O13 Phenotypic and molecular traits determine the tolerance of olive trees to drought stress
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Olive trees are known for their capacity to adapt to drought through several phenotypic and molecular variations, although this can vary according to the different provenances of the same olive cultivar. We confronted the same olive cultivar from two different location in Spain: Freila, in the Granada province, with low annual precipitation, and Grazalema, in the Cadiz province, with high annual precipitation, and subjected them to five weeks of severe drought stress. We found distinctive physiological and developmental adaptations among the two provenances. Thus, trees from Freila subjected to drought stress exhibited increasing root dry weights and decreasing leaf numbers and relative stem heights. On the other hand, the treatment with drought in Grazalema trees reduced their leaf chlorophyll contents, but increased their relative stem diameter and their root hydraulic conductivity. The physiological responses of Freila tree roots to drought were linked to different molecular adaptations that involved the regulation of genes related to transcription factors induced by ABA, auxin and ethylene signaling, as well as, the action of a predicted membrane intrinsic protein (MIP). On the other hand, the responses of Grazalema trees were related with different root genes related to oxidation-reduction, ATP synthesis, transduction and posttranslational regulation, with a special mention to the cytokinins signaling through the transcript predicted as a histidine-containing phosphotransfer protein. Our results show that olive trees adapted to dry environments will adjust their growth and water uptake capacity through transcription factors regulation, and this will influence the different physiological responses to drought stress.