

Boron nutrition affects membrane leakage and the chemical composition of leaves and fruits of *Olea europaea*

Ermelinda Silva^{1*}, Cátia Brito¹, Lia Dinis¹, Luís Rocha¹, Isabel Q. Ferreira², Helena Ferreira¹, Luís M. M. Ferreira³, José Moutinho-Pereira¹, Manuel Ângelo Rodrigues², Carlos Correia¹

¹ CITAB - Centre for the Research and Technology of Agro-Environmental and Biological Sciences, University of Trás-os-Montes and Alto Douro, Vila Real, Portugal, mail*: emsilva@utad.pt

² Mountain Research Centre (CIMO)–ESA, Instituto Politécnico de Bragança, Bragança, Portugal

³CECAV – Animal and Veterinary research Centre, University of Trás-os-Montes and Alto Douro, Vila Real, Portugal

Boron (B) is an essential microelement for plants, being its deficiency the most frequent micronutrient disorder in olive tree. The main functions of boron are related to cell wall strength and development, membrane function, cell division, fruit and seed development, water relations, sugar transport and hormone development. The study conducted in Bragança (Northeast Portugal), under rainfed conditions, shows that application of B-fertilizer decreased the symptoms of oxidative stress on leaves, both in summer and, with higher extent, in winter. In fact, B-treated trees presented lower electrolyte leakage, in a closely association with higher concentration of total thiols. Moreover, boron increased the concentration of soluble sugars, while decreased the accumulation of starch in both seasons. Meanwhile, total soluble proteins and total phenols levels were higher in B-fertilized plants during the summer period, whereas in winter, after frost events, the concentration of phenols was higher in B-starved trees. The chemical composition of fruits at final harvest revealed that B-supply increases the soluble sugars and the pulp ash content, decreases organic matter and dietary fiber, whilst the crude protein concentration was similar between treatments. Thus, the present study showed that addition of B-fertilizer affects the metabolism of olive tree and give new insights about the effect of

boron on plant physiology and biochemistry that will help to refine the improvement in B-fertilizer recommendations for olive growing areas.