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CONTRASTING FUNCTIONAL STRATEGIES FOLLOWING SEVERE DROUGHT IN TWO MEDITERRANEAN OAKS WITH DIFFERENT LEAF HABIT

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Abstract: Two types of oaks (*Quercus* L.; Fagaceae) with different palaeogeographic origin, different types of leaves, and different contrasting strategies to cope with water limitations, coexist in Mediterranean-type climates. Both *Q. faginea* and *Q. ilex* subsp. *rotundifolia* are considered as representatives of these two types of oaks that coexist in many areas of the western Mediterranean basin. However, this coexistence is a complex issue that has been the subject of debate in several articles (Nardini et al.1999, Montserrat-Martí et al. 2009, Peguero-Pina et al. 2015) and more research is needed to understand it. We induced severe water stress to both species, as occurs during summer in Mediterranean-type climates, to study the ability of plants to supply water to transpiring leaves that can be severely limited. Despite this common trend, *Q. faginea* experienced an early decrease in shoot hydraulic conductance (K_{shoot}) in response to drought, with a less

negative PLC50 than estimated for *Q. ilex* subsp. *rotundifolia*. In contrast to K_{shoot}, both species showed a similar evolution of hydraulic conductivity in the stems (K_{stem}) with increasing levels of drought stress. That is, the PLC50 in the shoots was lower than in the stems of *Q. faginea*, which is consistent with the hypothesis of "vulnerability segmentation" (Hochberg et al. 2017). According to the results obtained, the stems of *Q. faginea* were protected from an extensive xylem embolism and thus were able to develop new leaves after the dry period. This capacity is crucial for the survival and growth of this species, in addition to partially compensating for the loss of competitiveness with the coexisting Mediterranean evergreen oaks with longer leaf life. This was the case with *Q. ilex* subsp. *rotundifolia*, which showed a conservative foliar strategy, characterized by a high resistance to cavitation induced by drought and a maintenance of its functional leaves even in conditions of intense drought.

Key words: hydraulic traits, water stress, Mediterranean-type climates, vulnerability segmentation.

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