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**ABOVEGROUND STANDING CROP OF AN UNGRAZED *Elyonurus muticus*  
GRASSLAND UNDER ANNUAL BURNING IN THE PANTANAL, BRAZIL**

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**Abstract**

This study was conducted in the Pantanal of Mato Grosso do Sul state, Brazil, from September 1995 to July 1997. The objective was to evaluate the effect of annual burning on grasses and forbs biomass and standing dead in an ungrazed grassland of *Elyonurus muticus*. In two areas, one free of burning (control) and another area with annual burning, grasses, forbs aboveground biomass, and standing dead were collected. The experimental design was completely randomized with 10 replications. Burning modified the grasses and forbs biomass dynamics when compared to the area free of burning. After the first burning the grasses biomass reduced in, approximately, 22% and the forbs increased in 32%. After the second burning the grasses biomass reduced in, approximately, 35%, while the forbs was similar in both areas. The standing dead in the burning area was practically absent.

**Keywords:** dry matter production, fire, native pastures, natural pastures management, savanna

## Introduction

The Pantanal is a floodplain that occupies an area of 138,183 km<sup>2</sup>, located between the latitude 15° 30' and 22° 30' S and the longitude 54° 45' and 58° 30' W (Silva *et al.*, 1998). The main economic activity is cattle ranching, which is developed extensively.

The native pastures constitute, almost exclusively, the bases of cattle feeding. These areas suffer a decrease in quantity and quality of available forage, in the dry period, and a reduction of the available area for grazing in the flood periods (Embrapa, 1993). The native pastures are burned yearly, but the fire is used locally and selectively, to eliminate or control the expansion of undesired species and to foment the germination of low preference forages (Pott, 1982). Open grassland, with dominance of *Elyonurus muticus*, *Paspalum carinatum*, *P. lineare*, *Andropogon bicornis* and “poor” forested savanna, are areas usually burned.

Despite the fact that burning native pastures has caused a lot of controversy, its utilization as a management tool is a reality to this region. In this way, the present study aimed to evaluate the effect of annual burning on grasses, forbs biomass and standing dead in an ungrazed grassland of *Elyonurus muticus*.

## Material and Methods

The study was conducted at Nhumirim ranch, Nhecolândia subregion, Pantanal of Mato Grosso do Sul, from September 1995 to July 1997. The study area was an open grassland of *Elyonurus muticus* (Spreng.) Kuntze. Vegetation is predominantly grasses, but includes forbs and many annual and perennial species. The major species in frequency were *Elyonurus muticus* (95%), *Richardia grandiflora* (55%), *Axonopus purpusii* (50%), *Andropogon selloanus* (35%), *Trachypogon* sp. (30%), *Waltheria albicans* (20%), *Borreria verticillata* (10%), *Hyptis crenata* (6%), *Desmodium barbatum* (5%), *Ruellia* sp. (5%) and *Cyperus* sp. (5%). The topography is

plain and the soil is Hydromorphic Quartzous Sand, with the following results of the chemical analysis of samples collected at a depth of 0-20 cm: pH in water = 5.2; P = 1 mg/kg; exchangeable cations in cmol<sub>c</sub>/kg – Ca + Mg = 0.3; K = 0.09 and Al = 0.

Two ungrazed areas of 400 m<sup>2</sup> were under the following treatments: free of burning (control) and with annual burning. The experimental design was completely randomized with 10 replications. Burning was conducted in September 1995 and August 1996, immediately after the first rains. Monthly evaluation in both areas was performed 30 days after burning.

Aboveground biomass was determined by cutting the herbaceous vegetation off at the soil surface inside a quadrat of 1 m<sup>2</sup> as suggested by Frangi *et al.* (1980). Standing crop was separated into grasses, forbs and standing dead. After separation the material was packed in paper bag and placed in a stove with air circulation at 65°C. The total dry weight of living material is biomass, the total weight of dead material is called standing dead, and the sum of the two is standing crop (Clarke, 1986).

The model of variance analysis considered the effects of treatments and months, and their respective interactions. For the statistical analysis SAS (SAS, 1989) was used.

## **Results and Discussion**

Grasses and forbs biomass were lower significantly affected ( $P < 0.05$ ) by burning. After the first burning the grasses biomass reduced in approximately 22% and the forbs increased in 32% (Fig. 1). Immediately after the second burning, there was a 35% reduction in the grasses biomass, while the forbs was similar in the both areas. With the burning recurrence, grasses and forbs biomass were fewer than those obtained in the period following the first burning. This tendency to biomass reduction after the burning recurrence has been rising concerns about the utilization of annual burning, mainly when the low fertility and the sandy texture that compose

this vegetation physiognomy is considered. Many researchers share the opinion that burning is a supporting factor for savannas and forested savanna environment, preventing their evolution to forests, since it accelerates soil erosion and contributes to a gradual loss of fertility (Cavalcanti, 1978).

The standing dead in the annual burning area was inexpressive, practically absent. On the other hand, in the area free of burning its participation was distinguished, and was higher than the forbs biomass (Fig. 2). Due to the regional climatic condition, with low rainfall and high temperatures, associated to sandy the soils, which regulates rapid loss of rain water, the standing dead (dead cover) plays an important role in keeping moisture to adequate levels. According to Fontaneli *et al.* (1994), the dead cover is important for the conservation and productivity of the pastures. The same researchers pointed out that, since the dead material is the main element in the botanical composition, special attention must to be given to its importance in maintaining the physical, chemical and biological conditions of pastures.

Burning reduces grasses aboveground biomass and increase forbs biomass in ungrazed grassland of *Elyonurus muticus*. However, its reincidence evidenced a tendency to reduce standing crop.

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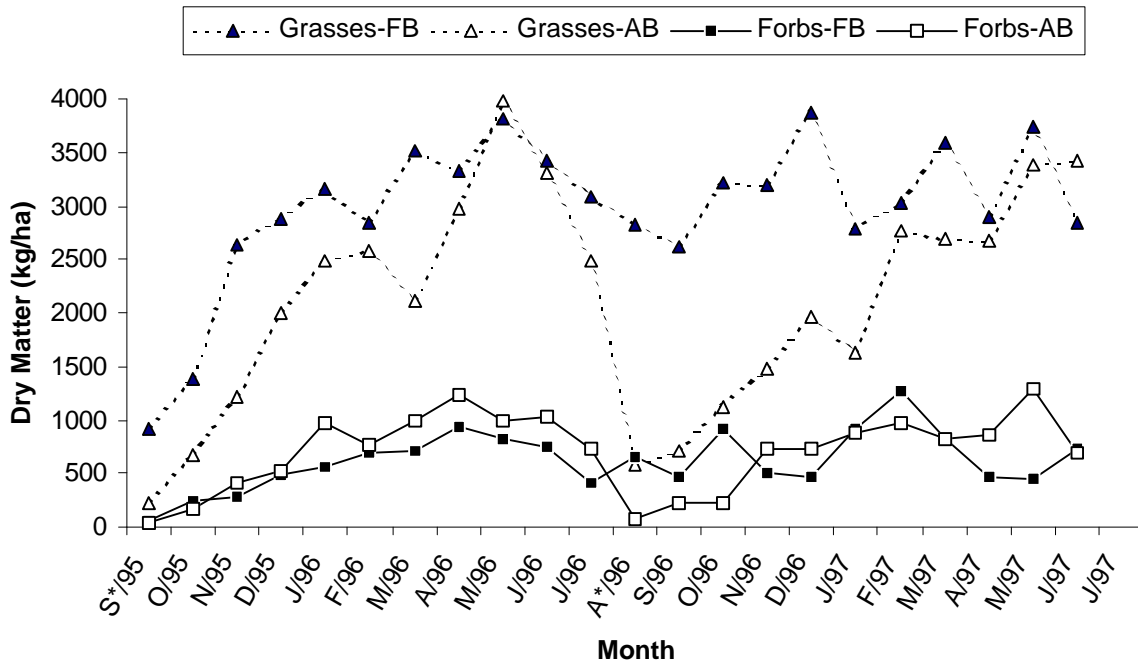
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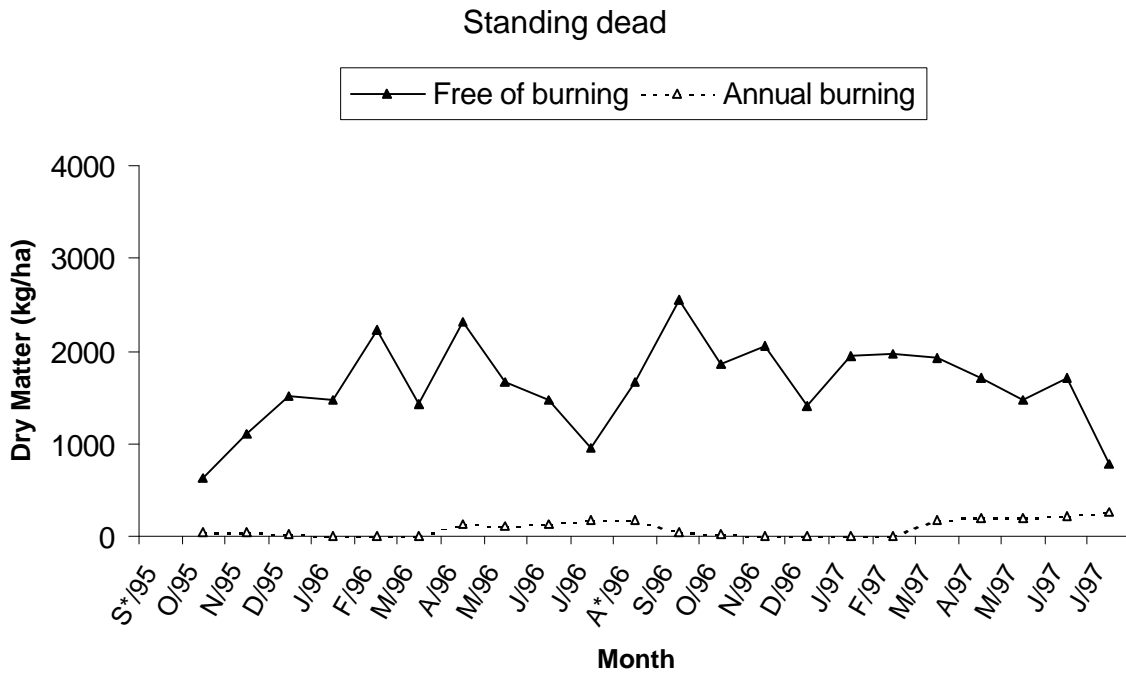
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**Figure 1** - Variation of grasses and forbs aboveground biomass (dry matter production, kg/ha) on a ungrazed grassland of *Elyonurus muticus*, under two treatments: annual burning (AB) and free of burning (FB), in the Pantanal, Brazil. (\*period of burning).



**Figure 2** - Variation of standing dead (dry matter production, kg/ha) on a ungrazed grassland of *Elyonurus muticus*, under two treatments: annual burning and free of burning, in the Pantanal, Brazil. (\*period of burning).