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Holm oak proteomic response to water limitation at seedling establishment stage reveals specific changes in different plant parts as well as interaction between roots and cotyledons

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Highlights

- Sugar content was higher in cotyledons than in roots. Phenolic compounds content was higher in roots.
- DAPs typical for cotyledons were related to starch metabolism, lipid to sugar conversion, and reserve proteins mobilization.
- Root tips presented more diverse DAPs. PR-5 and PR-10 protein families were unique for tips.
- DAPs in root bases were related to amino acid, secondary and active oxygen metabolism.
- A common feature for all plant parts was the up-regulation of sHSP, HSP60, HSP70, and HSP90 chaperones.

Abstract: *Quercus ilex* is a dominant tree species in the Mediterranean region with double economic and ecological importance and increasing use in reforestation. Seedling establishment is extremely vulnerable to environmental stresses, particularly drought. A time course study on physiological and proteomic response of holm oak to water limitation stress and recovery during early heterotrophic growth is reported. Applied stress led to diminution in plant water content and root growth, oxidative stress in roots and some alterations in the anti-oxidative protection. Plant parts differed substantially in soluble sugar and free phenolic content, and in their changes during stress and recovery. Proteomic response in holm oak roots and cotyledons was estimated using combined 1-DE/2-DE approach and protein

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