

## Final Report

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**Guest Department:** Royal Botanic Gardens, Kew

**Guest University:** Millenium Seed Bank

**From:** 23.01.2022

**Until:** 29.01.2022

**Title of the Research Project:** "Targeting the structural properties of bread wheat seeds to understand their fate during early germination"

**Report about visit and future plans** (max. 200 words, English):

The activities in collaboration with the host group "Seed and Stress Biology" were integrated in the frame of a broader Early-Stage-Funding Project. Differential scanning calorimetry (DSC) analyses provided a first characterisation of the structural properties of bread wheat seeds. Those equilibrated below 30% relative humidity (RH) displayed mild glass transition temperatures (T<sub>g</sub>) of around 40-45 °C. However, no clear steps in the seed DSC heating scans could be identified as T<sub>g</sub> above 50% RH. Therefore, to detect structural relaxations of the intracellular glass into a fluid, dynamic mechanical analyses and further DSC scans on seed embryos only are scheduled in 2022. We aim at constructing a phase diagram and ensuring that seeds subjected to various controlled deterioration regimes will be profiled for biochemical changes with either glassy or fluid cytoplasm. Overall, it is intended to elucidate the macromolecular bases of the "dry seed architecture".

Additionally, I held a lecture entitled "Does oxygen affect seed ageing mechanisms? A matter of cytoplasmic physical state", summarising a recently published paper. Due to the pandemic, the live lecture could be held with restricted in-presence-audience. Nonetheless, a lively discussion on current and future collaborations followed, with both partners wishing to prepare another paper and repeat the previous success supported by BritInn.



**Picture Credits:** Davide Gerna