S1/P31: SHORT AND LONG-TERM BENEFITS OF WHITE LUPIN GROWN AS A COVER CROP ON OLIVE PHYSIOLOGY

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Several positive effects of cover crops in orchards have been documented, including improvement on soil properties, which are reflected on tree physiological performance and yield. The use of legume species, such as white lupin, can provide other gains since they can fix atmospheric N_2, reducing the cost with N fertilizers. However, this species need to be sown every year, which is costly and laborious. So, we aim to test if still remain in the year after it had been grown the benefits of cover crop on physiological performance of olive tree. Three different soil management systems were investigated on a 15-year-old olive orchard (*Olea europaea* L., cv. Cobrançosa) grown in rainfed conditions: (1) conventional tillage, included as the control treatment (CT); (2) white lupin sowed in two consecutive years, 2009 and 2010 (LCY); (3) white lupin sowed in the first year, 2009 (LFY). The physiological parameters were determined in three periods of 2011: April, July and September. According to the results, in spite of the trees with LCY revealed tendentiously lower stem water potentials, the other variables showed a better performance of these trees. LCY management system improves the net photosynthetic activity in July and September, in accordance with the higher photochemical performance showed by the chlorophyll fluorescence measurements. In all periods studied the effective quantum yield of PSII, the photochemical quenching and the apparent electron transport rate were higher in LCY plants. The photosynthetic pigments concentrations were also increased with this cover crop. The soluble sugars analysis only showed significant differences in July where CT plants presented higher concentration then LCY. In general, there were no significant differences in total phenols, soluble proteins, total thiols, TBARS and electrolyte leakage among treatments. In addition, in almost the variables analyzed there were no significant differences between CT and LFY. Taking into account these results, we conclude that the benefits of white lupin on olive physiology do not extend for the following cultural cycle.

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