

## **DESCRIPTION FOR THE GENERAL PUBLIC**

Regulation of redox homeostasis in plant cells plays an important role in modulating redox signals associated with plant growth processes and their adaptation to prevailing environmental conditions. This may allow the plants to produce high-quality seeds that can be stored and maintain a high viability. Preliminary studies have shown that the regulation of the redox state during seed development may be closely related to the maintenance of seed viability during storage, when the seeds are exposed to aging and loss of viability. Therefore, the main objective of the planned research will be to analyze the network of redox regulation processes involving thiol proteins thioredoxins (Trx) with NADPH thioredoxin reductase (TrxR) and peroxiredoxins (Prx) in tree seeds, which differ in resistance to water loss and thus in the loss of viability during storage. As the participation of these proteins in the regulation of redox status is determined by their contribution to the S-nitrosylation and denitrosylation processes, we will analyze the level and location of nitric oxide (NO) and peroxyxynitrite (ONOO<sup>-</sup>), activity of S-nitrosogluthathione reductase (GSNOR), gene expression of Trx, TrxR, and GSNOR, and levels of total thiol groups and total S-nitrosothiols. Since the concentration of oxygen affects NO content, we will also analyze the intensity of respiration in the seeds. The role of reactive oxygen species (ROS) in initiating the aging process of seeds during storage has been repeatedly investigated and confirmed. As a result of ROS accumulation, guanine (G) may be modified, and the resultant 8-oxoG (8-oxoguanine) is considered to be a biomarker of oxidative stress. Therefore, the 8-oxoG level will be tested in the planned study, as it is important to check if changes in its level can be observed in the seeds during development and may affect the deterioration of seed viability during storage. The application of this research scheme will show the multiple aspects of the investigated processes and supplement the information on the physiology