



II Simpósio Internacional de Águas, Solos e Geotecnologias (SASGEO)

III JORNADAS INTERACT

LIVRO DE RESUMOS

17 e 18 de Maio

Universidade de Trás-os-Montes e Alto-Douro

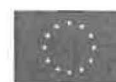
Vila Real – Portugal

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NORTE2020
PROGRAMA OPERACIONAL REGIONAL DO NORTE

PORTUGAL
2020



UNIÃO EUROPEIA
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Fruit yield and quality of olives under different deficit irrigation strategies

Alexandre Gonçalves^{1*}, Sandra Martins¹, Ermelinda Silva¹, Cátia Brito¹, Luís Pinto¹, Luís Rocha¹, Ivo Pavia¹, Ana Luzio¹, Lia Dinis¹, Fernando Nunes², M. Ângelo Rodrigues³, José Moutinho-Pereira¹ & Carlos M. Correia¹

¹Centre for the Research and Technology of Agro-Environmental and Biological Sciences, University of Trás-os-Montes and Alto Douro, (UTAD-CITAB), Quinta de Prados, 5000-801, Vila Real, Portugal; afgoncalves@utad.pt. ²Chemistry Centre, Vila Real (CQ-VR), University of Trás-os-Montes and Alto Douro, Quinta dos Prados, 5000-801 Vila Real. ³Mountain Research Centre (CIMO)–ESA, Polytechnic Institute of Bragança, Bragança

The Mediterranean Basin is a climate change hot spot where substantial warming and lower water availability is predicted. This scenario poses considerable challenges to olive groves, a crop with great ecological and socioeconomic importance. In order to overcome these constraints, new cropping practices focusing on water use efficiency must be investigated. In this work we aimed to investigate water management practices that can ensure the adequate compromise between yield and the quality of olive products. The study was conducted in Quinta do Prado, Lodões, Vila Flor (41°20'13.3"N, 7°05'54.2"W) and a full irrigation (FI) control, applied daily, equivalent to 100% of crop evapotranspiration (ET_c), was compared with three deficit irrigation strategies (DIS): regulated deficit irrigation (RDI; 80% of ET_c in phases I and III of fruit growth and 10% of ET_c in pit hardening stage, phase II; 56 % of the ET_c in all season), sustained deficit irrigation (SDI; 27.5% of ET_c), and sustained deficit irrigation adopted by the farmer (SDIAF; 21.2% of ET_c , applied weekly). The impact of treatments on fruit yield and quality during 2016 were evaluated. Using FI treatment as reference, no significant influence of RDI and SDI treatments were felt in crop yield, while the SDIAF treatment reduced it significantly ($P < 0.01$). Fruit quality analysis showed that the SDI treatment led to higher antioxidant activity than in FI and SDIAF treatments. However, the SDIAF strategy led to higher accumulation of both total phenols and flavonoids ($P < 0.01$). The fruit fat content was significantly higher in deficit irrigation treatments, when compared to the FI treatment. Irrigation treatments also induced changes in fruit fatty acids profile ($P < 0.001$) since palmitoleic acid (C16:1) decreased in the deficit irrigation treatments, linoleic acid (C18:2) decreased in the SDIAF treatment, and linolenic acid (C18:3) decreased in RDI and SDI treatments. Except for SDIAF, despite the great disparity in the amount of water used among treatments, there were no significant differences in fruit production. Hence, with an increase of 30% in water consumption, changing from the SDIAF to the SDI treatment, this particular farmer can increase the orchard production, without losing fruit fat content and antioxidant capacity. This work gives new insights about the effect of DIS when used in olive orchards and might help to illustrate the sustainability of these management practices.

Keywords: Climate change; *Olea europaea*; water management; antioxidant activity; fatty acids.

Acknowledgements: To Anabela Fernandes-Silva for the calculation of ET_c . This work was funded by the INTERACT project – “Integrative Research in Environment, Agro-Chains and Technology”, no. NORTE-01-0145-FEDER-000017, in its lines of research entitled ISAC, co-financed by the European Regional Development Fund (ERDF) through NORTE 2020 (North Regional Operational Program 2014/2020). SM (PD/BD/135327/2017), EM (PD/BD/128274/2017), CB (PD/BD/52543/2014), LR (PD/BD/113612/2015) and IP (PD/BD/113611/2015) acknowledge the financial support provided by the FCT-Portuguese Foundation for Science and Technology, under the Doctoral Programme “Agricultural Production Chains – from fork to farm” (PD/00122/2012).