

Habitat of the Leafless Tongue Orchid (*Cryptostylis hunteriana*) throughout its known Australian distribution

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Rationale

Targeted surveys to detect rare or cryptic plant species and their likely habitats are an important technique; however, they are expensive and time consuming, and sometimes don't provide much useful information, especially where the threatened plant species in question has a wide distribution. Furthermore, the current rate of habitat loss for these plant species is sketchy or unknown; like many rare and cryptic species the Leafless Tongue Orchid is often overlooked in surveys. This project set out to improve our understanding of what conditions and habitats the Leafless Tongue Orchid prefers, and so improve the way we manage native habitats and assess development to help protect and conserve them.

Description of the Leafless Tongue Orchid

The Leafless Tongue Orchid (*Cryptostylis hunteriana*) is a leafless saprophyte; only when in its reproductive phase (November to February in New South Wales and Victoria, June to August in Queensland) does it appear above ground. The species is listed as Vulnerable in NSW and at Commonwealth level. The principal threat to the species is disruption or loss of natural habitat through development pressures in coastal regions (NSW DECC 2005a). Lack of knowledge on preferred habitat can place species at risk in areas undergoing rapid and intensive development.

Prior to this study, papers on its regional occurrence had been published (e.g. Bell 2001; Clarke et al. 2004), but there was no comprehensive, range-wide treatment.

Methods

All known records of the Leafless Tongue Orchid were extracted from state and Commonwealth databases (and other verifiable sources) across its entire range: in all, 108 sites were surveyed. At each site, full floristic data were collected within a 0.4 ha (20 x 20 m) quadrat; additional data recorded included vegetation structure, soil types, aspect and cover-abundance for all plant species.

These data were then analysed: species recorded in plots from this and other surveys were transformed to simple presence/ absence format to allow data from all surveys (regardless of how cover-abundance scores were rated) to be used in the analysis. Two statistical analysis routines in

PRIMER (Clarke and Gorley, 2006) were used: the first elucidated apparent vegetation communities in which the Leafless Tongue Orchid occurred; the other - performed on the combined dataset - produced diagnostic species lists for each vegetation type generated. Maximum entropy modelling software (*MaxEnt*: Phillips et al. 2006) was used to model the distribution of the Leafless Tongue Orchid using landscape variables (e.g. climate, substrate, terrain datasets) to ascertain correlations within the current distribution. The derived vegetation communities, combined with *MaxEnt* outputs, allowed the species' potential distribution and those habitats where it was most likely to occur to be mapped across its range.

Results

The locations of the 108 known sites visited, areas of potential habitat and the most likely habitats for the Leafless Tongue Orchid, were mapped throughout the species' entire range.

Substantial populations of the Leafless Tongue Orchid occur: between Jervis Bay and Batemans Bay (NSW South Coast); near Lake Macquarie and Nelson Bay (NSW Central Coast); and East Gippsland in Victoria. Scattered records occur in south-east Queensland, the Gibraltar Range area and at Nowendoc (NSW Northern Tablelands), near Eden, (NSW South Coast) and in the Blue Mountains.

Existing authoritative texts stated the Leafless Tongue Orchid was known to occur in wet-heath on sandy soils in coastal districts; however, this research suggests it occurs in a much wider range of habitats, as outlined below.

NSW Northern Tablelands

- New England Blackbutt Grassy Forest and New England Blackbutt Shrubby Forest
- Large-fruited Blackbutt/ Strawberry Gum Woodland.

NSW Central Coast

- Scribbly Gum/ Bloodwood/ Apple Woodland
- Bloodwood/ Apple/ Mahogany/ Peppermint Forest
- Grey Gum/ Bloodwood/ Stringybark Forest (Georges River)
- Dwarf Apple/ Banksia Scrub (North Sydney).

NSW South Coast

- Banksia/ Hakea Wet Heath
- Banksia/ Hakea Dry Scrub-heath
- Peppermint/ Bloodwood/ Stringybark/ Silver-top Ash Forest
- Bloodwood/ Scribbly Gum/ Silver-top Ash Forest
- Silver-top Ash/ Yertchuck/ Spotted Gum Forest
- **Woollybutt/ Bangalay/ Stringybark/ Rough-bark Apple Forest (Eden)
- **Spotted Gum/ Woollybutt/ Paperbark Forest
- **Coachwood/ Lilly Pilly/ Bangalay Rainforest

South East Queensland

- Banksia/ Mahogany Wallum Heath

East Gippsland (Vic)

- Grasstree Wet Heath
- Yertchuck/ Stringybark Woodland.

The species was found to occur at elevations from 10m asl in South East Queensland to over 1200m in the NSW Northern Tablelands, on various soils derived from basalt, sedimentary geologies and Quaternary sands. Protected populations of the Leafless Tongue Orchid are known from various National Parks (e.g. Gibraltar Range, Tomaree, Wallarah, Ku-ring-gai, Jervis Bay, Murrumbidgee, Ben Boyd [NSW] and Croajingolong [Vic]).

Limitations**Data**

Ten of the 18 defined habitat types are based on single samples only: the authenticity of these records is not doubted, but their occurrences in otherwise unreported habitats pose questions about habitat variations associated with this species. Records in 3 of these groups (prefixed ** in the list above) are additionally uncertain because of

location data accuracy. These groups should be treated with less confidence than the other defined groups.

Use

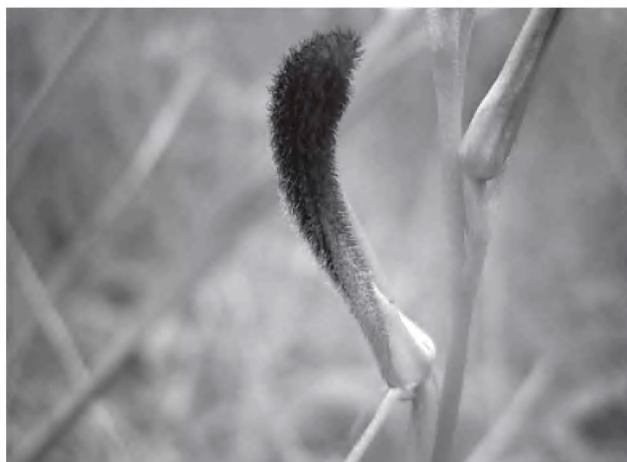
Modelling and habitat profiles are useful for estimating the probability of threatened cryptic plant species occurring; however, unknown populations could occur that have not been predicted because their habitat was not represented in the sample data. Outlier populations, particularly those at the limit of a species' range, are important in enabling species to adapt to future habitat alterations (e.g. as an effect of climate change). Given the foregoing, and the necessarily limited nature of this study, defining potential habitat for the Leafless Tongue Orchid should not rely totally on our research: an area's suitability as potential habitat for the Leafless Tongue Orchid should be determined using our research along with additional tools, such as the scientific literature and local knowledge.

Conclusion

Given the rate of species extinction and habitat loss in Australia, there is an urgent need for land managers and consent authorities to understand preferred habitat for rare species, especially cryptic species. The default assumption in most environmental impact assessments is that a species will be detected during surveys if it is present or, where not recorded, that the site represents low quality habitat for the species. However, a growing body of evidence recognises that this is not the case, either because an observer fails to detect species that are present at a site, or the plants' habits make it impossible to detect most of the time. Predictive modelling of potential habitat allows land managers to be better informed on the locations in which cryptic and rare species are likely to occur.

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The Leafless Tongue Orchid is a leafless saprophyte which is only detectable when in flower (November to February in New South Wales and Victoria, June to August in Queensland).

Photo: Stephen Bell

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Further Information

For full details of the study, including the results of predictive mapping, please contact the NSW Environmental Trust. A detailed paper submitted to the ecology journal *Cunninghamia* will be published in the near future following peer review.

The threatened and cryptic Leafless Tongue Orchid (Cryptostylis hunteriana) is often overlooked in surveys.
Photo: Alan Stephenson



Report from New Zealand Plant Conservation Network

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New Zealand Threat Classification System

The New Zealand Indigenous Vascular Plant Panel will be meeting in late April/early May to review the threat listing of New Zealand indigenous vascular plants. The Department of Conservation developed the Threat Classification System to assess the status of any plant, animal or fungus that has a wild population established in New Zealand. Information is gathered from the entire community of relevant scientific and conservation experts in the country.

Progress is monitored through three indicators; extinct species, status of threatened species and the status of at risk species. Extinct species is measured through trends in the number of indigenous species that are extinct. Status of threatened species and of at risk species are measured through trends in – the number of species in each category, the number of species in each category under active management and the demographic response to management at population level for selected species as case studies.

The system is reviewed approximately every three years.

Molloy, J., Bell, B., Clout, M., de Lange, P., Gibbs, G., Given, D., Norton, D., Smith, N., Stephens, T. (2002) Classifying species according to threat of extinction. A system for New Zealand. *Threatened species occasional publication* 22:26.

New Zealand's Favourite Plant for 2011

A native Bamboo Rush, *Sporadanthus ferrugineus*, found growing only in the Waikato region of the North Island was voted as the Network's favourite native plant for 2011 in our annual 'Vote for your Favourite Native Plant'. Past winners have been the Chatham Island forget-me-not, *Myosotidium hortensium*, Cook's scurvy grass, *Lepidium oleraceum* and pingao, *Ficinia spiralis*. What will it be this year? Voting opens at the end of the year.

Network Updates

Keep an eye out for details of our upcoming conference being held in Auckland at the end of this year.

Visit www.nzpcn.org.nz for more information.



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