

Ruminant Nutrition: Beef III

W289 Effect of increasing levels of alfalfa hay on ruminal fermentation in growing Simmental heifers fed high-concentrate diets.

Ana Madruga^{*1}, Alfred Ferret¹, María Rodríguez¹, Eva Mainau¹, Jose Luis Ruiz de la Torre¹, Xavier Manteca¹, and Luciano Adrian Gonzalez², ¹*Animal Nutrition and Welfare Service (SNIBA), Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain,* ²*Centre for Carbon, Water and Food, The University of Sydney, Camden, Australia.*

Eight rumen cannulated Simmental heifers (BW = 281.4 ± 18.5 kg) were randomly assigned to 1 of 4 experimental treatments to determine the effects of increasing levels of alfalfa hay on ruminal fermentation. Treatments tested were: a) total mixed ration with 10% barley straw as forage source (10BS), b) total mixed ration with 13% alfalfa hay as forage source (13AH), c) total mixed ration with 16% alfalfa hay as forage source (16AH) and d) total mixed ration with 19% alfalfa hay as forage source (19AH). Forages were coarsely chopped before their incorporation in total mixed ration. Diets were offered on an ad libitum basis, and formulated to be isocaloric (2.83 Mcal ME/kg DM) and iso-nitrogenous (14% CP on DM basis). After 2 weeks of diet adaptation, ruminal samples were taken immediately before feeding and at 4, 8, 12, 16, and 24 h after feeding on d1, d4 and d7 of the sampling week. Differences were analyzed by using the MIXED procedure of SAS. The model contained the fixed effects of treatment and the random effect of heifer. Day and hour were used as repeated measure. Intake of DM recorded during the sampling week was affected by treatment, being higher in heifers fed 16AH and 19AH than in heifers fed 10BS and 13AH (8.9 and 8 kg/d on average, respectively; $P < 0.001$). Heifers fed 19AH had a higher mean ruminal pH compared with the other treatments (6.74 vs. 6.55 on average; $P = 0.02$) and a higher total area under the pH curve ($P = 0.01$). Concentration of NH₃-N (1.8 mg N/100mL) and total VFA (84 mM) were not affected by treatment ($P > 0.10$). Heifers fed 10BS presented the lowest proportion of acetate ($P = 0.05$) and the highest proportion of propionate ($P = 0.04$). Molar proportions of butyrate, valerate, isobutyrate and isovalerate were not affected by treatment ($P > 0.10$). Results indicate that the inclusion of alfalfa hay at 19% of total DM in a high-concentrate diet fed to growing heifers did not affect total VFA and NH₃-N concentration, increased acetate and decreased propionate proportion, and increased mean ruminal pH, which can reduce the risk of ruminal acidosis.

Key Words: alfalfa hay, beef cattle, high-concentrate diet

W290 Protein requirements of Nellore and Angus young bulls.

Rafael A. Gomes^{*1,3}, Mario L. Chizzotti², Karina C. Busato¹, Marcio M. Ladeira¹, Aline C. Rodrigues¹, Matheus C. Galvão¹, José Rodolfo R. Carvalho¹, and Maria Helena Oliveira¹, ¹*Universidade Federal de Lavras, Lavras, Minas Gerais, Brazil,* ²*Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brazil,* ³*Washington State University, Pullman, WA.*

We used 48 animals with initial body weight (BW) of 380.2 ± 4.73 kg to determine protein requirements of Nellore and Angus young bulls by comparative slaughter technique. Four animals of each breed were slaughtered at beginning of the experiment (baseline animals). The remainder were housed in individual stalls, where 8 animals of each breed were fed ad libitum with a whole corn shell (WCS) diet (85% WCS and 15% of a pellet based on soybean meal) or a silage/concentrate (SC) diet (30% silage and 70% concentrate based on corn and soybean meal).

Other 4 animals of each breed were fed with the SC diet at 50% of the dry matter intake adjusted for metabolic BW of animals that received the SC diet ad libitum. Intake was measured daily and a metabolism trial was conducted with total collection of feces and urine. These data were used to estimate the crude and metabolizable protein intake (CPI and MPI, respectively). At 90 d of growth the cattle were slaughtered. The net requirement of protein for maintenance (NP_m, g/kg EBW^{0.75}/d) was assumed to be the intercept of the linear regression of the retained protein (RP) on CPI and the slope of the linear regression of RP on MPI was assumed to be the efficiency of protein utilization for maintenance (k). The NP_m was divided by the k to obtain the metabolizable requirement of protein for maintenance (MP_m, g/kg EBW^{0.75}/d). The net requirement of protein for growth (NP_g) was calculated by NP_g (g/kg EBG/day) = a + b × RE, where EBG is the empty body gain and RE is the retained energy. The data were analyzed using the GLM procedures of SAS adopting significance level of 0.05. We did not observe an effect ($P > 0.05$) of breeds on NP_m (1.01 g/kg EBW^{0.75}/d) and k (38%). MP_m was 2.68 g/kg EBW^{0.75}/d. In addition, breed did not significantly affect ($P > 0.05$) on NP_g (NP_g g/day = EBG × [286 - 8.23 × (ER/EBG)]). Funded by FAPEMIG, INCT-CA and CNPq.

Key Words: maintenance, growth

W291 Intake and digestibility of Nellore steers fed different sources of forage in diets with crude glycerin in feedlot.

Andressa F. Ribeiro, Antonio Jose Neto*, Luis G. Rossi, Erick E. Dallantonia, Monaliza O. Santana, Ana Laura E. G. F. Carvalho, Gabriela Dellamagna, Juliana D. Messana, and Telma T. Berchielli, *Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil.*

Nine ruminally cannulated Nellore steers (300.0 ± 30kg of BW and 18 ± 2 mo of age) were used in a 3x3 Latin Square experimental design to evaluate the effect of different sources of forage in diets with crude glycerin (80.64% of glycerol) on DM, CP, NDF and NFC intake and digestibility. The treatments were different sources of forage (fixed 15% of NDF from forage; fNDF): corn silage, sugar cane and sugar cane bagasse, in diets with 10% (DM) of crude glycerin. For this study intake, refusals and total feces collection were recorded for 3 d, experimental periods were 17 d (14 d for adaptation, 3 d for intake and total digestibility). Data were analyzed as a triple Latin square design with 3 treatments and 3 animals in 3 simultaneous triplicates using the PROC MIXED procedure of SAS. The least squares means were generated and compared ($P < 0.05$) using Tukey's test. There was no difference on DM and CP intake among diets. On the other hand, the intake of NDF increased ($P < 0.05$) in animals fed corn silage which did not differ from animal fed with sugar cane bagasse. Furthermore, animals fed with sugar cane bagasse decreased NFC intake ($P < 0.05$). Animals fed with corn silage increased DM and NDF digestibility compared with the other diets ($P < 0.05$). Additionally, an increase on CP digestibility was observed in animals feed with sugar cane bagasse, which not differed from animals fed with corn silage ($P < 0.05$). NFC digestibility increased in animals fed with sugar cane ($P < 0.05$). Different sources of forage included in 15% of fNDF in diets with crude glycerin (10% DM) altered intake and digestibility.

Key Words: biofuel, corn silage, sugar cane

W292 Effect of glycerol supplementation and ambient temperature on growth and metabolic and immunological responses in Korean cattle steers. Hyeok Joong Kang, Min yu Piao, Hyun Jin Kim, In Kyu Lee, Min Jeong Gu, Cheol Hee Yun, and Myunggi Baik*, *Seoul National University, Seoul, Republic of Korea.*

This study was performed to evaluate whether glycerol supplementation and ambient temperature affects growth and blood metabolic and immunological parameters in beef cattle. Twenty Korean cattle steers with average 14.4 mo of age and 405 kg of body weight (BW) were used. Animals were divided into conventional control diet group and 2% glycerol supplementation group. Steers were allowed a concentrate diet with the amount of 1.5% of BW and a tall fescue with the amount of 0.75% of BW for 8 weeks. Experimental period 1 (P1) was 4 weeks from July 28 to August 26, and period 2 (P2) 4 weeks from August 27 to September 26. Blood was collected 4 times at July 28, August 11, August 27, and September 26. Maximum temperature-humidity index (THI: 75.8) of August (P1) was higher ($P < 0.001$) than that (69.7) of September (P2), although maximum ambient temperature (27.8°C) of P1 was numerically higher than that (26.3°C) of P2 without statistical significance. Glycerol supplementation did not affect both concentrate and forage intake, average daily gain (ADG), and feed/gain ratio at P1 and P2. ADG was lower ($P = 0.03$) at P2 (0.74 kg/d) compared with P1 (0.89 kg/d). Feed/gain ratio was improved ($P < 0.001$) at P2 compared with P1. Glycerol supplementation did not affect blood concentrations of glucose, triglyceride (TG), cholesterol, high-density lipoprotein (HDL), low density lipoprotein (LDL), nonesterified fatty acid, and albumin. Blood concentrations of TG, cholesterol, HDL, LDL, glucose, and albumin were lowest ($P < 0.05$) at late July compared with other times (August and late September). Glycerol supplementation decreased blood CD8+ T cell population at late July and mid-August. However, it did not affect other blood immune cell populations. Blood granulocyte to lymphocyte ratio was highest at August 27. Monocyte and B cell populations were lowest ($P < 0.05$) at August 11. In conclusion, glycerol supplementation did not affect growth and blood metabolic parameters. Feed efficiency was lower at higher THI August compared with September. Some blood metabolic and immunological parameters were influenced by ambient temperature.

Key Words: beef cattle, ambient temperature, glycerol supplementation

W293 Comparison of fatty acid profiles and volatile compounds among quality grades and their association with carcass and sensory traits in loin and rump of Korean cattle steer. Min Yu Piao, Hyun Jin Kim, Cheorun Jo, Hyun Joo Kim, and Myunggi Baik*, *Department of Agricultural Biotechnology, College of Agriculture and Life Science, Seoul National University, Seoul, Republic of Korea.*

This study was performed to compare fatty acid contents and volatile compounds among quality grades (QG) and to understand association between QG and above parameters in loin and rump of Korean cattle steers. Loin and rump samples were obtained from 48 Korean cattle steers with each of 4 quality grades (QG 1++, 1+, 1, and 2; average 32 mo of age). In loin, oleic acid (C18:1n9) contents were highest ($P < 0.05$) in QG 1++ and lowest in QG 2. Linoleic acid (C18:2n6), eicosapentaenoic acid (C20:5: EPA), and polyunsaturated acid (PUFA) contents were lowest ($P < 0.05$) in QG 1++ and highest in QG 2. Palmitic acid, stearic acid, oleic acid, SFA, and MUFA contents were higher ($P < 0.05$) in loin than in rump. In loin, major fatty acid contents per meat, including palmitic acid (C16:0), oleic acid and saturated fatty acid (SFA) and USFA, were highest ($P < 0.05$) in QG 1++ and lowest in QG 2. Marbling score (MS), QG, and overall acceptability of sensory evaluation were

positively correlated ($r > 0.47$, $P < 0.05$) with oleic acid contents of fat. In contrast, MS, QG, tenderness, juiciness, flavor and overall acceptability were inversely correlated ($r < -0.62$, $P < 0.05$) with linoleic acid, EPA, and PUFA contents. MS and QG were positively correlated ($r > 0.59$, $P < 0.001$) with most of fatty acid contents per meat, including palmitic acid, stearic acid, oleic acid, SFA and USFA contents. Total 20 volatile compounds, including aldehydes and hydrocarbons, were detected in loin and rump by GC/MS analysis. Few hydrocarbon contents, including n-pentane, n-hexane, and 2-butene, were higher in QGs 1++ and 1+ than in QGs 1 and 2. Other volatile compounds did not show significant patterns among QGs. MS and QG were positively correlated ($r > 0.67$, $P < 0.05$) with 2-butene, n-pentane, chloroform, and n-hexane contents. Our results revealed that MS and QG are linked with fatty acid contents such as oleic acid in loin. Among 20 volatile compounds detected, only few compounds were associated with MS and QG.

Key Words: Korean cattle steers, quality grade, fatty acid

W294 Effects of essential oils and exogenous enzymes on in vitro ruminal fermentation. Fabiola A. Lino¹, Lidiamar L. R. Vieira¹, Andrea M. Mobiglia¹, Débora G. Sousa¹, Fernando R. Camilo¹, José Tiago Neves Neto¹, Tiago S. Acedo², Cristina S. Cortinhas², João Ricardo R. Dórea², Luis Fernando M. Tamassia², and Juliano J. R. Fernandes^{*1}, ¹Universidade Federal de Goiás, Goiânia, Goiás, Brazil, ²DSM Nutritional Products, São Paulo, São Paulo, Brazil.

The objective of this study was to evaluate the inclusion of a blend of essential oils and exogenous enzymes on in vitro ruminal fermentation (dual flow continuous culture fermenters). Ten fermenters with dual continuous flow and they each have 1.4 L capacity. The dilution rate of the liquid and solid content has maintained 10% and 5%.h⁻¹, respectively. The design was randomized complete block with 4 replicates. Two experimental periods, each one has 8 d, were considered a block. The ruminal fluid was collected from 5 Nelore steers with ruminal cannula. The experimental period has 8 d with a 5-d adaptation period and 3-d collection period. The diet composition on dry matter (DM) was 8.5% sugarcane bagasse, 82.5% corn, 5% soybean meal and 4% mineral mixture. Each fermenter received daily 100g of the diet (on DM) with additives includes, as follows: T1–300mg of monensin (0.012%, monensin from Tortuga); T2–essential oil (0.008%, Crina Ruminants); T3–blend of essential oil (0.008%, Crina Ruminants) and 300 mg of monensin (0.0024%, monensin from Tortuga); T4–blend of essential oil (0.008%, Crina Ruminants) and exogenous amylase (0.05%, Ronozyme Rumistar); T5– blend of essential oil (0.008%, Crina Ruminants), exogenous amylase (0.05%, Ronozyme Rumistar) and exogenous protease (0.08%, Ronozyme Proact). In this study were evaluated short-chain fatty acids (SCFAs) and the apparent digestibility of DM and crude protein (CP). The data were analyzed by R software and the probability of 5% was considered as statistical difference. There were no statistical differences for all variable studied. The data demonstrate that the use of essential oils and exogenous enzymes and their associations must be studied further because they showed the same fermentation parameters than the monensin treatment. Thus, these additives represent a good alternative to monensin.

Contd.

Table 1 (Abstr. W294). Production and ratio of SCFA, DM and CP digestibility on in vitro fermentation of diet with high concentrate level and different kind of additives

| | Treatments | | | | | P-value |
|----------------------------|------------|--------|--------|--------|--------|---------|
| | T1 | T2 | T3 | T4 | T5 | |
| Total SCFA, mM | 149.99 | 143.44 | 142.03 | 147.91 | 152.10 | 0.801 |
| SCFA % | | | | | | |
| Acetate | 50.3 | 50.7 | 51.3 | 53.3 | 48.4 | 0.885 |
| Propionate | 34.4 | 27.2 | 26.8 | 27.4 | 34.1 | 0.465 |
| Butyrate | 9.5 | 17.4 | 17.0 | 14.7 | 12.4 | 0.176 |
| Valerate | 3.21 | 1.99 | 1.99 | 2.00 | 2.58 | 0.311 |
| Acetate: propionate | 1.57 | 1.94 | 1.95 | 1.90 | 1.54 | 0.575 |
| Apparent digestibility (%) | | | | | | |
| DM | 41.90 | 43.51 | 47.96 | 48.12 | 43.65 | 0.614 |
| CP | 35.05 | 34.39 | 39.69 | 38.76 | 39.69 | 0.664 |

Key Words: amylase, essential oil, protease

W295 Effect of steam-flaking on in situ degradability and PDI values of maize, wheat and rice. Fei Wang*, Yunlong Huo, and Qingxiang Meng, *China Agricultural University, Beijing, China.*

The objective of this study was to investigate effects of cereal type and steam-flaking processing on nutritive values of maize, wheat and rice (with whole hulls). Intact and steam-flaked grains of maize, wheat and rice were measured for in situ degradability using nylon bag method and predicted for protein digested in the small intestine (PDI) using the method of French Protein System. Data obtained were subjected to ANOVA as a 2 × 3 factorial design with 3 replicates by the GLM procedure of SAS (Version 9.0; SAS Institute, Cary), and a Duncan significant difference test was used to determine the differences among means. Significance was declared at $P \leq 0.05$. Three ruminally cannulated Limousin steers averaging 400kg of body weight were used. Steers were fed a TMR diet twice daily. The results showed that the rumen effective degradation rate of dry matter (DM), organic matter (OM), starch and crude protein (CP) of the grains were: wheat (80.91%, 81.34%, 87.68% and 81.34%) > rice (71.10%, 72.84%, 84.79% and 72.84%) > maize (65.80%, 63.99%, 74.60% and 63.99%). The rumen degradation rate from fast to slow were: rice > wheat > maize. DM, OM, Starch and CP effective degradability of rice were increased by steam-flaking (SF) processing. SF processing also increased DM, OM, Starch and CP degradation rates of maize and wheat. However, DM, OM, Starch and CP degradation rates of rice were decreased by SF processing. Rumen nondegradable nitrogen from feed (PDIA) and PDI of wheat (50.07 and 99.97g/kg DM) were significantly higher ($P < 0.01$) than maize (34.83 and 55.03 g/kg DM) and rice (23.16 and 46.27 g/kg DM). PDI of maize was reduced ($P < 0.01$) by SF processing, while no significant differences were observed between PDI values of intact and steam-flaked wheat or rice. In summary, rumen effective degradation rate and PDI of wheat are higher than maize and rice. Steam-flaking can significantly improve the rumen effective degradability of rice and decrease the PDI value of maize, but have no significant effect on PDI values of wheat or rice.

Key Words: steam-flaking, in situ, protein digested in the small intestine (PDI) DI

W296 Effects of conventional dietary adaptation over periods of 6, 9, 14, and 21 days on feedlot performance and carcass

traits of Nellore cattle. Daniela Dutra Estevam¹, Danilo Domingues Millen², Ismael de Castro Pereira¹, Ramon Argentini Rizzieri¹, Gabriel Fernandes Melo¹, Alexandre Perdigão¹, Cyntia Ludovico Martins¹, and Mario De Beni Arrigoni¹, ¹São Paulo State University (UNESP), Botucatu, São Paulo, Brazil, ²São Paulo State University (UNESP), Dracena, São Paulo, Brazil.

This study, conducted at the São Paulo State University feedlot, Botucatu Campus, Brazil, was designed to determine the effects of adaptation periods of 6, 9, 14 and 21 d on feedlot performance and carcass traits of Nellore cattle. Cattle were fed for 88-d regardless of adaptation period adopted. The experiment was designed as a completely randomized block, replicated 6 times, in which ninety-six 20-mo-old yearling Nellore bulls (391.1 ± 30.9 kg) were fed in 24 pens (4 animals/pen) according to the different adaptation periods adopted: 6, 9, 14, and 21 d. The adaptation program consisted of ad libitum feeding of 3 diets over adaptation periods with concentrate level increasing from 70% to 86% of diet DM. Each of the adaptation diets containing 70.0%, 75.0%, and 80.5% concentrate were fed for 2-d, 3-d and 7-d to cattle adapted for 6-d, 9-d and 21-d; respectively. Also, the adaptation diets containing 70.0%, 75.0%, and 80.5% concentrate were fed for 4-d, 5-d and 5-d, respectively, to cattle adapted for 14-d. The finishing diet contained: 71.5% cracked corn grain, 14.0% sugarcane bagasse, 10.5% peanut meal, 2.5% supplement, 1.0% urea, and 0.5% limestone (DM basis). Cattle were fed ad libitum twice daily throughout the study, and feed offerings and refusals were weighed daily. Orthogonal contrasts were used to evaluate linear, quadratic, and cubic relationship between adaptation periods and the dependent variable. The use of different adaptation periods did not affect ($P > 0.10$) DMI, either expressed in kg or as % of BW. However, as the adaptation period lasted longer, final BW (6-d = 512.0 kg; 9-d = 521.9 kg; 14-d = 527.6 kg; 21-d = 514.8 kg), ADG (6-d = 1.37 kg; 9-d = 1.48 kg; 14-d = 1.56 kg; 21-d = 1.41 kg), G:F ratio (6-d = 0.142; 9-d = 0.153; 14-d = 0.153; 21-d = 0.146), and HCW (6-d = 277.3 kg; 9-d = 283.3 kg; 14-d = 287.8 kg; 21-d = 283.3 kg) were affected ($P < 0.05$) quadratically. Moreover, dressing percentage increased linearly ($P = 0.05$), as the adaptation period lasted longer (6-d = 54.13%; 9-d = 54.27%; 14-d = 54.55%; 21-d = 55.04%). Thus, yearling Nellore bulls should be adapted for 14 d. Grant provided by São Paulo State Foundation (FAPESP), São Paulo, São Paulo, Brazil.

Key Words: adaptation, Nellore

W297 The effect of crude glycerin concentration on fiber digestion in beef calves. Robert G. Bondurant*, Jana Harding, Melissa Jolly-Breithaupt, James C. MacDonald, Andrea R. McCain, and Samodha C. Fernando, *University of Nebraska-Lincoln, Lincoln, NE.*

Ruminally and duodenally cannulated steers (n = 7; 363 kg) were utilized in a 7 × 4 Latin rectangle to determine the effects of crude glycerin (GLY) on total-tract digestibility, rate and extent of fiber digestibility an rumen fermentation parameters. Crude glycerin replaced soybean hulls (SH) at 0, 4, 8, or 12% of diet DM. Basal diets consisted of 50% wheat straw (WS), SH, 4% supplement, and soybean meal, to maintain a consistent CP level. Fecal samples, rumen and duodenal fluid were collected 1 h before feeding and at 2, 5, and 8 h post feeding. In situ bags containing ground WS or SH were incubated in the rumen for 0, 6, 12, 16, 24, 48, and 96 h to determine NDF digestion rates. Both DM intake and OM intake, decreased quadratically ($P = 0.04$) as GLY increased in the diet, with lowest DM intake and OM intake at 4% GLY inclusion. As GLY inclusion increased from 0 to 12% diet DM, NDF intake linearly decreased ($P < 0.01$) (5.86 and 5.27kg, respectively). Glycerin inclusion level had no effect on total-tract DM or OM digestibility ($P \geq 0.66$). As

GLY inclusion increased from 0 to 12%, total-tract NDF digestibility decreased linearly ($P = 0.02$) from 64.78% to 53.76%, respectively. The inclusion of GLY had no effect on in situ rate of NDF digestibility ($P \geq 0.27$) for WS or SH. Molar acetate proportion decreased linearly ($P < 0.01$) as time post-feeding progressed as well as GLY increased. Molar propionate concentrations increased ($P < 0.01$) as GLY inclusion increased and time to feeding increased from -1 to 8 h. Butyrate concentration increased ($P < 0.01$) at 2, 5, and 8 h post feeding for 8 and 12% GLY, while concentrations were unchanged for 0 and 4% GLY. Subsequently, acetate to propionate ratio decreased ($P < 0.01$) as GLY level increased from 0 to 12% and time from feeding increased from -1 to 8 h. Although the inclusion of GLY in forage-based diets has a negative impact on NDF digestibility, a decrease in acetate to propionate ratio could result in improved G:F.

Key Words: glycerin, fiber, volatile fatty acid

W298 Effect of supplementing feedlot cattle with live *Saccharomyces cerevisiae* on feed intake and rumen parameters.

D. O. Sousa^{*1}, C. A. Oliveira¹, J. M. Souza¹, J. A. Marques¹, A. V. Velasquez¹, E. Chevau^{x2}, L. J. Mari², and L. F. P. Silva¹, ¹University of São Paulo, Pirassununga, São Paulo, Brazil, ²Lallemand Animal Nutrition, Aparecida de Goiânia, Goiás, Brazil.

Our objective was to evaluate the effect of supplementation with live yeast (*Saccharomyces cerevisiae* CNCM I-1077) on feed intake and rumen parameters of beef cattle. Eight rumen cannulated steers with 24 mo and weighting 450 kg were used in a duplicated 4x4 Latin square design. Two levels of concentrate (60 or 80% of DM) and 2 treatments (with or without yeast supplementation) were applied, having sugarcane silage as the roughage source. The product was given in capsules, via rumen cannula, to achieve 8×10^9 cfu of yeast per animal. Animals were housed individually in tie-stalls with free access to water, and fed ad libitum allowing for 5 to 10% of orts. Feed was offered twice daily and orts weighed daily to measure DMI. Each period lasted for 28d to allow for complete washout of the previous treatment. The last 2 d of each treatment period were used for rumen fluid sample collection for pH and short chain fatty acids (SCFA) measurements. Feeding diets with 80% concentrate increased feed intake (9.4 vs. 8.6 kg \pm 0.4, $P = 0.05$); however, yeast supplementation had no effect on feed intake. Feeding a greater concentrate diet decreased mean rumen pH (6.52 vs. 6.69 \pm 0.07, $P < 0.01$), and live yeast supplementation prevented the drop in rumen pH. Feeding the greater concentrate diet increased rumen total concentration of SCFA (43 vs. 36 mM \pm 3, $P = 0.03$), but only without yeast supplementation. Supplementation with live yeast increased the molar proportion of acetate (63.2 vs. 62.4% \pm 0.8, $P = 0.03$), and of valerate (1.23 vs. 1.18% \pm 0.06, $P = 0.06$) in the rumen, and decreased the concentration of butyrate (10.6 vs. 11.4% \pm 0.5, $P = 0.03$). Yeast supplementation promoted changes in rumen fermentation that are associated with better maintenance of a higher pH, and a higher proportion of acetate in the rumen. However, these changes did not translate into a detectable increase of feed intake.

Key Words: short chain fatty acids, sugarcane silage, yeast

W299 Effect of adding virginiamycin in combination with different doses of monensin on feedlot performance. Raul Lizarraga¹, Juan Pablo Russi¹, Luis Casares², Milton Gorocica², and Alejandro Relling^{*1,3}, ¹Fac Cs Veterinarias, UNLP, Argentina, ²Phibro Animal Health, Argentina, ³IGEVET, CCT La Plata, CONICET, Argentina.

The objective of this experiment was to evaluate the effect of the addition of virginiamycin (Vm) in combination with different doses of monensin (Mn) on feedlot performance. Two-hundred 40 crossbred steers (189 \pm 3 kg) were used in an 80 d experiment. Steers were blocked by BW and randomly distributed in 24 pens, 9 animals each. Steers were fed a finishing diet (90% concentrate) based on whole-shelled corn and milo silage as roughage source. Three dietary treatments were evaluated: T1, basal diet supplemented with 180 mg Mn/hd/d; T2, basal diet supplemented with 200 mg Vm and 180 mg Mn hd/d; and T3, 200 mg Vm and 120 mg Mn hd/d. Body weight was measured on d 0, 40 and 80. Dry matter intake was measured weekly and G:F was estimated for the entire feeding period. Prior to harvest, on d 80, an ultrasound was performed to measure back fat (BF) and ribeye area (REA). Hot carcass weight was measured at harvest. Data were analyzed using a complete randomized block design with block as random effect and treatment as fixed effect. Fisher's protected test was used for mean separation. Pen was used as the experimental unit. Hot carcass weight and G:F were greater and DMI lower in the T2 group (all $P < 0.05$, Table 1). Back-fat tended to be greater in T2 ($P = 0.09$), BW on d 40 and 80, and REA were numerically greater in T2 but not statistically different among treatments. Feedlot performance (ADG, G:F) of T3 was numerically greater than that of T1, but differences were not significant (all $P > 0.10$). In conclusion the addition of 200 mg Vm to a higher dose of Mn improved feedlot performance (HCW and G:F).

Table 1 (Absr. W299). Feedlot performance and carcass characteristics in cattle supplemented with Vm in diets with two levels of Mn

| | T1 | T2 | T3 | P-value |
|------------------------------|--------------------|--------------------|--------------------|---------|
| BW d 0, kg | 189.4 | 188.9 | 188.9 | 0.80 |
| BW d 40, kg | 278.3 | 282.8 | 279.6 | 0.44 |
| BW d 80, kg | 302.6 | 305.8 | 303.1 | 0.64 |
| ADG, kg/d | 1.42 | 1.46 | 1.42 | 0.73 |
| DMI, kg/d | 9.32 ^a | 8.59 ^b | 9.19 ^a | <0.01 |
| G:F | 0.137 ^a | 0.150 ^b | 0.137 ^a | 0.05 |
| Carcass weight, kg | 173.5 ^c | 178.0 ^d | 171.2 ^c | 0.05 |
| Ribeye area, cm ² | 52.1 | 52.4 | 52.1 | 0.95 |
| Back fat, cm | 0.49 | 0.53 | 0.50 | 0.09 |

^{ab}Values with different superscripts are statistically different at $P < 0.05$.

^{cd}Values with different superscripts are statistically different at $P < 0.10$.

Key Words: beef cattle, virginiamycin, monensin

W300 Evaluation of rumen microbiota in sugarcane silage based diet with different sources of nonfibrous carbohydrates. J.

M. Souza, D. O. Sousa^{*}, L. G. Mesquita, N. R. B. Cònsolo, M. O. Frasseto, C. A. Oliveira, and L. F. P. Silva, University of São Paulo, Pirassununga, São Paulo, Brazil.

With the increasing adoption of sugarcane silage in ruminant feed, it becomes essential to understand the effects of supplementation with different levels and sources of non-fiber carbohydrates (NFC) on ruminal microorganisms. The aim of this study was to characterize the population change of cellulolytic and amylolytic rumen bacteria, caused by the increase of concentrate, and by the use of different sources of NFC in diets with sugarcane silage. Six Nellore beef cattle, castrated, and cannulated in the rumen, were used in a 3 0215 3 Latin square design. The experimental diets were formulated with 2 levels of concentrate: 60% or 80%, and the roughage used was sugarcane silage. Within each level of concentrate inclusion, 3 different sources of NFC were used: steam flaked corn (SFC), pelleted citrus pulp (PCP), or ground corn (GC). SFC and PCP were included in the diet in partial replacement of 70% of GC.

At d 14 of each period, samples of rumen contents were collected for DNA extraction and subsequent analysis of the relative quantification of rumen microorganisms by real time PCR. The increase of concentrate in the diet resulted in a decrease in population of *Fibrobacter succinogenes* ($P < 0.01$) and *Streptococcus bovis* ($P < 0.01$), and in an increased of *Ruminococcus flavefaciens* ($P = 0.05$) and *Megasphaera elsdenii* population ($P = 0.04$), without changing the *Ruminococcus albus* population ($P = 0.63$). The partial replacement of GC by PCP resulted in an increase of *S. bovis* population ($P = 0.01$) and in a reduction of *R. flavefaciens* ($P < 0.01$), without changing *F. succinogenes* ($P = 0.64$). Moreover, the replacement of GC by SFC increased the population of *M. elsdenii* ($P = 0.03$) and reduced *R. albus* ($P < 0.01$). There was a significant Diet*NFC interaction only for *M. elsdenii* ($P = 0.02$), where SFC increase *M. elsdenii* population only at the 80% concentrate diet. In conclusion, substituting GC for PCP resulted in an increase only in population of *S. bovis*, while substituting GC for SFC resulted in a decrease in population of *R. albus*, and in an increase of *M. elsdenii*, in diets with sugarcane silage as the roughage source.

Key Words: beef cattle, rumen microorganism, qPCR

W301 Effects of rotating antibiotic and ionophore feed additives on enteric methane and volatile fatty acid production of steers consuming a high forage diet. Whitney Crossland^{*1}, Luis Tedeschi¹, Todd Callaway², Mike Miller¹, Brandon Smith¹, and Matt Cravey³, ¹Texas A&M University, College Station, TX, ²USDA-ARS Southern Plain Region, College Station, TX, ³Huvepharma Inc., Amarillo, TX.

Feed additives such as ionophores and antibiotics have been shown to decrease ruminal methanogenesis, but evidence as a long-term means of mitigation is lacking. In the present study, we proposed a rotation of feed additives as an alternative to reduce methane (CH₄) production and to increase animal responses. Rumen-cannulated steers ($n = 12$) were fed a basal high forage diet at 2% of BW (DM) for 13 wk in a Calan gate facility for individual DMI measurement. Steers were randomly assigned to 1 of 6 treatments: (1) control (C) containing the basal forage diet and no additive, (2) bambermycin (B) = C + 20 mg B/hd/d, (3) monensin (M) = C + 200 mg M/hd/d, (4) B7M = rotating B and M treatments weekly, (5) B14M = rotating B and M treatments every 14 d, and (6) B21M = rotating B and M treatments every 21 d. Steers were blocked by weight in a RCB design with repeated measures each wk. Performance data and rumen fluid were collected weekly for in vitro analysis ($n = 13$) and results were interpreted on organic matter intake (OMI) basis. Treatments did not affect ADG. Potential activity of CH₄ (PAM) was greatest for M-fed steers and least for B21M-fed steers (0.219 vs 0.172 mM/kg OMI, respectively; $P < 0.05$). Additionally, PAM of the B21M-fed steers was most consistent of all treatments. Total VFA concentration differed ($P < 0.05$), being greatest for M- and B14M-fed steers (3.46 and 3.47 mM/Kg OMI) and lowest for the B7M treatment (2.87 mM/Kg OMI), but were not different from other treatments. The PAM differed over time for all treatments decreasing toward wk 6 then increasing toward wk 12. Wk also affected total VFA peaking at wk 3 followed by a significant depression in wk 4 (4.02 vs 2.86 mM/Kg OMI; $P < 0.05$). There is an evidence to suggest that weekly rotation of B and M feed additives may not provide additional benefit at either the ruminal or environmental level when compared with continuous feeding of single feed additives. However, a 21-d rotation may combine desirable animal performance, decreased CH₄ emissions, and provide a novel practical approach for industry feeding protocol.

Key Words: feed additive, CH₄, VFA

W302 Flint corn processing methods and dietary concentrations of roughage NDF for finishing cattle: 1. Intake and digestibility of nutrients. Antonio Humberto Fleury de Melo¹, Murillo Alves Porto Meschiatti¹, João Meneghel de Moraes¹, Camila Delveaux Araujo Batalha¹, Lucas Jado Chagas¹, Débora de Carvalho Basto¹, Jonas de Souza¹, Nayana Carla Gonçalves Barbosa², and Flávio Augusto Portela Santos^{*1}, ¹University of São Paulo, Piracicaba, São Paulo, Brazil, ²Federal University of Goiás, Jataí, Goiás, Brazil.

The objective of this trial was to evaluate intake and total-tract apparent digestibility (AD) of nutrients in finishing diets containing flint corn (70 – 75% vitreous endosperm) either ground (particle size: 2.70 mm) or steam-flaked (bulk density: 360 g/L), combined with dietary contents of 4, 7, 10 or 13% (DM basis) NDF from sugarcane bagasse. Sixteen Nellore bulls (BW = 484.46 ± 7.47 kg) fitted with rumen cannula, were fed diets containing 76–86% corn and randomly allocated to 16 pens for 2 periods (14 d for adaptation and 6 d for collection) in a 2 × 4 factorial arrangement. Total feces collection was carried out for 4 d. During the collection period the amount of diet offered was restricted to 85% of previous ad libitum intake. The data were analyzed using a PROC MIXED model with period and animal as random effect. Linear and quadratic effects were tested for dietary concentrations of roughage NDF. There were no interactions between corn processing and dietary concentrations of sugarcane bagasse NDF. Steam flaking of flint corn tended ($P = 0.07$) to decrease DMI (7.76 vs. 7.28 kg.d⁻¹), it decreased ($P < 0.01$) AD of NDF (50.73 vs. 33.12%) and of crude protein (75.05 vs. 71.93%), but it increased ($P < 0.01$) AD of DM (73.45 vs. 77.38%) of TCHO (75.19 vs. 81.93%), of NFC (84.1 vs. 95.16%) and of starch (95.95 vs. 99.36%). Steam flaking increased ($P < 0.01$) dietary TDN concentration (80.26% vs. 84.22%) but had no effect ($P = 0.73$) on TDN intake (6.22 vs. 6.15 kg.d⁻¹). Increasing roughage NDF content of the diets caused a quadratic response for DMI (6.95, 7.90, 7.80 and 7.41 kg.d⁻¹, respectively) and nutrient intakes and a linear decrease for AD of DM (78.80; 75.95; 75.90 and 72.80% respectively), of TCHO (81.55, 78.76, 78.86 and 75.07% respectively) and had no effect ($P = 0.40, 0.11, 0.94$ and 0.29 , respectively) on AD of NDF, NFC, CP, EE and starch. In conclusion, steam flaking increases energy value of flint corn and feeding around 7% of sugarcane bagasse NDF in finishing diets optimizes energy intake of Nellore bulls.

Key Words: feedlot, steam-flaked corn, roughage NDF

W303 Effect of excess MP supplementation from corn gluten meal or soybean meal on plasma amino acid concentrations of beef cows consuming low quality forage. Taylor C. Geppert^{*1}, Allison M. Meyer², and Patrick J. Gunn¹, ¹Department of Animal Science, Iowa State University, Ames, IA, ²Division of Animal Sciences, University of Missouri, Columbia, MO.

The objective was to determine the effects of excess MP supplementation from feedstuffs differing in rumen degradability of protein on plasma AA concentrations. As part of a larger study, we hypothesized excess MP supplementation from feedstuffs differing in rumen degradability would alter reproductive performance of beef cows around the time of ovulation, potentially due to changing circulating AA concentrations. Non-pregnant, nonlactating mature beef cows ($n = 18$) were allotted by age, BW and BCS to ad libitum corn stalks and 1 of 2 isocaloric, isonitrogenous dietary supplements consisting primarily of either (1) corn gluten meal (GLM) or (2) soybean meal (SBM), supplemented at 150% of NRC MP requirements. Cows were individually supplemented once daily for 58 d and coccygeal blood samples were taken on d 47 for AA analysis. Data were analyzed using the MIXED procedures of SAS.

On d 47, total AA, essential AA, nonessential AA, glycogenic AA and branched-chain AA were not different ($P \geq 0.21$) between treatments. However, total ketogenic AA tended to be greater ($P = 0.07$) in excess GLM than excess SBM supplemented cows. When expressed as a percent of total AA, arginine, lysine, threonine, tryptophan and valine were lesser ($P \leq 0.05$) in GLM than SBM supplemented cows. However as a percent of total AA, leucine, methionine and phenylalanine were greater ($P \leq 0.03$) in GLM than SBM cows. In addition, as a percent of total AA asparagine and proline were greater ($P < 0.05$) in cows supplemented with GLM than SBM. As a percent of essential AA, arginine, lysine, valine, tryptophan and threonine were lesser ($P \leq 0.04$), and methionine, phenylalanine and leucine were greater ($P \leq 0.03$) in GLM than SBM. These data illustrate that supplementing MP at 150% of NRC requirements from feedstuffs differing in rumen degradability may change the profile of circulating plasma AA around the time of ovulation in beef cows consuming low quality forage. However, the effects of this change in AA profile on reproductive function of beef cows are still largely undetermined and warrant further investigation.

Key Words: amino acid, corn stalk, protein

W304 Flint corn processing methods and dietary concentrations of roughage NDF for finishing cattle: 2. Rumen fermentation, N metabolism, and ingestive behavior. Antonio Humberto Fleury de Melo¹, Murillo Alves Porto Meschiatti¹, Camila Delveaux Araujo Batalha¹, Jonas de Souza¹, João Meneghel de Moraes¹, Débora de Carvalho Basto¹, Lucas Jado Chagas¹, Nayana Carla Gonçalves Barbosa², and Flávio Augusto Portela Santos^{*1}, ¹University of São Paulo, Piracicaba, São Paulo, Brazil, ²Federal University of Goiás, Jataí, Goiás, Brazil.

The objective of this trial was to evaluate rumen fermentation, N metabolism and ingestive behavior of cattle fed diets containing flint corn (70 – 75% vitreous endosperm) either ground at 2.70 mm or steam-flaked at 360 g/L, combined with dietary contents of 4, 7, 10 or 13% (DM basis) NDF from sugarcane bagasse. Sixteen Nellore bulls (484.46 ± 7.47 kg) fitted with rumen cannula, were fed diets containing 76–86% corn and randomly allocated to 16 pens for 2 periods (14d adaptation; 6d collection) in a 2 × 4 factorial arrangement. During the collection period the amount of diet offered once a day was restricted to 85% of previous ad libitum intake. Rumen samples were collected on d 16 at 0, 2, 4, 6, 8, 10, 12, 16 and 24 h post feeding. Blood samples and urine spot samples were collected on d 15, 4 h post feeding. Microbial synthesis was estimated based on the purine derivative method. The data were analyzed using a PROC MIXED model with period and animal as random effect. Linear and quadratic effects were tested for dietary concentrations of roughage NDF. No interactions were observed between corn processing and NDF level. Steam-flaking increased ($P < 0.01$) rumen propionate and decreased ($P < 0.01$) butyrate and N-NH₃ concentrations. Steam-flaking decreased ($P < 0.01$) N ingestion, blood urea nitrogen (BUN), N urine and total N excretion and increased ($P = 0.03$) microbial efficiency. Increasing dietary sugarcane bagasse NDF tended to increase linearly ($P = 0.10$) rumen pH and decreased linearly ($P = 0.05$) rumen propionate and ($P = 0.05$) total VFA. Increasing bagasse NDF caused a quadratic effect ($P < 0.01$) on N ingestion and absorption. Rumination and mastication time were increased linearly ($P < 0.01$) as roughage NDF was increased. Blood glucose and BUN were not affected ($P = 0.53$ and 0.54 , respectively) by bagasse NDF level. In conclusion, steam-flaking of flint corn improves energetics and N metabolism of beef cattle. Feeding increasing levels of bagasse

NDF stimulates rumination but it decreases the efficiency of energy production in the rumen.

Key Words: feedlot, steam-flaked corn, roughage NDF

W305 Carcass traits of Nellore cows finished in different times of high intake supplementation in pasture. Flavio Dutra de Resende^{*1,2}, Ana Paula Reiff Janini², Ivanna Moraes de Oliveira¹, Aline Domingues Moreira², Fernanda Diamantino dos Santos³, Paloma Helena Gonçalves³, Michele Aparecida Prado Alves³, and Gustavo Rezende Siqueira^{1,2}, ¹Agência Paulista de Tecnologia dos Agronegócios, Colina, São Paulo, Brazil, ²UNESP, Jaboticabal, São Paulo, Brazil, ³UNIFEB, Barretos, São Paulo, Brazil.

This project aimed to evaluate the carcass traits of Nellore cull cows finished in different times of high intake supplementation in *Brachiaria brizantha* ‘Marandu’ pasture, in dry season. It is assumed that the high intake supplementation in pasture could improve the carcass traits of these animals. The experiment was performed from 09/2014 to 11/2014, assessing 4 times of finishing with high intake supplementation – 2% of BW – in pasture (0, 21, 42 and 63 d). Several 60 Nellore cull cows were used and kept, before the beginning of the study, in system extensive production, pasture plus mineral salt ad libitum. The cull cows were distributed randomly (experimental design in randomized blocks) on 20 experimental units (paddock), composed by 3 animals/paddock and 5 paddocks/supplementation time. At zero time, the cows were conducted directly to slaughter and, at the end of feeding times 21, 42 and 63 d, the remaining cull cows were slaughtered for evaluation of carcass traits. The supplementation time did not alter the carcass length (136.43 cm; $P = 0.90$), carcass depth (45.59 cm; $P = 0.53$) and size of round (87.03 cm; $P = 0.79$) from cull cows. It was a linear increase ($P < 0.01$) on weight and carcass yield, *longissimus* muscle area (LM area) and subcutaneous fat thickness (12th-rib fat). Cull cows finished with 63 d of supplementation at pasture presented increased weight from 203.7 kg to 257.8 kg and the LM area became from 56.9 cm² to 70.8 cm², regarding the slaughtered cull cows at d 0. At the same period, it was registered an increase of 3.59 percentage points in carcass yield, initially of 51.5%; as well in 12th-rib fat, passing from 2.02 mm to 6.15 mm. Therefore, the increase in supplementation time applied in finishing of Nellore cull cows allows an improvement the carcass traits.

Key Words: carcass, loin eye area, subcutaneous fat thickness

W306 Sugar cane straw replacing whole corn on growth and intake of feedlot finishing bulls. Barbara J. M. Lemos^{*1}, Flavio G. F. Castro², Bruno P. C. Mendonça², Dheivid B. Fernandes², and Juliano J. R. Fernandes¹, ¹Universidade Federal de Goiás, Goiania, Goiás, Brazil, ²AgroCria, Goiania, Goiás, Brazil.

The effects of increasing amounts of pelleted sugar cane straw (SCS) replacing corn in finishing diets (85% whole corn + 15% pelleted concentrate) of feedlot young bulls were evaluated during a 103 d period. Nellore bulls (n = 80; 337 ± 31 kg of BW) were allotted to 20 outdoor pens (4 bulls per pen) and assigned to a complete randomized block design with 5 blocks (initial BW) and 4 dietary treatments (Table 1): Control (whole corn), SCS3%, SCS6%, SCS9%. Bulls were adapted over 21 d by decreasing inclusion of SCS on dietary DM (d 1 to 7, 30% of SCS; d 8 to 14, 20% of SCS; d 15 to 21, 10% of SCS). The DMI increased linearly up to 23%, as kg/d and 22% as % of BW ($P = 0.01$), 19% on DIP intake ($P = 0.03$) and 39% on peNDF intake ($P < 0.01$) with increased addition of SCS. No effects were observed in NE intake ($P > 0.05$). The Final BW and ADG tended to increase linearly ($P = 0.10$,

BW; $P = 0.07$, ADG) with increasing amounts of SCS. In conclusion, SCS is a possible peNDF source replacing whole corn. There were evidences of growth and nutrients intake improvement.

Table 1 (Abstr. W306). Composition of finishing diets with increasing amounts of pelleted sugar cane straw (SCS; composition of 92% DM, 6.9% ash, 1.8% CP, 0.5% EE, 69% NDF, 13% peNDF, 37% ADF) replacing corn (3, 6, and 9% of dietary DM) and effects on growth and intake of Nelore bulls fed 85% whole corn + 15% pelleted concentrate

| Item | Diet | | | | SEM | P-value | |
|---------------------------|---------|-------|-------|-------|-------|---------|------|
| | Control | SCS3% | SCS6% | SCS9% | | Lin | Quad |
| Diet composition, % of DM | | | | | | | |
| CP | 14.6 | 14.3 | 14.1 | 13.8 | — | — | — |
| DIP | 8.1 | 7.9 | 7.8 | 7.7 | — | — | — |
| NDF | 14.1 | 15.8 | 17.6 | 19.3 | — | — | — |
| peNDF | 5.4 | 5.6 | 5.9 | 6.1 | — | — | — |
| NEm, Mcal/kg | 2.10 | 2.03 | 1.97 | 1.90 | — | — | — |
| NEg, Mcal/kg | 1.44 | 1.40 | 1.35 | 1.31 | — | — | — |
| Growth | | | | | | | |
| Initial BW, kg | 340.1 | 338.3 | 336.5 | 336.5 | 1.50 | 0.95 | 0.21 |
| Final BW, kg | 490.3 | 499.8 | 498.6 | 500.8 | 6.00 | 0.10 | 0.24 |
| ADG, kg/d | 1.459 | 1.567 | 1.574 | 1.595 | 0.052 | 0.07 | 0.34 |
| Intake | | | | | | | |
| DM, kg/d | 8.59 | 9.40 | 10.05 | 10.57 | 0.499 | 0.01 | 0.71 |
| DM, % of BW | 2.07 | 2.25 | 2.41 | 2.53 | 0.113 | 0.01 | 0.84 |
| NEm+g, Mcal/d | | | | | | | |
| DIP, kg/d | 0.684 | 0.745 | 0.784 | 0.813 | 0.039 | 0.03 | 0.69 |
| peNDF, kg/d | 0.461 | 0.530 | 0.626 | 0.641 | 0.032 | <0.01 | 0.41 |
| G:F | 0.170 | 0.168 | 0.157 | 0.153 | 0.007 | 0.08 | 0.91 |

Key Words: beef cattle, byproduct, fiber

W307 Impact of a molasses-based liquid feed supplement on the diet selection behavior and growth of fattening calves. Lisa J. Gordon and Trevor J. DeVries*, *Department of Animal and Poultry Science, University of Guelph, Guelph, ON, Canada.*

The objective of this study was to assess the impact of a molasses-based liquid feed (LF) supplement on the feed sorting behavior and growth of young, fattening cattle fed a high-grain diet. Twenty-four male Holstein calves, 90.2 ± 2.6 d old and weighing 137.5 ± 16.9 kg, split into groups of 4, were exposed to each of 2 treatments in a crossover design with 35-d treatment periods. Treatments were (1) control diet (76.0% high-moisture corn, 19.0% protein supplement, 5.0% alfalfa/grass haylage), and (2) LF diet (68.4% corn, 17.1% protein supplement; 9.0% molasses-based LF, and 4.5% alfalfa/grass haylage). Diets were designed to support 1.5 kg/d ADG. Data were collected for the final 3 wk of each treatment period. Feed intakes were recorded daily and calves were weighed 2x/wk. Feed samples of fresh feed and refusals were collected 3x/wk for particle size analysis. The particle size separator had 3 screens (19, 8, and 1.18 mm) and a bottom pan, resulting in 4 fractions (long, medium, short, fine). Sorting was calculated as the actual intake of each fraction expressed as a % of its predicted intake. Data were summarized by pen and week and analyzed in a repeated measures general linear mixed model. Calves tended ($SE = 4.8$; $P = 0.08$) to sort for long particles on the control diet (110.5%) and did not sort these particles on the LF diet (96.8%). Sorting for medium particles ($102.6 \pm 0.6\%$) was similar ($P = 0.9$) across diets. Calves sorted against short particles on

the LF diet (97.5%; $SE = 0.5$; $P = 0.04$), but did not sort this fraction on the control diet (99.4%). Calves sorted against fine particles ($79.3 \pm 4.0\%$), to a similar extent ($P = 0.2$), on both diets. DMI was similar across diets (6.1 kg/d; $SE = 0.1$; $P = 0.9$), but day-to-day variability in DMI was higher (0.5 vs 0.4 kg/d; $SE = 0.02$; $P = 0.04$) when calves were fed the control compared with the LF diet. Calves on both diets had similar ADG (1.6 kg/d; $SE = 0.04$; $P = 0.8$) as well as within-pen variability in ADG (0.4 kg/d; $SE = 0.05$; $P = 0.7$). Feed conversion was also similar between control and LF diets (4.3 vs 3.9 kg DM/kg gain; $SE = 0.3$; $P = 0.4$). The results suggest that despite promoting more consistency in DMI, addition of a molasses-based LF to a high-grain, finishing calf diet did not affect calf growth.

Key Words: molasses, fattening calf, sorting

W308 Feedlot performance and carcass traits of Nelore and ½ Angus x Nelore cattle adapted either for 9 or 14 days.

Daniel Hideki Mariano Watanabe*¹, Murillo Ceola Stefano Pereira², Ana Carolina Janssen Pinto¹, Wilson Inácio Silva Filho¹, Gustavo Perina Bertoldi¹, André Luiz Nagatani Rigueiro¹, Anderson Augusto Santos¹, Paulo César da Silva Santos¹, Luis Felipe Rebeschini Oliveira¹, Pedro Fernando Santi¹, João Victor Tino Dellaqua¹, Mário De Beni Arrigoni², and Danilo Domingues Millen¹, ¹São Paulo State University (UNESP), Dracena, São Paulo, Brazil, ²São Paulo State University (UNESP), Botucatu, São Paulo, Brazil.

This study, conducted at the São Paulo State University feedlot, Dracena Campus, Brazil, was designed to evaluate the length of adaptation period to high concentrate diets on overall feedlot performance and carcass traits of Nelore (NE) and 1/2 Angus x Nelore (AN) cattle. The experiment was designed as a completely randomized block with 2×2 factorial arrangement, replicated 6 times (3 animals/pen), in which seventy-two 22-mo-old yearling bulls [36 NE, and 36 AN] were fed in 24 pens for 89 d according to the treatments: NE adapted for 9-d; NE adapted for 14-d, AN adapted for 9-d, and AN adapted for 14-d. Average initial BW was 319.2 ± 18.5 kg, and 307.9 ± 29.5 kg for NE and AN, respectively. The adaptation program consisted of ad libitum feeding of 3 diets over adaptation periods with concentrate level increasing from 62% to 86% of diet DM. Each of the adaptation diets containing 62%, 70%, and 78% concentrate was fed for 3-d to cattle adapted for 9-d. For cattle adapted for 14-d, the adaptation diets containing 62%, 70%, and 78% concentrate were fed for 5-d, 4-d and 5-d, respectively. The finishing diet contained: 66.5% cracked corn grain, 14.0% sugarcane bagasse, 16.0% cottonseed meal, 1.5% supplement, 1.2% urea, and 0.8% limestone (DM basis). Cattle were fed ad libitum twice daily throughout the study, and feed offerings and refusals were weighed daily. No significant ($P > 0.10$) adaptation length main effects were observed for any of the feedlot performance and carcass traits variables evaluated. However, significant ($P < 0.01$) biotype main effects were observed, in which AN yearling bulls had greater final BW (466.6 kg vs. 425.8 kg), ADG (1.71 kg vs. 1.27 kg), DMI expressed in kg (11.8 kg vs. 9.5 kg), and DMI expressed as % of BW (3.07% vs. 2.53%), improved G:F ratio (0.146 vs. 0.134), and heavier HCW (243.6 kg vs. 229.0 kg). No significant ($P = 0.74$) biotype main effect was observed for dressing percentage (AN = 53.5%; NE = 53.2%). Thus, AN yearling bulls performed better than NE yearling bulls regardless of length of the adaptation period adopted. Cattle should be adapted for 14-d, because longer adaptation periods are safer. Grant provided by São Paulo State Foundation (FAPESP), São Paulo, São Paulo, Brazil.

Key Words: adaptation, biotype

W309 Rumen morphometrics of Nellore and 1/2 Nellore x Angus cattle adapted either for 9 or 14 days to high-concentrate diets. André Luiz Nagatani Rigueiro^{*1}, Daniel Hideki Mariano Watanabe¹, Murillo Ceola Stefano Pereira², Wilson Inácio Silva Filho¹, Gustavo Perina Bertoldi¹, Ana Carolina Janssen Pinto¹, Anderson Augusto Santos¹, Mariana Squizatti¹, Daniela Dutra Estevam², Lais Aquino Tomaz¹, Osvaldo Alex Souza¹, and Danilo Domingues Millen¹, ¹São Paulo State University (UNESP), Dracena, São Paulo, Brazil, ²São Paulo State University (UNESP), Botucatu, São Paulo, Brazil.

This study, conducted at the São Paulo State University feedlot, Dracena Campus, Brazil, was designed to evaluate the length of the adaptation period to high concentrate diets on rumen morphometrics and rumenitis of Nellore (NE) and 1/2 Angus × Nellore (AN) cattle. The experiment was designed as a completely randomized block with 2 × 2 factorial arrangement, replicated 6 times (3 animals/pen), in which seventy-two 22-mo-old yearling bulls [36 NE (319.2 ± 18.5 kg), and 36 AN (307.9 ± 29.5 kg)] were fed in 24 pens for 89 d according to the treatments: NE adapted for 9-d; NE adapted for 14-d, AN adapted for 9-d, and AN adapted for 14-d. The adaptation program consisted of ad libitum feeding of 3 diets over adaptation periods with concentrate level increasing from 62% to 86% of diet DM. Each of the adaptation diets containing 62%, 70%, and 78% concentrate was fed for 3-d to cattle adapted for 9-d. For cattle adapted for 14-d, the adaptation diets containing 62%, 70%, and 78% concentrate were fed for 5-d, 4-d and 5-d, respectively. The finishing diet contained: 66.5% cracked corn grain, 14.0% sugarcane bagasse, 16.0% cottonseed meal, 1.5% supplement, 1.2% urea, and 0.8% limestone (DM basis). At harvest, rumenitis incidence (RUM) was determined, on the entire washed rumen, using a scale of 0 (no lesions noted) to 10 (severe ulcerative RUM). Likewise, a 1-cm² fragment of each rumen was collect from cranial sac. The number of papillae per cm² of rumen wall (NOP) was determined, as well as the mean papillae area (MPA). The rumen wall absorptive surface area in cm² was calculated as follows: 1 + (NOP × MPA) – (NOP × 0.002). No significant ($P > 0.10$) biotypes and adaptation length main effects were observed for any of the rumen morphometrics variables evaluated. However, a significant ($P < 0.01$) biotype main effect was observed for RUM, where NE yearling bulls had greater RUM scores than AN yearling bulls (2.05 vs. 1.35). No significant ($P = 0.15$) adaptation length main effect was observed for RUM. Thus, NE yearling bulls are more sensitive to rumen epithelium damage, regardless of length of the adaptation period adopted. Grant provided by São Paulo State Foundation (FAPESP), São Paulo, São Paulo, Brazil.

Key Words: adaptation, rumenitis

W310 Relationships of feedlot performance and rumen morphometrics of Nellore cattle differing in phenotypic residual feed intake. Murillo Ceola Stefano Pereira², Gustavo Durante Cruz³, Mario De Beni Arrigoni², Juliana Silva¹, Tássia Veluma Barbosa Carrara², and Danilo Domingues Millen^{*1}, ¹São Paulo State University (UNESP), Dracena, São Paulo, Brazil, ²São Paulo State University (UNESP), Botucatu, São Paulo, Brazil, ³Cargill Animal Nutrition, Elk River, MN.

The objective of this study was to examine the relationship of feedlot performance, DMI variation and rumen morphometrics of Nellore cattle classified by residual feed intake (RFI). A study was conducted, in 2 consecutive years, using individual pens at São Paulo State University feedlot, Dracena campus, Brazil. At year 1, forty-eight 20-mo-old Nellore bulls (358.2 ± 19.4 kg) were fed for 94 d. At year 2, sixty 20-mo-old Nellore bulls (402.5 ± 33.0 kg) were fed for 84-d. All Nellore bulls

were categorized as high RFI (RFI > 0.5 SD above the mean, n = 25), medium RFI (RFI ± 0.5 SD from the mean, n = 56) and low RFI (RFI < 0.5 SD below the mean, n = 27). The finishing diet, in both years, contained: 71.5% cracked corn grain, 16.0% sugarcane bagasse, 7.7% soybean meal, 3.5% supplement, and 1.3% urea (DM basis). Variables were analyzed by a linear model with year and RFI groups as the main effects, with interactions. Animals classified as low RFI had lower ($P = 0.01$) initial BW (high = 382.5 kg; medium = 378.1 kg; low = 371.8 kg), daily DMI in kg (high = 10.1 kg; medium = 9.5 kg; low = 8.2 kg), daily DMI expressed as % of BW (high = 2.32%; medium = 2.18%; low = 1.92%), and improved ($P = 0.01$) G:F ratio (high = 0.112; medium = 0.131; low = 0.143). However, no significant ($P > 0.10$) RFI effect was observed for ADG (high = 1.14 kg; medium = 1.25 kg; low = 1.16 kg), final BW (high = 484.0 kg; medium = 489.5 kg; low = 474.7 kg) and HCW (high = 266.7 kg; medium = 262.7 kg; low = 256.1 kg). Moreover, animals categorized as high RFI had lower ($P = 0.02$) DMI variation (high = 12.28%; medium = 15.14%; low = 16.24%). No significant ($P > 0.10$) RFI effect was observed for rumenitis (high = 1.4; medium 1.4; low = 1.1), number of papillae (high = 45.6; medium = 43.6; low = 43.1), and absorptive surface area (high = 25.4 cm²; medium = 26.3 cm²; low = 22.7 cm²). Nonetheless, Nellore bulls ranked as low RFI presented smaller ($P = 0.07$) mean papillae area (high = 0.55 cm²; medium = 0.60 cm²; low = 0.50 cm²). Selection of low RFI Nellore bulls is feasible because it does not negatively affect feedlot performance, HCW, and rumen characteristics.

Key Words: papillae, Nellore

W311 Effects of crude glycerin on feed intake and apparent total-tract digestibility of finishing diets in crossbred heifers. E. H. C. B. van Cleef^{*1,3}, S. Uwituze², C. A. Gilis², C. L. Van Bibber-Krueger², K. A. Miller², C. C. Aperce², and J. S. Drouillard², ¹São Paulo State University, Jaboticabal, São Paulo, Brazil, ²Kansas State University, Manhattan, KS, ³FAPESP, São Paulo, Brazil.

Expansion of the biodiesel industry worldwide has increased availability of crude glycerin, a major by-product of biodiesel production from animal and vegetable oils. Our objective was to evaluate DMI and apparent total-tract digestibilities of DM, OM, and NDF in crossbred heifers fed finishing diets in which 15% crude glycerin was used to replace a portion of dry-rolled corn. Twenty-four crossbred heifers (334.4 ± 0.9 kg initial BW) were randomly assigned to 12 pens and allowed ad libitum access to isonitrogenous finishing diets containing 10% corn silage and 90% concentrate composed of dry-rolled corn, soybean hulls, corn gluten feed, soybean meal, mineral premix, and 0 (CON) or 15% crude glycerin (GLY). Glycerin contained 81.5% glycerol, 13.3% water, 6.3% ash, and <0.02% methanol. Animals were fed chromic oxide (0.1% of diet DM), and fecal grab samples were collected 3 times daily (8, 16, and 24 h after feeding) on d 7, 21, and 35; composited by animal; dried; and ground through a 1-mm screen. Chromic oxide contents of feces and diets were determined by atomic absorption and used to calculate apparent total-tract digestibilities of DM, OM, and NDF. Weights of feed DM delivered and refused were recorded daily to calculate DMI. Data were analyzed as a completely randomized design with repeated measures using a mixed model with diet, time, and diet × time as fixed effects, and animal within diet × time as a random effect. There were no interactions between treatment and time of sampling ($P > 0.10$), suggesting no adaptive response to dietary glycerin. Feed DMI was similar among treatments (10.93 and 10.92 kg/d for CON and GLY, respectively; $P > 0.1$). Organic matter digestibility of GLY diet was greater than that of the CON diet ($P = 0.04$), and DM digestibility followed a similar trend ($P = 0.06$). Digestibility of NDF was unaffected

by glycerin addition ($P > 0.10$). Crude glycerin can effectively replace dry-rolled corn in diets for beef heifers when fed at 15% of diet DM, improving OM digestion without adversely affecting NDF digestibility.

Key Words: apparent total-tract digestibility, by-product, glycerin

W312 Impact of the nutritional plan in the growing phase on performance of Nellore cattle during the finishing phase. Ivanna Moraes de Oliveira*¹, Matheus Henrique Moretti², João Alexandrino Alves Neto³, Aline Domingues Moreira⁴, Rodolfo Maciel Fernandes⁴, João Marcos Beltrame Benatti⁵, Gustavo Rezende Siqueira^{1,4}, and Flávio Dutra de Resende^{1,4}, ¹Agência Paulista de Tecnologia dos Agronegócios, Colina, São Paulo, Brazil, ²Agroceres Multimix, Rio Claro, São Paulo, Brazil, ³Campos Rações e Minerais, Acreúna, Goiás, Brazil, ⁴UNESP, Jaboticabal, São Paulo, Brazil, ⁵Trouw Nutrition/Bellman, Mirassol, São Paulo, Brazil.

The effects of nutritional plans (NP) in the growing phase on the performance of Nellore cattle during the finishing phase were evaluated. Our hypothesis was that the NP in the growing phase affect the body weight gain rate (BWGR) in the finishing phase, and that there is an interaction between the NP. The evaluated NP were characterized by the combination of different types of supplementation in the dry season (post-weaning - phase I) e wet season (phase II) (both growing phase) and finishing stage (dry season - phase III). In phase I, the animals received protein supplementation (PS; 0.1% BW) or protein-energy supplementation (PES; 0.5% BW); in phase II, mineral salt (MS; ad libitum), or PES (0.5% BW); and in phase III, the animals under the different NP in the growing phase (PS/MS; PS/PES; PES/MS and PES/PES) received 1.5 or 2.0% BW of supplement. Animals were maintained on a Marandu-grass pasture at all phases. Animals were weighed after 16 h of solid-feed deprivation. The BWGR was calculated as $(ADG \div \text{average BW of the animal} - \text{in each phase}) \times 100$. The experimental design was completely randomized, with a 2 (supplements in phase I) \times 2 (supplements in phase II) \times 2 (supplements in phase III) factorial arrangement; $n = 5$ (animals as replicate). The t -test was applied at 10% probability. No interaction was detected ($P > 0.10$) between phases I, II, and III. In addition, the NP supplied in phase I did not influence ($P > 0.10$) ADG, BWGR, or the final BW in phase III. The ADG during phase III was influenced only by the nutritional history of phase II. In phase III, the animals fed MS (1.02 kg) during phase II had a greater ($P = 0.02$) ADG than those fed PES (0.92 kg). Likewise, the animals fed MS had a higher BWGR in phase III than those fed PES (0.27 vs. 0.21 kg/100 kg BW, respectively). In phase II, the animals fed PES gained 60.3 kg more than those which received MS. At the end of phase III, this difference became 47.2 kg, i.e., 78% of the gain obtained in phase II was maintained. The nutritional plan utilized during the growing phase, before finishing (wet season), alters the gain rate in the finishing. Trouw Nutrition/Bellman provided financial support, and FAPESP provided the fellowship grant.

Key Words: growth, historic nutritional, supplementation

W313 Performance of grazing Nellore cattle finished with high-intake supplementation. Flavio Dutra de Resende*^{1,3}, Beatriz Lima Vellini¹, Ivanna Moraes de Oliveira¹, João Marcos Beltrame Benatti², Matheus Henrique Moretti², Rodolfo Maciel Fernandes³, Aline Domingues Moreira³, and Gustavo Rezende Siqueira^{1,3}, ¹Agência Paulista de Tecnologia dos Agronegócios, Colina, São Paulo, Brazil, ²Trouw Nutrition/Bellman, Mirassol, São Paulo, Brazil, ³UNESP, Jaboticabal, São Paulo, Brazil.

The effects of high intake supplementation on the performance of Nellore cattle finished on *Brachiaria brizantha* 'Marandu' pastures was evaluated. It was hypothesized that the performance Nellore cattle finished under high intake supplementation and with a high forage allowance is improved when corn is used as the source of energy, and that under conditions of low forage allowance, citrus pulp is the most suitable source of energy. Two forage allowances (FA; 2.5 and 4.5 kg DM kg⁻¹ BW) and 2 sources of energy (SE; corn and pulp included in the diet at 2% of the BW) were evaluated. In the experiment, were used 48 (48) uncastrated Nellore cattle at 30 mo of age, with an initial BW of 430.0 \pm 2.7 kg. The animals were blocked according to body weight and the data evaluated in randomized blocks in a 2 \times 2 factorial arrangement (FA and SE). The paddock was considered the experimental unit, with 3 replicates per treatment (4 animals/paddock). There was no interaction between SE and FA ($P > 0.10$). None of the factors led to any differences ($P > 0.10$) in carcass yield (58.8%), average daily gain (1.22 kg day⁻¹) or gain yield (carcass gain/weight gain: 805.6 g kg⁻¹). The higher FA resulted in an increase in BW (559.0 kg; $P = 0.06$) as compared with the animals on lower FA (534.0 kg). However, no difference was detected for carcass gain (0.98 kg day⁻¹; $P = 0.28$), carcass weight (322.2 kg; $P = 0.11$), subcutaneous fat thickness (SFT; 4.31 mm; $P = 0.24$), or loin eye area (LEA; 78.4 cm²; $P = 0.49$) for the animals under different FA. Corn and pulp did not alter the final BW (546.5 kg; $P = 0.19$). Contrastingly, the carcass gain (1.02 kg day⁻¹ vs 0.93 kg day⁻¹; $P = 0.09$), the carcass weight (327.6 kg vs 316.8 kg; $P = 0.09$), and the SFT (4.72 mm vs 3.89 mm; $P = 0.18$) were greater in the animals fed corn as compared with pulp. Citrus pulp provided animals with a larger LEA ($P < 0.01$) as compared with corn (81.0 cm² vs 75.8 cm²). It is recommended to use a forage allowance of 4.5 kg DM kg⁻¹ BW and corn as the source of energy. Nutreco/Bellman provided support.

Key Words: carcass, energy source, forage allowance

W314 Different supplementation strategies to grazing beef cattle in tropical conditions. Bruna B. Menezes², Henrique J. Fernandes*¹, Maria G. Morais², Marina N. Bonin³, Gelson L. D. Feijó³, Ednéia P. Rosa¹, Lucy M. Surita^{1,3}, Yasmin S. Falcão¹, and Amanda A. Perestrelo¹, ¹State University of Mato Grosso do Sul, Aquidauana, MS, Brazil, ²Federal University of Mato Grosso do Sul, Campo Grande, MS, Brazil, ³EMBRAPA Beef Cattle, Campo Grande, MS, Brazil.

The objective of this study was to evaluate the effect of different supplementation strategies on the average daily gain (ADG) and carcass characteristics of Nellore bulls grazing Piatã grass (*B. brizantha* cv. BRS Piatã) pastures from the weaning until a Brazilian commercial slaughter weight of 450 kg. Thirty 2 bulls (initial BW of 189 \pm 15.7 kg) from the State University of Mato Grosso do Sul, Aquidauana, Brazil, were randomly distributed in 4 treatments (8 animals/experimental units per treatment): mineral supplementation (Control), continuous concentrate supplementation (Continuous), concentrate supplementation from weaning until a BW of 320 kg (Growing), and concentrate supplementation from 320 kg until 450 kg BW (Finishing). Concentrate supplement used was Recrimax AC (until BW of 320 kg) and Lipomax (BW from 320 to 450 kg) (Real H, Campo Grande, MS, Brazil) and was supplied at 0.5% of body weight. Recrimax AC and Lipomax were formulated with corn, soybean meal, urea, molasses, rumen-protected fat (Lactoplus), salt (sodium chloride), dicalcium phosphate, virginiamycin, and a premix with methionine, lysine, minerals and vitamins A, D and E. These supplements had 75.6 and 85.1% OM, 24.3 and 18.6% CP, 1.34 and 2.3% EE, 7.1 and 12.3% NDF, 44.2 and 54.2% NFC, 68.3 and 77.6% TDN, respectively. Mineral supplement was supplied ad libitum.

To calculate ADG, animals were weighted (after 16 h of solid fasting) at the beginning of the trial and at the slaughter day. After slaughter, measurements of loin eye areas (LEA) and fat thickness at the 12th rib (FT) were taken. The effect of the concentrate supplementation, of the continuous or tactical (just in part of the animal's life) concentrate supplementation, and of the phase of the tactical supplementation were evaluated by the partition of the sum of squares of treatment in orthogonal contrasts. ADG was greater to supplemented animals and to continuous compared with tactical concentrate supplementation ($P < 0.05$), and did not differ between phases of tactical concentrate supplementation (0.449, 0.611, 0.519 and 0.557 kg/d for Control, Continuous, Growing and Finishing treatments, respectively). Concentrate supplementation and continuous supplementation (when compared with tactical supplementation) also increased ($P < 0.05$) LEA (64.6, 88.8, 72.0 and 77.6 cm² for Control, Continuous, Growing and Finishing, respectively). FT (1.59, 1.72, 2.05 and 1.85 mm for Control, Continuous, Growing and Finishing, respectively) was not affected ($P > 0.05$) by the treatments. Acknowledgments to FUNDECT – Foundation to Support development of education, science and technology of the state of Mato Grosso do Sul, for financial support of the project.

Key Words: carcass, concentrate, Nelore

W315 Effect of high-fiber concentrate diets on intake, performance, carcass traits and meat quality of feedlot Nelore heifers. J. M. B. Ezequiel^{*1}, P. S. N. Oliveira¹, R. L. Galati², D. S. Ferreira¹, V. C. Santos¹, A. C. Homem Junior¹, and E. H. C. B. van Cleef¹, ¹São Paulo State University, Jaboticabal, São Paulo, Brazil, ²Federal University of Mato Grosso, Cuiabá, Mato Grosso, Brazil.

The use of fiber-rich by-products, as corn germ meal, could prevent metabolic disorders in feedlot cattle fed high-concentrate diets, avoiding losses in performance. Therefore, the objective of this study was to evaluate high-concentrate diets with corn germ meal totally replacing corn grain on performance, carcass traits, and meat sensory characteristics of feedlot Nelore heifers. Twenty-eight heifers (200 ± 22.5 kg BW) were randomly assigned to 4 treatments in a 2 × 2 factorial arrangement: 2 concentrate levels (70 and 80%), and 2 energy sources (corn grain and corn germ meal). Corn silage was used as roughage, and concentrate was composed of soybean hulls, sunflower meal, mineral premix and corn or corn germ meal. Animals were gradually adapted to the finishing isoenergetic and isonitrogenous diets over a 6-wk period. Weights of feed delivered and refused were recorded daily and composited samples were analyzed for DM, CP and aNDF contents. At the end of 112-d feedlot period, heifers were transported for 100 km to a commercial abattoir. There was no interaction ($P > 0.05$) of concentrate levels and energy sources for DM intake, which was not affected by treatments. The concentrate level of 80% and corn, allowed the greatest CP (1.17 kg/day) and aNDF (4.05 kg/day) intakes. Final BW ($P < 0.05$) and ADG ($P < 0.01$) were decreased when corn germ meal was used. Dressing percentage, HCW, LMA, as well as BF were unaffected by treatments. Carcass muscle and fat were greater for animals fed 80% concentrate diets ($P < 0.05$). Preference and texture of *Longissimus* muscle were greater when animals were fed 80% concentrate diets with corn germ ($P < 0.05$). In conclusion, high proportions of concentrate containing corn as energy source seems to provide best performance, but the total replacement of corn with corn germ meal in high-concentrate diets promote better sensory characteristics of meat from finishing Nelore heifers.

Key Words: by-product, cattle, corn germ meal

W316 Use of virginiamycin in Nelore cattle fed mineral supplement or protein supplement. Gustavo Rezende Siqueira^{*1,3}, Michele Aparecida Prado Alves², Paloma Helena Gonçalves², Ivanna Moraes de Oliveira¹, Rodolfo Maciel Fernandes³, Guilherme Felipe Berti², Fernanda Diamantino dos Santos², and Flávio Dutra de Resende^{1,3}, ¹Agência Paulista de Tecnologia dos Agronegócios, Colina, São Paulo, Brazil, ²UNIFEB, Barretos, São Paulo, Brazil, ³UNESP, Jaboticabal, São Paulo, Brazil.

The objective of this study was to evaluate the use of virginiamycin (VM) and the supplementation level on the performance of Nelore cattle in their post-weaning phase grazing on *Brachiaria brizantha* 'Marandu' during the wet season. We hypothesized that VM works on the gram-positive bacteria by inhibiting processes that result in loss of energy, modulating the ruminal fermentation and promoting an improvement in animal performance. The following supplements were utilized in this experiment: mineral (ad libitum) and protein (0.1% of BW), with or without inclusion of VM. The experiment was conducted from January to March 2014, divided into 3 25-d periods. Eighty (80) post-weaning uncastrated Nelore, with an average initial BW of 205.4 ± 21.9 were used in the experiment. Animals were weighed at the end of each period, after a solid food-deprivation period of 16 h. Data were analyzed in randomized blocks with repeated measures over time, in 2 × 2 factorial arrangement in which the factors were the supplements and lack or inclusion of VM. The paddock was considered the experimental unit, with 4 paddocks per treatment (5 animals/paddock). Means were compared by the *t*-test at 10% probability, and a trend at 15%. There was no interaction between VM and the supplementation level ($P = 0.78$). It was considered that there was an upward trend of 0.06 kg in ADG for animals fed VM ($P = 0.16$), which resulted in the increased final BW of the animals fed VM (269.5 vs 264.8; $P = 0.09$). The protein supplement provided an additional gain of 0.09 kg/day as compared with the mineral supplement, which represented a 11% higher ADG ($P = 0.03$) and an increase in BW (271.7 vs 262.6; $P = 0.01$). The highest ADG ($P < 0.01$) was observed in the first period (1.01 kg), decreasing by 48% in the second period, and increasing by 0.30 kg/day in the third period as compared with the second; this variation was due to the climatic conditions. The use of VM and protein supplement improves animal performance during the wet season. Acknowledgments: Paraíso Nutrição Animal.

Key Words: additive, supplements, wet season

W317 Finishing strategies for grazing Nelore cattle in the wet season. Gustavo Rezende Siqueira^{*1,3}, Paloma Helena Gonçalves², Michele Aparecida Prado Alves², Ivanna Moraes de Oliveira¹, Rodolfo Maciel Fernandes³, Carlos Carvalho Marcolino², Fernanda Diamantino dos Santos², and Flavio Dutra de Resende^{1,3}, ¹Agência Paulista de Tecnologia dos Agronegócios, Colina, São Paulo, Brazil, ²UNIFEB, Barretos, São Paulo, Brazil, ³UNESP, Jaboticabal, São Paulo, Brazil.

The effects of supplementation strategies on the performance of Nelore cattle finished on Marandu-grass pastures (wet season) were evaluated. It was expected that with the increased energy density at the final stage of finishing there would be improvement in animal performance. The experimental period (EP) was from 12/2013 to 05/2014 (five 28-d periods). Seventy-two uncastrated cattle with an average initial BW of 409.3 ± 17.8 kg were used in the experiment. The following nutritional plans were adopted: mineral supplement (MS; ad libitum), 140 d of the EP; energy supplement (ES; 0.7% of the BW), 140 d of the EP; MS/high supplementation on pasture (MHS; MS on the first 70 d of the EP and supplementation at 2% BW in the last 70 d of the EP). At the end of

each period, the animals were weighed (after 16 h of feed deprivation) to determine the average daily gain (ADG). To calculate the carcass gain and carcass gain percent (carcass gain/weight gain), 6 animals were slaughtered at the beginning of the EP (control slaughter). The experimental design was of randomized blocks, analyzed as a repeated measure over time, in which the experimental unit was the paddock (6 animals/paddock). There was interaction between periods and nutritional plans on ADG ($P < 0.01$). In the first 2 periods, animals fed ES showed a 27% higher ADG ($P < 0.01$) than the others. In the last 2 periods, however, MHS (1.83 kg/day) provided a greater ($P < 0.01$) ADG as compared with ES (1.27 kg/day) and MS (0.92 kg/day). Carcass gain in the animals fed MHS was 56% and 16% higher ($P < 0.01$) than in those receiving MS and ES, respectively. Nutritional plan MHS increased (P

< 0.01) the carcass gain percent by 5% and 20% as compared with the animals fed MS and ES, respectively. Dressing percent and final carcass weight were higher ($P < 0.01$) in the cattle that received MHS (58.7%; 355.2 kg), followed by those that received ES (56.8%; 333.0 kg) and then MS (52.8%; 281.9 kg). A greater uptake of nutrients, through increased supplementation during the final stage of finishing, improves the animal performance by increasing carcass gain percent, weight, and dressing percent. Acknowledgments: Trouw Nutrition/Bellman.

Key Words: high supplementation on pasture, nutritional plans, wet season