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Effect of fire on weed dynamics and behavior of pre-emergent herbicides in *Eucalyptus* spp. plantations

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The forest fires that occurred during summer 2021-22 in Uruguay generated concern in several areas, including silvicultural systems. The fire could generate changes at the flora level by changes in the dormancy of soil bank seeds, and in the behavior of frequently used pre-emergent herbicides due to inactivation by ashes. These possible changes impose a challenge in connection to weed control. In this study, an attempt was made to provide an answer to the problem by evaluating the dynamics of weeds and the behavior of pre-emergent herbicides in post-fire *Eucalyptus* plantations. The evaluations were carried out in two sites previously burned —one of them previously harvested and the other one not, being able to obtain data in different conditions. The weed dynamics was evaluated through the observational study of the percentage of total weed cover and present species were identified. With the data obtained, the parameters frequency, diversity and richness were calculated to analyze the different properties separately. Pre-emergent herbicides were evaluated in a randomized block experimental design: S-metolachlor, flumioxazin + S-metolachlor , isoxaflutole + S-metolachlor, oxifluorfen + S-metolachlor . Proposed treatments were assessed for possible interactions with fire and removal of the first cm of soil and ashes. Weed density was evaluated by characterizing and quantifying how many weeds could emerge in a square 30cm×30cm. While one of the fields was evaluated 8, 23, 31, 41, 61, and 82 days post application (DPA), the other was evaluated 8, 20, 31, 41, and 61 DPA. On both experiments the fire showed an increase in the weeds. In one experiment the weeding percentage increment was 64.9% on the burned area, while on the other it was 54.3 %. In addition, in the non-harvested field there were no large amounts of weeds on both treatments due to the conditions that standing trees generated. The results of weed control did not show interaction between efficiency and ashes presence, and were related to the species present in the weed bank, not showing a clear trend among the herbicide treatments. The S-metolachlor treatment was always the highest in number of weeds. The number of weed|m2 was about 17-25 on the harvested field, and 3-4 weed|m2 on the non-harvested one. The fire generated changes in the expression at seed bank of soil. This study was an important development in the generation of knowledge for future production.

Keywords: fire, ash, removal, weeds, seed bank, pre-emergent herbicide, dormancy

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