Evolution and ageing of Brachiaria brizantha pasture component in a silvopastoral system

M. Rakocevic¹, F.C. de Oliveira, J. Ribaski and O.J. Lavoranti

Keywords: grass regeneration, leaf area index, morphology

Introduction The main causes of the decline of *Brachiaria* pasture in the tropics are lack of maintenance, fertilisation and excessively high animal stocking rates (Boddey *et al.*, 2004). *Brachiaria brizantha* has two predominant morphological forms: 1) relatively high stems with grouped tillers at a high position constructed from short leaves (bunch type); 2) low stems with long leaves, which in time evolve into the first type (Kanno *et al.*, 1999). The concept of *Brachiaria* management involves animals entering to commence grazing when the pasture is 50-60cm high and being removed at 25-30cm. leaving a regrowth period of at least 30 d (Alves *et al.*, 1996). The aim of this study was to determine the impact of two distinct regrowth periods (short versus very long) on the morphology of *Brachiaria brizantha* Hochst. ex A. Rich. (Bb), in a silvopastoral system (SPS) with *Corvmbia citriodora* Hook. (Cc).

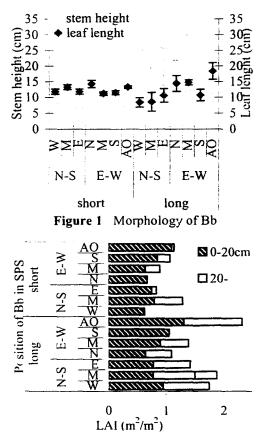


Figure 2 Leaf area index per layer

Material and methods The experiment was conducted during 2001-2002 on twelve-year-old SPS established on 70 ha, with Cc and Bb components planted on the contours (30 m between tree strips) in Tamboara, north-western of State of Paraná, southern Brazil (23° 10' latitude, 52° 27' longitude), average altitude of 480m. The climate is Cfa (Köppen's). Brachiaria in SPS is used for rotational pasture by adult zebu cattle. A completely randomised experimental design was used, with seven treatments hierarchically classified in distinct positions of Bb in SPS defined by Cc orientations: North-South (N-S) and East-West (E-W). An open area (AO) of pasture was used as control. The other treatments were distributed in the middle (M) between tree strips - 15 m, and 3 m distant from tree lines, corresponded to W(est) and E(ast) side of N-S tree orientation, and N(orth) and S(outh) side on E-W tree orientation. The orthogonal comparison within and between short (Oct. 2001) and long (Oct. 2002) periods of Bb regrowth was evaluated by F test. Leaf area index (LAI) per layer of 20cm was calculated from three replicates, while stem height and leaf length were calculated for ten replicates in 2001, and from three replicates in 2002.

Results At the end of the long regrowth period. Bb stems were significantly higher (Figure 1) than with short regrowth, and there was a greater leaf area (Figure 2) distributed in upper layers of the grass canopy. The leaf length showed a tendency to be shorter in long regrowth, especially on the N-S orientation, where there was an increased LAI in upper layers (20-40cm and even in 40-60cm). The highest LAI was developed in AO and in the middle of transects (M), with an important part distributed in the upper horizons of the canopy.

At these sample points, the inter-specific competition for the light is less important, but intra-specific competition partially blocks tillering close to the soil surface.

Conclusions Long grass regrowth induced morphological changes in Bb (appearance of bunch type tillers) which irreversibly led to ageing of the Bb canopy. These results question the concept of allowing *Brachiaria* regrowth to a canopy height of 60cm.

References

Alves, S.J. & C.V. Soares Filho (1996). Braquiária. Comissão paranaense de avaliação de forrageiras. Forragicultura no Paraná, Londrina, 183.

Boddey, R.M., R. Macedo, R.M. Tarré, E. Ferreira, O.C. de Oliveira, C. P. de Rezende, R.B. Cantarutti, J.M.Pereira, B.J.R. Alves & S. Urquiaga (2004). Nitrogen cycling in *Brachiaria* pastures: the key to understanding the process of pasture decline. *Agriculture, Ecosystems and Environment*, 103, 389-403.

Kanno, T., C. M. Macedo, V.P.B. Euclides, A.E. Bono, J. Santos, C.M. Rocha & L.G. Beretta (1999). Root biomass of five tropical grass pastures under continuous grazing in Brazilian savannas. *Grassland Science*, 45, 9-14

¹Embrapa Florestas, Estrada da Ribeira Km 111, P. O. Box 319, 83411-000 Colombo, Paraná, Brazil, Email: mima@cnpf.embrapa.br