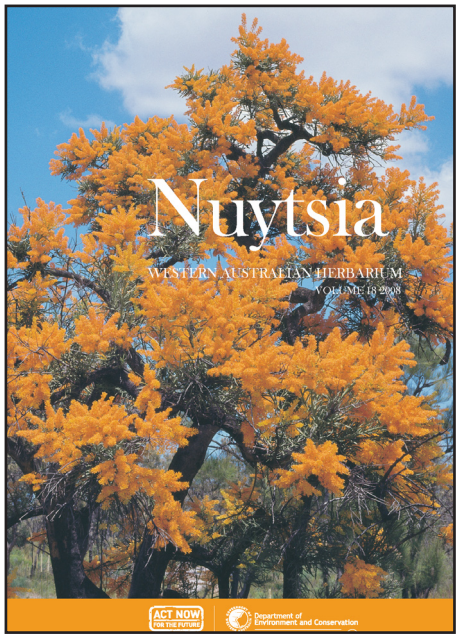
Nuytsia

WESTERN AUSTRALIA'S JOURNAL OF SYSTEMATIC BOTANY

ISSN 0085–4417



Butcher, R. *Platytheca anasima* (Elaeocarpaceae) a new, geographically restricted species from the Whicher Range, south-west Western Australia

Nuytsia 18: 31–37 (2008)

All enquiries and manuscripts should be directed to:

The Managing Editor – *NUYTSIA*
Western Australian Herbarium
Dept of Environment and Conservation
Locked Bag 104 Bentley Delivery Centre
Western Australia 6983
AUSTRALIA

Telephone: +61 8 9334 0500
Facsimile: +61 8 9334 0515
Email: nuytsia@dec.wa.gov.au
Web: science.dec.wa.gov.au/nuytsia

ACT NOW FOR THE FUTURE | Department of Environment and Conservation
Our environment, our future

Platytheca anasima (Elaeocarpaceae) a new, geographically restricted species from the Whicher Range, south-west Western Australia

Ryonen Butcher

Western Australian Herbarium, Department of Environment and Conservation,
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983

Abstract

Butcher, R. *Platytheca anasima* (Elaeocarpaceae) a new, geographically restricted species from the Whicher Range, south-west Western Australia. *Nuytsia* 18: 31–37 (2008). *Platytheca anasima* R.Butcher is described as a new species restricted to the Whicher Range of south-west Western Australia and distinguished from other *Platytheca* taxa. A distribution map and images of the new species are provided.

Introduction

Platytheca Steetz is a south-west Western Australian endemic genus with two currently described species: *P. galioides* Steetz and *P. juniperina* Domin. The genus was previously included, along with *Tetratheca* Sm. and *Tremandra* R.Br. ex DC., in Tremandraceae, but molecular cladistic analyses (Bradford & Barnes 2001; Crayn *et al.* 2006) now recognise this southern Australian endemic family as a well supported clade nested within Elaeocarpaceae.

Of the two currently recognised species, *P. juniperina* is restricted to quartzitic or granitic slopes in the southern part of the State and is morphologically consistent across its range. By contrast, *P. galioides* is widespread in a range of habitats across the south-west and displays considerable variation in number of leaves per whorl, leaf length and width, and in the indumentum of stems, leaves, pedicels and calyx segments. These parts may be glabrous or densely hispidulous throughout, or have various combinations of simple and glandular hairs. Some forms of *P. galioides* have been formally recognised at various taxonomic ranks in the past, but these names have all been synonymised under *P. galioides* (Joy Thompson *in sched.*; Chapman 1991).

Flora surveys of the Whicher Range, conducted between 1995 and 2006 by the Wildflower Society of Western Australia and the Department of Environment and Conservation (DEC), have led to two additional phrase-named taxa being recognised, namely *Platytheca* sp. Argyle (G.J. & B.J. Keighery 281) and *P.* sp. Sabina (G.J. & B.J. Keighery 295) (Western Australian Herbarium 1998–). Each of these taxa has more characters in common with *P. galioides* than with *P. juniperina*. While *P.* sp. Argyle (G.J. & B.J. Keighery 281) can be easily distinguished by a consistent suite of morphological characters, *P.* sp. Sabina (G.J. & B.J. Keighery 295) is closely allied to some collections of the morphologically variable *P. galioides* and is still under taxonomic review.

Platytheca sp. Argyle (G.J. & B.J. Keighery 281) is described herein as the new species *P. anasima* R.Butcher, prior to the taxonomic resolution of *P.* sp. Sabina (G.J. & B.J. Keighery 295), as it is potentially threatened by mineral sands mining activities and its formal description will help assist its conservation management.

Methods

All specimens of *Platytheca* at MEL and PERTH were examined, including types of *P. crassifolia* Steetz (=*P. galioides*), *P. crucianella* Steetz (=*P. galioides*) and *P. galioides*. Herbarium acronyms follow Holmgren and Holmgren (1998–) except CFR. which refers to the Central Forests Region regional herbarium in Bunbury, Western Australia. Stem width and foliage measurements were taken from both herbarium specimens and material preserved in 70% ethanol. Where values differed under different treatments, this has been noted. Floral measurements were taken from rehydrated flowers and material preserved in 70% ethanol.

The term strigillose is used here to describe the indumentum on the ovary and fruit of *P. anasima* and is used as a diminutive form of strigose, defined by Radford *et al.* (1974: 140) as 'covered with sharp, coarse, bent trichomes usually with a bulbous base'. Hewson (1988: 19) recommends against the inclusion of swollen hair bases in the definition (accepted here) and defines strigose as 'covered with appressed, rigid, bristle-like, straight trichomes'. The minute hairs on the ovary of *P. anasima* are more similar to those in the first definition, however, being bent above a bulbous base, then appressed to the ovary surface.

The distribution map was prepared using DIVA-GIS freeware Version 5.0.2.0. (http://www.diva-gis.org), from PERTH specimen data, and shows *Interim Biogeographical Regionalisation for Australia (IBRA) Version 6.1* boundaries (Department of the Environment, Water, Heritage and the Arts 2008).

Taxonomy

Platytheca anasima R.Butcher, *sp. nov.*

Ab speciebus aliis omnibus turma sequenti characteorum distinguitar: caulibus verticillibus 5-8-foliatis; foliis latis (0.7–4.3 mm), obovatis, conduplicatis, apiculatis; pedicellis pilis glanduligeris fasciculatis; ovario strigoso abbreviato.

Typus: south-east of Capel, Western Australia [precise locality withheld for conservation reasons], 7 November 2007, *R. Butcher & J.A. Wege* RB 1247 (*holo*: PERTH 07719787; *iso*: CANB, HO, K, MEL, NSW).

Platytheca sp. Argyle (G.J. & B.J. Keighery 281), Western Australian Herbarium, in *FloraBase*. http://florabase.dec.wa.gov.au [accessed March 2008].

Sprawling to *erect shrub*, 0.5–1.5 m high, 0.6–1.0 m wide. *Stems* alternately branched, rarely opposite, slender, terete, straight, apices indeterminate, yellowish green infused with pink to pinkish brown when young, orange-brown when mature, with a transparent to very pale grey,

thin, flaky bark, not glaucous, smooth or rugulose when dry, longitudinally ridged below expanded nodes, internodes glabrous or hispid (often on the same branch). *Leaves* 5–8-whorled, persistent, ±horizontal becoming strongly declinate; petiole articulate, compressed with thickened midvein on abaxial surface, 0.2–0.55 mm long, yellow-green aging to tan-brown, glabrous but surrounded by a ring of long, simple hairs encircling the node; blade narrowly to broadly obovate, flat to abaxially conduplicate, 1.3–10.4 mm long, 0.7–4.3 mm wide at maturity; apex rounded to truncate, with a stiff, acutely triangular, up-turned apiculus (0.25–0.5 mm long); base attenuate; margins entire, ±flat to shortly revolute, with openly spaced, short, tubercle-based simple hairs; adaxial surface mid-green, glabrous or with scattered short, tubercle-based simple hairs or tubercular remnants, not glaucous, smooth to slightly wrinkled; abaxial surface very pale, dull, light green, glabrous; main veins usually distinct on both surfaces. *Flowers* single in leaf axils; 1 or 2(3) per flower-bearing whorl. *Bracts* absent. *Pedicels* bulbous at base, straight then curved in upper third or just below receptacle, 17.5–29.5 mm long, 0.15–0.25 mm wide, pale yellow-green infused with pink to pink-red, darker towards apex, glabrous except for a cluster of long (0.5–1.1 mm long) red-tipped, glandular hairs in the lower half, not glaucous, tapering and gently fluted to ridged in the upper part into a receptacle 1.2–1.6 mm wide. *Calyx* segments 5, inserted at edge or just inside receptacle rim, deciduous after anthesis, lanceolate, 7.1–10.1 mm long, 1.9–2.5 mm wide, reflexing strongly during anthesis; apex acuminate; margins ±flat, slightly thickened; outer surface pale green to pale pink when fresh, drying purple, glabrous; inner surface with yellow area at base, bearing a few simple hairs at apex and short, thick, glistening villi just inside margins. *Petals* 5, deciduous, broadly obovate with narrowed base to ±obcuneate, 11–13 mm long, 8–13 mm wide with the widest point in the upper third; apex broadly rounded to sub-truncate with an acute triangular projection (0.6–0.9 mm long) from centre, blue or purple with a magenta flare at base above a distinct yellow spot. *Stamens* 10, in 2 dimorphic, alternating whorls, all free; *outer stamens* opposite petals, shorter than inner stamens, 5.3–7.1 mm long; filaments flattened, 0.25–0.5 mm long, yellowish pink, glabrous; anther body compressed, gently arcuate, 2.0–2.7 mm long, dark red, dorsal surface papillose, margins and upper half of ventral surface bearing simple hairs and large tubercles (with or without an apical hair); tube narrow, geniculate near base, 3.1–4.1 mm long, yellow, bearing simple hairs and large tubercles (with or without an apical hair) in lower two-thirds; *inner stamens* 6.3–7.9 mm long; filaments thickened, wedge-shaped, 0.05–0.3 mm long, yellowish pink; anther body compressed but with a thicker ridge along mid-line, very gently arcuate, 2.3–3.3 mm long, red; margins and upper third of ventral surface bearing simple hairs and large tubercles (with or without an apical hair); tube very narrow, ±straight, 3.5–4.5 mm long, yellow, with simple hairs and large tubercles (with or without an apical hair) in lower half. *Ovary* elliptic in outline, thickened and fleshy along outer margins of locules with a thickened ridge along the septum (appearing ±4-lobed in TS), 1.4–1.7 mm long, 1.2–1.6 mm wide, cream-pink to tan, densely strigillose, glabrous internally; *style* kinked at base then straight, 4.9–5.2 mm long, yellow-pink, strigillose or strigose for up to half its length; expanding abruptly into a simple *stigma* at apex; *ovules* 2, 1 in each locule, attached near the apex of the septum by a small but distinct placenta. *Fruit* a loculicidal and tardily septicidal capsule, ovate to ±circular in outline, compressed dorsiventrally, 4.4–6.5 mm long, 4.0–5.2 mm wide, light brown, strigillose. *Seed* ovoid, planoconvex, 3.4–4.0 mm long, 2.4–2.5 mm wide, obtuse to rounded proximally, flattened to convex distally, light brown; testa with a thin membranous coat and large, inflated simple hairs, these with rounded apices lacking a filiform extension.(Figure 1)

Specimens examined. WESTERN AUSTRALIA: [localities withheld for conservation reasons]1 Nov. 2005, *E.M. Bennett & D. Brearley* HV 10-7 (PERTH 07331568); 1 Nov. 2005, *E.M. Bennett & D. Brearley s.n.* (PERTH 07331576); 7 Nov. 2007, *R. Butcher & J.A. Wege* RB 1248 (AD, BRI, PERTH 07719795); 22 Oct. 1997, *R. Davis* 4407 (PERTH 04926552); 17 Nov. 2005, *S.A. Fisher* BNC 733 (CFR., PERTH 07318170); 21 Oct. 2004, *G.J. & B.J. Keighery* 281 (PERTH 06985556); 282 (PERTH 06972926); 283 (PERTH 06985548); 284 (PERTH 06985513); 11 Dec. 2005, *G.J. & B.J. Keighery* 714 (PERTH 07325754).

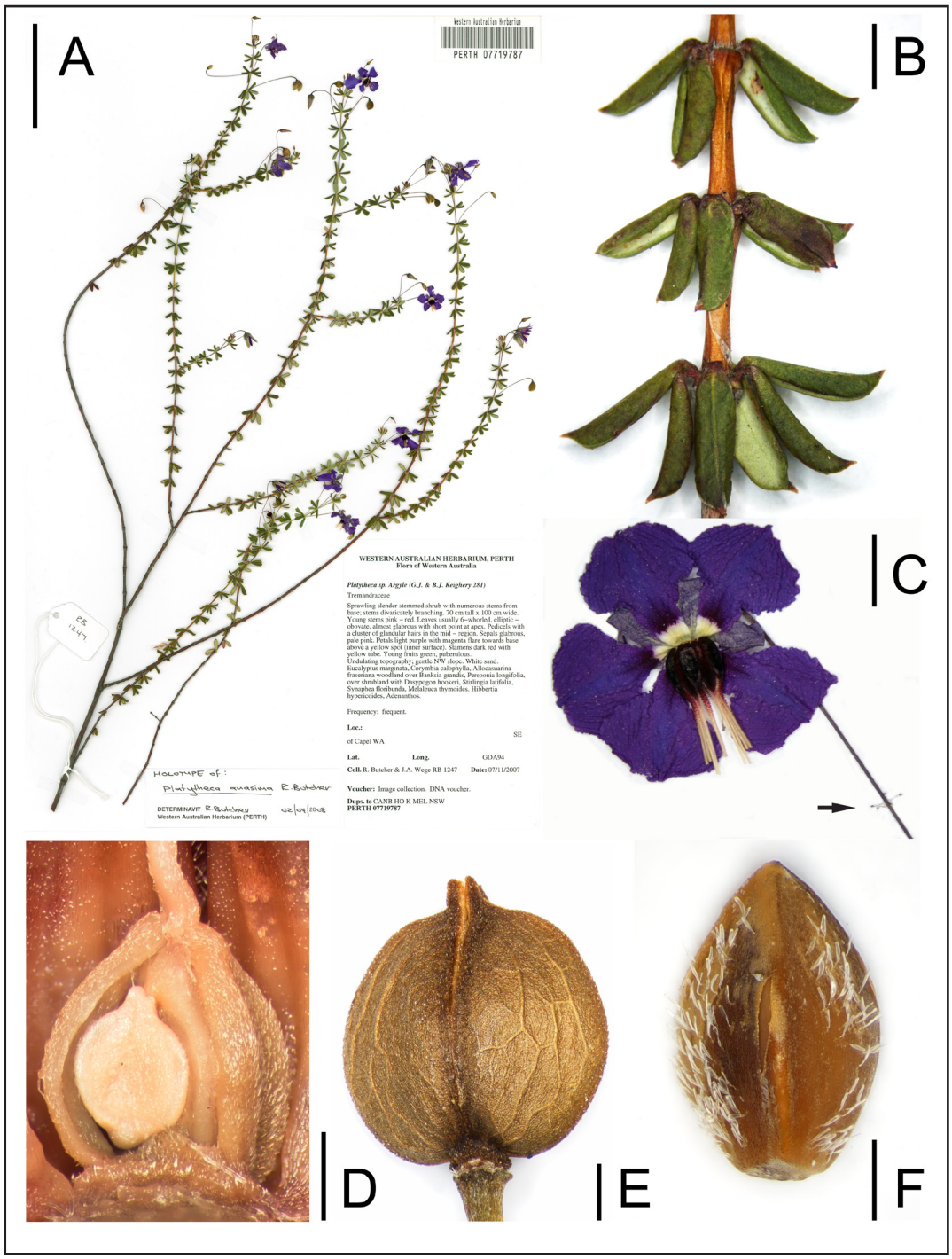


Figure 1. *Platytheca anasima*. A – holotype (*R. Butcher & J.A. Wege* RB 1247); B – abaxially conduplicate, discolorous, 6-whorled leaves showing stiff apiculus; C – pressed flower showing yellow spot at the base of the petals, stamen morphology and cluster of glandular hairs on the pedicel (arrowed); D – rehydrated, dissected ovary with strigillose indumentum, showing fleshy septum and single ovule per locule; E – fruit showing strigillose indumentum; F – dorsal surface of seed showing inflated hairs which lack a filiform terminal extension. Scale bar = 5 cm (A); 5 mm (C); 1 mm (B, E, F); 0.5 mm (D). Images B–F from *G.J. & B.J. Keighery* 281 (PERTH).

Phenology. Buds, flowers and fruits seen together on specimens collected from mid-October to mid-December.

Distribution and habitat. *Platytheca anasima* has been collected from State Forest *c.* 15 km east-south-east of Capel (Figure 2). It grows on gentle slopes of white-grey sand or brown sandy loam in mixed *Eucalyptus marginata*, *Corymbia haematoxylon*, *C. calophylla* and *Allocasuarina fraseriana* low woodland over *Banksia grandis*, *Kingia australis*, *Persoonia longifolia* and *Xylomelum occidentale*. Associated shrub species include *Acacia lateriticola*, *Dasypogon hookeri*, *Banksia dallanneyi*, *Hibbertia hypericoides*, *Isopogon sphaerocephalus*, *Kunzea recurva*, *Melaleuca thymoides*, *Pericalymma ellipticum*, *Stirlingia latifolia*, *Synaphea floribunda* and *Xanthorrhoea preissii*.

Conservation status. Listed as Priority Two under DEC Conservation Codes for Western Australian Flora, as *P.* sp. Argyle (G.J. & B.J. Keighery 281) (Atkins 2008). *Platytheca anasima* is currently known from only three areas within 10 km^2 across two Forest Blocks. Potential threats include sand mining activities and *Phytophthora cinnamoni* disease risk.

Etymology. From the Greek *anasimos* (with turned-up nose), in reference to the broad leaf apex with its up-turned apiculus.

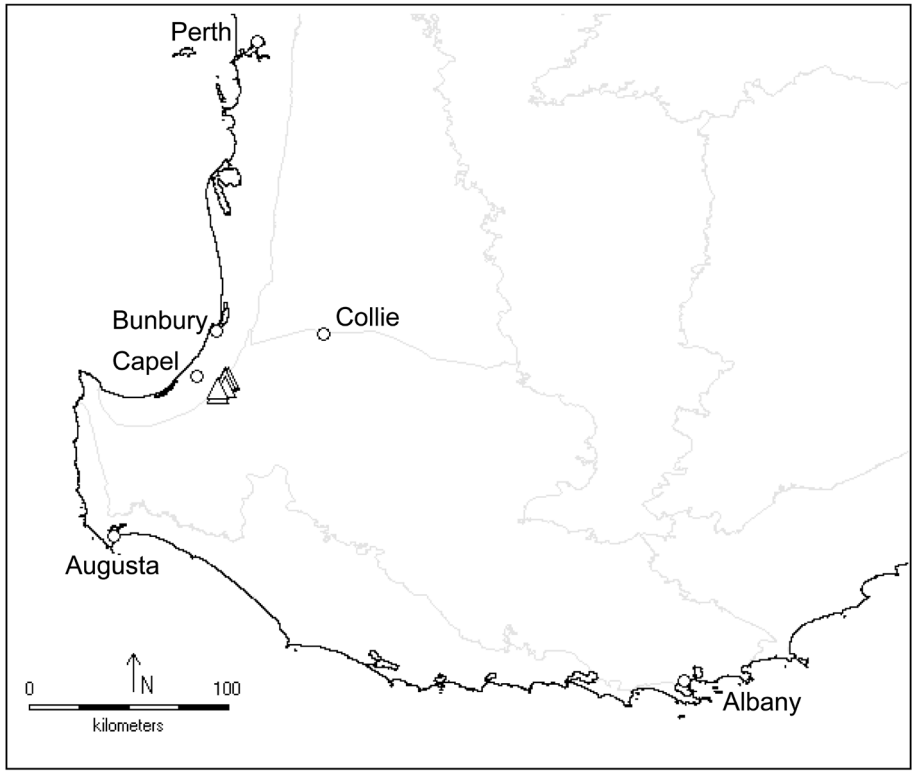


Figure 2. Distribution of *Platytheca anasima* (△) in south-west Western Australia.

Affinities. *Platytheca anasima* can be distinguished from all other *Platytheca* species by the following combination of characters: 5–8-whorled, obovate, ±flat to abaxially conduplicate leaves, which have a small but distinct, stiff, up-turned apiculus, a cluster of long, glandular hairs in the lower half of the otherwise glabrous pedicel, and strigillose indumentum on the ovary (and therefore the fruit).

Platytheca juniperina is similarly distinctive in its stiff, ±linear, glabrous, pungent leaves, which have strongly revolute margins (±triangular in TS), broad, distinctly fluted receptacles, and ±glabrous ovary (and therefore the fruit; both may have a few simple and/or short glandular hairs at the apex).

By comparison, leaf shape in *P. galioides* varies from linear with very strongly revolute margins (±terete to ±triangular in TS), to elliptic or obovate, especially on lower parts of the plant. The latter leaf shapes are characteristic of *P.* sp. Sabina (G.J. & B.J. Keighery 295). While the apex of the leaf may be incurved in *P. galioides*, both these taxa lack the stiff, up-turned apiculus characteristic of *P. anasima*. *Platytheca galioides* and *P.* sp. Sabina (G.J. & B.J. Keighery 295) may also possess glandular hairs on the pedicel, but these are usually intermixed with simple, hispid hairs when present, and are not found in the distinct cluster seen in *P. anasima*. Similarly, these taxa have a longer, denser ovary indumentum than *P. anasima*, and may also have short glandular hairs mixed with the simple hairs.

Notes. The seeds of *P. juniperina* and *P. galioides* have both inflated and slender hairs (Boesewinkel 1999, Figures 31–34 and Downing *et al.* 2008, Figure 3j, k, respectively) with most inflated hairs terminating in a slender, hair-like projection. *Platytheca anasima* seeds apparently have inflated hairs only, and these lack a filiform, terminal extension (Figure 1F). Further observation of seeds of all taxa is needed, however, to assess whether this character is diagnostic or whether it varies with seed maturity.

Platytheca galioides has been collected with (e.g. *G.J. & B.J. Keighery* 715; PERTH) and in close proximity to (e.g. *R. Butcher & J.A. Wege* RB 1249; PERTH) *P. anasima*.

Acknowledgements

Thanks are due to Greg and Bronwen Keighery, and members of the Wildflower Society of Western Australia, for their organisation of, and participation in, the Whicher Range Survey. Kelly Shepherd and an anonymous reviewer are thanked for their comments towards the improvement of this manuscript, Juliet Wege for field assistance and Paul Wilson for nomenclatural discussion and correction of the Latin. Additional thanks are due to David Cantrill for permission to access specimens at MEL, and to Catherine Gallagher, Wayne Gebert and Pina Milne for their assistance during my visit. This research was funded by a grant to DEC Science Division from Ministerial funds for Swan Bioplan: a new conservation plan for the Swan Coastal Plain and adjacent escarpments.

References

Atkins, K.A. (2008). *Declared Rare and Priority Flora List for Western Australia*. (Department of Environment and Conservation: Perth.)

Boesewinkel, F.D. (1999). Ovules and seeds of Tremandraceae. *Australian Journal of Botany* 47: 769–781.

Bradford, J.C. & Barnes, R.W. (2001). Phylogenetics and classification of Cunoniaceae (Oxalidales) using chloroplast DNA sequences and morphology. *Systematic Botany* 26: 354–385.

Chapman, A.D. (1991). *Australian plant name index. K–P*. (Australian Government Publishing Service: Canberra.)

Crayn, D.M., Rossetto, M. & Maynard, D.M. (2006). Molecular phylogeny and dating reveals an Oligo-Miocene radiation of dry-adapted shrubs (Tremandraceae) from rainforest tree progenitors (Elaeocarpaceae) in Australia. *American Journal of Botany* 93(9): 1328–1342.

Department of the Environment, Water, Heritage and the Arts (2008). *Interim Biogeographic Regionalisation for Australia (IBRA), Version 6.1*. http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/index.html [accessed 2 April 2008]

Downing, T.L., Ladiges, P.Y. & Duretto, M.F. (2008). Trichome morphology provides phylogenetically informative characters for *Tremandra*, *Platytheca* and *Tetratheca* (former Tremandraceae). *Plant Systematics and Evolution* 266: 199–221.

Hewson, H.J. (1988). *Plant Indumentum*: *a handbook of terminology*. Australian Flora and Fauna Series Number 9. (Australian Government Publishing Service: Canberra.)

Holmgren, P.K. & Holmgren, N.H. (1998–). *Index Herbariorum: a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium*. http://sweetgumnybg.org/ih/ [accessed 2 April 2008]

Radford, A.E., Dickison, W.C., Massey, J.R. & Bell, C.R. (1974). *Vascular plant systematics*. (Harper & Row: New York.)

Western Australian Herbarium (1998–). *FloraBase – The Western Australian Flora*. Department of Environment and Conservation. http://florabase.dec.wa.gov.au/ [accessed 2 April 2008]