

# Svalbard Global Seed Vault commences seed experiment that will last 100 years

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Five gene banks provide seeds from their stocks for the long-term project on Svalbard, which is coordinated by Nord Gen. Part of the samples will be stored at IPK Gatersleben at minus 196 °C in liquid nitrogen to slow down the ageing process. The seed samples on Svalbard will be tested every ten years. Credit: Manuela Nagel/ IPK

How long can seeds stay alive? That question is crucial for seed gene banks and research institutes working with plants and seeds. Therefore, a

new seed longevity experiment has started in the Global Seed Vault. The experiment comprises seeds of 13 globally important crops, produced by project partners from all over the world, including Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), and is planned to go on for a hundred of years from now on.

The first experimental seed samples will be brought into the Svalbard Global Seed Vault on the 27th of August. These first test sets consist of seeds produced at the IPK Gatersleben. "We contribute a total of five crops—wheat, barley, pea, lettuce and cabbage. The material was grown on our experimental fields in the last year," says Prof. Dr. Andreas Börner from the Genebank department at IPK Gatersleben. "The IPK is the first institution to provide seeds. The other partners will follow next year."

During the following 2-3 years, seeds from nine additional crops will be produced and put into the  $-18^{\circ}\text{C}$  seed storage in Svalbard. Seeds will be produced by the project partners that are highly ranked gene banks and research institutes that also have taken advantage of the opportunity to deposit security duplicates of their valuable seed collections in the Svalbard Global Seed Vault.

In parallel, samples of all five gene banks will be stored in cryotanks at IPK. The storage in liquid nitrogen ( $-196^{\circ}\text{C}$ ) leads to a deceleration of aging processes. "The idea is to compare the quality of the initial seeds with material stored at the Svalbard even after 100 years," says PD Dr. Manuela Nagel from the Genebank department at IPK. "Therefore, we store seeds and seed flour and analyze primary compounds to elucidate processes of seed deterioration over the 100 year storage period."

"This experiment is one of its kind. It will provide [future generations](#) with valuable information about seed viability and more precise knowledge of how often seeds need to be regenerated," said Åsmund

Asdal, Seed Vault Coordinator at Nordic Genetic Resource Center (NordGen), the gene bank responsible for managing the project.

The main principle for conserving seeds is that well dried and frozen seeds of many important food crops can stay alive for a very long time. Exactly for how long seeds can maintain the germination ability after storage under optimal conditions is not fully explored. But it is assumed that seeds of many species can stay alive for centuries.

Gene banks test seeds in their collections regularly, to be able to regenerate seeds in time and keep the genetic resources contained in the seeds viable and available for research and plant breeding. Increased knowledge about how long seeds can stay alive will be extremely useful for gene banks, and also for the management of the Svalbard Global Seed Vault, which is a facility where gene banks can store duplicates of their primary seed collections as a security in case seeds are lost at home. The Seed Vault can be considered as a huge bank box for seeds, and it is crucial to know at which intervals seeds that are conserved here must be replaced by new fresh seeds.

The first experiment seeds that are put into the Seed Vault now will be tested in 2030 and then identical seed samples will be tested every tenth year until 2120, a hundred years from now. Results and reports from the project will be published throughout the whole project period, adding knowledge to management routines and guidelines, both for [seed](#) conservation in regular genebanks and for the long-term conservation of seeds in the Seed Vault.

Provided by Leibniz Institute of Plant Genetics and Crop Plant Research

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