

Research highlights *ex situ* conservation strategies for endangered native myrtles

New research highlights the importance of holistic conservation strategies to safeguard the germplasm of native New Zealand myrtles under threat from myrtle rust. It includes successful *in vitro* culture for several myrtle species, and hand pollination of Bartlett's rātā, New Zealand's rarest tree species.

New Zealand's native myrtle species are all classified as nationally threatened, mainly due to the potential impact from myrtle rust (*Austropuccinia psidii*), especially on reproduction by destroying flowers and seeds.

This research describes three methods (conventional seed banking, cryopreservation and *in vitro* culture) which can be used to store germplasm (seed, embryos, pollen, shoots or cells) of native New Zealand myrtles.

Researchers used eight species in the study – mānuka (*Leptospermum scoparium*), ramarama (*Lophomyrtus bullata*), rōhutu (*L. obcordata*), climbing rātā (*Metrosideros diffusa*), pōhutukawa (*M. excelsa*), southern rātā (*M. umbellata*), Bartlett's rātā (*M. bartlettii*) and swamp maire (*Syzygium maire*).

Five of the species were tested for long-term storage through seed banking. *L. bullata*, *L. obcordata*, *M. diffusa*, *M. umbellata* and *M. bartlettii* seeds were desiccation tolerant, meaning they did not lose viability when dried to 5-7% moisture content.

For these species, conventional seed banking (storage at -18°C at low moisture contents) might be suitable. *Syzygium maire* seeds and embryos were however extremely sensitive to drying, and therefore cryopreservation, the storage of plant material at ultra-low temperatures, is required.

Metrosideros bartlettii is New Zealand's rarest tree species and since it can't produce viable seed by using its own pollen (self-incompatible), trees at Otari Native Botanic Garden in Wellington were hand pollinated using an unrelated individual's pollen.

Successful *in vitro* culture (tissue culture) was obtained for various myrtle species, while photoautotrophic micropropagation techniques were developed for *L. scoparium*.

Photoautotrophic tissue culture is "micropropagation without sugar in the culture medium, in which the growth or accumulation of carbohydrates of cultures is dependent fully upon photosynthesis and inorganic nutrient uptake. There are multiple advantages to using this form of propagation, because this system actively encourages plant growth. Namely, there are lower contamination rates due to the lack of sugar in the growing medium, and more catering to plants that aren't able to be successfully multiplied by conventional means. This method also incorporates the use of ventilated vessel (tissue culture container) to promote growth.

This research [Integrated ex situ conservation strategies for endangered New Zealand Myrtaceae species](#) has been published in the New Zealand Journal of Botany. Research agencies were Otari Native Botanic Garden & Wilton's Bush Reserve, and Plant & Food Research. This research builds on the [Seed-banking and germplasm research strategy](#) report which was funded by the Ministry for Primary Industries.



Photo: Karin van der Walt, Conservation and Science Advisor, investigating cryopreservation of swamp maire at the Lions Otari Plant Conservation Laboratory, Wellington.

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