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CORRELATION BETWEEN COLOSTRUM COMPOSITION, BODY WEIGHT UPON CALVING, AND DAY 30 IN LAMBS

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Abstract: Fifteen sheep with single and twin gestation were selected, from each group, which were maintained on natural pasture. On the 140th day of gestation, the sheep were placed in individual pens, after prior establishment (by palpation) of gestation (single or twin). The colostrum was collected one hour post-partum then at 12, 24, and 36 h post-partum to determine the yield of lamb raising and the composition of the colostrum. Maternal blood was drawn after placing the sheep in the pens, then blood was drawn from the lambs to determine plasma glucose and IgG. From the recently born lamb, the blood was drawn upon calving and 12, 24, 36, and 120 h post-partum to determine the blood sugar and IgG. Lambs' daily average weight gain was evaluated from calving up to 60 days of life. There were no differences in colostrum production and fat components; however, protein and lactose had higher values in the single gestation than in twin gestation ($p < 0.05$ for both). Females with single gestation had glycemia higher than those with twin gestation 12 h post-partum (102.2 ± 32.8 vs. 73.4 ± 29.9 mg/dl, $p < 0.05$). IgG colostrum content was similar upon calving, but higher in the sheep with single gestation at 12 and 24 h, reaching similar values at 36 hours (4.7 ± 9.7 and 5.8 ± 7.7 mg/ml in the case of single and twin gestation). IgG in recently born lambs was higher in lambs from single gestation than in lambs from twin gestation at least up to 48 h of life. Body weight upon calving has always been superior in lambs from single gestation than in lambs from twin gestation from calving to 30 days of life.

• Introduction

Sheep is a key global economic resource due to its large adaptation capacity to different climate, altitudinal, and feeding conditions, greater than in any other animal species. The growth of sheep is mainly performed by small breeders in developing and transitional regions, sometimes taking place in marginal territories with extreme conditions and reduced water and pasture. For example, a traditional area for sheep's growth is also Mountainous Banat, a region in which the climate conditions are varied, with low temperatures, average winds, and relatively low precipitations in winter.

In this area, sheep are raised in the extensive system on the lands around towns, but during the summer, they are taken up in the mountain. Sometimes, they fail to ensure the required amount of feed for the entire herd or, most of the time, fibrous feed is not enough. In these situations, the main limiting factor for sheep's growth is maternal malnutrition during gestation. In turn, the malnutrition of the mother sheep can affect the viability and development of newly born lambs, because it results in a difficult gestation and a small body mass and the high post-partum mortality of the lambs, especially in the case of twin gestations. Most post-natal mortality occurs especially in the first three days post-partum because of the lack of colostrum and the subsequent reduced resistance to the weather to which is added a lower quality of colostrum.

• Material and method

The study was conducted at SCDCOC Caransebeș on 30 sheep, of which 15 sheep with single gestation and 15 sheep with twin gestation maintained on natural pasture, which provided raw protein: 3.3%, metabolizable energy: 1.9 Mcal/kg, with a digestibility of 45%. On the 140th day of gestation the sheep were placed in individual pens, after a prior identification (by palpation) of gestation (single or twin). The colostrum was collected 1 h post-partum, then at 12, 24, and 36 h post-partum, to determine the yield of the raising lambs and the composition of the colostrum. Maternal blood was collected after placing the sheep in the pens, then from the lambs to determine the plasma glucose and IgG. From newly born lambs, the blood was collected upon calving and at 12, 24, 36, and 120 h post-partum to determine blood sugar and IgG.

• Results and discussion

The evolution of the body mass and the bodily condition of the sheep during gestation revealed that, at the beginning of gestation, the mass and body condition were similar between groups (55.7 ± 3.2 kg and 2.10 ± 0.21 ; 55.9 ± 4.8 kg and 2.05 ± 0.28 for single and, respectively, twin gestations. Body mass in the sheep with twin gestation remained almost constant throughout the gestation, while it gradually decreased to thin single gestation sheep, so that the differences were statistically significant at 120 days of gestation ($p < 0.05$) and reached the maximum difference at 140 days of gestation ($50.5 \pm 4.5 \pm 0.05$). On the other hand, the evolution of the body condition score did not highlight differences between groups during the gestation, remaining largely stable between 0 and 60 days of gestation and, therefore, decreasing during gestation (1.58 ± 0.50 for single gestation and 1.48 ± 0.40 for twin gestation, reaching 4.0). Blood glucose values in mother sheep blood plasma after 140 days of gestation and immediately post-partum were: 40.6 ± 18.6 mg/dl on day 140 after gestation and 150 ± 40.2 mg/dl after gestation in sheep with single gestation and 29.6 ± 12 mg/dl, respectively 145.5 ± 35 mg/dl in sheep with twin gestation. Blood sugar increased suddenly post-partum, but no differences were observed between single gestations compared to twin ones; however, before calving, blood sugar in twin gestation sheep showed a tendency ($p = 0.092$) lower than in single gestation sheep.

The yield of the colostrum and its composition (proteins, fats, and lactose) in the first 36 h after foetal highlighted the fact that there were no differences between productions and fat components between groups, but the sheep with single gestation showed higher protein and lactose values than sheep with twin gestation ($p < 0.05$ and 0.05).

• Conclusions

Malnutrition in pregnant sheep has affected the quantity and quality of the colostrum, which compromises the intake of colostrum and protein, lactose and IgG for each newly born lamb in the case of twin gestation and, therefore, its post-natal development and survival. Given the importance of prolificity as a means of increasing the productivity of sheep, it is of great interest to look for management alternatives that favour foetal growth, weight gain, and neonatal viability in twin gestations, especially when flocks are increased on low pasture.