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Could fire severity promotes the biosynthesis of bioactive compounds as a strategy to enhance the plant survival?

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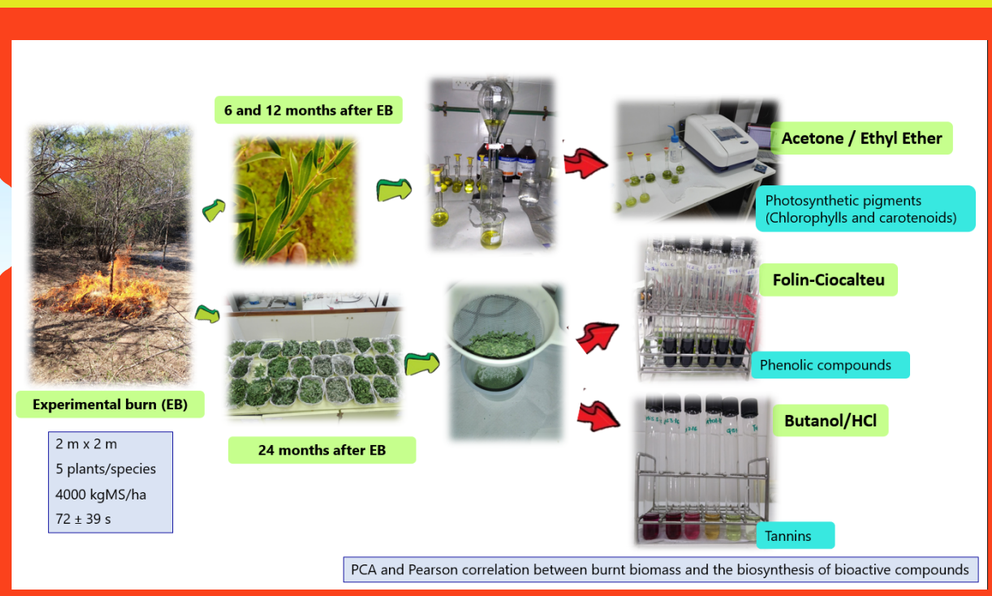
Fire causes effects on diverse aspects of plant functioning and development, many of them linked to survival. However, the response of native vegetation to this disturbance possibly reveals a plant strategy to tolerate fire linked to the biosynthesis of compounds like chlorophylls and secondary metabolites. The aim of this study was to evaluate whether fire severity could promote the biochemical tolerance to fire by influencing the biosynthesis of chemical compounds

Why

As a main defense mechanism, plants synthesize bioactive compounds whose function is to grant them protection against environmental disturbances. The loss of aerial biomass during a fire event could promote this plant response. The link between burnt biomass with the biosynthesis of bioactive compounds could be considered as an indicator of the burnt plant response to stress and, besides, it could also influence the plant survival

How



PCA and Pearson correlation between burnt biomass and the biosynthesis of bioactive compounds

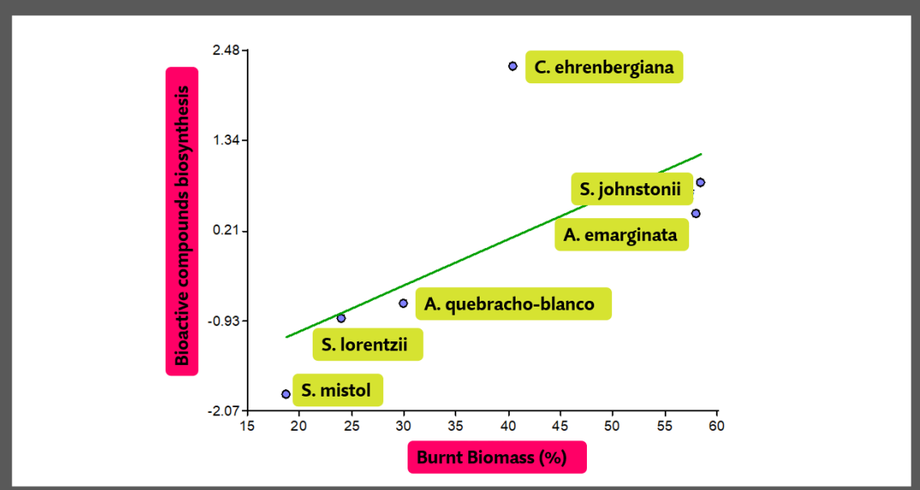
Study area: The Argentine Western Chaco Region (INTA's 'Francisco Cantos' Experimental Station in Santiago del Estero)

Selected species:
-*Schinopsis lorentzii*
-*Aspidosperma quebracho-blanco*
-*Sarcomphalus mistol*
-*Celtis ehrenbergiana*
-*Atamisquea emarginata*
-*Schinus johnstonii*

Treatment
An experimental burn was carried out in 2016 during the flammability peak of the Chaco Region (October)

Findings

The experimental burn caused a variation in the bioactive compounds evaluated within a short temporal scale (short term effect).
The Pearson's correlation coefficient between burnt biomass and the first component of the biosynthesis of bioactive compounds showed a significant association between them (Pearson's P= 0.40, P-value= 0.0014)



Results about burnt biomass suggested different fire severity among species studied, showing that shrubby species (*C. ehrenbergiana*, *A. emarginata* and *S. johnstonii*) were more seriously affected than tree species (*S. mistol*, *S. lorentzii*, and *A. quebracho-blanco*). Additionally, the first-mentioned species showed the highest values of biosynthesis of compounds in response to fire.
These results suggest that fire severity could affect the post fire plant responses observed in our study

Conclusions

Our results suggest that in low-intensity events (as the experimental burn performed in this work), the correlation between the biosynthesis of bioactive compounds and the amount of burnt biomass during the experimental burn, could be considered as an indicator of the burnt plant response to stress and indirectly, as a bioindicator of the plant tolerance to fire