W184 Effects on lactation performance when slick hair gene is simulated in dairy cattle in the tropics. R. M. Mejía*[1,2], J. A. Ortuño[1], G. J. Lascano[2], and M. Vélez[1], [1]*Zamorano University*, *El Zamorano, Honduras*, [2]*The Pennsylvania State University*, *University Park*.

In the tropical and subtropical regions, high temperatures affect dairy cattle, reducing the metabolic activities of the animal and decreasing the blood flow to the udder. Cattle with the slick hair gene tolerate high temperatures and humidity much better than normal haired cows. The objective of the present study was to determine if the effect on lactation performance of slick hair gene cows can be simulated through hair clipping. The experiment was conducted in Zamorano University, Honduras located at 800 m.a.s.l. (average year-round temperature of 23° C). Thirty two multiparous crossbred, Holstein, Jersey and Brown Swiss lactating cows were monitored through 140 d of lactation. Cows were blocked according to their age, body condition score and milk production and assigned randomly to two different coat treatments. Treatments consisted of normal-haired (NH; n=16) and clipped-hair lactating cows (CH; n=16). Hair was clipped from the cow′s barrel, neck and legs at the beginning of the experiment and on d 60. CH and NH cows were kept under the same environmental conditions. Rectal temperature (at 1400 h) and milk yield (kg/d) were measured once weekly. All data were analyzed according to a randomized complete block design with repeated measures using the MIXED procedure of SAS. NH cows had lower temperatures (35.2 vs.36.4° C ± 0.58; P = 0.01). There was a significant interaction effect between time and treatment (P = 0.05) that was maintained consistently throughout the experiment. Milk yield (kg/day) was higher when cows were clipped (13.4 vs. 10.8 ± 0.26; P = 0.003). The decrease in rectal temperature and increase in milk production reflects the capacity of CH cows to mimic lactation performance of slick-haired gene cows resulting in an enhanced lactation performance.

Key Words: slick hair gene, clipped-haired cows, lactation performance

W185 Effects of a direct-fed microbial product on milk production by crossbred dairy cows in the Brazilian Cerrado. R. D. Sainz*[1], C. U. Magnabosco[2,3], R. A. Carnevalli[3], R. Guimamães Jr.[2], M. M. S. Mamede[4,3], J. R. Costa Jr.[5,3], and E. A. Filgueiras[6], [1]*University of California*, *Davis,* [2]*Embrapa Cerrados*, *Planaltina, DF, Brazil*, [3]*Embrapa Arroz e Feijão*, *Santo Antonio de Goiás, GO, Brazil*, [4]*Associação Goiana de Criadores de Zebu*, *Goiânia, GO, Brazil*, [5]*Universidade Estadual de Goiás*, *Goiânia, GO, Brazil*, [6]*Bioformula*, *Goiânia, GO, Brazil*.

Thirty-two Girolando (crossbred Holstein x Gir) dairy cows were randomized as to percentage Holstein, age, parity, stage of lactation and current production level into control and treated groups. Cows averaged 63% Holstein, 2.6 parities, 174 days of lactation and 13.3 kg/d milk. Treated group cows received 2 g/d of a product (Bioformula, Goiania, Brazil) containing live yeast (1×10^9 CFU/g), mannan oligosaccharide (10%), and *Lactobacillus acidophilus*, *Bacillus subtilis*, and *Enterococcus faecium* (2×10^7 total CFU/g), whilst controls received 2 g/d of the carrier alone. Cows grazed *Brachiaria brizantha* pastures and received up to 5 kg/d grain supplement according to production level. Milk production was monitored weekly for six weeks. Five control and four treated cows had mastitis during the experiment and their data were excluded. Data were analyzed by ANOVA, with treatment as main effect and previous level of production as the covariate. When previous level of production was included, all other factors (percentage Holstein, age, parity and stage of lactation) became non-significant. Average milk yields for the first three weeks were 11.1 and 11.7 kg/d (SD = 0.97) for control and treated cows, respectively (P = 0.15). For the second three weeks, average milk yields were 10.8 and 11.9 kg/d (SD = 0.86) for control and treated cows, respectively (P = 0.01). Therefore, direct-fed microbials had no effect in the first three weeks of treatment, but for the second three weeks milk production was increased by 10%. These results suggest that probiotics have the potential to increase milk production by crossbred dairy cows under tropical conditions.

Key Words: probiotics, dairy, tropical

W186 Digestibility of fresh sugarcane-based diets with slow-release non protein nitrogen addition for limit-fed dairy heifers in the tropics. G. J. Lascano*[1], M. Velez[2], J. M. Tricarico[3], and A. J. Heinrichs[1], [1]*The Pennsylvania State University*, *University Park*, [2]*Zamorano University*, *El Zamorano, Honduras*, [3]*Alltech Inc.*, *Nicholasville, KY*.

Sugarcane presents interesting characteristics for feeding ruminants in the tropics, such as perennial growth, reduced harvesting requirements, and peak yield and nutritive value that coincide with dry periods when forage is scarce. An experiment was conducted to determine the effect of replacing soybean protein (SBM) with non-protein N in limit-fed dairy heifers in the tropics. Eight Holstein heifers (237.6 ± 5.45 kg BW) were allocated to 2 dietary treatments in a cross over design. Treatments were control (C; 23% SBM) and O (Optigen, fed at 3% of DMI; Alltech Inc.). The forage to concentrate ratio was 50:50 (DM-basis) and fresh chopped sugarcane the sole source of forage. Each experimental period (2) lasted 15 d with 4 d of total feces and urine collection. Diets provided similar intakes of ME, allowed for 800 g/d of ADG, and chemical composition was held constant across all diets. Data were analyzed using a mixed-effects model with repeated measures. Compared to O, diet C tended to have greater total tract apparent digestibility (TAD) of DM (71.2 vs. 68.6 ± 0.63%; P = 0.06) and ash (47.4 vs 38.3 ± 3.81%; P = 0.08). Total tract apparent digestibility values in C-fed were greater than in O-fed heifers for OM (73.9 vs. 71.3 ± 0.64%; $P < 0.01$), CP (76.9 vs. 75.2 ± 0.72%; P = 0.04), hemicellulose (50.5 vs. 43.3 ± 1.89%; $P < 0.01$), and starch (98.6 vs. 97.2 ± 0.48%; P = 0.03). However, TAD of NDF was similar (44.9 ± 1.93%; P = 0.26) and TAD of ADF was lower (P = 0.03) in C (27.7± 2.15%) than in O heifers (33.3 ± 2.15%). Excretion of urine, wet and dry feces, and water intake were similar between treatments. Retained N was similar between treatments (65.5 ± 3.53%; P = 0.47), and thus no differences were found in N dynamics. We conclude that when O replaced SBM it tended to decrease DM and decreased OM, CP, hemicellulose, and starch TAD, but did not affect NDF and increased TAD of ADF. Even though control diets were more digestible overall, individual nutrient digestibility was not greatly affected, suggesting that replacing SBM with slow-release non-protein N is possible in sugarcane-based diets in the tropics.

Key Words: sugarcane, tropics, limit-feeding, dairy heifer

W187 System dynamics ex ante decision support for caprine initiatives in Southern Mexico. K. C. McRoberts*[1], C. F. Nicholson[4], R. W. Blake[3,1], T. W. Tucker[1], and G. Díaz Padilla[2], [1]*Cornell University*, *Ithaca, NY*, [2]*Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias*, *Xalapa, Veracruz, México*, [3]*Center for Latin American and*

Caribbean Studies, Michigan State University, *East Lansing*, [4]*California Polytechnic State University*, *San Luis Obispo*.

Researchers and development practitioners at the Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP) Xalapa team were trained in systems thinking and dynamic modeling techniques during an institutional capacity-building course. Course participants contributed expert knowledge to improve a system dynamics model designed to assess impacts on farmer profits of value-added agricultural production by a smallholder marketing cooperative. The dynamic biophysical and socioeconomic model consisted of nine modules that represented the aggregate community goat flock and a processing and marketing cooperative. The primary objective of the model was to assess strategies to increase net income from caprine production in highland communities. This adaptable model was designed as an *ex ante* impact assessment mechanism for INIFAP to evaluate the opportunities and limitations of value addition. Model analyses indicated that manufacture of goat's milk products by the cooperative could increase community net income from caprine activities under a wide variety of environmental and market conditions. Increases in net income from dividend payments during the dry season could partially mitigate seasonality from other income sources. Model sensitivity analyses indicated that the exogenous effects of seasonal rainfall on forage supply were more important to system performance than feedback processes (e.g., reinvestment of profits). System performance was measured by elements that likely influence farmer and cooperative decision-making: returns to labor, time required until the cooperative was financially solvent, dividend payments, and buyer orders for aged cheese cancelled due to supply delays. The analyses also indicated potential risks and factors that could limit cooperative success. The most important included the size and reliability of the market for premium aged cheese, the cooperative's policy of payments for milk and dividends, milk production costs, cheese production costs, and the composition and productivity of the goat flock. These factors and forage quality should receive priority in future research.

Key Words: caprine production, system dynamics, processing cooperative

W188 Biomass production and nutritional value of wheat and oat hydroponic forages sowed at three densities. J. A. Rivera-Ahumada[1], A. S. Juárez-Reyes[1,4], H. Bernal-Barragán[2,4], M. A. Cerrillo-Soto*[1,4], F. G. Ríos-Rincón[3,4], A. Estrada-Angulo[3,4], and M. Guerrero-Cervantes[1,4], [1]*Universidad Juárez del Estado de Durango*, *Durango, Dgo., México*, [2]*Universidad Autónoma de Nuevo León*, *Monterrey, Nuevo León, México*, [3]*Universidad Autónoma de Sinaloa*, *Culiacán, Sinaloa, México*, [4]*Red Internacional de Nutrición y Alimentación en Rumiantes*, *Durango, Dgo, México*.

A study was conducted to evaluate the biomass yield, CP, ME, metabolizable protein (MP) content, and gas fermentation parameters of wheat and oat hydroponic forages. Seeds were sowed at three densities (400, 600 and 800 g seeds) and manually placed in 40 × 40 cm plastic trays in triplicate. A controlled 5 × 4 m green house was used to grow the germinated hydroponic seeds and after 10 and 12 d, the forages were harvested. Two hundred mg of samples were incubated by triplicate in 100 ml calibrated glass syringes for 0, 3, 6, 9, 12, 24, 48, 72 and 96 h. Data were fitted to the equation: $Y=a + b*(1-e^{-ct})$ to estimate the gas produced from the soluble fraction *a*, the gas produced from the slowly degradable fraction *b* and the constant rate of gas production *c*. The ME content (Mcal kg^{-1} DM) was calculated by: $(2.20+0.136Gas\ production_{24h}+0.057CP+0.0029EE^2)/4.184$. The MP content was estimated according to the Intestinal Digestible Protein French System. Data were analyzed according to a factorial design to test the effects of 3 seed densities (400, 600, 800 g), 2 species (wheat and oat) and their interactions. There was a species × density interaction for biomass yield, CP and *b* fraction ($P < 0.05$). Biomass yields of wheat hydroponic forage with the higher density was 3.7 fold of that grown with the lower density, whereas an increment of 1.8 fold was registered in the oat hydroponic forage. Higher seed density in oats resulted in decreased CP (from 18.0 to 13.2%) and ***b*** (from 58.9 to 45.5ml of gas/200 mg DM) values, respectively. Values for in vitro gas production at 24 h, constant rate of gas production ***c***, ME and MP contents were higher ($P < 0.01$) for hydroponic wheat (60.5 mL/200 mg DM, 6.7% h^{-1}, 2.7 Mcal ME kg^{-1} DM and 80.6 g MP kg^{-1} DM) than for hydroponic oat (44.3 mL/200 mg DM, 5.7% h^{-1}, 2.2 Mcal ME kg^{-1} MS and 64.2 g MP kg^{-1} DM). According to our results, wheat hydroponic forage has a better nutritive value than its counterpart.

Key Words: hydroponic forage, in vitro gas production, nutritive value

W189 Growth potential of village chicken in Nigeria. J. A. Olupona*, O. O. Adejinmi, and A. M. Raji, *Federal College of Animal Health and Production Technology, Institute of Agricultural Research and Training*, *Ibadan, Oyo, Nigeria*.

The growth potential of village chickens in Nigeria was evaluated by comparing their growth performance under intensive and semi-intensive system of management. Preliminary investigation by the author revealed that 86.75% of village chickens are kept under semi-scavenging system of management in Ibadan southwest local government of Nigeria whereas birds are provided with small amount of grains and by-products to supplement their scavenging. Chicks (n=52), 8 wk old were collected from villages in Ibadan south west local government and individually raised in cages. Chicks (n=56) remained with the farmers and were raised under semi- scavenging conditions. On-farm made growers mash (18%CP) was fed to chicks raised under intensive condition and birds were treated against common diseases and parasites. Data were collected on feed intake, weight gain and feed efficiency. All measured and calculated parameters were tested for normality using proc univariate, normal and plot procedure of SAS and later analyzed using ANOVA. Village and system of management significantly ($P < 0.05$) influenced growth rates. Feed intake, weight gain and feed efficiency for birds under intensive conditions were significantly ($P < 0.05$) greater than for birds under semi-scavenging conditions. Phenotypic variance for daily weight gains, and growth rate were lower for intensively managed birds than for semi intensive system Correlation coefficients of growth traits measured between intensive and semi-scavenging conditions were low (r=0.16-0.49; $P < 0.05$), probably indicating that the effect of environment and its interaction on genotype had a strong impact. It is concluded that growth potential of village chicken can be enhanced by providing sufficient feed under semi- scavenging conditions.

Key Words: village chicken, semi-scavenging, intensive

W190 Effects of demographic characteristics and attitudes of consumers on table egg consumption. M. Bejaei* and K. M. Cheng, *The University of British Columbia*, *Vancouver, BC, Canada*.

In addition to regular (white and brown) eggs, alternative types of table eggs (e.g., free-run, free-range, organic eggs) are also available in Canadian market and their market growth rate has been high during the last decade in British Columbia (BC). Despite this growth there is insufficient data about consumers' attitudes and preferences relating to this differentiated egg market. The objective of our research was

to identify the consumers' attitudes and demographic characteristics toward different types of table eggs. We used an online interactive survey questionnaire to gather information from adult BC residents. Email addresses of 1027 potential subjects were randomly selected and 702 completed surveys were processed. The survey was conducted in June 2009 according to the regulations of UBC Behavioural Research Ethics Board. PASW Statistics 17 (SPSS) was used to analyze the survey data. Different statistical tests were applied to the responses (e.g. ANOVA, Pearson correlation, Bonferroni correction). Our results indicated that the consumption of cage-free eggs has changed in BC in 2009 in comparison to a Print Measurement Bureau consumer survey in 2007. Almost a third of the consumers used free-range eggs at home in BC in 2009. Individuals with a higher educational level or higher income consumed more free-range eggs and fewer white regular eggs than those with a lower educational level or lower income. Consumers who rated the nutritional value of white regular eggs as high (score 4 or 5 in a five point Likert scale) consumed more white regular eggs. Consumers did not act according to the same priorities when they were selecting different types of eggs. Price was the main factor in selection of white regular or brown regular eggs; bird welfare, environmental concerns and having access to healthy food were main factors in the selection of cage-free eggs; and nutritional value and having access to healthy food were main factors in consumption of nutrient enhanced eggs. Because of the results of this research egg producers are more capable of designing a marketing mix plan to develop their market share in the future.

Key Words: table eggs, consumer attitudes, demographic characteristics

W191 Effect of dry ammoniation on the chemical composition and digestibility in vitro in the mesocarp of the fruit and empty bunches of African oil palm. N. Castro-Ucross[1], J. Vergara-Lopez[2], and O. Araujo-Febres*[1], [1]*Universidad del Zulia, Facultad de Agronomía, Departamento de Zootecnia*, *Maracaibo, ZU, Venezuela*, [2]*Instituto Nacional de Investigaciones Agricolas*, *Maracaibo, ZU, Venezuela*, [3]*Universidad del Zulia, Facultad de Agronomía, Departamento de Zootecnia*, *Maracaibo, ZU, Venezuela*.

Venezuela has about 52,384 ha planted with African oil palm, of which 27,100 ha had a total production of fresh empty fruit bunch of about 334,262 MT (with empty bunches representing 25% and mesocarp 11% of total weight). This study was conducted to evaluate the effect of dry ammoniation on the chemical composition and digestibility in vitro of the mesocarp of the fruit and the empty fruit bunches of african oil palm at Catatumbo municipality of Zulia state, Venezuela. Five levels of urea (0, 15, 30, 45 and 60 g/kg DM) and two incubation times (14 and 28 d) were applied to the products. The study was conducted as complete randomized experiment with a factorial arrangement 2×2×5, with 3 replications. Dry matter (DM), crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), lignin (Lig) and in vitro dry matter digestibility (IVDMD) were determined. Data were analyzed using ANOVA. Dry matter content decreased ($P < 0.01$) as urea levels increased. The lowest values of NDF, ADF and Lig were found in the empty fruit bunch (32.9, 29.6 and 7.1%, respectively) and the correlation analysis demonstrated a downward trend in fiber content as urea levels and incubation time increased. The CP content was greatest ($P < 0.01$) in the mesocarp at 28 d of incubation, and it increased 4% units when comparing 0 vs 60 g of urea addition. The IVDMD was greater in the empty fruit bunch (61.7%, $P < 0.01$) than in the mesocarp (39.5%). Dry ammoniation positively changed the chemical composition and digestibility of oil palm by- products, with the empty fruit bunch being the most affected of the byproducts.

Key Words: African oil palm, dry ammoniation, dry matter digestibility

W192 Nutritive value of Henequen (*Agave fourcroydes* Lem.) pulp as ruminant feed. E. González–García*[1,2], O. Cáceres[2], F. Ojeda[2], and R. Delgado[2], [1]*INRA, UMR 868, Élevage des Ruminants Regions Chaudes*, *Montpellier 34090, France*, [2]*Estación Experimental de Pastos y Forrajes 'Indio Hatuey'*, *Matanzas 44280, Cuba*.

Henequen (*Agave fourcroydes* Lem.) is a highly resistant and succulent plant (genus *Agave*; family Agavaceae) with sword-shaped leaves of 1.2 to 1.8 m long in a form of rosette. It's extensively planted in Mexico (Yucatan) and Cuba (Varadero) basically to profit their leaves′ fiber (so-called Henequen) for rope and twine productions. The remained pulp is an industrial by-product that, if not used, may constitute an environmental problem. We evaluated its nutritive value (NV), fresh (HPF) or ensiled (HPE), as a ruminant feed with potential to be used in a planned integration of livestock and agro industry productions locally in the north-center of Matanzas, Cuba (23°08′22″N 81°17′10″W). Two metabolic trials of 21 d each (14 d adaptation, 7 d data collection) were conducted for evaluating HPF and HPE, respectively. For each trial, 6 adult castrated Pelibuey wethers (BW = 35 ± 2.3 kg) were used, randomly housed in individual metabolism crates and the INRA French system of ad libitum (10% of refusal from previous day) feed supply and total feces collection was implemented. Feeds (HPF or HPE) were daily and individually distributed into 2 equilibrated meals (0800 and 1630). Data were analyzed for each trial by separate using an ANOVA. The experimental unit was the wether, included in the model as a random effect. Comparisons between HPF and HPE were avoided. Despite a limiting DM content (16.8 and 20% for HPF and HPE, respectively), either HPF or HPE showed acceptable NV for ruminants due to good voluntary intake (Ø: 96% of reference feedstuff) which was likely due to the high energetic potential (>2.5 mcal/ kg DM) (Table 1). However, CP content was low for both states of presentation (72 and 60 g/ kg DM for HPF and HPE, respectively) which also determined low levels of protein arriving to the small intestine (PDIMN and PDIME). This by-product of Henequen industrial processing (pulp) could be considered as an energetic raw material for ration formulation in ruminant feeding systems. However, some strategies such as drying (i.e. meal) are recommended to increase feasibility of manipulation and conservation during long periods of time.

Table 1. Nutritive value of henequen pulp, fresh (HPF) or ensiled (HPE)

State of presentation	DM, %	CP, g/kg DM	CF, g/kg DM	ME, mcal/ kg DM	PDIMN, g/kg DM	PDIME, g/kg DM	Ca, g/kg DM	P, g/kg DM
HPF	16.8	72	204	2.62	51.1	73.1	58.0	4.0
HPE	20.0	60	280	2.50	48.0	68.0	50.0	0.4

PDIMN, microbial protein to be synthesized from degraded dietary N when energy is not limiting; PDIME, microbial protein synthesized from rumen fermented OM when degraded N is not limiting.

Key Words: nutritive value, ruminant, Henequen

W193 Economic weight of some production and functional traits of dairy cattle. F. Szabó*[1], Z. Fekete[1], J. Wolf[2], and M. Wolfová[2],

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The objective of this study was to evaluate the marginal and relative economic values of 7 traits for dairy cattle. The importance of the study derives from more than 68% of cattle in Hungary belonging to the dairy industry. The study was conducted in 2009 using a bioeconomic model based on the program ECOWEIGHT (Wolf et al., 2005). Data were collected for typical dairy farms of about 330 Holstein- Friesian cows with annual milk yield close to 7,000 kg. Cows were managed in loose-housing systems with parlor milking, representing current commercial dairy enterprises. A total mixed ration based on maize silage and concentrates with some alfalfa hay was offered to 4 groups (first-, second-, third- phases of the lactation and a dry group). Besides the dairy enterprise, calf and replacement rearing were also taken into consideration. Income came from milk, calves, culled cows, and sale of manure. About 50% of the total cost was related to feed and the remainder was due to factors such as management, reproduction and health services, labor, interest and amortization. Annual revenues and costs were used for the economic calculations. Gross margin was the difference between income and variable costs. Marginal economic value of a given trait was defined as the partial derivative of the profit function and was standardized by multiplying by the genetic standard deviation of the trait. The relative economic values for traits were expressed as percentages of the standardized economic value of 305-d milk yield. The relative economic importance of the traits were as follows: 305-d milk yield, 100%; length of productive life, 52%; conception rate of cows, 35%; 305-d protein yield, 35%; 305-d fat yield, 21%; stillbirth, 13%; and pregnancy rate of replacements, 3%. It can be concluded that milk yield is currently the most economically important trait in Hungary.

Key Words: 305-d milk-, protein- and fat yield, length of productive life, conception rate