

UNDERSTANDING PLANT RESPONSES TO ABIOTIC STRESS THROUGH METABOLOMICS

Thomas C.R. Williams^{1,2}, Alice P. Barbosa², Rosilene O. Mesquita², Eduardo A. Soares², Camilo E. Vital², Marcelo E. Loureiro²

1. Departamento de Botânica, Universidade de Brasília, Brasília, Brazil

2. Departamento de Biologia Vegetal, Universidade Federal de Viçosa, Viçosa, Brazil

Abiotic stresses are responsible for significant reductions in agricultural production, making understanding the ways in which plants respond to such conditions a priority if plants with increased resistance to such stresses are to be bred or engineered. Conditions such as water deficit or the presence of heavy metals may force changes on plant metabolism, and alterations in metabolism also form part of the mechanisms that plants use to respond to these stresses. Gas chromatography mass spectrometry (GC-MS) based metabolite profiling is therefore a valuable tool in the analysis of plant stress phenotypes. This technique was used to investigate the responses of tolerant and sensitive varieties of two of the most important Brazilian crops, soybean and sugarcane, to different levels of water deficit. These experiments indicated the presence of qualitative and quantitative differences in the metabolites accumulated in both leaf and root tissue of tolerant varieties under stress conditions. Experiments where *Arabidopsis* was exposed to arsenate have also been carried out and highlight the metabolic alterations that occur in the presence of this toxic compound. The further interpretation of data obtained from such experiments will ultimately benefit greatly from its incorporation into sophisticated models of plant metabolism.