Ewes shorn and unshorn during pregnancy in South Brazil: effects on body condition score and lamb birth weight

Ovelhas esquiladas e não esquiladas durante a gestação no Sul do Brasil: efeito na condição corporal e no peso ao nascer dos cordeiros

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Abstract

In this work the effects of pre-lamb shearing on the ewe body condition scores (BCS) and lamb birth weights and growth rates were examined. A flock of 64, three year old Border Leicester x Texel ewes (49-54 kg), exposed to rams in March were divided, on day 74 of pregnancy, into two groups each of 32 ewes. The ewes grazed together, on natural pampas grass, at a stoking rate of five ewes/ha and a pasture availability of approximately 800 kg DM/ha. One group was shorn (S), at day 74 of pregnancy (P74) and the other was left unshorn (US). The BCS of the S and US ewes were assessed at the beginning of the experiment (P74), P108 and P135, as well as at lactation (L) on days L15 and L24. The lamb birth weights, and weights at 2 and 3 weeks of life were also recorded. Both groups of ewes showed a marked reduction of BCS during gestation and lactation periods. The S group experienced a significantly ($P < 0.05$) more severe reduction of BCS. This dropped from 3.3 score units at P74 to 1.79 and 1.22 at P135 and L24. The BCS of the US group were 3.11, 2.19 and 1.21 score units respectively at these times. Shearing pre-lambing increased mean lamb birth weight by 0.71 kg and this was statistically significant ($P < 0.05$). There were no effects on the lamb weight gain measured at two and three weeks of life. The increase in lamb birth weight produced by shearing ewes during pregnancy, described in this paper, could reduce the lamb perinatal mortality, especially in years with a low forage supply, leading to a critical BCS during gestation. The results suggested also that close attention should be given to the BCS of the ewe flock during pregnancy, a practice that is not common in the southern areas of Brazil.

Keywords: Sheep. Pre-lamb shearing. Lamb birth weight. Body condition score.

Resumo

No presente trabalho, foi testado o efeito da esquila pré-parto na condição corporal (BCS), no peso de cordeiros ao nascer e no seu desenvolvimento. O grupo experimental foi constituído de 64 ovelhas com 3 anos, cruzas Border Leicester x Texel (49-54 kg), encarneiradas em março, foram divididas, aos 74 dias de gestação, em dois grupos de 32 cada. As ovelhas foram mantidas em campo nativo, 5 ovelhas/ha, com disponibilidade aproximada de 800 kg/ha. Aos 74 dias de gestação, um grupo foi esquilado (S) e o outro foi mantido não esquilado (US). A BCS dos dois grupos foi avaliada no início do experimento (P74), P108 e P135 dias de gestação e aos 15 e 24 dias da lactação. Foi também coletado o peso dos cordeiros ao nascer e a duas e três semanas da lactação. Observou-se uma redução na BCS média das ovelhas, de ambos os grupos, durante a gestação e lactação. O grupo S experimentou uma redução significativamente mais severa ($P < 0,05$) na BCS. A BCS média desse grupo decresceu de 3,3 no dia P74 para 1,79 e 1,22 nos dias P135 e L24. No mesmo período, os valores da BCS média do grupo US foram de 3,11, 2,19 e 1,21. Ao nascer, o peso dos cordeiros, de ovelhas S foi 0,71 kg maior ($P < 0,05$) do que o dos cordeiros de ovelhas do grupo US. Não houve diferença entre o ganho de peso dos cordeiros dos dois grupos medido a duas e três semanas de vida. O aumento no peso ao nascer dos cordeiros produzido pela esquila das ovelhas durante a gestação, descrito nesse trabalho, poderá reduzir a mortalidade perinatal de cordeiros, especialmente em anos com escassez de pastagem que pode resultar em uma BCS crítica durante a gestação. Os resultados sugerem também que atenção especial deverá ser dada a BCS das ovelhas durante a gestação, prática que não é comum no Sul do Brasil.

Palavras-chave: Ovinos. Esquila pré-parto. Peso ao nascer de cordeiros. Condição corporal.

Introduction

On the pampas areas of the State of Rio Grande do Sul (RS)-Brazil (30° to 33° S), 22 to 38% of the lambs born died in the perinatal period[1]. The main cause of these losses is exposure starvation syndrome[2,3]. In

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UK, Eals and Small[4] suggested that exposure/starvation leads to hypothermia, caused mainly by low energy reserves of the new-born at birth. Lambs with low birth weight, especially twins and triplets, are considerably more susceptible to hypothermia than single, perhaps heavier, lambs.

In New Zealand, Dalton, Knight and Johnson[5] observing Romney Marsh cross ewes suggested a correlation between birth weight and lamb mortality. Lambs with birth weight of 2.0 - 2.5 kg showed a mortality rate of 48%. On the other hand, on well developed lambs, with birth weight of 6.0 - 6.5 kg, the mortality rate was reduced to 22.6%. In the same study, the lowest lamb mortality rate (13 and 14%) was observed in the group of lambs born with 4.0 - 5.0 kg live weight. A lower lamb mortality rate was also observed in Uruguay by Montossi et al.[6] in a group of Corriedale lambs with a birth weight between 4.0 - 5.0 kg when compared to heavier and lighter ones. In RS few data are available on the birth weight of lambs born from ewes grazed under extensive range conditions. The data available refer to 2.9 - 3.7 kg lambs born from Corriedale and Polwarth ewes, thus below the birth weight range likely to be associated with a low mortality rate[2,3,7].

Although a reasonable amount of work has been produced on factors that affect fetal growth and the survival potential of the new-born, some points are still unclear. Mellor[8] and Morris, McCutcheon and Revell[9] point out that the three main factors that affect lamb fetal growth are: (a) ewe nutrition during pregnancy; (b) placental size and (c) pre-lambing shearing.

In RS, two works presented data on food supplementation of ewes during pregnancy and its effect on lambs' birth weight. Bento and Figueiró[10] mentioned that pregnant Corriedale ewes grazed on ryegrass and on native grass, plus supplementation, produced lambs that were 420 and 330 g heavier than those grazed on native grass only. Also, Silveira[11] observed that ewes put on ryegrass from day 80 of gestation, produced lambs 290 g heavier than those from ewes grazed on native pampas grass.

Finally, a series of publications has shown the effect of shearing during pregnancy on lamb birth weight. In the UK, Austin and Young[12], working with ewes in pens, described that shearing pregnant ewes, in the middle of gestation, increased the lamb birth weight. More recently, a group of experiments conducted in New Zealand and reviewed by Kenyon et al.[13] showed that lambs born from ewes shorn, around day 70 of pregnancy, were 700 g heavier than lambs born from unshorn ewes. This effect was more pronounced in twins and triplet births. The work described in this paper aimed to test the effect of shearing, during the gestation period, on the ewe body condition score (BCS), birth weight and growth rate of lambs, using a commercial sheep flock grazed on extensive pampas grass.

Materials and Methods

This experiment was conducted in a farm located at 30° 11' S, 52° 22' W, with a mean annual rainfall of 1594 mm with temperature ranging of 9 to 20 °C. A flock of multiparous, three year old, Border Leicester x Texel cross ewes (weight ranging from 49 to 54 kg) shorn eight months before, was used in this experiment. All ewes had their estrus synchronized using intravaginal 60 mg medroxyprogesterone acetate (MAP) sponges and exposed to six, three year old, Border Leicester, tested rams, with known fertility in March.

Ewes were scanned for pregnancy 74 days after been served, on the second week of May. Sixty four single pregnant ewes were then randomly selected, tagged and had their BCS taken by a skilled technician using the method proposed by Russel, Doney and Gunn[14]. Body condition was assessed by using the finger tips feeling the degree of sharpness or roundness of the lumbar vertebrae, the prominence and degree of muscle and fat over and under the horizontal process and by pressing the fingers into the eye muscle and fat

cover in the area between the vertical and horizontal processes. Using these assessments all the ewes were scored on a scale of 0 (emaciated) to 5 (very fat), using half-scores as intermediate points along the scale.

Two groups of 32 pregnant ewes, with similar BCS were formed. One group was shorn (S) at the 74th day of pregnancy (P74) on the 2nd week of May and another group was left unshorn (US). The ewes were subsequently submitted to a BCS evaluation at the 108th (P108) and 135th (P135) day of pregnancy and at 15th (L15) and 24th (L24) days of lactation.

During the experiment, the two ewe groups grazed together on natural pampas grass at a stocking rate of five ewes/ha and a pasture availability of about 800 kg DM/ha. The predominant botanical composition of the pasture was *Paspallum notatum*, *Andropogon lateralis* and *Aristida jubata*. During the last month of gestation and during lambing, the two groups were grazed on six hectares of *Avena sativa* and *Lolium multiflorum* improved pasture with an availability of 1200 kg DM/ha. Ewes had access to water and to minerals (Nutriphos, Pr, Brazil) *ad libitum*. Ewes were dewormed with ivermectin before the trial and at the day of shorn.

At lambing time (1st week of August), the experimental flock was checked at 6:00 and 10:00 am and again at 2:00 and 6:00 pm, when all the new-born lambs were weighed ear tagged, and had their umbilicus treated with iodine solution. The lambs' weights were also taken at 14.74 ± 6.61 and 23.85 ± 10.31 days of age.

2.1 Analysis of data

Data were analyzed using the SAS version 6.12. The model included the main effect shearing and BCS during gestation and lactation periods, the lamb gender, as well as the lamb weight at birth and up to three weeks of age as the dependent variables. Difference between means were compared by Tukey-test

Results

The BCS variation of the S and US groups during the pregnancy and lactation periods is shown in table 1. Using the model during the gestation period comparing the S and US groups and considering the number of gestation days and the BCS at shearing time, a significant difference was observed ($P < 0.05$) during this period. It was estimated that the BCS of the S group was 0.5 units of BSC less than those of the US group. The daily BCS reduction was estimated in 0.02 units of BSC in both groups. During lactation an interaction was observed ($P < 0.05$) between S and US ewes and days of lactation. Analyzing individually the BCS of each observation day significant differences ($P < 0.05$) were detected at P135 and at L15 between S and US ewes.

Of the 64 pregnant ewes in the experimental group, it was possible to get the body weight at birth of 32 lambs from the S group and from 27 lambs from the US group. One still birth was recorded among lambs in the US group. Four lambs of the same group were lost to predators.

There was a difference ($P < 0.05$) in mean birth weight of lambs from S and US ewes (Table 2). The results showed that lambs from group S were 0.71 kg heavier at birth than lambs born from US ewes ($P < 0.05$). No interaction ($P > 0.05$) was observed between

Table 1 - Mean score condition and standard deviation of shorn and unshorn ewes during gestation and lactation periods - Pantano Grande (RS) - 2007

Group	Ewes (n)	Gestation days*			Lactation days*	
		74**	108	135	15	24
Shorn	32	$3.30^{a} \pm 0.75$	$2.50^{a} \pm 0.59$	$1.79^{a} \pm 0.63$	$1.45^{a} \pm 0.48$	$1.22^{a} \pm 0.31$
Unshorn	32	$3.11^{a} \pm 0.69$	$2.73^{a} \pm 0.65$	$2.19^{b} \pm 0.70$	$1.80^{b} \pm 0.66$	$1.21^{a} \pm 0.37$

*day mean; ** shorn period; [ab] Means within a column not followed by the same superscript differ ($P < 0.05$)

Table 2 - Mean and standard deviation of birth weight (kg) and up to 35 days of lactation from lambs born from shorn and unshorn ewes - Pantano Grande (RS) - 2007

Source	Lambs (n)	Weight mean		
		Birth	2nd weight*	3rd weight**
Shorn	32	5.47[a] ± 0.94	9.04[a] ± 2.25	11.84[a] ± 4.52
Unshorn	27	4.76[b] ± 1.17	7.93[a] ± 2.63	11.15[a] ± 3.08
Mean		5.11 ± 1.10	8.48 ± 2.46	11.49 ± 4.00

* mean lambs days of life 14.74 ± 6.61 days; ** mean lambs days of life 23,85 ± 10.31 days; [ab] Means within a column not followed by the same superscript differ (P < 0.05)

lamb gender from S and US ewes. No differences (P > 0.05) were detected in mean weight of lambs at L15 and L24. No interaction (P > 0.05) was detected between BCS at parturition and birth lamb weight. The analysis of the weight gain of the lambs from both groups showed no statistical difference between groups (P > 0.05). No interaction (P < 0.05) was detected between lambs weight gain and ewes BCS at parturition.

Discussion

In this work, the fluctuation of BCS of pregnant ewes during gestation and lactation periods is presented. The results showed that ewes grazed on extensive conditions in the southernmost part of Brazil, during gestation and lactation periods, face a marked reduction on their BCS of approximately two units score, whether shorn or not. The estimated daily BCS loss during gestation was 0.02 units of BCS.

In the UK it is recommended that, the BCS of ewes at mating time and at the end of gestation period should be 3.5 and 3.0 respectively[15]. The data found in this experiment showed values of BCS for mating (3.0) and lambing time (2.4) lower than that suggested above. The low BCS of the ewes and the further decline observed during the gestation period may explain the low birth weight and the high lamb mortality observed by Coimbra Filho[16] in local flocks, since the ewe nutritional status is one important factor for birth weight.

In this study, a group of ewes was shorn around the 75 days of gestation being thus possible to check the impact of this procedure on the ewes BCS during gestation and lactation periods. The data collected showed that shearing produces a higher reduction on the BCS of the ewes, estimated by the model on – 0.5 units of BCS, compared with the unshorn ewes. Dabiri et al.[17] did not find any difference on the BCS of shorn and unshorn ewes at the end of the pregnancy period. However, the BCS of the ewes mentioned in his work (2.8) was superior to the BCS of the ewes found in our experiment (1.9). In the work mentioned above the authors were able to show that shorn ewes, at the end of gestation, had significantly lower values for lumbar fat than unshorn ones. Further- more, in previous work, Dabiri et al.[18] found that the weight of the ewes shorn at day 134 of gestation adjusted for the weight of fleece removed was lower than the unshorn ewes. More recently, Morris, McCutcheon and Revell[9] mentioned that shearing did not affect the weight of the ewes during gestation but the weight of this group was 3.0 kg lower at day 45 of lactation. Montossi et al.[19], working in Uruguay, with Corriedale ewes at parturition, observed a high correlation between BCS and body weight. In our study using a different tool to access the nutritional status of the ewes, this trend was not observed. The BCS of the shorn ewes at end of gestation and at lambing was significantly lower than that of the unshorn ewes. However, this trend reverted at day 13 of lactation when BCS of the shorn group was similar to the US group.

The main result of this study was to show the effect of shearing pregnant ewes on the birth weight of their

lambs. It was found that lambs born from sheared ewes were 0.71 kg heavier than the ones born from unshorn ewes. This result has been broadly reported in the international literature[12,13,20,21] but has not been described in sheep flocks grazed in extensive conditions of southern Brazil.

Perinatal mortality of lambs born from shorn and unshorn ewes was low. In fact, only one lamb was lost from a ewe of the unshorn group. As the lambing field was visited four times per day for birth weight taking, this management may have helped new-born survival. Besides that, the increase of the lamb birth weight caused by shearing ewes during pregnancy put them in a group of low mortality risk, as suggested by Dalton, Knight and Johnson[5]. The authors mentioned that the lowest perinatal mortality rate (12%) observed by then in New Zealand was in the group of lambs with birth weight between 4.0 – 5.5 kg. In this study the mean birth weight of lambs born from shorn ewes was 5.47 ± 0.94 kg, which is in a range of low mortality risk. Also, the weight of lambs born in the US group (4.7 ± 1.17 kg) is also in a range of low mortality what may explain the low lamb mortality observed in both groups. The birth weight of lambs born from ewes grazed in RS, mentioned by several authors[2,3,7] varies from 2.9 to 3.7 kg. Thus, the increment on the birth weight caused by shearing the ewes during the pregnancy shown in this work would put them in a birth weight range of low mortality risk.

In fact, the estimate was that for each increase in BCS unit of ewe at the end of gestation will be an increase of 0.78 kg on the lamb birth weight. Using this model, if the ewe BCS, at the end of gestation period, was increased to 3.0 by a better nutritional level, the estimated lamb birth weight would be 6.37 kg for the S group and 5.42 kg for the US group.

In this study, due to the extensive grazing condition, data on pasture quality and the daily consumption of the ewes from S and US group was not taken. Such information could bring some light on the effect of shearing on the SC and on the lamb's birth weight. Symonds, Bryant and Lomax[22], looking at the effect of shearing on energy metabolism of the pregnant ewe in UK, concluded that shearing at eight weeks before lambing results in a chronic increase in energy requirement, which is met by oxidizing body fat depots. They also stated that the cold stress induced by shearing may inhibit insulin secretion resulting in increased plasma glucose concentrations. Observations on metabolic profiles carried out on the S and US ewes[23] showed that the blood glucose level did not differ between the two groups, but a decrease of this metabolite was observed at the end of the gestation period. This could be explained by a lower cold stress faced by the ewes grazed on pampas areas where the winter temperatures can fall below 10 °C but never to the extent occurring in Northern Europe.

The exact time of shearing to maximize the birth weight response remains to be identified. Morris and McCutcheon[20] mentioned that ewes shorn at day 70 of pregnancy would have a great opportunity to respond to the shearing effect than those shorn at either 100 or 130 days of pregnancy. Alexander[24] has shown that placental weight peaks at around day 90 of pregnancy, thus shearing could exert an effect on placental development and hence on the ability of the dam to supply nutrients to the growing fetus. In this work, the ewes were shorn at day 74 of pregnancy perhaps increasing placental development and consequently enhanced fetal nutrient supply in late pregnancy, leading to a higher lamb birth weight. This hypothesis could be confirmed by comparing the placental weight of ewes from the S and US group. The fact that ewes were kept outside during lambing and not continuously monitored led to difficulty in recovering the placenta immediately after birth. Only a small number was collected thus making impossible any meaningful statistical analysis. In a recent experiment conducted in Uruguay, Montossi et al.[6] found that the mean placental weight of shorn ewes was significantly

greater than that of unshorn ones (0.382 x 0.351 kg). It is thus suggested that further observation should be conducted to check the real impact of shearing pregnant ewes around day 70th of pregnancy on the placental growth.

Conclusion

The increase in the lamb birth weight produced by shearing ewes during pregnancy, described in this paper, could reduce the lamb perinatal mortality, especially in years with a low forage supply, leading to a critical BCS during gestation. The results suggested also that a close attention should be given to the BCS of the ewe flock during the pregnancy period, practices that are not common in the south of Brazil.

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