International publications of Damanhour University

Papers published Internationally by Damanhour University Staff Members of Different Departments

(6)

Agathokleous, E., et al. (2017). "Application and further characterization of the snap bean S156/R123 ozone biomonitoring system in relation to ambient air temperature." Sci Total Environ 580: 1046-1055.

Increased mixing ratios of ground-level ozone (O3) threaten individual plants, plant communities and ecosystems. In this sense, O3 biomonitoring is of great interest. The O3-sensitive S156 and the O3-tolerant R123 genotypes of snap bean (Phaseolus vulgaris L.) have been proposed as a potential tool for active biomonitoring of ambient O3. In the present study, an O3 biomonitoring was conducted, with the S156/R123 tool, along with a monitoring of O3 and other environmental conditions in an urban area in Athens, Greece, during the growing seasons of 2012 and 2013. Plant yield was evaluated to assess the effectiveness of AOT40 in interpreting O3-induced phytotoxicity. Across the two genotypes, an approximately two times lower total number of pods - and consequently lower bulk mass of seeds - was found in 2012 than in 2013, although there was no significant difference in the final AOT40 between the two years. No significant differences were observed in the stomatal density or conductance between the two genotypes, whereas it was estimated that, in both genotypes, the abaxial leaf surface contributes 2.7 fold to O3 intake in comparison to the adaxial one. By testing the role of ambient air temperature in outdoor plant environment chambers (OPECs), it was found that increased temperature limits mature pod formation and complicates interpretation of O3 impacts in terms of S156/R123 yields ratios. This is the first study providing evidence for a hormetic response of plants to ambient air

temperature. This study also points out the complexity of using yield as a measure of O3 impact across different environments with the snap bean system, whereas visible foliar injury is more consistently related to O3 effects.