FORAGE MASS AND LEAF AREA INDEX IN MULTISPECIES PASTURES UNDER CONTINUOUS STOCKING

MASSA DE FORRRAGEM E ÍNDICE DE ÁREA FOLIAR EM PASTAGENS MULTIESPÉCIES SOB LOTAÇÃO CONTINUA

Lucas Ferreira Penteado*[1]; Ana Carolina Lopes Batista [1]; Ana Flávia Bastos Ongaro[2]; Giovanna Castilho Santos[1]; Marcelo Moretin Vieira[1]; Ricardo Lopes Dias da Costa[1]; Flávia Maria de Andrade Gimenes[1]

[1]Instituto de Zootecnia/APTA/SAASP, Nova Odessa/SP, Brazil;
[2]Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina, MG, Brazil;
*Corresponding author: lucaspenteado@hotmail.com

Abstract

The association of different species in a pasture ecosystem is a challenge for grazing management, where the leaf area index (LAI) is the end result of interactions between plant-animal-environment. Therefore, this study evaluated the effects of grazing management strategies (GMS) considering forage canopy heights on forage mass production (FM) and LAI in multispecies pastures. The experiment was conducted at the Instituto of Zootecnia in Nova Odess, SP in autumn (June 2021) and spring (December 2021). Multispecies pastures were composed of aruana grass (*Megathyrsus maximum cv. Aruana*) and a mix of forage legumes: calopo (*Calopogonium mucunoides*), macrotyloma (*Macrotyloma axillare)* and stylo (*Stylosanthes macrocephala*+ *Stylosanthes capitata*). The study was conducted in four randomized blocks with four treatments (grazing management strategies – GMS: 15, 30, 45 and 60 cm canopy heights) and four replications (500 m²/each paddock), with continuous stocking of sheep. For the FM evaluation, the forage was cut at soil level in three 0.25 m² areas, representative of the average paddock height. The samples were weighed, homogenized and divided into two subsamples for component separation and total dry matter quantification after drying in a forced-air oven at 65 °C for 72 hours. The leaf area (cm²) was determined using a LI-COR model 3100 measuring device to calculate the total covered soil area (m²) and to find the LAI values for aruana grass (LAIaruana), legumes (LAILeg) and aruana grass + legumes (LAITotal). Analysis of variance was performed by SAS software using proc MIXED. The Tukey test was applied for comparison of means ($P<0.05$). There was a significant effect for GMS and season in FM ($P<0.0001$; $P=0.00061$). The highest FM value found was for 60 cm GMS, with 8883±489.5 kg DM.ha^{-1}, compared to 15 cm with 5714±489.5 kg DM.ha^{-1}, and the largest FM was observed in autumn (7977±346,2) compared to spring (6505±346,2 kg DM.ha^{-1},). There was interaction between GMS and season for aruana grass leaf blade area (LBAG) and legume leaflet (LL), ($P=0,0038$; $P=0.0060$). LBAG and LL presented smaller values for 30 cm GMS during autumn, of 641 and 3± 86,27 kg DM.ha^{-1}. There was seasonal effect ($P<0.0001$) for the dead material component (DMC), with values of 4412 and 1989± 227.1 kg DM.ha^{-1}, respectively, in autumn and spring. There was a GMS and season effect for LAIaruana and LAITotal ($P= 0.0030$; $P<0.0001$, respectively). The highest values of LAIaruana and LAITotal were observed for GMS of 60 cm with values of 4.1 and 4.7, while, the lowest values observed were 2.2 and 2.3 for 15 cm GMS, respectively. The highest values observed for the season were 4.3 and 4.7 during spring for LAIaruana and LAITotal. There was a significant interaction between GMS and season for LAILeg ($P= 0.0145$), and the highest value was observed for the 60 cm GMS in spring (1.1). Decreasing favorable edafoclimatic conditions and increased grazing pressure by reducing grazing management heights reflected LBGA and LL mass production decrease, contributing to the LAI reduction, but the legumes' presence increased LAI values. DMC mass presence in unfavorable conditions contributed to the lower LAI values, directly affecting the plants' photosynthetic apparatus, with lower quantity and quality, impacting forage plant resources. Therefore, FM and LAI were affected by GMS and season. It is not advisable to use grazing management strategies below 45 cm for LAI maintenance, mainly for forage legumes during unfavorable periods.

Keywords

Grazing management strategies, legume, sustainability, tropical grass

Acknowledgments:

FAPESP (2018/23246-9) and CAPES for research grants.