

EVIDENCE FOR A THIRD SPECIES OF *GASTRODIA* (POTATO-ORCHID) IN TASMANIA

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INTRODUCTION

The genus *Gastrodia* is represented by about 35 species, 7 endemic in Australia, the others distributed through India, Indonesia, Malaysia, New Guinea and New Zealand (Jones 2006). The plants have a rootless fleshy rhizome that sometimes looks like a potato (hence the vernacular name) and a leafless fleshy to wiry brown flower stem (Jones 2006).

For many years, Tasmania had just the one species of *Gastrodia*, then referred to as *Gastrodia sesamoides* (e.g. Firth 1965; Curtis 1975; Jones et al. 1999; Jones 2006). However, it was widely recognised by orchidologists and field botanists that there were two entities, quite distinct from one another: a shortly-statured light cinnamon brown taxon with the flower spike in a distinct shepherd's crook shape (i.e. nodding) when in bud; and a much taller robust taxon with dark brown to almost black stems and erect flower spikes when in bud. The robust entity (*Gastrodia procera*) was partially described by Carr (1991) and more formally circumscribed by Jones (1998) in a review of all Tasmanian orchid genera.

Jones (2008) described a new species of *Gastrodia*, *G. surcula*, apparently restricted to higher elevations in the Australian Capital Territory and southern New South Wales (Jones et al. 2008).

The distinguishing character of this new entity is that it forms localised clonal groups with the flowering stems connected in a network of irregular subterranean rhizomes (Jones et al. 2008). The inflorescence also generally has fewer and less crowded flowers, the flowers with a labellum midlobe that is ovate-oblong (Jones 2008).

This article presents evidence for the presence of *G. surcula* in Tasmania, based on four collections, anecdotal reports and digital images.

EVIDENCE FOR A THIRD SPECIES

Tahune 2008

On 29 December 2008 H. & A. Wapstra noticed a colony of *Gastrodia* about

halfway up the walking track to the Tahune Air Walk in bare ground in a bend of the track. There were at least 15 plants in an area of about 1 x 1.5 m. They were pale, thin-stemmed, about 25 cm tall, still in bud with the nodding inflorescence typical of *G. sesamoides*. We were puzzled to find them in the deep shade of a wet sclerophyll/mixed forest (as compared to dry sandy heathland or woodland, the more typical habitat for this species). Other things that stood out were the large number in such a small patch and the lateness in the season (about a month later than those we were familiar with). For various reasons, no samples or images were taken that day.

King Island

In October 2009 H. & A. Wapstra visited Eva & Martin Finzel on King Island, Bass Strait, who showed us photographs of a dense stand of numerous of what we presumed were *G. sesamoides* from their

property. These strongly reminded us of the Tahune encounter. The plants had not yet emerged at the time and we asked that they collect some samples later in the year, including underground parts to establish if the individual plants were connected, as by this time we were aware that Jones had described a new clonal species, *G. surcula* (Jones 2008).

At the King Island site the plants occur in tall scrub dominated by *Leptospermum scoparium*, *Monotoca glauca* and *Banksia marginata*. A striking feature of the population was the density of flowering scapes (Plates 1 & 2), which is quite atypical of *Gastrodia sesamoides* – one patch supported about 50 stems in 30 x 50 cm, and another patch 10 stems in 15 x 15 cm. The Finzels supplied numerous images and several excavated plants. Another striking feature was that the plants were not growing as individuals from a single tuber but arising from tubers joined by narrow rhizomes (Plates 3 & 4). Of note is the stature of the plants (Plates 1 & 2): certainly not as tall as typical

G. procera but taller than most *G. sesamoides*. The colour of the scape is also of interest (less dark than typical *G. procera* but darker than most *G. sesamoides*). The inflorescence in bud is quite typical of *G. sesamoides* (i.e. hooked – Plate 1) but more typical of *G. procera* at full anthesis (i.e. erect with individual flowers more spread out along the scape – Plate 2).



© Eva & Martin Finzel



Pic 22

Plate 1 (above). A mass of closely growing stems of *Gastrodia* plants on King Island – note especially the pale brown colour of scapes and the nodding inflorescences in bud

Plate 2 (above right). Later stage flowering of the King Island plants showing the more erect flower spike with more widely separated flowers



© Eva & Martin Finzel

Pic 24



© Eva & Martin Finzel

Pic 26

Plate 3 (left). Whole plant showing two scapes arising from separate fleshy rhizomes connected to a larger fleshier tuber. **Plate 4 (right).** Close-up of the same tuber-rhizome system

Tahune 2009

On 22 December 2009 H. & A. Wapstra revisited the Tahune site to make a collection but found that the 2008 colony had entirely disappeared. However, we found a few similar plants, mostly as singles but one pair in leaf litter emerging about 5 cm apart. When we dug these up, their tubers were connected with a fleshy brittle rhizome (Plates 5 & 6). We also exposed the tuber of another plant and followed the rhizome for about 1 m in the direction of another specimen. This effort demonstrated that these plants were also connected by a rhizome, but we covered it up without taking a specimen.

This patch occurs in tall wet sclerophyll/mixed rainforest, so quite different habitat to that on King Island.



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Plate 5. Context of the pair of *Gastrodia* at Tahune (circled) with another individual in the background (circled)



Plate 6. Excavated pair of flowering scapes from the Tahune site shown in Plate 5

Longley

In December 2009, Malcolm Wells and Peter Fehre (UpClose Tasmania orchid photographers) made mention of a close-growing patch of tall *Gastrodia* at Huon Road, Longley (Plate 7). These plants were growing in leaf litter under a mature *Acacia dealbata* (silver wattle). Malcolm and Peter subsequently (1 January 2010) made an excavation of two flowering scapes and the associated tubers, which were connected.

Plate 8. Dense patch of *Gastrodia procera* in a pile of mulch near Longley



Plate 7 (left). A mass of closely growing stems of *Gastrodia* plants in leaf litter under a strip of mature silver wattles near Longley

Of note is that at about the same time, and on the same property, Malcolm and Peter also encountered a patch of what we are quite comfortable calling *G. procera*, based on stature and colour. Unlike typical *G. procera*, however, these were growing as a dense patch, amongst a pile of mulch (Plate 8). A possible explanation of this population is that the mulching process cut up numerous tubers and several individuals arose from these tuber pieces – *Gastrodia procera* occasionally turns up in mulched garden beds.



South Hobart

In December 2010, Mark Wapstra encountered a relatively dense patch of quite tall *Gastrodia* in South Hobart. I assessed the site as part of a development proposal to install a new water pipeline so the patch was going to be excavated by a massive machine anyway, and I took the opportunity to remove some plants prior to works being undertaken. At first I thought these were simply *G. procera*, because of

their stature, generally erect flower spike (although in bud several were hooked) and dark colour to the scape (Plates 9 & 10) but on excavation it became clear that the expected single tuber was in fact a mass of interconnected rhizomes and tubers, with flowering scapes arising from several locations along the same rhizome (Plate 11). In addition, the stature did not reach the sometimes massive height of *G. procera* and the scape was not as dark as most specimens.



Plate 9 (left). Dense patch of *Gastrodia* at South Hobart – note the stature, erect flower spikes and dark brown-black stems



Plate 10 (right). Another part of the same patch, with several plants at an earlier stage of flowering – it is difficult to discern in the image but many of the flower spikes are nodding in bud

I washed the clump of scapes (Plate 12) carefully with a hose, loosening dirt with a pair of forceps, eventually ending up with a dirt-free tangled mass of rhizomes and tubers (Plate 13). Tubers were connected by quite narrow diameter rhizomes, which were quite brittle and broke easily (Plate 14). While the mass did not resemble the more delicately connected and more separated tubers of the King Island collections, the overall impression is of similar plants. The difference in the density of the rhizome-tuber system may be a function of soil friability.

WHERE TO FROM HERE?

The protologue of *Gastrodia surcula* is quite brief (Jones 2008) and is presumably based on limited material, especially with

respect to examination of the rhizome and tuber system of flowering specimens. The problem is that when field botanists record *Gastrodia*, we don't dig them up to look at the form of the rhizome: we never had to – they were either small, light brown and nodding in flower (*G. sesamoides*) or tall, dark brown-black and erect in flower (*G. procera*). This means that it is virtually impossible to know how many, if any, of our records of *Gastrodia* in Tasmania may refer to the suspected new entity (and whether this should be called *Gastrodia surcula*). However, we have asked several botanists of their memory of how individuals of *Gastrodia* grow in Tasmania and it appears that the majority grow as singles or dispersed patches but not dense patches, the latter probably indicative of



Plate 11. *In-situ* excavation of some of the flowering stems – note the branching rhizomes narrowly connected to larger fleshy tubers and two scapes arising from the same tuber-rhizome mass



Plate 12 (left). The excavated clump of flowering stems before hosing
Plate 13 (right inset). The end result of removing most of the dirt



Plate 14. Partially cleaned mass of tubers and rhizomes – note the multiple flowering scapes arising from the same mass, the delicately connected rhizomed and the numerous small “buds” on the main fleshy tubers

the interconnected rhizome characteristic. Jones et al. (2008) noted that *G. surcula* is difficult to separate from *G. sesamoides*, which is mainly found at lower elevations and grows as single plants or in dense clusters with the rhizomes separate.

Jones (2008) and Jones et al. (2008) described the habitat of *Gastrodia surcula* in the Australian Capital Territory and southern New South Wales as “higher montane and subalpine areas” in “snowgum woodland, often on road embankments and beside tracks in well-drained loam” at elevations of 1000–1200 m. They applied the vernacular name of “snowgum potato-orchid” but perhaps “cloning potato-orchid” would better describe our specimens. None of the locations suspected of supporting *Gastrodia surcula* in Tasmania could be described as “montane” or “snowgum

woodland”: all are below 500 m elevation and from the dry to wet sclerophyll (eucalypt) forest. Whether *Gastrodia surcula* turns out to be more widespread and occurs in a broader range of habitats and elevations on mainland Australia is yet to be seen but it is quite conceivable that the more southerly latitudes of Tasmania mean that the species occurs at lower elevations and in drier (but colder) habitats (this is certainly the case for many other Tasmanian populations of vascular species we share with montane mainland Australia).

For the moment, pending a more detailed morphometric-genetic study, which would be necessary to confidently assign the suspected collections of *G. surcula* to that species, or indeed another, we have chosen to lodge the material (at the Tasmanian Herbarium) from all sites as *G. surcula*.

The collections comprise pressed plants, spirit collections and images along with the associated rhizomes and tubers. We now urge field workers that encounter *Gastrodia* to make an effort to ascertain the nature of the rhizome-tuber system and make collections, along with notes on the density of flowering scapes. Although they make unwieldy specimens on an herbarium sheet, including the tuber and rhizome is vital to making an accurate identification.

The authors would welcome viewing images and/or collected material of *Gastrodia* from anywhere in Tasmania, and are happy to submit such material to the Tasmanian Herbarium on behalf of the original collector, along with details of the collection site and population.

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REFERENCES

- Carr, G.W. (1991). New taxa in *Caladenia* R. Br., *Chiloglottis* R. Br. and *Gastrodia* R. Br. (Orchidaceae) from south-eastern Australia. *Indigenous Flora & Fauna Association Miscellaneous Paper* 1: 1–24.
- Curtis, W.M. (1979). *The Student's Flora of Tasmania Part 4a Angiospermae: Orchidaceae*. Government Printer, Hobart.
- Firth, M.J. (1965). *Native Orchids of Tasmania*. C.L. Richmond & Sons Pty. Ltd., Devonport.
- Jones, D.L. (1998). Contributions to Tasmanian orchidology 1: introduction and the genera *Acianthus*, *Arthrochilus*, *XCalassodia*, *Calochilus*, *Corybas*, *Cyrtostylis*, *Dipodium*, *Dockrillia*,

Gastrodia, *Leptoceras*, *Microtis*, *Pyrorchis* and *Townsonia*. *Australian Orchid Research* 3: 1–15.

- Jones, D.L. (2006). *A Complete Guide to Native Orchids of Australia including the Island Territories*. Reed New Holland, Sydney.
- Jones, D.L. (2008). Twelve new species of Orchidaceae from south-eastern Australia. *The Orchadian* 15(12): 546–558.
- Jones, D.L., Egan, J. & Wood, T. (2008). *Field Guide to the Orchids of the Australian Capital Territory*. National Parks Association of the ACT Inc., Canberra.
- Jones, D., Wapstra, H., Tonelli, P. & Harris, S. (1999). *The Orchids of Tasmania*. Melbourne University Press, Melbourne.