Use of biosensor for estimating abiotic stresses and technical management of olive groves

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ABSTRACT

Global climate changes will introduce final changes into the agricultural ecosystems which will affect the productivity. Water stress is considered to be the most important factor limiting plant growth and production. Thus, monitoring of plant water status in field grown is considered of great interest, as it would allow the diagnoses of the onset and severity of water stress so as to schedule management practices and irrigation according to the actual plant needs. Changes in plant water status could be described by using a sensitive physiological indicator, which integrates both soil and climatic conditions. The most recent assessment techniques that can establish a quantitative relationship between plant water status and other physiological parameters, which can be monitored easily is the leaf water turgor potential. Theses measurements can be monitored continuously thus providing a continuous record of plant water state in response to environmental variables. The aim of our study was to evaluate a quantitative direct relationship of the olive tree water status that might be used to schedule irrigation or management practices so that plant water status can be maintained above certain thresholds in field grown olive trees.

The relationships between water relation, gas exchange parameters and leaf water turgor measurements were examined in field grown olive tree (*Olea europaea* L) Chemlali variety. Three cultural practices are made to mitigate the stress recorded (pruning, providing additional fresh and brackish water and foliar fertilizer) and their effect are quantified.

. Our data indicated that using this relationship, a critical value of daily leaf water turgor potential decrease could be estimated and can be used as an accurate and simple signal for real-time efficient cultural intervention in olive tree orchard. This approach has the advantages that it needs only a small number of sensors and little data processing.

Key words: water stress , salinity, pruning, irrigation