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TILLERING DYNAMICS OF *Panicum maximum* Jacq.cv. TANZANIA-1 AFTER GRAZING

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Abstract

Tillering dynamics and tiller dry matter weight from Tanzania grass (*Panicum maximum* cv. Tanzania-1) were evaluated in two post-grazing stubbles (High Post-grazing Stubble – HPS-3.6 t of DM/ha and Low Post-grazing Stubble – LPS-2.3 t of DM/ha). There was no difference between post-grazing stubbles for decapitated axillary and basal remainder and new axillary tillers. The LPS presented greater number of new basal tillers. The rate of appearance of new basal and axillary tillers decreased with time after grazing. There were differences between the treatments on tiller dry matter weight, and greater values were found in the high post-graze stubble.

Keywords: Post-graze stubble, grass, basal tiller, axillary tiller, apical meristem

Introduction

Grass productivity is directly related to the continuous expansion of leaves and tillers from remaining meristems, which is an important trait to the restauration of foliar area after grazing. It will directly affect the pasture longevity. According to Callaghan et al. (1992), the

longevity of tillers and the rate of tiller emission overcome the short-term local adversities. However, there are great differences among species in tiller emission rate, which depends directly on the number of leaves that each species needs to produce a new tiller. Tillering varies according to species and also depends on internal and external conditions of the plant. It is influenced by the genotype, hormonal balance, stage of growth, light, temperature, photoperiod, mineral nutrition and defoliation. The objective of this work was to evaluate the tillering dynamics and tiller dry matter weight of *Panicum maximum* cv. Tanzania-1 after grazing under two post-grazing stubbles.

Material and Methods

The experiment was conducted at EMBRAPA – Beef Cattle (National Beef Cattle Research Center), in Brazil (Latitude. 20^{o} 27' S, Longitude. 54^{o} 37' W and Altitude 530m). The experimental area is located in a Dark-Red Alic Latosol – "cerrado" soil, characterized by clay texture, low pH, low base saturation and high aluminum concentration. The weather, according to Köppen classification, is savanna rainy tropical, subtype Aw, characterized by a well defined occurrence of dry periods during the coolest months of the year and a rainy period during summer. The Tanzania-1 pasture measured 1.12 ha subdivided into 6 paddocks of 0.19 ha, and was established in January, 1999. In the second half of September 1999, 2 t/ha of limestone, 444 kg/ha of fertilizer 0-20-20 and 27.3 kg/ha of a trace element mixture were applied. Each paddock was grazed for seven days with variable numbers of cross-bred animals, depending on the post-graze stubble required. When the animals left the paddock, 220 kg/ha of urea were applied. In the second week of evaluation an infestation of Fall Armyworm (*Spodoptera frugiperda*) was observed. In November, Lambdacyhalothrin (40 mL/paddock) was applied. To estimate the contribution of the different kinds of tillers, 10 clumps were chosen at random, per replicate, to evaluate basal remaining tillers, axillary

remaining tillers, new basal tillers, new axillary tillers and decapitated tillers (apical meristem eliminated). The tiller count was done in 8, 16, 24 and 32 days after grazing. To identify the clumps, stakes with numbered ribbons were used. To determine tiller dry matter, 20 tillers per replicate were sampled, cut at soil level and then taken to the laboratory for dry matter measurement. The experimental design was a complete randomized block with treatments distributed in a split plot design, and three repetitions. The post-graze stubbles (High Post-graze Stubble – HPS-3.6 t of DM/ha and Low Post-graze Stubble – LPS-2.3t of DM/ha) constituted the plots and the days after grazing (8, 16, 24 and 32 days) the sub-plots. To determine tiller dry matter weight, the evaluations ware taken at 7, 14, 21, 28 and 35 days. Analysis of variance and regression analysis were done using the General Linear Model procedure (GLM) – SAS.

Results and Discussion

There was no effect ($P>0.05$) of post-graze stubbles on the number of tillers decapitated, with mean values of 2.0 and 7.6 tillers for HPS and LPS, respectively. A reduced number of decapitated tillers was observed, in both treatments, and this can be attributed to no elevation of apical meristem since it was the first grazing of the area. Gomide et al., (1979) reported that successive cuts or grazing that do not remove the apical meristem, promote its elevation, thus favoring later decapitation. Similar to what happened with the decapitated tiller, there were no difference ($P>0.05$) among the post-graze stubbles for basal remaining tillers (76.2 for HPS and 85.6 for LPS) and axillary remaining tillers (7.9 for HPS and 7.7 for LPS). The low number of axillary remaining tillers can be attributed to their location in the plant, usually in the upper part, where the chances to be removed by an animal are greater. The similarity among the post-graze stubbles for the remaining basal tillers can be explained by the similarity among post-graze stubbles for decapited tillers. More ($P<0.05$) new basal

tillers were found in the low subble treatment, with mean values of 14.4 and 16.1 tillers for HPS and LPS, respectively. This greater quantity of tillers, mainly in the first weeks (Figure 1), could be the result of the increase in light intensity on the basal buds, as described by Youngner (1972). There was no interaction between stubble and days after grazing, and the quantity of new basal tillers, in both treatments, decreased linearly with the days after grazing (Figure 1). In both residues, an intense tillering was noted in the two first weeks after grazing. The same result was found by Corsi (1984) who verified intense concentration in tiller emission in the first eight days after cuting in one cultivar of *Panicum maximum*. There was no difference ($P>0.05$) among post-graze stubbles for new axillary tillers, with mean values of 3.0 and 3.2 tillers for HPS and LPS, respectively. Reduction in the rate of appearance of new axillary tillers was verified during the regrowth period (Figure 1). Even in the first days after grazing, lower values of tillers were found when compared to basal tillers, indicating their little contribution to plant regrowth. Jewiss (1972) reported that the axillary tillering reduction could be explained by the apical dominance of each tiller on its axillary buds, when the number of basal tillers increases.

Although there was no interaction ($P>0.05$) between post-graze stubbles x days after grazing for tiller dry matter weight, there were differences ($P<0.01$) among post-graze stubbles, and the mean values were 1.576 and 1.187 g DM/tiller in high and low post-graze stubble, respectively. The dry matter weight of tillers showed a quadratic response to the days after grazing (Figure 2). The decrease in tiller dry matter occurred in the second week in both post-grazed stubbles. It was probably due to the lack of rain in the period, together with the infestation of Fall Armyworm (*Spodoptera frugiperda*) which removed a considerable part of leaf area, affecting dry matter production by tiller that week. After controlling the Fall Armyworm (*Spodoptera frugiperda*), the dry matter weight of tillers increased during the days after grazing as a function of the restructuration of leaf area and increase in the stem

weight. As a conclusion, the low post-graze stubble presented higher rates of appearance of tillers, by clump, but those, presented lower dry matter weight tillers when compared to high post-graze stubble.

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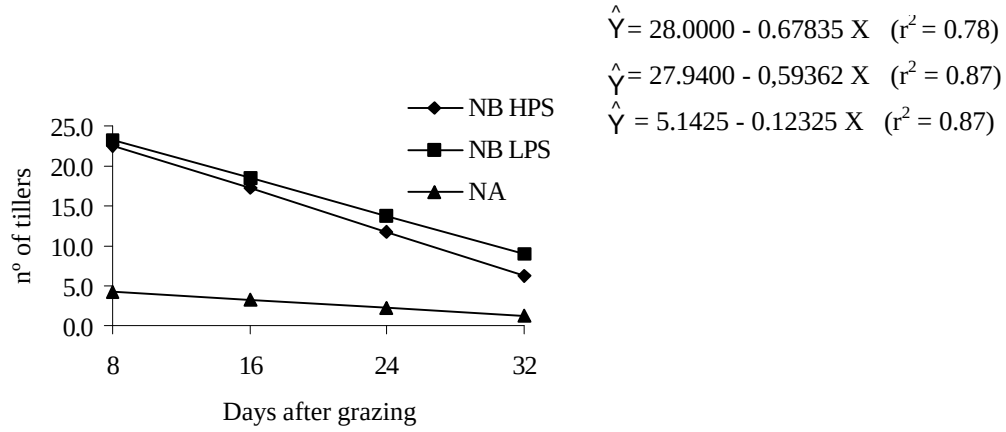

Figure 1 - Tiller number, per clump, of new basal tillers and new axillary tillers as a function of days after grazing

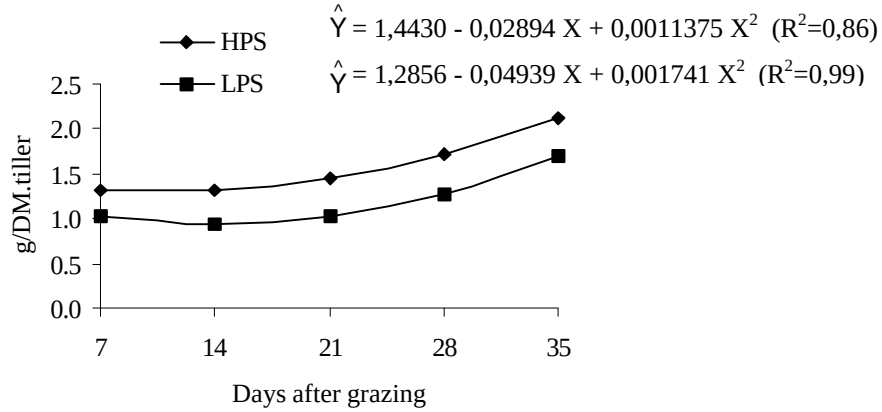

Figure 2 - Tiller dry matter weight at two post-graze stubble (low and high) as a function of days after grazing