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### Can Orchids be used as Indicators of Ecosystem Health?

The loss of urban native vegetation is a global crisis particularly as cities continue to expand and populations grow. Native vegetation often remains as small isolated fragments embedded in the human matrix of urban development. These remnants become islands of biodiversity that experience varying degrees of degradation. Habitat loss in the biodiversity hotspot of south west Western Australia is considered to be one of the major threats to native terrestrial orchids, and is in part responsible for the current listing of 34 species as critically endangered. Despite the loss of habitat, orchids continue to persist in the urban environment although little is known in detail of their ecological response to such pressures. Orchids are a highly specialized group of plants, their pollination methods and mycorrhizal associations ensure complex interactions with their environment. Do these interactions provide a measurable way to assess the health of ecosystems?

This study looks at a number of sites currently sustaining native orchid populations within the highly urbanized metropolitan region of Perth, Western Australia. The health of field sites has been quantified against a benchmark condition. The pollination success, outplanting survival and presence of mycorrhiza are investigated for seven orchid species from four genera commonly found in the study area. Genetic sequencing of mycorrhizal isolates allows a thorough investigation of fungal specificity and the influence of environmental conditions on fungal presence. Insights into the ecology of common orchid species with congeners that are rare and endangered may be invaluable in future planning and management of urban reserves. Measurement and quantification of ecological responses of orchids in reference to varying site condition variables aims to determine whether orchids can be successfully utilized as indicators of ecosystem health.