

***Ex situ* conservation programmes for cacti and succulents at the Royal Botanic Gardens Kew**

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RBG Kew's mission: to inspire and deliver science-based plant conservation worldwide, enhancing the quality of life. Scientific advice and activity is delivered through Kew's 'Breathing Planet Programme' aimed at:

- Ameliorating the effects of climate change through a better understanding of plant/habitat diversity, to enhance the retention of the Earth's major remaining carbon sinks on land;
- Banking seed and practising restoration ecology;
- Identification of locally-appropriate useful plant species that can be used in sustainable ways;
- Informing the visitors to our Gardens and website about our work and what they can do as individuals to help us all live more sustainably.

By the 1970s botanic gardens began to recognize the role they could play in *ex situ* conservation – this linked to *in situ*. At Kew, micro-propagation and seed-banking facilities were established and the institute became the UK's Scientific Authority for CITES, offering a 'bonded warehouse' for Customs' seizures.

Many cacti and other succulent species are conserved *ex situ* in the Millennium Seed Bank (MSB). Fieldwork for the MSB has uncovered some very rare and long lost taxa in habitat, such as *Dioscorea elephantipes* and *Cylindrophyllum hallii*, the latter not seen since 1928, now re-discovered and with seeds in the Bank. While most of the seeds conserved in the MSB are collected in habitat, a smaller proportion are obtained from Kew's living collections under controlled pollination conditions by gardens' staff.

Examples include various rare cacti from the genera *Melocactus*, *Escobaria*, *Thelocactus*, *Mammillaria* etc. and taxa from countries with which Kew does not yet have bilateral agreements to collect seed in habitat.

This is not only conserving these species, but also represents an insurance policy for the living collections, should a plant be lost to disease etc. *Ex situ* conservation depends on having well-trained, devoted staff.

The challenges that face re-introduction programmes using *ex situ* material include:

- Difficulty of maintaining sufficiently large and genetically diverse collections under glass;
- Danger of inadvertent selection of genotypes that prefer artificial glasshouse conditions, but may not be best adapted to wild environments;
- Seed-banking or back-up facilities at other gardens needed as insurance against failures;
- Capacity issue – staff resources often limited;
- Risks to wild populations from re-introduction (diseases, pests etc.).