

# SOME LARVAL HOST PLANTS FOR *APHANASIMUM AUSTRALE* (CERAMBYCIDAE: CERAMBYCINAE: APHANASINI): PROTEACEAE APPEAR TO BE THE SOLE LARVAL HOSTS FOR THIS TRIBE.

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## Summary

The range of larval host plants for *Aphanasium australe* (Boisduval) is expanded to include several species of *Grevillea* in the Sydney region. Adult *A. australe* were reared from several species of *Grevillea*, *G. buxifolia* (Sm.) R.Br., *G. oleoides* Sieber ex Schult. & Schult., *G. sericea* (Sm.) R.Br. and *G. speciosa* (Knight) McGill. An additional record for *Hakea sericea* Schrad. & J.C.Wendl. is provided. In *Hakea*, *A. australe* has been found to infest the stems and roots but in *Grevillea*, it appears to be confined to infestation of the root system. The only known larval host records for *Aphanasium* spp. are *Hakea* and *Grevillea* (Proteaceae).

**Key Words:** *Aphanasium*, *Aphanosperma*, Cerambycidae, larval hosts, *Grevillea*, *Hakea*

## INTRODUCTION

*Aphanasium australe* is known to breed in species of *Hakea* and *Grevillea* (Proteaceae) (Froggatt 1895, Duffy 1963, Moore 1964, Webb 1987, Webb *et al.* 1988). Nothing is known of the biology of the other species of *Aphanasium* (Slipinski and Escalona 2016). In *Hakea*, multiple *A. australe* larvae may be active in the roots, stem and branches without necessarily causing death of the plant (Duffy 1963, Moore 1964). Infestation in the stem causes the stem to swell and produce a gummy exudate (Duffy 1963). Moore (1964) indicates that adults emerge from November onwards and have one generation per year.

Britton (1968) described the new genus *Aphanosperma* with two species in the tribe Aphanasini, which had previously only contained the single genus *Aphanasium*. Webb (2020) provided records of *Aphanosperma orientalis* Britton from two species of *Persoonia*, *P. levis* (Cav) Domin. and *P. lanceolata* Andrews and then later from two additional species, *P. pinifolia* R. Br. and *P. linearis* Andrews (Webb 2022). Previously, species of *Aphanosperma*, specifically *A. occidentalis* Britton, had only been recorded from *Hakea* (Proteaceae) woody fruits in Western Australia (Britton 1968).

Infested root balls and lower stems of species of *Grevillea* and *Hakea* were collected from various locations in southern Sydney (New South Wales) during 2020-21 and maintained in plastic tubs under semi-controlled conditions. Progressively over time, adult specimens of *A. australe* emerged.

## RESULTS

### New *A. australe* records from Proteaceae

#### *Grevillea buxifolia*

1. NSW, Menai, Heathcote Rd., collected on 26 September 2021, emerged on 29 December 2021 from the below ground root mass (1 specimen).
2. NSW, Royal National Park, Curra Moors Fire Trail, collected on 24 September 2021, emerged on 19 January 2022 from the below ground root mass (1 specimen).

#### *Grevillea oleoides*

1. NSW, Royal National Park, Curra Moors Fire Trail., collected on 16 September 2021, emerged on 16 November 2021 from the below ground root mass (1 specimen).

#### *Grevillea sericea*

1. NSW, Menai, Heathcote Rd., collected on 15 September 2021, emerged on 18, 25 and 30 November 2021 from the below ground root mass (6 specimens from 6 individual plants).
2. NSW, Menai, Heathcote Rd., collected on 26 September 2021, emerged on 2 November 2021 from the below ground root mass (1 specimen).
3. NSW, Royal National Park, Loftus Trig, collected on 15 September 2021, emerged on 21 February 2022 from the below ground root mass (1 specimen).

#### *Grevillea speciosa*

1. NSW, Menai, Heathcote Rd., collected on 26 September 2021, emerged on 28 October, 14 and 19 December 2021 from the below ground root mass (4 specimens from 4 individual plants).

#### *Hakea sericea*

1. NSW, Woronora River, "The Needles", collected on 7 July 2020, emerged on 26 October 2020 from the lower stem (1 specimen).

The one specimen that emerged from *H. sericea* did so from a segment of the stem taken from just above ground level. In contrast, all specimens that emerged from *Grevillea* spp. did so from excavated root material even though stem material was present in some wood samples collected. Infestation by *A. australe* was most common in *Grevillea* specimens growing on dry lateritic outcrops with poor soil moisture. Plants were generally in poor condition, rarely exceeded 1 m in height and ca. 25 mm in diameter at ground level, had root systems close to the surface and were easily pulled from the ground. A large number of specimens of *G. buxifolia*, *G. sericea* and *G. oleoides* growing in deeper soils were inspected by excavating soil from around the base but not removing the plant. These specimens generally had more robust root systems and no active infestations or previous damage by *A. australe* were evident.

Generally, only one larva was present in the root system of any one plant but in the case of two *G. sericea* samples, two larvae were present. In both cases only one specimen emerged successfully. All plant material collected was from living plants and in many cases the root systems had previous damage. In some cases, there appear to be little or no undamaged root material left – yet the plants were alive.

Larvae tunnel towards the extremity of the root and then return close to the stem to pupate (Figures 1 and 2). Young larvae tunnel below the cambial layer and as they grow and return to the proximal part of the root create a much larger chamber packed with fine wood fibres in which they subsequently pupate. No actual emergence holes were observed. However, in most cases, much of the root system close to the stem had cracks or damage caused by previous infestation through which the adults emerge.

### DISCUSSION

Specimens emerged over an extended period from late October to Late February but the majority emerged during November. This is consistent with the observations of Moore (1964). The delayed emergences after November may have resulted from confinement under artificial conditions.

The published record of *A. australe* infesting *Grevillea* (*G. rosmarinifolia* A. Cunn.) (Webb 1987) provided no other biological data and the specimen, now residing

in the collection of the NSW Department of Primary Industries (Orange), has no other label data attached.

These records are the first to detail aspects of the biology of *A. australe* in *Grevillea*. Infestation in *Grevillea* differs from that of *Hakea* in that larvae work within the root system and pupate close to the base of the plant. Whereas, in *Hakea*, they are mostly recorded in the stem and branches but also roots (Duffy 1963, Moore 1964).

Many *Grevillea* specimens had evidence of previous damage by *A. australe* and at least two specimens of *G. sericea* had more than one larvae present in the root system. This indicates that plants can withstand multiple infestation in the same season and over multiple seasons.

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**Figure 1.** **A.** Young larva tunneling in apparently healthy *G. sericea* root. **B.** Older larva returning to the main root mass in *G. buxifolia*. **C.** Pupae enclosed in wood shavings close to the base of the stem in *G. sericea*. **D.** Pupae extracted from pupal chamber in *G. sericea*.





**Figure 2.** **A.** Recently eclosed adult at the base of the root mass in *G. oleoides*. **B.** Recently eclosed adult emerging from previous damaged material in *G. sericea*. **C.** Fully sclerotized adult extracted from the subterranean base of the stem of *G. oleoides* at the point of root attachment.

