

CAN WE DELIVER ENHANCED WATER USE EFFICIENCY, SUSTAIN YIELDS AND ENHANCE YIELD QUALITIES BY EXPLOITING ROOT-TO-SHOOT SIGNALLING MECHANISMS IN CROP PLANTS?

M.A. Bacon\*, W.J. Davies, I.C. Dodd and D. Mingo

The Lancaster Environment Centre, Lancaster University, Bailrigg, Lancaster, LA1 4YQ, United Kingdom

Signals travelling from roots-to-shoots have been shown to communicate information regarding soil water status and control gas exchange and growth in the absence of any changes in plant water relations. This phenomenon is embodied in the theoretical basis to a novel deficit irrigation technique known as partial rootzone drying (PRD). While several examples are in existence to demonstrate the success PRD, little physiological evidence supporting the theoretical basis to the technique exists, with some notable exceptions. This paper presents a brief review of relevant recent literature, the research of the European Consortium tasked with developing this novel deficit irrigation technology in Mediterranean crops and research by the authors to elucidate the physiological basis of a plants' response to soil water availability. The paper will conclude by considering a new experimental framework to scrutinise PRD.