



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

22nd International Grassland Congress

Vertical Distribution of Leaves and Stems on the Sward and Forage Intake by Lambs in Tifton-85 Pasture

Alda L. G. Monteiro
Federal University of Paraná, Brazil

Cláudio J. A. da Silva
Federal University of Paraná, Brazil

Marina G. B. da Silva
EDUVALE/Avaré, Brazil

Sergio R. Fernandes
Federal University of Paraná, Brazil

César H. E. C. Poli
Universidade Federal do Rio Grande do Sul, Brazil

See next page for additional authors

Follow this and additional works at: <https://uknowledge.uky.edu/igc>

 Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/22/1-7/20>

The 22nd International Grassland Congress (Revitalising Grasslands to Sustain Our Communities) took place in Sydney, Australia from September 15 through September 19, 2013.

Proceedings Editors: David L. Michalk, Geoffrey D. Millar, Warwick B. Badgery, and Kim M. Broadfoot

Publisher: New South Wales Department of Primary Industry, Kite St., Orange New South Wales, Australia

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Presenter Information

Alda L. G. Monteiro, Cláudio J. A. da Silva, Marina G. B. da Silva, Sergio R. Fernandes, César H. E. C. Poli, Nelson T. Santos Jr., Thiago Augusto Cruz, and Carolina Dalagassa dos Santos

Vertical distribution of leaves and stems on the sward and forage intake by lambs in Tifton-85 pasture

Alda LG Monteiro^A, Cláudio JA da Silva^B, Marina GB da Silva^C, Sergio R Fernandes^B, César HEC Poli^D, Nelson T Santos Jr^E, Thiago Augusto Cruz^E and Carolina Dalagassa dos Santos^E

^A Animal Science Dept., Universidade Federal do Paraná (UFPR)/Curitiba, Paraná, Brazil

^B Post Graduate Stud., Animal Science Dept., Universidade Federal do Paraná (UFPR)/Curitiba, Paraná, Brazil

^C Agricultural and Animal Sci. Dept., EDUVALE/Avaré, São Paulo, Brazil

^D Animal Sci. Dept., Universidade Federal do Rio Grande do Sul., Porto Alegre, RS, Brazil

^E Graduate School, UFPR, Brazil

Contact email: aldaufpr@gmail.com

Keywords: Leaf mass, stem mass, sward layers, bite rate, time spent per bite

Introduction

Sward characteristics affect the performance of grazing livestock, especially for the youngest animals. The aim of this study was to evaluate the relationship between the vertical distribution of leaves and stems on the sward and the forage intake parameters of lambs in four sheep meat production systems grazing a Bermudagrass (*Cynodon dactylon*) cv. Tifton-85 pasture.

Methods

The experiment was carried out between November/2008 and March/2009 at the Laboratório de Produção e Pesquisa em Ovinos e Caprinos (LAPOC), Universidade Federal do Paraná (UFPR), located in Pinhais-PR (25°25' S, 49°8' W, 915 m of altitude), Southern of Brazil.

The morphological composition of sward and the forage intake process of lambs were assessed in four lamb meat production systems on Tifton-85 pasture: (1) unweaned lambs maintained only on pasture until slaughter; (2) unweaned lambs supplemented with concentrate until slaughter; (3) early weaned lambs maintained only on pasture until slaughter; and (4) early weaned lambs supplemented with concentrate until slaughter. Sixty Suffolk lambs were distributed into the systems according to sex, BW and type of birth (single or twin), and were evaluated from 46 to 144 days of age in all systems. Lambs were weaned at 46 days of age and immediately allocated in the paddocks of the early weaning systems. When supplemented, lambs received a daily protein-energy concentrate at 2% of body weight (BW) on dry matter (DM) basis. The continuous grazing treatment adopted a variable stocking which was adjusted every 21 days to maintain forage allowance in DM/day equal to 12% BW.

The vertical distribution of morphological components of sward was determined from three forage samples collected per paddock (three paddocks per production system) every 21 days. Each sample was cut in layers of 10 cm height with a stratifier. Leaf lamina and stem plus sheath fractions were obtained from each layer, and dried to esti-

mate the dry mass per area (ton DM/ha) of morphological components per layer.

Forage intake of lambs was assessed at the beginning, the middle and at the end of experimental period, with approximately interval of 28 days between each evaluation. Two female lambs per paddock were assessed in the morning and afternoon using the method described by Penning and Hooper (1985). Bite rate (bites per minute), time spent per bite (seconds per bite), bite mass (mg DM/kg metabolic weight – MW) and intake rate (g DM/min/kg MW) were measured. The DM content of forage ingested was estimated from samples collected by hand plucking, and animals were weighed in a platform scale, with 10 g accuracy.

The experiment was set up in a randomized block design with four treatments and three replicates, with five tester lambs per replication. The variables were analyzed using ANOVA and means were compared by Tukey test to identify significant differences at $P < 0.05$.

Results

The forage allowance was similar ($P > 0.05$) between the production systems with mean of 11.6% BW in DM/d, which was close to the predetermined value (12% BW in DM/d). However, until 40 cm of sward height, the leaf and stem masses in each layer of the sward differed ($P < 0.05$) between the production systems (Table 1). Leaves and stems on the 40-50 and 50-60 cm layers were observed only in the systems with weaning and, therefore, were not compared statistically between the production systems. These results show that different sward structures were formed between the systems with and without weaning, with less layers and higher concentration of forage mass in the first 20 cm of sward height in the systems without weaning.

Higher ($P < 0.05$) leaf mass was observed in the systems with weaning (1.5 t DM/ha on average) compared to the systems without weaning (1.0 kg DM/ha on average, Table 1). Higher homogeneity in the vertical distribution of leaf mass on the sward was registered in the system with

Table 1. Mean and standard error of mean (SEM) for leaf lamina and stem plus sheaths by layer of Tifton-85 pasture in the four lamb meat production systems

Sward layers (cm)	Production Systems				SEM
	Unweaned	Creep feeding	Weaned	Weaned and supplemented	
Leaf lamina (kg DM/ha)					
50-60	-	-	-	0.4	-
40-50	-	-	0.0	5.2	-
30-40	0.0 b	0.0 b	1.7 ab	37.4 a	5.8
20-30	4.4 b	7.0 b	67.0 b	229.1 a	29.5
10-20	168.5 c	182.0 c	443.2 b	584.4 a	55.1
0-10	835.3 ab	888.7 ab	965.2 a	631.6 b	45.5
Total	1008.3 b	1077.7 b	1477.0 a	1488.0 a	73.7
Stem plus sheaths (kg DM/ha)					
50-60	-	-	-	0.0	-
40-50	-	-	0.0	0.4	-
30-40	0.0 b	0.1 b	0.2 b	4.2 a	0.6
20-30	0.5 b	1.2 b	15.6 b	102.8 a	14.4
10-20	85.1 c	69.0 c	285.1 b	585.2 a	65.2
0-10	1417.8 c	1482.9 bc	2129.4 a	1965.1 ab	102.7
Total	1503.4 b	1553.2 b	2430.3 a	2657.9 a	162.6

Means followed by lowercase letters in the same row differ by Tukey test ($P < 0.05$).

weaning and supplementation, which showed 55% of leaf mass (0.8 t DM/ha) distributed into the 10-20 and 20-30 cm layers. Also, the stem mass was higher ($P < 0.05$) in the systems with weaning (2.5 t DM/ha on average) compared to the systems without weaning (1.5 ton DM/ha on average). The system with weaning and supplementation showed the stem mass distributed until 40-50 cm layer, with 26% (0.7 t DM/ha) concentrated on the 10-20 and 20-30 cm layers. Only 4.5 to 12% stem mass was distributed into these layers in the other systems.

Differences in the vertical distribution of leaf and stem masses on the sward of the systems with and without weaning may be related to the pattern of diet selection and intake rate of forage by ewes and lambs. The little grazing experience determines an increase on time spent in diet selection and a decrease in the intake rate of forage by lambs, leading to a modify sward structure of pastures grazed only by this category (Baumont *et al.* 2000; Ribeiro *et al.* 2009).

Weaned lambs had lower ($P < 0.05$) bite rate (20 bites/min on average) compared to unweaned lambs (27 bites/min). Bite mass and intake rate were similar ($P > 0.05$) between the production systems and showed mean values of 12.6 mg DM/kg MW and 0.28 g DM/min/kg MW. Low bite rate of weaned lambs may be related to higher stem mass on the sward of systems with weaning, which is considered a physical barrier to the defoliation process. Thus,

weaned lambs show lower grazing efficiency compared to unweaned lambs, which was characterized by an increase in time spent on bite formation (3 s/bite vs. 2 s/bite).

Conclusion

Ewes modify the structural and morphological composition of the sward in the systems without weaning, which show higher concentration of leaf and stem mass in the first 20 cm of sward height. Weaning and supplementation led to higher homogeneity in the vertical distribution of leaves and stems on Tifton-85 sward. Early weaned lambs exhibit a low grazing efficiency, characterized by low bite rate and a high time spent in bite formation when compared to unweaned lambs.

References

- Baumont R, Prache S, Meuret, M, Morand-Fehr P (2000) How forage characteristics influence behaviour and intake in small ruminants: a review. *Livestock Production Science* **64**, 15-28.
- Penning PD, Hooper GEN (1985) An evaluation of the use of short-term weight changes in grazing sheep for estimating herbage intake. *Grass and Forage Science* **40**, 79-84.
- Ribeiro TMD, Monteiro ALG, Poli CHEC, Moraes A, Silva ALP, Barros CS (2009) Características da pastagem de azevém e produtividade de cordeiros em pastejo. *Revista Brasileira de Zootecnia* **38**, 580-587.