

## Screening of New Caledonia flora species for seeds desiccation tolerance

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### Introduction

The seed allows plant survival when environmental conditions are unfavorable, and its dispersion to colonize other sites. Seed tolerance to abiotic stresses imposed by the environment when separated from the mother plant and fruit is essential for the maintenance and evolution of the species in its ecosystem. The seed desiccation tolerance is the property to survive withdrawal of cellular water without non-reversible damage, and gives the ability to survive in extreme environmental conditions. The objective of the research program was to acquire physiological data related to desiccation tolerance of seeds belonging to species and genera from different ecosystems.

### Methods

Field missions were conducted to collect seeds of species from different vegetation units. Seeds were studied in the laboratory for morphological characters and for drying experiments. Seeds were desiccated by equilibration at 25 °C over 9 different saturated salt solutions, obtaining a range of 9 relative humidities (RH), which were 9%, 23%, 34%, 45%, 62%, 75%, 81%, 85%, 92%, respectively. Seed sorption isotherms were established using saturated salt solutions. Species were classified regarding their desiccation tolerance based on their RH50; RH50 value corresponded to the relative humidity at which 50% of the initial viability of the seeds (non desiccated) was lost.

### Results and Conclusions

Seeds from 66 species from 48 different genera and 33 families were collected. Germination tests following desiccation have been completed so far for 40 species. Results highlighted variability in desiccation tolerance between species, ranging from tolerant to highly sensitive, with the existence of a continuum in desiccation tolerance between species. Some genera showed constant behaviour for all their species, such as *Pittosporum* (tolerant) or *Syzygium* (sensitive) The screening for desiccation tolerance is currently extended to other species. All data regarding desiccation tolerance, taxonomical classification, morphological analysis and biogeographical criteria are grouped in a database named DESSICAL. Over time, DESSICAL would permit to clarify whether the seed's ability to tolerate a certain grade of desiccation plays a role in the maintenance of species in some habitats. Analysis of this database should provide useful information regarding adaptability of species to environmental changes.

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