Animal Reproduction

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Placental development and thermoregulation in pregnant sheep in the silvopastoral system during the summer

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Resumo

Animals subjected to high temperatures undergo behavioral, physiological, and reproductive changes. Thus, this study aimed to analyze different reproductive aspects and physiological changes in ewes subjected to heat stress during pregnancy. This experiment was carried out at the Sheep Research Unit at UTFPR, in Dois Vizinhos, PR. Pregnant crossbred Dorper x Santa Inês ewes were divided into two groups: Silvipastoril System (SPS; n=12) and Open Pasture (OP; n=12) on the day 43,4±9,17 of pregnancy. Physiological variables and environmental data were registered every two weeks for six time points from this moment forward. The ewes were kept in a suspended pen from day 123,4±9,17 of pregnancy until parturition. Placentas and lambs were weighed at birth, and the placentas were photographed for biometrical analysis. Lambs were also weighed at ten days of age. Both systems were stressful for the sheep when all microclimatic variables were taken into account, but the SPS had lower Air Temperature than OP (OP=26.9±0.41°C, SPS=26.0±0.38°C; p=0.0288; T Student test). Moreover, the radiant thermal load of the two groups presented a difference of 34Wm-2 (p=0.0288), and the Temperature of the Grass was also different (PS=25.6±0.44°C, SSP=23.4±0.37°C; p=0.0043). During the study, no system effect was observed on the mobilization of white blood cells (p=0.4777), nor was there any effect of time or interaction between variables (p=0.8109 and p=0.4150). No differences were observed in quantifying circulating monocytes between the groups (p>0.05). Neutrophils were only affected by time (p<0.0001). In the SPS group, a difference was observed between timepoints 4 and 1, 5 and 1, 6 and 1 (p=0.0174; p=0.0093; p=0.0065, respectively), between 4 and 2, 5 and 2, 6 and 2 (p=0.0096; p=0.0050; p= 0.0035, respectively). While in the OP group, differences were observed between timepoints 5 and 1 and 6 and 1 (p=0.0328; p=0.0204, respectively). Respiratory and Heart Rates of the animals exposed to the sun were higher than that of the sheep that remained in the shade (p<0.001). Regarding the duration of pregnancy, there was no effect of treatment (p=0.4987). Interestingly, both systems had higher numbers of female lambs (PS: male 40%, female 60%; SSP: male 38%, female 61.54%). Only an effect of the type of pregnancy (single vs. twin) was detected on the bodyweight of lambs at ten days (p=0.0273), which was not observed at birth (p=0.9455). Regarding placental biometry, twin pregnancies had a greater membrane area (p=0.0223), but no differences were observed in placenta weight (p=0.1522) and the number of cotyledons (p=0.5457). Therefore, it can be concluded that the type of Sheep Rearing System affects the thermal comfort of pregnant ewes, and the SPS can offer more amenable microclimate conditions resulting in more comfort during pregnancy.