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Effect of charcoal and ash from forest fires on the reproductive behavior of two native species versus two invasive species.

Oscar Cruz, Otilia Reyes, and Sheila F. Riveiro

Area of Ecology, Department of Functional Biology, Faculty of Biology, University of Santiago de Compostela, 15782 Santiago de Compostela, Spain (oscar.cruz@usc.es)

Forest fires are a global problem that affects almost all parts of the world. Southern Europe has been a fire prone area since prehistoric times. The northwest of the Iberian Peninsula, despite being an area abundant in rainfall, is currently a hotspot for forest fires. Forest fires produce carbon and ash as a result of the combustion of vegetation, these products can affect the germination behavior of plants.

Due to climate change, forest fires are becoming more severe, more intense and more recurrent, and this context of disturbances facilitates and accelerates the replacement of native species by invasive alien species in many forest ecosystems. For this reason, we propose to compare the role of carbon and ash in the germination of two native species versus two invasive alien species. The two selected native species were *Pinus pinaster* Aiton and *Salix atrocinerea* Brot. and the two invasive species *Paraserianthes lophanta* (Willd.) I.C. Nielsen and *Acacia melanoxylon* R. Br. For it, 5 concentrations of ash and 1 concentration of carbon from 2 different origins (carbon from the same studied species and carbon from *Ulex europaeus* L.) were applied to seeds of these species. Mainly it stands out that the control germination of the native species was higher than that of the invasive species and the germination obtained under ash or carbon treatments was always similar or lower than the control germination. The germination obtained with the carbon of the own species was similar to the control germination and significantly higher than that achieved with the carbon of *U. europaeus*. Germination timing depends on each species studied, and invasive species take longer to complete their germination than native species (30-42 days versus 80-125 days). The carbon of the own species did not modify the germination timing while the carbon of *Ulex* did it in the two native species.

Therefore, carbon and ash are two factors that modify the germination behavior of both the native species and the invasive species studied and can be used to manage plant regeneration after forest fire.

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