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Evaluation of germination, growth and ecophysiological response of *Cistus monspeliensis* L. in different contaminated and uncontaminated soils of the Iberian Pyrite Belt

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Iberian Pyrite Belt (IPB) is one of the most important volcanogenic massive sulfide ore deposits in the world. As a result of the mine activities, many areas from the IPB have become extreme environments with high concentrations of a wide variety of potentially hazardous elements (PHEs) and low pH in their soils, which cause severe contamination problems and inhibit or reduce the plant colonization and their growth. Nevertheless, *Cistus monspeliensis* L. grows spontaneously in mine areas from the IPB under these extreme conditions, which suggests that this species must have mechanisms to adapt and defend itself against oxidative stress caused by the high levels of PHEs. The main objectives of this study are to evaluate germination, growth, development and ecophysiological behaviour of *C. monspeliensis* in different contaminated and uncontaminated soils. For this purpose, two different assays were conducted in potted plants in a greenhouse with *C. monspeliensis* seeds collected in the São Domingos mine area (SE Portugal, IPB). In the first assay, twenty *C. monspeliensis* seeds were sowed to evaluate the germination in pots (n=4) with five different contaminated and uncontaminated soils - *Uncontaminated soils*: a sandy soil (A) and a soil from Caldeirão (C) (S of Portugal), *Contaminated soils*: two *gossans* from São Domingos mine (SD and G) and a *gossan* amended with an organic corrective (GC). After one month, germination rate was evaluated. Total and available multielemental concentrations were determined in the soils. In the second assay, *C. monspeliensis* seedlings were planted in the contaminated soil GC and in the uncontaminated soil C. After three months of growth, plants were harvested and shoots were separated from roots. Plant height, fresh biomass and multielemental concentration in shoots were quantified. Pigments (chlorophylls, anthocyanins and carotenoids), glutathione, ascorbate, H_2O_2 and the activities of several key antioxidative enzymes were also quantified in shoots. In the first assay there were no significant differences in the results obtained between germination rates of *C. monspeliensis* in contaminated and uncontaminated soils (%): 46.3 $\pm$ 8.5 (A), 46.3 $\pm$ 8.5 (C), 47.5 $\pm$ 24.7 (SD), 41.3 $\pm$ 10.3 (G) and 36.3 $\pm$ 18.4 (GC). Available concentrations (mg/kg) of PHEs in the soils (second assay) were significantly higher in GC (Zn: 3-5; As: 2-3; Pb: 2-3) than in C (Zn, As, Pb: < 1). Significant differences were also found in the growth and development of *C. monspeliensis* plants. Plants height, leaf size and plant dry biomass were higher in individuals from C soil than from GC soil, although toxicity symptoms were not observed in any of them. *Cistus monspeliensis* growing in GC soil showed higher H_2O_2 contents and lower levels of pigments than plants growing in C soil. Furthermore, plants growing in GC soil triggered defence mechanisms against oxidative stress, in the form of increased antioxidative enzyme activity. As a general conclusion, these results reveal that *C. monspeliensis* is adapted to unfavourable environments with high concentrations of PHEs, adjusting its tolerance mechanisms at the metabolic and physiological levels.