

Deciphering the code of redox fluxes, signaling, and stress might be a major challenge. So far we can be satisfied when knowing that changes in a plants redox state in response to stress conditions are often similar, being recorded as higher NAD(P)H/NADP⁺ status. Plants will be subjected to diversified nitrogen nourishment to induce redox imbalance in cells. The first highlights of the project proposal is that all methodological approaches are based on natural variations in redox state induced by plant growth with nitrogen in an oxidized or reduced form. The other major aspect is that these shifts will be measured *in vivo* with the application of genetically encoded biosensors, therefore the results reflect a true metabolic potential of plant cells. Since it is known that plant mitochondria are the primary organelles involved in redox regulation, their contribution in maintaining redox homeostasis will be faced. Mutant plants with the disfunction of several mitochondrial alternative pathways will be challenged with reductive stress conditions. The combination of these two factors may let us select the targets in the mitochondrial protective components being of interest for redox biology. The aim of this project is to determine the potential of mitochondrial alternative components to alleviate ammonium toxicity. This knowledge might be important for obtaining resistant plants to several stress factors.