

FISIOLOGÍA VEGETAL



XXII REUNIÓN DE LA SOCIEDAD
ESPAÑOLA DE FISIOLOGÍA VEGETAL

XV SPANISH PORTUGUESE
CONGRESS OF PLANT PHYSIOLOGY

LIBRO DE
ABSTRACTS



26-29 DE JUNIO DE 2017

BARCELONA
SPAIN

2017
FV



C0278 FOLIAR APPLICATION OF MELATONIN TO MITIGATE OLIVE TREE SUMMER STRESS

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1 Resumen

Olive crop is widely distributed in the Mediterranean region and has a distinct socioeconomic importance in Portugal, namely in the Northeast region, where mostly rainfed olive orchards cover over 75000 ha and comprise approximately 36000 producers. The projected climate change characterized by severe summer conditions, with low rainfall, excessive heat load and high irradiance levels might affect this crop, notwithstanding the defense strategies that olive trees dispose against summer stress. In this work we aimed to investigate a new cropping practice with the introduction of a foliar application of melatonin (*N*-acetyl-5-methoxytryptamine; 100 µM) that have shown a central role in stress tolerance in different plant species. The study was conducted in an organic orchard of seven-years-old at Quinta do Prado, Lodões, Vila Flor (41°20'13.3"N, 7°05'54.2"W), Portugal, and shows the impact on leaf gas exchange, chlorophyll a fluorescence, relative water content, concentration of photosynthetic pigments and fruits total phenolic content at 6 different times between July and October 2016. Melatonin sprayed plants consistently showed higher stomatal conductance (18-73% during morning measurements and 11-136% at midday), net photosynthesis (25-81% morning and 32-130% at midday), electron transport rate (12-23% morning and 0.1-13% at midday) and photochemical yield of photosystem II (12-24% morning and 0-13% at midday). The better physiological status of the melatonin sprayed olive trees was reflected in a decrease in fruits total phenolic content (21%). The results suggest that the foliar application of melatonin boost the physiological activity of olive trees, giving new insights about the effect of this new cropping practice in olive orchards. Future studies to optimize the concentration and the number of applications of this metabolite must be pursued in order to get a better performance of olive tree under the harsh climatic conditions projected for the Mediterranean region.