

Do fire retardants affect the recovery of the fine fuel of the herbaceous layer of an open savanna? A case study.

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ABSTRACT- Wildfires burning large areas represent harm to human health, environment and the economy. Therefore, more efficient fire combat techniques are needed. The fire retardants are chemical products useful to reduce fire intensity helping in fire combat. The objective of this work was to investigate the recovery of the fine fuel of the herbaceous layer after a fire in areas with the use of fire retardants. The experiment took place in an area of open savanna, 35 km Southeast of Brasília (DF), burned one year before our experiment. In this area, eight plots (10 x 30 m) were selected to apply fire retardants (R). In the first two plots, R1 was applied, in the second two R2, and the remaining plots were used as control (C). The plots were burned independently in September 2018, the onset of the rainy season (53.2 mm before the burn). In each plot, monthly, five samples (0.25 m²) of aboveground biomass were randomly harvested. The fuel was sorted in dicots (D), graminoids (G) and palm leaves (P). The dry mass was estimated after drying (~60°C) for 48h. Wilcoxon test ($p < 0.05$) was used to compare the recovery of G, D and P biomass between September (before fire) and February for treated and untreated plots separately. Regarding the total biomass (T) in February, a Kruskal-Wallis test was used to compare R1, R2 and C for D, G and P. A two-way ANOVA was used to compare T among plots (R1, R2, C) and between September and February. Before the fire, T in C ($T=0.33 \pm 0.03$ kg/m²; $G=0.13 \pm 0.01$ kg/m²; $D=0.12 \pm 0.04$ kg/m²; $P=0.07 \pm 0.06$ kg/m²) was similar to R1 ($T=0.53 \pm 0.06$ kg/m²; $G=0.24 \pm 0.06$ kg/m²; $D=0.23 \pm 0.05$ kg/m²; $P=0.06 \pm 0.06$ kg/m²) and R2 ($T=0.17 \pm 0.10$ kg/m²; $G=0.26 \pm 0.04$ kg/m²; $D=0.20 \pm 0.07$ kg/m²; $P=0.06 \pm 0.02$ kg/m²). In February 2019, there was no significant differences for T, G, D, P with pre-fire values for R1 ($T=0.60 \pm 0.06$ kg/m²; $G=0.23 \pm 0.02$ kg/m²; $D=0.30 \pm 0.01$ kg/m²; $P=0.06 \pm 0.05$ kg/m²) and R2 ($T=0.50 \pm 0.15$ kg/m²; $D=0.14 \pm 0.02$ kg/m²; $G=0.32 \pm 0.19$ kg/m²; $P=0.02 \pm 0.01$ kg/m²), suggesting that R1 and R2 didn't impair the recovery of the fine fuel in the burned plots. (FAPDF/0193.001387/2016; CNPq/442722/2018-4; Comando da Área Alfa (DF) da Marinha do Brasil)

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