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May the origin of *Cistus monspeliensis* seeds determine its behaviour as a phytoremediator species for mine soils?

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Metal mining is one of the activities that causes the greatest problems of environmental pollution around the world. The main consequences derived from this activity are the degradation of soils, and alteration/destruction of vegetation, hydrology, fauna, microclimate, topography and landscape quality. In South-East of the Iberian Peninsula is located the Iberian Pyrite Belt (IPB), one of the most important volcanogenic massive sulfide ore deposits in the world. The opencast and underground mining activities in this area generated large amounts of waste materials with high total concentrations of metal(loid)s. These materials also present other chemical and physical characteristics adverse to plant development such as low pH, water holding capacity, available nutrients and organic matter content, and unfavourable texture. However, some species have developed mechanisms of response to these stress conditions and have colonised spontaneously some contaminated soils/wastes in these areas from the IPB. In this study, we have investigated physiological behaviour of *Cistus monspeliensis*, a shrub adapted to Mediterranean conditions that grows in several contaminated and non-contaminated areas from the IPB, with the aim whether what are the key drivers for the unravelling of different physiological responses: the origin of the plants or the conditions of the growth medium. For this, seeds of *C. monspeliensis* were sampled in São Domingos mine (CmSD) and in an uncontaminated area from Caldeirão (CmCald) (SE of Portugal). Seeds were germinated in Petri dishes and subsequently the seedlings from both areas were planted in a contaminated soil developed on a gossan (CS) and in an uncontaminated soil (US) under controlled conditions in a greenhouse. Multielemental concentrations were determined in soils (total and available fractions) and plants (shoots). Germination rate, shoot height and dry biomass were measured, as well as pigments, glutathione, ascorbate and H_2O_2 contents were analysed in plant shoots. Total concentrations of As, Cr, Cu, Pb and Sb in CS exceed the intervention and maximum limits for ecosystem protection and human health. Preliminary results showed that there were not significant differences in the germination rate among assays (CmSD–CS, CmSD–US, CmCald–CS, CmCald–US). After two months growing, *C. monspeliensis* from both origins showed slightly higher height and biomass in US than CS. The leaf size did not show significant differences among the different assays. The CmCald plants were adapted to the mine soil conditions without showing toxicity symptoms and with a development similar to CmSD plants. In general, no significant differences were found for pigments among

plant-soil assays, while H_2O_2 content slightly increased in individuals planted in CS soil independently of seeds origin. In addition, the increase of oxidative stress in *C. monspeliensis* in CS caused the activation of ascorbate and glutathione production to maintain the cell's redox state. Therefore, our study shows that *C. monspeliensis*, regardless of its origin, has the ability to tolerate contaminated environments with high total content of metal(oid)s. This statement is a very important point for mine soil recovery plans.

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