

CONTRIBUTION TO THE STUDY OF THE WOOL OF THE BORDALEIRA SERRA-DA-ESTRELA BREED

CONTRIBUTO PARA O ESTUDO DA LÃ BORDALEIRA SERRA-DA-ESTRELA

Lourenço J.¹, Pires J.², Magalhães P.³, Miranda M.³, Delgado F.^{1*}

¹Escola Superior Agrária / Instituto Politécnico de Coimbra, Portugal. *fdelgado@esac.pt.

²Exploração ARTOVISTRELA, Viseu, Portugal.

³ANCOSE – Associação Nacional de Criadores de Ovinos Serra-da-Estrela, Oliveira do Hospital, Portugal.

Keywords: Wool parameters; Serra-da-Estrela sheep; Fleece weight; Staple length; Wool crimping.

Palabras clave: Parâmetros Lanares; Ovinos Serra-da-Estrela; Peso do velo; Comprimento da mecha; Frisado.

ABSTRACT

From the fleeces of 50 female sheep breed Bordaleira Serra-da-Estrela (BSE) samples were collected from two different locations: between shoulders (eE) and in insertion of the tail (Cd). The sample represented the two varieties (White and Black, [V], n = 25 each) and five age groups (1st to 5th shearing for each variety, [I], n = 5 each), aiming to make a brief characterization of wool currently produced by BSE breed.

The parameters evaluated were (1) the fleece weight [PVelo], (2) the wool lock length [CM-eE and CM-Cd] and (3) the grade of wool crimping 1 and 2 cm [F-eE1; F-eE2; F-Cd1 and F-Cd2], the latter parameter presented great difficulty in evaluation and many samples showed no crimping, even in a 8x magnified observation, having been assigned a value of 0 complete waves. Data from CRD experimental design were submitted to ANOVA-SAS obeying the linear model $Y_{ijk} = \mu + V_i + I_j + VxI_{(ij)} + \sum_{ijk}$, and their averages were compared (Duncan, $\alpha = 0.5$). Variety has influenced CM-Cd ($P < 0.001$) and crimping between shoulders [F-eE1, F-eE2] ($P < 0.05$) with higher values for the White variety (7,752 cm, 2.04 and 3.68, respectively). Age influenced PVelo and CM-Cd ($P < 0.001$) and also the CM-eE ($P < 0.05$), and the values of the 1st shearing age are different from all others ($P < 0.05$) and smaller in all parameters. The highest values were recorded for the 2nd shearing. The degree of crimp showed maximum values of 5 and 9 full dimples between the shoulders at 1 and 2 cm from the root. For the tail insertion, the corresponding values were 3 and 6.

RESUMO

A partir dos velos de 50 fêmeas ovinas da raça Bordaleira Serra-da-Estrela (BSE) colheram-se amostras de duas localizações diferentes: entre espáduas (eE) e inserção da cauda (Cd). A amostragem representou as duas variedades (Branca e Preta, [V]; n=25 cada) e os 5 estratos etários (da 1ª à 5ª tosquia, para cada uma das variedades, [I]; n=5 cada), com o objectivo de se proceder a uma caracterização sumária das lãs actualmente produzidas pela raça BSE. Os parâmetros avaliados foram (1) o Peso do Velo [PVelo], (2) o Comprimento da Mecha [CM-eE e CM-Cd] e (3) o grau de Frisado a 1 e a 2 cm [F-eE1; F-eE2; F-Cd1 e F-Cd2], tendo este último parâmetro apresentado grande dificuldade de avaliação e para muitas amostras mostrou-se inexistente, mesmo em observação ampliada 8x, tendo sido atribuído o valor de 0 ondulações. Os dados obtidos em desenho CRD foram submetidos a ANOVA-SAS obedecendo ao modelo linear $Y_{ijk} = \mu + V_i + I_j + VxI_{(ij)} + \sum_{ijk}$, tendo as respectivas médias sido comparadas (Duncan, $\alpha = 0,5$). A Variedade influenciou o CM-Cd ($P < 0.001$) e o frisado entre espáduas [F-eE1, F-eE2] ($P < 0.05$) com maiores valores para a variedade Branca (7,752 cm, 2,04 e 3,68, respectivamente). A Idade influenciou o PVelo e o CM-Cd ($P < 0.001$) e, ainda, o CM-eE ($P < 0.05$), sendo os valores da 1ª tosquia diferentes de todos os outros ($P < 0.05$) e menores em todos os parâmetros. Os maiores valores registaram-se à 2ª tosquia. O grau de frisado apresentou máximos de 5 e 9

ondulações completas entre espáduas a 1 e a 2 cm da raiz. Para a inserção da cauda, os valores correspondentes foram de 3 e 6.

INTRODUCTION

The Bordaleira Serra-da-Estrela (BSE) is considered to be the best Portuguese sheep breed for dairy purpose. The first milking records date back to 1945 and since 1981 is the main goal for the National Association of Sheep Breeders of Serra-da-Estrela (ANCOSE) which was the first breeder's association of small ruminants. In this way, various attempts have been made in the context of animal breeding, to increase productivity, including the introduction of exotic genomes. Sometimes, under the technical guidance, as was the case of Frisserra (Milchschaf x BSE), others by private enterprise without any control (Romanov, Awassi and Assaf). In this way also, the quality of wool that is cross-type have changed. This study sought for expected evidences and assessed the impact over the BSE breed, although the Wool sector in Portugal is in decline.

In the decade of 80-90 there was a 40 % reduction in world production of wool, from 2 to 1.2 million tons. In 2013, the world ranking for producing countries of untreated (dirty) wool, China was the largest producer with 471,111 tons, Followed by Australia with 360,520 ton. and New Zealand with 135,000 ton. (FAO, 2013).

The wool produced in Portugal in 1968, did not meet the requirements of national consumption. In the early 70s, they accounted for only about 42 % of the supply of our wool industry. In 1986, the situation was still substantially the same, since the domestic production of dirty wool was about 9,000 tons. while the raw-wool imports prowled the 9,802 tons (Azevedo *et al.*, 1989). However, in 2013, domestic production (6,011 tons.) was higher than imported (5,541 tons.), being the value of exports of 4,117 tons. (INE, 2015).

In terms of dirty wool, Portugal has shown a production reduction (figure 1). In 2014, it was the lowest of all records (5,801 tons.). In 1967, there was the highest peak of production with 14,055 ton., About three times of that produced in 2014 (INE, 2015).

The low profitability of wool production is clear when a producer pays for the shearer 1.90 € / head and sells the wool by 0.70 € / kg.

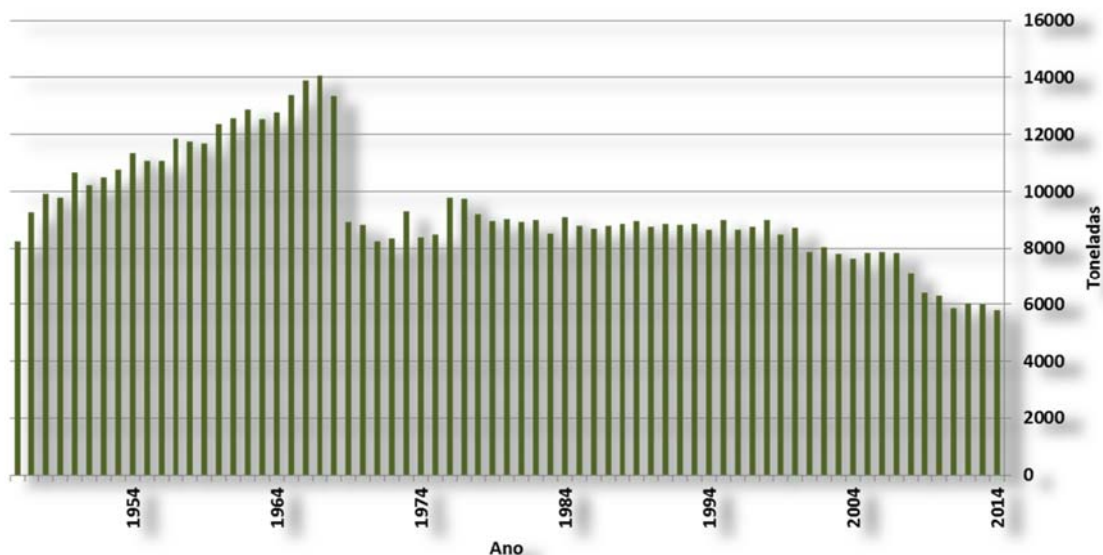


Figure 1. Yearly production of Rough Wool in Portugal (*Produção anual de Lã suja em Portugal*).

MATERIAL AND METHODS

From the fleeces of 50 female BSE sheep breed, we collected samples in two different locations (figure 2): in between shoulders (eE) and at the tail insertion (Cd). Samples were taken after shorn and the chosen spots tried to enhance eventual differences. Next studies will enlarge the scope of sampling and comparison with other breeds

The sample represented the two varieties (White and Black [VAR]; n = 25 each) and 5 age groups (1st to 5th shearing, for each of the varieties [ORDER]; n = 5 each), with the purpose of making a brief characterization of the wool produced by BSE.

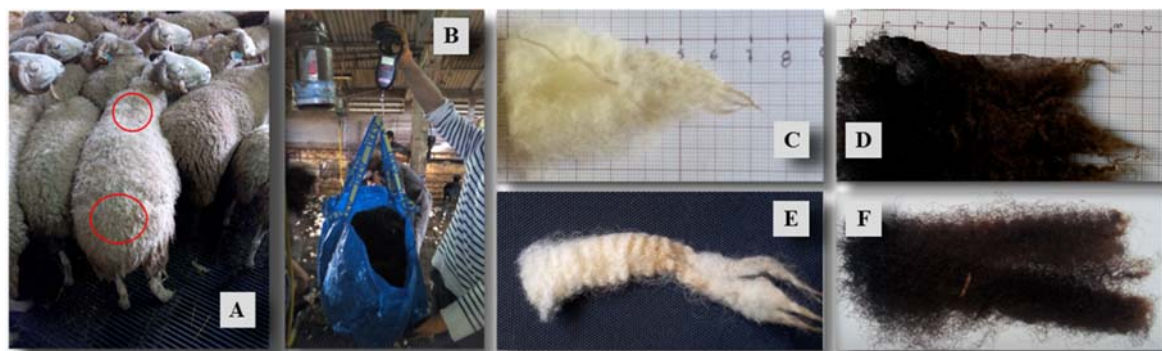


Figure 2. Location of the sampling spots [A], Fleece weighing [B], Wool Lock Length determination [C and D] and the Grade of Wool Crimping determination [E and F] (*Localização dos pontos de amostragem [A], Pesagem do Velo [B], determinação do Comprimento da Mecha [C e D] e do grau de Frisado [E e F]*).

The evaluated parameters were: 1) the fleece weight [PVelo]; 2) the staple length [CM-eE and CM-Cd] and, further, 3) the degree of crimping shown at 1 and 2 cm far from the root [F-eE1; F-eE2; F-Cd1 and F-Cd2]. The crimping degree proved to be lacking in many samples, even with 8x magnification. In these cases, it was assigned the value of 0 dimples.

Data from CRD design were submitted to ANOVA-SAS according to the linear model $Y_{ijk} = \mu + V_i + I_j + VxI_{(ij)} + \sum_{ijk}$, with the main factors' corresponding averages being compared (Duncan, $\alpha = 0.5$).

RESULTS AND DISCUSSION

Tables I, II and III present the results of ANOVA and the corresponding means comparison.

Table I. Effect of Variety and Shearing order over the Fleece weight [PVelo] and Length at both locations - between shoulders [CM-eE] and tail insertion [CM-Cd] - along with the corresponding mean comparison (*Efeito da Variedade e da Ordem da Tosquia sobre o Peso do Velo [PVelo] e o Comprimento da Mecha nas duas localizações - entre-Espáduas [CM-eE] e na inserção da cauda [CM-Cd] - e comparação das respectivas médias*).

		PVelo			CM-eE			CM-Cd		
		P	$\bar{x} \pm EPM$	[3]	P	$\bar{x} \pm EPM$	[3]	P	$\bar{x} \pm EPM$	[3]
VAR	Brancas	ns	1,262±0,0820	A	ns	7,960±0,2828	A	***	7,762±0,3280	A
	Pretas		1,389±0,0981	A		7,220±0,3290	A		6,468±0,2627	B
ORDEM (idade)	1ª tosquia	***	0,846±0,0800	b	*	6,530±0,3804	b	***	5,590±0,4051	b
	2ª tosquia		1,580±0,1202	a		8,620±0,5281	a		8,100±0,4022	a
	3ª tosquia		1,519±0,1629	a		7,210±0,5654	ab		7,760±0,4796	a
	4ª tosquia		1,282±0,1198	a		7,850±0,3713	ab		6,940±0,3781	a
	5ª tosquia		1,400±0,1079	a		7,740±0,4256	ab		7,160±0,5398	a

Notas: 1) O Frisado na inserção da cauda [F-Cd1 e F-Cd2] foi influenciado ($P \leq 0,5$) pela interação VARxORDEM; 2) P (significância do efeito) = ns - não significativo; * - significativo ($P \leq 0,05$); ** - bastante significativo ($P \leq 0,01$); *** - altamente significativo ($P \leq 0,001$); 3) Médias ladeadas por letras iguais não diferem entre si (Duncan, $\alpha = 0,05$) - maiúsculas para VAR e minúscula para ORDEM.

Variety influenced CM-Cd ($P < 0.001$) and the crimp between shoulders [F-eE1, F-eE2] ($P < 0.05$) with higher values for the White sheep (7,752 cm, 2.04 and 3.68, respectively).

The Order (age) influenced PVelo and CM-Cd ($P < 0.001$) and also the CM-eE ($P < 0.05$), and the values of the 1st shearing differ from all other ($P < 0.05$) and were smaller in all parameters. The highest values were recorded at the 2nd shearing and the smallest at the 1st.

The degree of Crimping showed maximum of 5:09 full dimples between the shoulders at 1 and 2 cm from the root. For the tail, the corresponding values were 3 and 6. However, dimples were observed in only 50 % of samples between shoulders and in 34 % of tail insertion samples.

The weight of the fleece and the Staple length had values below those indicated by the breed standard and were 1.5 to 2.0 kg, and 8 to 14 cm (SPOC; SPREGA). These are results that demand future analysis within this breed and assess the hypothetical loss of wool quality.

Table II. Effect of Variety and Shearing order over the Fleece between shoulders at 1 cm [F-eE1] and 2 cm [F-eE2] far from the root, along with the corresponding mean comparison (*Efeito da Variedade e da Ordem da Tosquia sobre o Frisado entre-Espáduas a 1 cm [F-eE1] e a 2 cm [F-eE2] da raiz e comparação das respectivas médias*).

VAR		F-eE1			F-eE2		
		P	$\bar{x} \pm EPM$	[3]	P	$\bar{x} \pm EPM$	[3]
VAR	Brancas	*	2,04±0,353	A	*	3,68±0,697	A
	Pretas		1,08±0,321	B		1,64±0,513	B
ORDEM (idade)	1ª tosquia		1,70±0,559	a		2,60±0,909	a
	2ª tosquia		1,30±0,559	a		1,90±1,016	a
	3ª tosquia	ns	0,80±0,416	a	ns	1,40±0,748	a
	4ª tosquia		1,90±0,586	a		3,50±1,118	a
	5ª tosquia		2,10±0,623	a		3,90±1,187	a

Notas: 1) O Frisado na inserção da cauda [F-Cd1 e F-Cd2] foi influenciado ($P \leq 0,5$) pela interação VARxORDEM; 2) P (significância do efeito) = ns - não significativo; * - significativo ($P \leq 0,05$); ** - bastante significativo ($P \leq 0,01$); *** - altamente significativo ($P \leq 0,001$); 3) Médias ladeadas por letras iguais não diferem entre si (Duncan, $\alpha = 0,05$) - maiúsculas para VAR e minúscula para ORDEM.

Table III. Effect of Variety and Shearing order over the Fleece in tail insertions at 1 cm [F-Cd1] and 2 cm [F-Cd2] far from the root, along with the corresponding mean comparison (*Efeito da Variedade e da Ordem da Tosquia sobre o Frisado na inserção da cauda a 1 cm [F-Cd1] e a 2 cm [F-Cd2] da raiz e comparação das respectivas médias*).

VAR		F-Cd1			F-Cd2		
		P	$\bar{x} \pm EPM$	[3]	P	$\bar{x} \pm EPM$	[3]
VAR	Brancas	ns	0,76±0,226	A	ns	1,48±0,433	A
	Pretas		0,76±0,233	A		1,04±0,344	A
ORDEM (idade)	1ª tosquia		0,60±0,306	a		0,80±0,442	a
	2ª tosquia		0,90±0,379	a		1,70±0,731	a
	3ª tosquia	ns	1,00±0,422	a	ns	1,50±0,687	a
	4ª tosquia		0,20±0,200	a		0,30±0,300	a
	5ª tosquia		1,10±0,433	a		2,00±0,745	a

Notas: 1) O Frisado na inserção da cauda [F-Cd1 e F-Cd2] foi influenciado ($P \leq 0,5$) pela interação VARxORDEM; 2) P (significância do efeito) = ns - não significativo; * - significativo ($P \leq 0,05$); ** - bastante significativo ($P \leq 0,01$); *** - altamente significativo ($P \leq 0,001$); 3) Médias ladeadas por letras iguais não diferem entre si (Duncan, $\alpha = 0,05$) - maiúsculas para VAR e minúscula para ORDEM.

CONCLUSIONS

The variety and the order of shearing influenced some of the parameters (see results).

As mentioned, the weight of the fleece and the Staple length had values below those indicated by the breed standard. These values, combined with the absence of crimps (only observed in 50 % of the samples taken

from the between shoulders spot and in 34 % of the tail insertion samples) suggest deterioration of wool features.

ACKNOWLEDGEMENTS

The authors thank the collaboration and availability to ARTOVISTRELA and ANCOSE.

BIBLIOGRAPHY

Azevedo J.; Valentim R. 1989. Produção de lã em Trás-os-Montes.

<URL: [http://repositorio.utad.pt/bitstream/10348/1594/1/I%20CZ%20Produ%C3%A7%C3%A3o%20de%20l%C3%A3%20\(1989\).pdf](http://repositorio.utad.pt/bitstream/10348/1594/1/I%20CZ%20Produ%C3%A7%C3%A3o%20de%20l%C3%A3%20(1989).pdf)>.

FAO. 2013. Food and Agriculture Organization of the United Nations - Statistics Division.

<URL: <http://faostat3.fao.org/browse/Q/QL/E>>.

INE. 2015. Instituto Nacional de Estatística - Estatísticas da Produção Animal. Lisboa.

<URL: https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_indicadores&indOcorrCod=0000926&contexto=bd&selTab=tab2>

SPOC. s/d. Sociedade Portuguesa de Ovinotecnia e Caprinotecnia - Recursos Genéticos - Ovinos Serra-da-Estrela.

<URL: http://www.ovinosecaprinos.com/recursos_f.html>.

SPREGA. s/d. Sociedade Portuguesa de Recursos Genéticos <URL: <http://www.sprega.com.pt/sprega.html>>.