KAT; and 46, 91, and 89 for TX STC at 0700, 1300, and 1700 h, respectively [SEM 6.1]). In conclusion, RT of STC was low at all times compared with DOR and KAT, even with lower RR. There appeared to be considerable adaptation from wk 1 to 2 during the 2 highest HLI periods via evening respiration. Region effects varied with breed, such as relatively high RR by STC from the NW to maintain low RT, lower RR of DOR from the SE than other regions, and a smaller difference among times in RR of KAT from TX.

Key Words: adaptation, hair sheep, heat
doi:10.2527/asasann.2017.692

693 Feeding behavior of grazing lambs in a silvopastoral system during dry season in Brazil.

F. de Oliveira Scarpino van Cleef*[1,2], T. Silva do Nascimento[1], D. J. A. Santos[1], E. H. C. B. Van Cleef[1], and A. C. Ruggieri[1,2], *[1]São Paulo State University, Jaboticabal, Brazil, [2]CNPq, Brasilia, Brazil.*

The aim of this study was to evaluate the presence of shade on the behavior of grazing lambs during dry season in Jaboticabal, State of São Paulo, Brazil. The climate in Jaboticabal is classified as tropical-Aw, and the dry season starts in June, when this study occurred. Massai grass (*Panicum maximum* × *Panicum infestum*) was used as the forage and eucalyptus (*Eucalyptus urophylla* × *Eucalyptus grandis*) was used as the trees. Twenty-four crossbred lambs (23 ± 3.3 kg BW and approximately 90 d old) were blocked by initial BW and assigned into 3 experimental treatments: unshaded (UN), which is unshaded Massai grass pasture; moderate shading (MS), which is Massai grass pasture with eucalyptus trees spaced 12 by 2 m; and intense shading (IS), which is Massai grass pasture with eucalyptus trees spaced 6 by 2 m. Light interception was the criteria for starting grazing period, and the residual pasture height was fixed at 20 cm. Animals were observed over 8 consecutive days in order to assess the grazing activities: feeding (FE), lying ruminating (LR), standing ruminating (SR), lying (LY), standing still (SS), searching for food (SF), and other activities (OA). Previously trained observers recorded the behavioral activities, every 10 min, from 0800 to 1700 h. Data were submitted to ANOVA, using the MIXED procedure of SAS, and the treatments' means were compared using Tukey's test at 5% significance. Animals in UN spent more time on FE (64% for UN, 54% for MS, and 51% for IS; $P < 0.0001$), with no differences observed between treatments with trees. Time of LR was greater for IS (23% for UN, 25% for MS, 32% for IS; $P < 0.0001$). On the other hand, animals in MS spent more time SS (0.8% for UN, 4% for MS, 1% for IS; $P < 0.0001$) and SR (0.5% for UN, 0.9% for MS, and 0.3% for IS; $P = 0.0001$), but both activities were similar between UN and IS. The activities LY, SF, and OA did not differ among treatments ($P = 0.28$, $P = 0.61$, and $P = 0.09$, respectively). The silvopastoral system improved the state of welfare of the lambs, as shown by the greatest time spent lying ruminating.

Key Words: eucalyptus, heat stress, shade
doi:10.2527/asasann.2017.693

694 In vitro methane production of diets containing high concentrations of crude glycerin for feedlot sheep.

E. H. C. B. van Cleef*[1,2,3], M. T. C. Almeida[1,2], F. O. S. van Cleef[1,4], A. L. Abdalla Filho[3,5], P. P. Santos[5], A. L. Abdalla[5], and J. M. B. Ezequiel[1], *[1]São Paulo State University, Jaboticabal, Brazil, [2]FAPEMIG, Belo Horizonte, Brazil, [3]FAPESP, São Paulo, Brazil, , [4]CNPq, Brasilia, Brazil, [5]Centre for Nuclear Energy in Agriculture, University of São Paulo, Piracicaba, Brazil.*

Crude glycerin is the major byproduct of the biodiesel industry. Previous studies have indicated this byproduct as an enteric methane (CH_4) mitigating agent. An in vitro rumen batch culture study was conducted to compare the effects of high inclusions of crude glycerin in diets for feedlot sheep on CH_4 production. The technique used in this trial involved the measurement of gaseous species produced during fermentation by a pressure transducer. Isonitrogenous (18.4% CP) and isoenergetic (2.7 Mcal ME/kg DM) diets were composed of corn silage, soybean hulls, soybean meal, mineral premix, cracked corn grain, and crude glycerin included at 0 (G0), 10, 20, or 30% (G30) of the total diet (DM basis), in a roughage:concentrate ratio of 40:60. Crude glycerin totally replaced corn grain in G30 and contained 83% glycerol, 95% DM, 6% salt, and less than 0.01% methanol. Three adult male rumen-cannulated sheep were used as rumen fluid donors. To carry out this study, 160-mL serum bottles ($n = 30$) containing 0.5 g test feed (placed into F57 Ankom filter bags), 50 mL buffer solution, and 25 mL ruminal fluid were used. The bottles were sealed and placed into a forced-air oven (39°C). Each mixture was incubated in triplicate. The pressure was measured and gas samples were collected at 0, 4, 8, 12 and 24 h after incubation, and the cumulative gas production was evaluated. After the 24-h incubation period, terminal pH was measured. Filter bags containing feed residues were washed, dried, and incinerated to determine OM disappearance. Gas samples were evaluated for CH_4 concentration by gas chromatography. Data were analyzed using the MIXED procedure of SAS, and whenever the F-test was significant, contrast analyses (linear, quadratic, and 0 × glycerin) were performed. No interaction of treatment × inoculum was observed in this trial ($P > 0.10$). Total gas production (mL/g OM disappeared) was not altered ($P = 0.44$) by crude glycerin inclusion (average 54.5 mL). However, CH_4 concentration was linearly increased ($P = 0.004$) with values from 4.6 (G0) to 7.4 mL/g OM disappeared (G30). Terminal pH was also affected by treatments, with values linearly decreasing from 6.7 (G0) to 6.6 (G30; $P = 0.003$). The inclusion of high concentrations of crude glycerin