MEDWIN PUBLISHERS
Committed to Create Value for Researchers

International Journal of Zoology and Animal Biology
ISSN: 2639-216X

Effect of the Shearing Date on Wool Growth on Native Pasture in Merino Sheep

Fernandez Abella D*, Irabuena O, Sterla S and Hernandez Ruso Z

Department of Biological Science, Pole of Production & Reproduction in Ruminants, University of Uruguay, Uruguay

***Corresponding author:** Daniel Fernandez Abella, Department of Biological Science, Pole of Production & Reproduction in Ruminants, University of Uruguay, 50000, Jump, Uruguay, Tel: 59899146270; Email: ferabe@unorte.edu.uy

Investigation Paper

Volume 3 Issue 5

Received Date: August 25, 2020

Published Date: September 07, 2020

DOI: 10.23880/izab-16000239

Abstract

Wool growth rate has been studied in 30 Merino Australian adult wethers divided into three groups according to shearing dates: September, October and November. Differences in fleece weight were observed between shearing dates with heavier weight in October and November (5.50; 5.60 Kg) respect to September (4.95 Kg). Marked seasonal rate in wool growth was observed, reached its maximum in summer and minimum in winter. Annual wool growth average was 11.8g day-1 for September and 13.1g day-1 for October-November ($p<0.05$). Annual variation of pasture production explains wool growth determining changes in body weight and its interaction with shearing date. The maximum percent clean wool yield was found in summer and minimum in winter. Staple length follows the same tendency as wool growth, whereas the diameter was independent and same in the three groups (20.18; 20.42 and 20.57 micron, September, October and November, respectively). Wool growth is affected by nutrition, photoperiod and temperature, wherever in our conditions the major factor is the quality and quantity of native pasture is very important to know wool growth rate as well as the best shearing moment in order to improve wool production.

Keywords: Sheep; Merino; Shearing Date; Wool Growth

Introduction

Is know the effects of time of shearing (twice or three time of year) [1,2] or autumn versus spring [3-5], or shearing period of gestation (before or after lambing) [3,6] on the quality and production of wool, and lamb survival [6-8]. However, little information is available on the effect of the shearing date on wool growth. Previously, in the Powarth breed has been shown the effect of different date in the spring of shearing in wool production on basaltic nature pastures [9]. In late winter, shearing determine lower wool growths corresponding to lower supply of native pastures [9]. This indicates that the shearing date can sharply infer in the production of wool from a farm, economically affecting its returns.

Thus, the aim of the present work was to study the effect of date shearing in another type of nature pasture (crystalline basement soil) on wool production.

Materials and Methods

The experiments took place in a farmer situated in the south part of Uruguay (latitude of 43° 39' South, longitude of 54°40' West), on native pasture (crystalline basement soil).

Thirty Merino Australian castrated males similar in age (3-year-old), body weight, quality and quantity of wool were randomly separated into three experimental groups: shearing September 15, October 15 and November 15.

Tattoo Patch method [10,11] was used to determine wool growth, taking samples (10 x 10 cm) every 60 days in the right rib of the animal. Wool yield was determined and fiber

diameter was determined by AIR Flow [12]. Body weight was measured monthly; the weight of live weight without wool is calculated through the calculation of existing wool according to that obtained in the Patch. The fleece weight was determined with a precision balance (+0.100 Kg).

Pasture growth (exclusion cages), protein (Microkjeldhal) and dry matter were determined in the pasture [13,14].

During the treatment period the wethers had good body condition and received drug treatments to minimize the parasitic burden.

Statistical analyses were computed using the GLM or FREQ procedures of the SAS (2008) System for Linear Models. The significance level was considered for values of $P < 0.05$ (Figure 1).

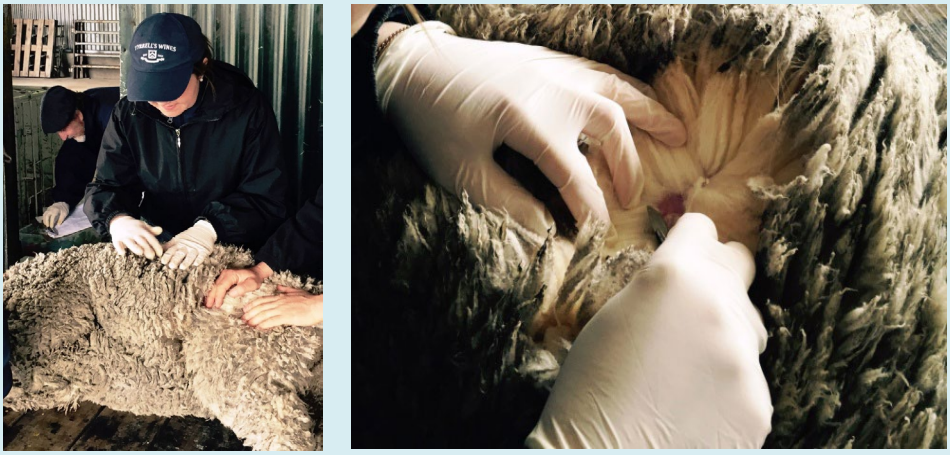

Figure 1: Tattoo Patch method.

Results and Discussion

The results show differences between shearing dates increasing the weight of fleece when the shearing is already made in the spring (Table 1). The maximum wool growth that occurs three weeks post shearing was enhanced by the quantity and quality of pastures existing in November, as well as by a favorable photoperiod (long days) [15,16]. Similar data have been reported by Fernandez Abella, et al. [9] in Polwarth breed on Basalt nature pasture, who obtained higher wool production in October-November versus August (3.86 *vs* 4.29 Kg, fleece weight), being a value for intermediate September (4.01 Kg).

In this work, results indicate an interaction between shearing date and nutrition, found by the correlation obtained between the weight of clean wool of the patch square (WCWPS) and the growth of the pasture ($r=0.45$; $p<0.05$). Significant differences were observed between shearing dates and wool growth (11.8g day^{-1} for September and 13.1g day^{-1} for October-November ($p<0.05$), explained by increased growth in spring-summer, which determined greater animal weight, as well as fleece weight. However, there were no different in fiber diameter ($p >0.05$) (Table 1).

There were different in body weight and fleece weight ($p< 0.05$; Table 1). Body weight follows the pasture production curve, with highs in summer-early autumn and lows in winter-early spring. These results are consistent with those obtained by Williams, et al. [16]; Hawker, et al. [17] who confirm that body weights accompany the growth curve of pastures. However, wool growth is delayed by 3-4 weeks in response to nutrition changes [19].

There were annual differences in wool growth rate, being in the second year largest due to higher growth during autumn, compared to the first year (Table 2). The average daily growth rate for the two years was 1.38; 1.70 and 1.73 mg/cm^2 for each group (September, October and November, respectively). The maximum potential rate was not reached (2.0 mg/cm^2) [19]. Similar resultants were observed on basaltic pasture [9].

The wool yield evaluated in the Patches shows a decrease in the winter, due to lower precipitation, lower diameter and increase in greasy content according to results observed by Hemsley, et al. [20]. Fiber diameter increases in all groups from the shearing to the maximum at the end of summer, then decreases to become minimal in the winter. There were differences in the diameter of the fibers, September shearing determined lower values ($p<0.05$). The length of wool fibers has seasonal variations, but not as marked as the diameter

(multiple correlation WCWPS, diameter and length of the fibers 0.94). The correlation obtained between fleece weight and annual WCWPS was 0.49 and 0.60, for each year. The low correlation is based on the surface of the Patch performed is the same in all animals, however the body surface is different between individuals.

Shearing Date	September	October	November
Fleece weight (Kg)			
Average	4.65 + 0.22	5.17 + 0.30	5.26 + 0.24
	5.25 + 0.34	5.83 + 0.17	5.93 + 0.38
	4,95 + 0.41 a	5.50 + 0.41 b	5.60 + 0.46 b
Fiber diameter (µ)			
Average	19.60 + 0.63	19.55 + 0.35	19.65 + 0.32
	20,76 + 0.62	21.29 + 0.82	21.50 + 0.83
	20.18 + 0.85 a	20.42 + 1.08 a	20.57 + 1.13 a
Body weight (Kg) (at shearing)			
Average	62.12 + 1.60	65.90 + 3.54	66.75 + 2.51
	64.18 + 1.57	67.05 + 3.39	67.90 + 2.50
	63.15 + 1.87 a	66.48 + 3.42 b	67.33 + 2.51 b
a vs b : p<0.05			

Table 1: Effect of shearing date on fleece weight, fiber diameter and body weight (mean + standard error) during two years.

Shearing Date		Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	Jun	July	Aug	Annual Average
September	First Year	1.12		2.12		1.43		1.2		1		1.15		
	Second Year	1.08		1.78		1.81		1.36		1.3		1.25		
		1.1		1.95		1.62		1.28		1.15		1.2		1.38 + 0.33 a
October	First Year		1.95		2		2		1.14		1.3		1.81	
	Second Year		1.57		2.38		1.96		1.5		1.42		1.39	
			1.76		2.19		1.98		1.32		1.36		1.6	1.70 + 0.38 b
November	First Year	1.3		1.78		2.1		1.92		1.65		1.52		
	Second Year	1.42		1.74		2.3		1.86		1.79		1.38		
		1.36		1.76		2.2		1.89		1.72		1.45		1.73 + 0.27 b

a versus b : p <0.05

Table 2: Wool growth (mg/cm^2 day^{-1}) determined by Tattoo Patch every 60 days according to shearing date.

The decrease in the digestibility and protein percentage of the pasture (Table 3) reduce the wool growth. Formoso, et al. [14] reported in the same native pastures (crystalline basement soil) pasture digestibility of 67.3; 57.7; 60.0 and

57.7% for spring, summer, autumn and winter respectively. Changes in pasture growth determine changes in wool growth; however other environmental factors such as temperature and photoperiod also get involved [21-23].

Pasture production		Saison Growth Pasture (%)			
Kg (Dry Matter ha^{-1})		Spring	Summer	Autumn	Winter
First year	4110	36	28	20	16
Second year	4520	31	29	25	15
		Protein (%)			
First year		10.2 ± 1.5a	9.1 ± 0.5a	8.9 ± 0.5a	7.7 ± 0.8b
Second year		9.7 + 2.0a	8.2 +0.4ab	10.0 + 0.6a	6.8 + 0.9b

a vs b : p<0.05

Table 3: Pasture production (yield per hectare) growth (percentage) and protein (percentage) in each season.

Conclusion

In conclusion, in our conditions (breed and native pasture) spring shearing date affect wool growth. There are no reports in the literature on the effect of shearing date on wool growth; except for an experiment conducted on another type of native pasture (Basalt) in our country [9]. Both confirm that in sheep feed pastures, shearing date change the quantity of wool produced.

References

1. Torell DT, Weir WC, Bradford GE, Spurlock GM (1969) Effects of time of shearing on wool and lamb production. California Agriculture pp: 16-19.
2. Salehi M (2009) The Season Effects and Shearing Time on Wool Production, Breaking Resistance, Fiber Diameter and Fiber Length of Baluchi Sheep Breed.
3. Campbell A (2006) The effect of time of shearing on wool production and management of a spring-lambing merino flock, PhD thesis, Veterinary Science, University of Melbourne pp: 188.
4. Story LF, Ross DA (1960) Effect of shearing time on wool. NZ J Agric Res 3(1): 113-124.
5. Fernandez Abella D, Rodriguez Palma R, Saldanha S (1996) Effects of season of shearing on the fertility of ewes mated early and on wool growth on natural basalt soil pasture. Produccion Ovina 9: 63-74.
6. Black JL, Bottomley GA (1980) Effects of shearing and lambing dates on the predicted pasture requirements of sheep in two Tasmanian locations. Austr J Exp Agric Anim Husb 20(107): 654-661.
7. Lightfoot RJ (1967) The effects of shearing time and stocking rate on wool production. J Dep Agric Western Australia 8(3): 90-98.
8. Lamb PR (2004) Staple strength and its relevance to worsted processing. Wool Technology and Sheep Breeding 52: 171-192.
9. Fernandez Abella D, Surraco L, Borsani L, Capurro A (1991) Effect of the shearing season on basalt natural pastures in Polwarth sheep. Boletin de Ciencias Biológicas 1: 31-48.
10. Turner HN (1956) Measurements as an aid to selection in breeding sheep for wool production. Animal Breeding 24(2): 87-118.
11. Langlands JP, Wheeler JL (1968) The dyebanding and tattooed patch procedures for estimating wool production and obtaining samples for the measurement of fiber diameter. Austr J Exp Agric Anim Husb 8: 265-269.
12. Swan A **(**1997) Objective measurements of style in the CSIRO fine wool flock. AASMB yearbook pp: 46-47.
13. AOAC (2000) Association of Official Analytical Chemist. EUA.
14. Formoso D, Colucci PE (2012) Productivity of natural field improvements in Cristalino Central, Uruguay.
15. Allden WG (1979) Feed intake, diet composition and wool growth. In: Physiological and environmental limitations to wool growth. JL Black, PJ Reis, et al. (Eds.), pp: 61-78.
16. Williams AJ, Winston RJ (1965) Relative efficiencies of wool feed conversion at three levels of nutrition in genetically different batches in wool production. Austr J Exp Anim Husb 5: 390-395.
17. Hawker H, Crosbie SF, Thompson KF, McEwan JC (1984) Effects of season on the wool growth response of Romney ewes to pasture allowance. Proc Austr Soc Anim Prod 15:

380-383.

18. Black JL, Bottomley GA (1980) Effects of shearing and lambing dates on the predicted pasture requirements of sheep in two Tasmanian locations. Austr J Exp Agric Anim Husb 20: 654-661.

19. Reis PJ (1967) The growth and composition of wool. IV The differential response of growth and of sulphur content of wool to the level of sulphur-containing animo acids given per abomasum. Austr J Biol Sci 20(4): 809-825.

20. Hemsley JA, Marshall JTA (1984) A column extraction method for the estimation of wax and suint in raw wool. Wool Technol. Sheep Breed 31: 158-163.

21. Nagorcka BN (1977) The description and analysis of wool growth. Austr J Agric Res 28(4): 737-746.

22. Pannaretto BA (1979) Effects of light on cyclic activity of wool follicles and possible relationships to changes in the pelage of other mammals. In Physiological and Environmental Limitations to Wool Growth, Black JL, Reis PJ, et al. (Eds.), Sidney, Australia, pp: 327-336.

23. Greenty KG, Orwin DFG, Woods JL, Young SR, Smith MC (1984) Seasonal wool production and staple strength of Romney ewes. NZ Soc Anim Prod 44: 57-59.