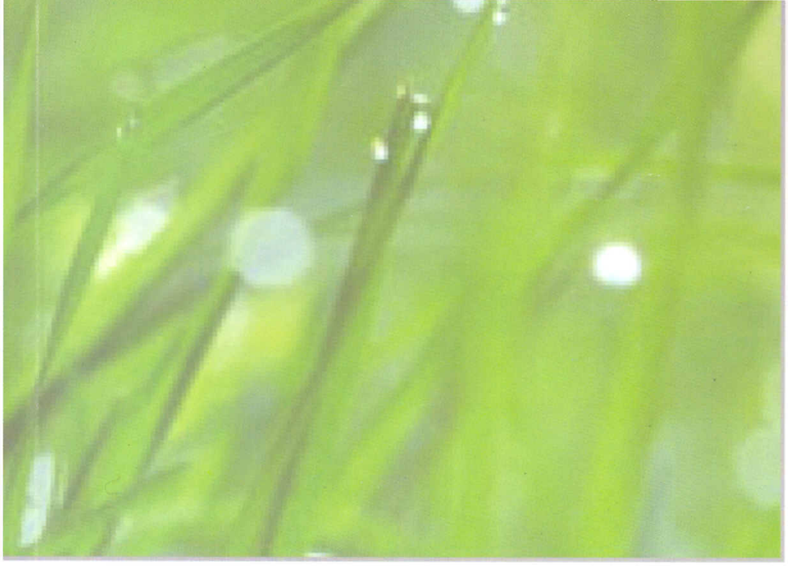


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Oxidative and nitrosative-based signaling wave and post-translational modification orchestrates the acclimation of citrus plants to salinity stress

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Reactive oxygen species and reactive nitrogen species involved in a plethora of physiologic and pathologic conditions in plants, however knowledge on the oxidative and nitrosative signaling outcomes is still unclear. To better understand how oxidative and nitrosative signals are integrated to eventually regulate cellular adjustments to external conditions, local and systemic responses were investigated in roots and leaves of citrus plants after root treatment with H_2O_2 or sodium nitroprusside (SNP; nitric oxide donor), pre-treatment with H_2O_2 or SNP followed by NaCl stress, and direct NaCl stress for 8 days. Phenotypic and physiological data showed that pre-exposure to H_2O_2 or SNP induced acclimation to subsequent salinity stress. Both H_2O_2 and NO were locally and systemically accumulated in the citrus's tissues upon chemical treatments and/or NaCl. Combined histochemical and fluorescent approaches document the existence of a vascular tissue-driven long distance ROS and NO signaling mechanism. Transcriptional analysis of genes diagnostic for H_2O_2 and NO signaling just after chemical treatments or following 8 days of salinity revealed various tissue- and time- specific feedback/feedforward mechanisms controlling internal H_2O_2 and NO homeostasis. Also evidence presented showing that protein carbonylation, nitration and *S*-nitrosylation encode an 'oxidative and nitrosative memory' following by H_2O_2 or SNP pre-treatments that could be involved in acclimation to salt stress. In addition, for the first time, a whole-plant analysis of the oxyproteome, nitroproteome and nitrosoproteome is presented characterising potential carbonylated, nitrated and nitrosylated targets proteins with distinct or overlapped signatures. This work provides a global framework to better understand the oxidative and nitrosative signaling network under physiological and stressful conditions.