattlemen contemplating using Charolais sires, Charolais seedstock producers, or animal science students. The user provides information describing their terminal beef system including costs, revenues and production variables. These variables are then passed to a modified version of SIMUMATE, a computer model used to estimate net returns for beef production systems. Rel-

ative economic values are defined as the marginal change in expected profit per progeny from increasing a particular trait by one unit. This derivation approximates the partial derivative of profit with respect to each parameter. The software estimates relative economic values for birth weight, weaning weight, post-weaning average daily gain, marbling score and yield grade. The EPD for birth weight, weaning weight, yearling weight, fat thickness, marbling score, ribeye area and carcass weight are currently computed for many Charolais sires. A linear transformation of the weaning and yearling weight EPD is used to calculate the EPD for post-weaning ADG. Another transformation is used to calculate a yield grade EPD from fat thickness, ribeye area and carcass weight EPD. Thereafter, the EPD and relative economic values are combined to rank Charolais sires based upon the economic selection index. This tool should provide valuable assistance to users of Charolais bulls attempting to maximize profit in their beef production system.

Key Words: beef, selection index, profit

International Animal Agriculture

498 Development of a sustainable sheep production system for the Mexican tropics. P. Fajersson*, S. Hernandez, E. Santacruz, A. Alonso, and E. Ocaña, *Colegio de Postgraduados, Campus Veracruz.*

Mexico imports 54% of the mutton consumed. Interest exist in expanding sheep production in the tropics. The common extensive grazing systems without supplementation are neither competitive nor sustainable. Intensive and sustainable production systems have not been developed. The objective of this study is to improve tropical sheep production through management, genetic and nutritional strategies, minimizing the use of resources outside the ranch and without damage to the environment. Campus Veracruz is located in the humid tropics with 1200 mm annual rainfall (May-October) and a temperature of 27.8° C. 104 Tabasco ewes and 3 Tabasco and 3 Katahdin rams are managed on 7 ha of African Stargrass in a semi-confined system with 8 h grazing, cut Taiwan grass and minerals. Additional supplementation, from breeding through lactation, includes Gliricidia Sepium, Taiwan silage, corn sprouts and multi-nutritional blocks. A rotational grazing system with Leaders and Followers are being used. The ewes are subjected to 10 days flushing, synchronization using the male-effect and a 1 mo breeding period using controlled mounts. A comparison is made with 52 of the ewes bred to Tabasco rams and 52 bred to Katahdin rams to evaluate reproductive performance of the ewes and growth rate and carcass characteristics of purebred and crossbred lambs. Results of the first of three cycles were: 102 (97%) pregnant ewes gave birth to 149 lambs. Restricted suckling and supplementation were used until weaning at 3 mo of age. No differences ($P > 0.05$) were observed between birth and weaning weights of the purebred lambs and those crossbred with Katahdin (3.0 and 3.1 Kg) and (14.5 and 14.6 Kg). Breed differences ($P < 0.05$) were observed with regard to twin births, which were 28.8% for purebred and 57.7 % for crossbred lambs. Death of twin lambs caused the 8.1% mortality until weaning. At weaning, the lambs were sold for 25 cents/kg, a very good price, followed by slaughter at 5 mo of age and 35 kg. In conclusion, results from the first cycle indicate that the sheep production system developed is viable and feasible for producers and compares favorably to extensive systems currently common in the region.

Key Words: sheep, sustainable system, tropics

499 In vitro gas production and in situ degradability of four native species commonly consumed by grazing goats in North Mexico. M.A. Cerrillo*¹, O.O. Lopez¹, and R.A.S. Juarez¹, *Universidad Juarez del Estado de Durango. Durango, Dgo. Mexico.*

The objective of this study was to determine *in vitro* gas production and *in situ* degradability from huizache (*Acacia schafnerii*), encino blanco (*Quercus grisea*), encino colorado (*Quercus eduardii*) and nopal (*Opuntia spp*). To measure *in vitro* gas production, 200 mg of samples were incubated in a mixed suspension of rumen contents obtained from three rumen cannulated goats; whereas *in situ* degradability was estimated in three rumen cannulated sheep. Both animal species were fed alfalfa hay. The gas volumes and *in situ* values were recorded at 0, 3, 6, 12, 24, 48, 72 and 96h after incubation. The *Opuntia* species produced more gas

and was degraded in a higher proportion than the other forages. The insoluble but fermentable fraction (b) of *Opuntia* was 51.7 ml of gas, the potential production (a + b) was of 67 ml and the fractional rate (c) was 11%/h. The degradability of b fraction of *Opuntia* was 35% and the a + b fraction was 91.5%; whereas the highest value for c was for the *Acacia* species (6.5%/h). The *Q. eduardii* was the forage with the lowest gas production (b = 27.1 ml and a + b = 32.5 ml). The *Acacia* was the forage that presented the lowest degradability (b = 14.4% and a + b = 36.9%). The high values of c in gas production and potential degradability of *Opuntia spp* may indicate the high energy content of this species and it could reflect an important nutritional role of the *Opuntia* species in the feeding of grazing goats, particularly during the dry season.

Key Words: Goats, *In vitro* gas production, *In situ* degradability

500 Release of urea from the mammary gland of lactating cows during a humid tropical summer. C. H. Lu¹, C. J. Chang*¹, P. N. Lee¹, C. P. Wu², and X. Zhao³, ¹National Chung Hsing University, Taichung, Taiwan, ²National Chia Yi University, Chia Yi, Taiwan, ³McGill University, Ste-Anne-de-Bellevue, Canada.

Lactation performance of 6 primiparous Holstein cows, average DIM 90 days, during a humid tropical summer was characterized with selected milk traits and arteriovenous concentration (A-V) differences of some metabolites across the mammary gland. In the 3-month duration, the afternoon humidex value ranged from 44.6 to 53.5. Meanwhile, the rectal temperature of cow varied ($P < 0.05$) from the highest 40.02 °C in mid summer to 39.36 and 38.26 °C for the beginning and end of summer, respectively. Milk yield declined from 29.2 to 22.2 kg/d in the first month of summer but remained indifferently thereafter. In the course of summer, lactose content decreased linearly ($P < 0.05$) from 4.69 to 4.38 % and activity of milk N-acetylglucosaminidase (NAGase) increased linearly ($P < 0.05$) for more than two folds, overall. A-V difference across the mammary gland indicated net uptake of glucose and net release of urea. The release of urea from mammary gland increased ($P < 0.05$) with advancing summer from 1.54 to 7.76 mg/dl. It is suggested that experimental cows suffered from different extent of heat stress along the summer in the study area, as implied from rectal temperature. Decrease in lactose content and increase in NAGase activity indicate deterioration of mammary function. This deterioration is hypothesized to be initiated by elevated body temperature and become irreversible after mid summer. Increased urea release from mammary gland along the summer season implies accelerated amino acid turnover and decreased efficiency of protein utilization in the course of heat stress-induced malfunction of mammary gland. In perspective, increasing A-V difference of urea can be used for prognosis of suboptimal function of mammary gland.

Key Words: Heat stress, Urea, Mammary gland

501 Withdrawn. . .

502 Characterization of commercial feedlots in Nuevo León, México. H. Morales-Treviño, E. Gutierrez-Ornelas, H. Bernal-Barragan, J. Colin-Negrete, and R. Gonzalez-Gonzalez, *Universidad Autonoma de Nuevo Leon, Marín, Nuevo Leon, Mexico.*

Seven feedlots were enrolled in a descriptive survey during 1997 at Nuevo Leon, Mexico. The purpose of the survey was to get information about feeding practices, animal performance, type of animals, management and other factors may affect competitiveness. Feedlots had 73% of their full capacity (61000 animals) and the state of Nuevo Leon had facilities to feed 200000 animals. Feedlots fed 81% heifers, 11% bulls and 8% steers during an average feeding period of 120 d (90 # 165 d). Animals started at age of 16 months (8 to 26 months) with an initial body weight of 240 kg (160 to 320 kg). Slaughter weight was 400 to 420 kg for males and 360 to 380 kg for heifers. Most of the animals fed were crosses of Brahman X Brown Swiss. There were other animals crossed with European breeds and synthetic breeds such as Brangus and Beefmaster. Feedstuffs more frequently used were sorghum grain, cottonseed meal, whole cottonseed, protein supplement, molasses and sorghum or grass hay. Some feedlots included several byproducts such as poultry litter, poultry meal, rice grain polished, citrus pulp, bakery waste, sorghum straw and soybean hulls. Use of feed additives included sulfametacin, chlorotetracyclin, oxitetracyclin, monensin, lasalocid, melengestrol acetate, sodium bicarbonate, vitamin E and as newly introduced product zilpaterol. One out of seven feedlots was using steam flaked grains, but for the remaining feedlots grinding was the current grain processing technique. None of the surveyed feedlots had an established feed quality control system. Total mixed rations were usually fed two to three times per day. Feeding systems involved 2 to 4 rations depending on the length of the feeding period. There was a great variability in the length (7 to 30 d) of feeding step up diets according with the initial weight of the animals and the feeding strategy of each operation. Finishing diets contained an amount of forage that went from 12 to 25%. Average daily gain, ADFI and ADG/ADFI were 1.3 kg, 9.5 kg and 0.13, respectively. There was not an established feeding system for the surveyed feedlots in Nuevo Leon since high variation existed in the number and type of diets, type of animals as well as source and quality of feedstuffs.

Key Words: Feeding System, Feedlot, Mexico

503 Perceptions and value of international education in the Animal Science curriculum. N. Forsberg^{*1}, J. Taur¹, and H. Chesbrough¹, ¹*Oregon State University.*

Goals were to determine the status of international (INT) education (ED) within Departments of Animal Science (AS) across Canada and the US, to survey perceptions of internationalization by leaders of departments, to identify barriers to INT ED and to evaluate relationships between INT ED and various criteria of student "success" (i.e., admission to veterinary and graduate schools and starting salaries). A survey was mailed to 124 department heads of AS and 78 of these were returned (63%). Sixty % offered INT opportunities to their students. The most common forms of INT ED included advising (56%), INT internships (34%), INT content in core AS classes (29%), scholarships for INT activities (20%) and internationalization of the mission statement (19%). Using a score of 1 (highly agree) through to 5 (strongly disagree), Heads agreed that "INT experiences enhance maturity and other personal attributes of students" (Score = 1.57) and that "demand for graduates who understand INT issues was increasing" (Score = 1.80). Barriers to participation in INT programs were financial and lack of administrative and institutional support. In universities with enrollments over 15000, significant associations were detected between measures of internationalization and student outcomes. Significant associations existed between 1) the ratio of INT students/total students and 2) experience in INT study/research and % of seniors attending graduate school (R= .62 and .51, respectively). A significant association was also found between participation in INT study/research and starting salary (R=.51). It is worthwhile considering INT ED offerings within departments as means to broaden education and, possibly, to enhance student success.

Key Words: international, education, survey

504 Assessing the sustainability of animal traction among Maasai agro-pastoralists in Monduli District, Tanzania. A.B. Conroy*, R.T. Eckert, and M.L. Becker, *University of New Hampshire, Durham, NH/USA.*

A case study using rapid rural appraisal (RRA) techniques was developed to assess the sustainability of draft oxen and donkey use in 10 villages and the corresponding 27 sub-villages in Southern Monduli District. Using semi-structured interviews, the heads of 130 agro-pastoral farmsteads were selected to represent the full range ecological and economic strata in the Kisongo section of Monduli district. The locations of each farmstead were documented using a hand held GPS. Interviewees described and displayed land use strategies, livestock and draft animal production systems, and their impact on the local economy and environment. This qualitative data was evaluated using a software program called NVivo, where the data were coded and organized around specific themes of sustainability. Traditionally pastoralists, the Maasai people have made a rapid transition to a more agropastoral lifestyle in the last 20 years. Livestock and crop growing has become more intensive, as farmsteads used the draft animals to grow and manage maize and beans on agricultural plots averaging 12 ha in size. Draft animals have generated great short term economic benefits, however the adoption of draft animals has had a profound affect on the environment and availability of common grazing lands for other livestock. The most sensitive indicators of sustainability developed in this study were the geography, the presence of livestock, especially cattle, the local perception and government policies toward animal traction, the prevalence of farming in marginal areas, the degree of soil erosion, adequate and improving crop yields, system of land tenure, availability of fertilizer, quality s

Key Words: Maasai, Animal Traction, Sustainability

505 A livestock based child nutrition project in Malawi. S. Patten^{*1}, A. Woldegebriel², G. Kanyama-Phiri³, B. Mtimuni³, H. Swartz², R. Savage², R. Phoya³, L. Kamwanja³, F. Chelera³, and W. Boylan⁴, ¹*Macalester College*, ²*Lincoln University*, ³*University of Malawi, Bunda College of Agriculture*, ⁴*University of Minnesota.*

The purpose of this study was to evaluate the potential benefits of goats milk and soybean flour as an effective component of the indigenous weaning food for children. The study group consisted of 200 children between the ages of 6 months-5 years from 4 villages in central Malawi. There was no control group instead; composite national data on the nutritional status of children was used for comparison. Women who met the selection criteria and volunteered to participate in the project received a doe, 5-10 kg of improved soybean seed, and legume seedlings. Participants were required to attend a series of demonstrations on goat management, health and husbandry, milking and milk utilization, food safety and food preparation. The women were also required to return the first-born kid and an equivalent of harvested soybean seeds to the project. Household baseline surveys indicated that 35.4% of the children under five were underweight for age and 57.7% were stunted. Weight and other growth parameters used to assess the effectiveness of the nutrition intervention project reflected the significant contribution of the project to the physical development of the children and to their reduced risk from life-threatening infectious diseases. The project also empowered women through formation of village-based committees that managed the day-to-day activities of the project. Almost 98% of the participants returned the kid and quantity of seed to the project. The introduction of the project into the villages, in conjunction with the training programs given to women, made the project locally sustainable and a highly valued approach to alleviating the problem of chronic child malnutrition. Presently NGOs working in Malawi and public-sector institutions that cater for malnourished children, had purchased animals from the villages in order to implement variations of the project in other settings. The cash returns from the sales had also improved the economic security of some families.

Key Words: Children, Malnutrition, Milk