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### Use of *ex situ* orchid collections in conservation research with reference to *Restrepia* (Orchidaceae)

Since *Restrepia* species in cultivation have been propagated by keikis or division they are still very close genetically to wild plants. This makes cultivated collections of this genus particularly useful as model populations for research purposes, although they may not represent the full genetic spectrum, found in the wild.

In the current study, we are using a private collection of *Restrepia* to study self-incompatibility and inbreeding depression in this genus. A variety of inter-clonal crosses; and inter-specific crosses producing primary hybrids have been performed to investigate some of the breeding barriers within the genus. This programme of plant breeding experiments has been performed in concert with a study of axenic seed culture in order to propagate this genus *in vitro* and thereby assist the breeding programme. Preliminary results indicate that *Restrepia* species exhibit varying degrees of self-incompatibility and a high potential for inbreeding depression. Self-pollinations were found to produce few viable seeds. For viable seeds and a vigorous F1 generation an inter-clonal cross was found to be required. Primary hybrids between species produced >90% 'filled' seeds, germinated well, with vigorous F1 seedlings. Primary crosses between sections Pleurothalopsis and *Restrepia* produced seeds with less 'filling' and seedlings with less F1 vigour.

*Restrepia* grow in montane forests that are under threat from external factors that may affect their habitat. With fragmentation of habitat and dwindling populations the chances of successful cross-pollination are reduced. For a self-incompatible genus this means reduced viable seed production and reduced chances of maintaining a self-sustaining population. We discuss the potential value of *ex situ* conservation and *in vitro* propagation in the future conservation of this delightful genus.