

### Growth and forage yield of tropical grasses in silvopastoral systems in Brazil

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The interest in the knowledge of the establishment of grasses under shading increased, aiming to provide subsidies for the successful implantation of silvopastoral systems. In this study, we analyzed tiller growth and forage production of *Brachiaria brizantha* (cultivars BRS-Paiaguás, BRS-Piatã and Marandu) and *Panicum maximum* (cultivars Massai and BRS-Tamani) in silvopastoral systems, at Campo Grande, MS, Brazil. The experiment was arranged in randomized complete block design, with strip plots and two replications. The plots were implanted in March 2016, among the *Eucalyptus urograndis* adult tree rows, with an average height of 28 m, in 22 x 2 m arrangement. The tiller count (tiller.m<sup>-2</sup>) was performed every 30 days at five equidistant points (A, B, C, D and E) between rows of eucalyptus and one point at full sun (F). To determine forage yield, three cuts (at 60 day intervals), at the height of 10 cm of soil residue, were performed. The points presented different solar transmittances: F = 100%, A = 85%, B = 87%, C = 77%, D = 25% and E = 15%. The shading points presented a reduction of 74% in tiller population compared to the sun. The biomass production of *Brachiaria* cultivars (1,466 kg.ha<sup>-1</sup> DM) was higher than that of *Panicum* cultivars (980 kg.ha<sup>-1</sup> DM), with no differences in the same species. In general, the grasses showed biomass reduction decreasing from point A to E (36 to 67%). The cultivars of *Brachiaria brizantha* are more suitable for implantation in silvopastoral systems with adult trees, as an establishment strategy in fall-winter (off-season).

### Cattle productivity and carbon stock in silvopastoral systems with *Cratylia argentea* in the Colombian Dry Caribbean

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Dual-purpose cattle systems in department of Cesar are based on grazing of grasses. Milk yield total solids, fat and protein content for cows Zebu x Swiss brown at mid lactation stage were evaluated for silvopastoral systems with *Eucalyptus camaldulensis* and *Cratylia argentea* cv Veranera associated with *Brachiaria hybrid* Mulato II (T1), *Bothriochloa pertusa* (T2), *Brachiaria brizantha* cv. Toledo (T3) and *Megathyrus maximus* cv. Tanzania (T4). The initial establishing density of tree was 500 units per hectare with harvest projection for fencing post at six years and final plot density of 300 trees. A simple crossover design was used to analyse the variables. The saleable milk yield was higher ( $P < 0,05$ ) in T1 (6,0 l/v/d) in comparison to the other associations. The treatment did not affect ( $P > 0,05$ ) the milk quality variables. The total timber volume of *E. camaldulensis* was 56,2 when considering 17,1 m and 13,9 cm as total height and diameter at breast height, respectively. For carbon stock aerial biomass, the reserve was estimated as 11,65 tC/ha with fixation rates of 1,94 tC/ha/yr. The association Mulato II – *Cratylia* – *E. camaldulensis* was identified as a silvopastoral system that increase the saleable yield of milk compared with the predominant open grass (*Bothriochloa pertusa*) in the Colombian dry Caribbean region, that has shown a milk production of 3,9 l/v/d at the midterm of the lactating curve for dual-purpose cows. This system also represents an opportunity to contribute to mitigation from carbonfixation rates of 1,94 tC/ha/yr at the cattle production system and farm level.

### *Paspalum umbrosum*: a possible option C4 grass for silvopastoral systems in subtropical zones.

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Silvopastoral Systems is a sustainable production alternative. The success of these systems is based on the interaction among its components. The use of forage species tolerant to understory conditions is crucial to keep a positive balance. Instead, keeping within the structure of the C4 and C3 pastures components gives them more resilience, productivity and proliferation of weeds. In winter of 2018, a trial was established to determine the response of three species of *Paspalum* (*P. dilatatum*, *P. notatum* y *P. umbrosum*) in three understories conditions under an old plantation of *E. dunnii*; 16 plants of each were placed thrice in plots located on the stand's boundary; 10 m inside and outside it. The yield by plant was determined from the October 1 to the November 16, leaf water potential ( $\Psi_L$ ) and leaf temperature. There was interaction between specie and condition. *P. dilatatum* produced more than the double of dry weight than *P. umbrosum* in the exterior condition, meanwhile the last is 20% superior in the internal. Simultaneously, *P. dilatatum* showed  $\Psi_L$  de -1.9 Mpa in the external, while *P. notatum* and *P. umbrosum* reached -2.9 y -3.1 Mpa, respectively. However, there were no differences between species in the internal, with a mean of -2 Mpa. Leaf temperature was superior to 30 °C outside the stand and less than 23 °C on the boundary and inside. *P. umbrosum* presents a good perspective to be used as a C4 forage for silvopastoral. Its tolerance may be associated to water relation at high radiation.

### Morphometry of *Peltophorum dubium* in a silvopasture system in Southwestern Paraná, Brazil / Morfometria de *Peltophorum dubium* (*Canafistula*) em sistema silvipastoral no Sudoeste do Paraná

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*Canafistula* é nativa do Brasil, secundária inicial, de ocorrência em Floresta Estacional Decidual e Semidecidual, usada na arborização urbana e rural, pelo ótimo sombreamento. É estudada em sistemas silvipastoris, pela influência da sua área de copa na luminosidade do sub-bosque e a altura de copa no período ideal para introdução de animais no sistema. Avaliaram-se estas variáveis em um experimento de sistema silvipastoral no Sudoeste do Paraná-Brasil (Universidade Tecnológica Federal do Paraná, Dois Vizinhos), implantado em quatro linhas duplas (repetições), espaçadas 10 metros entre elas e 2 m x 1,5 m na linha/entrelinha de cada linha dupla. Em um inventário florestal, em junho/2018, quatro anos após o plantio, foram obtidas as variáveis deste estudo. Área de copa média foi de 4,1 m<sup>2</sup>/árvore (CV% 92,0), considerada suficiente para abrigar um animal de pequeno até de grande porte. A altura de copa teve valor médio de 2,4 m (CV% 23,6), ainda abaixo da altura adequada para inserção de animais de grande porte, que é de pelo menos 3 metros. Contudo, as árvores possuem 6,8 cm de DAP, variável apropriada ao emprego de animais no sistema, onde o mínimo estabelecido é 6 cm. E, para melhor eficiência, faz-se a adoção de cercas eletrificadas para impedir o contato direto dos animais com as árvores. A canafistula, aos 4 anos, já pode abrigar animais de pequeno porte, porém necessita aumentar sua altura de copa para evitar danos por animais de grande porte, caso sejam soltos sem uso de cerca elétrica circundando os renques.