Patterns of Genetic Diversity for Iconic Swamp Orchid Phaius Australis in Australia

PATTERNS OF GENETIC DIVERSITY FOR ICONIC SWAMP ORCHID PHAIUS AUSTRALIS IN AUSTRALIA

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The Swamp Orchids *Phaius australis* and *P. bernaysii* are iconic and beautiful terrestrial orchids that occur in disjunct populations along Australia's east coast and in isolated inland locations. However, these orchids are endangered due to illegal collection in the past and continued habitat loss and fragmentation. Future climatic change threatens to push such species with small populations, limited connectivity and narrow environmental tolerances to extinction. In this study we have investigated the viability and persistence of the species by combining genetic and demographic studies across a 2000 km range. Thirty-four populations were sampled from Cooktown, North Queensland to mid-north coast New South Wales. NextGen sequencing was utilised to develop 22 microsatellite marker and population genetics analyses utilised to explore diversity, variation, inbreeding and spatial patterns of diversity across the latitudinal range. Population sizes ranged from extremely small (two individuals) to 100's of plants. We found low genetic diversity and variation across the species range, with little indication of inbreeding but some evidence of clones. Genetic bottlenecks were recognized in some populations known to be recovering from recent rapid population loss. Patterns of post-colonisation divergence from *Phaius tancarvilleae*, a widespread tropical co-gener will be presented. The persistence of populations in current locations under changed climatic conditions and the ability to follow a climatic niche southward will be discussed in the context of possible assisted translocations.