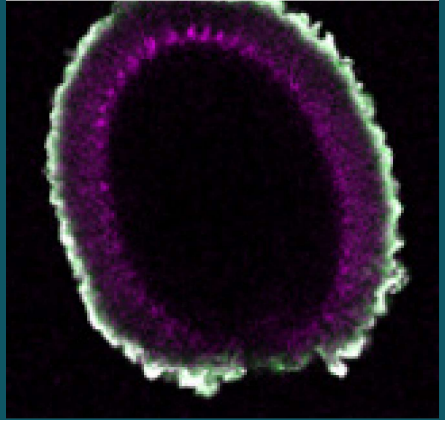

©Adeline Berger - Optical section through an Arabidopsis seed showing its mucilage halo composed of rhamnogalacturonan-I (green immunolabeling) and cellulose (Direct Red 23, magenta staining) obtained by confocal microscopy.

Properties and diversity of *Arabidopsis thaliana* seed seminal mucilage

Read more

Cambert M. *et al.*
Datasets of seed mucilage traits for *Arabidopsis thaliana* natural accessions with atypical outer mucilage
Scientific Data . 2021
https://doi.org/10.1038/s41597-021-00857-3

Value creation

- dataset 1. Portail Data INRAE https://doi.org/10.15454/1MZ1ZC (2021).
- dataset 2. Portail Data INRAE https://doi.org/10.15454/EYABB2 (2021).
- dataset 3. Portail Data INRAE https://doi.org/10.15454/LBUN4X (2021).

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Context

Models predicting the effects of climate change on ecosystems require data on how adaptive plant traits are affected. To accelerate the dissemination of knowledge and facilitate innovation in this field, open science is a strategic tool. With this objective in mind, 187,490 data points from 20 natural variants of the model plant *Arabidopsis thaliana* were made available to the scientific community and described in a data paper summarising four years of work in the framework of the CEMMU project funded by the French National Research Agency (ANR). The aim of this project was to study the effect of temperature changes on an adaptive seed trait: the production of mucilage (a polysaccharide hydrogel) that forms upon imbibition of seeds in water. Various hypotheses have been put forward to explain the adaptive advantage of mucilage production, including its role in maintaining seed viability. In *Arabidopsis*, the mucilage consists of two structurally distinct layers, a water-extractable outer layer and an inner layer that adheres to the seed. These structural differences suggest that the two layers play different roles in seed physiology.

Results

The CEMMU project used a transdisciplinary approach to produce three databases describing the quantity, composition, structure and hydration rate of the inner mucilage layer for 20 natural *Arabidopsis* variants from various geographical locations in Europe and Central Asia. These variants were selected on the basis of atypical macromolecular characteristics of the outer mucilage. The data, which cover 33 traits measured on four biological replicates, have been described in a data paper and are now available to the scientific community on the Data INRAE data repository. These were derived from histological, biochemical and NMR relaxometry analyses. Being able to share and reuse the data should make it possible to explore different avenues that may explain the adaptive role of seed mucilage and the impact of variability on the ability of seeds to adapt to their natural environment.

Future outlook

A first round of data exploitation (NMR and chemometrics) allowed us to make initial hypotheses on the impact of the natural variability of the internal mucilage on the hydration rates of the internal seed tissues. A statistical analysis of the potential relationships between the different characteristics measured is underway to confirm our hypotheses.