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Reinstatement of *Antidesma dallachyanum* (Phyllanthaceae) as a distinct species in Australia

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Abstract

Antidesma dallachyanum is recognised as endemic to Australia and morphologically distinct from *A. bunius*, which occurs in Malesia. The taxonomic history of *A. dallachyanum* is discussed and its typification resolved. The species is described and illustrated with a distribution map provided. An identification key to *Antidesma* species in Australia is provided.

Keywords: taxonomy; identification keys; bushfood; ethnobotany; Queensland

Introduction

Antidesma L. (Phyllanthaceae, tribe *Antidesmateae* Benth.) was described by Linnaeus (1753) with one species *A. alexiteria* L. native to India. The genus is composed of *c*. 155 species of dioecious subshrubs, shrubs and trees from the tropics of Africa, Asia, northern Australia and various Oceanic Islands (Hoffmann 2005; GBIF 2024). Several species are also cultivated in different parts of the world for edible fruits and leaves and other cultural uses (Islam *et al*. 2018; Nguyen-Ngoc *et al*. 2024; Puangpronpitag *et al*. 2008). Molecular data using multiple genes have provided strong support for placement of *Antidesma* within Phyllanthaceae where it formed a well-supported clade within the tribe Antidesmateae (Wurdack *et al*. 2004). Earlier, morphology based classifications had instead treated the genus either as a member of a broadly circumscribed Euphorbiaceae (Bentham 1873) or as a segregated monogeneric family, Stilaginaceae (Airy Shaw 1980). Both treatments predate the APG II (2003) classification, under which many genera formerly assigned to Euphorbiaceae were reallocated among the segregate families now recognised, including Phyllanthaceae;

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the broad circumscription of Euphorbiaceae has nonetheless persisted in some regional treatments (Chayamarit & van Welzen 2005; van Welzen & Chayamarit 2007). The putatively close relationship between *Antidesma* and other members of tribe Antidesmateae such as *Thecacoris* A.Juss., indicated by Bentham (1873), has been supported by molecular analysis using a combination of plastid and nuclear markers (Kathriarachchi *et al*. 2005).

To date, five species of *Antidesma* have been accepted as native to Australia, namely *A. bunius* (L.) Spreng., *A. ghaesembilla* Gaertn., *A. parvifolium* F.Muell., *A. erostre* F.Muell. ex Benth. and *A. hylandii* Airy Shaw (Airy Shaw 1980; CHAH 2026). These occur in tropical northern Australia, from Western Australia across to the Northern Territory and Queensland. In Queensland, *Antidesma* species occur from the Torres Strait islands to Mackay. The different species grow in a variety of habitats ranging from wet closed forests (rainforests) to seasonally dry closed forests (vine thickets) and woodlands.

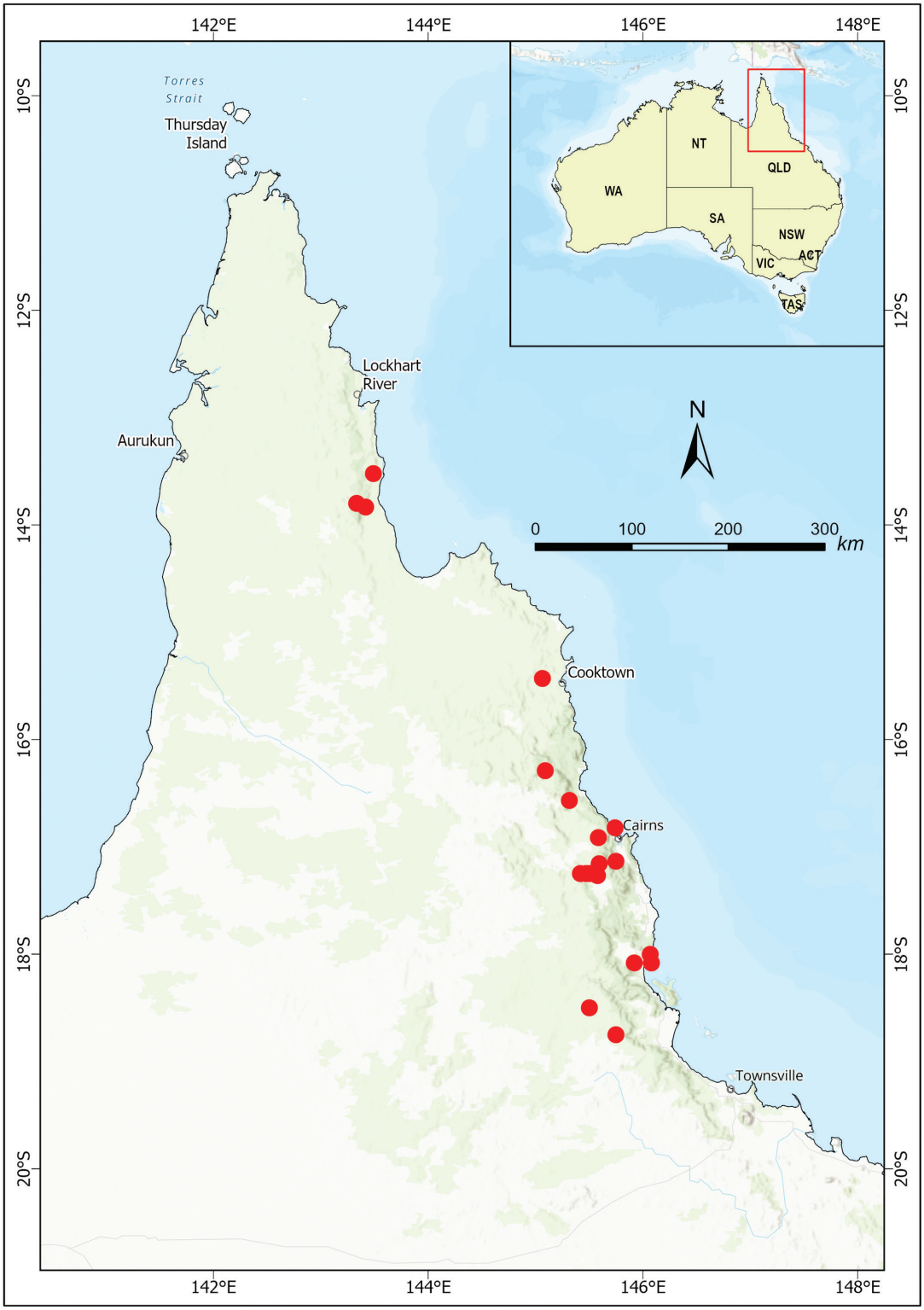
In April 2024, a review of bushfoods native to north Queensland and known among Indigenous communities was undertaken in collaboration with the Traditional Owners, with written permission granted by the Watsonville Aboriginal Corporation. This review resulted in the identification of several species of *Antidesma* growing in the Traditional Owners' countries and nearby areas. One of these species reminded the first author of an Australian native tree labelled as *Antidesma bunius* (L.) Spreng. growing at the Brisbane Botanic Gardens that was clearly distinct from those grown in Asia yet still referred to under the same epithet. In May 2024, botanical artist Marcelle Stirling alerted the first author of another cultivated tree growing in the Brisbane area which was originally bought in 2011 from Yuruga Native Nursery in Tolga, north Queensland, as *A. bunius*. Following examination of herbarium specimens collected from Australia and Malesia held at the Queensland Herbarium, it was determined that the native Australian material referred to as *A. bunius* is distinct from the Asian *A. bunius*. The Australian material was previously described as *A. dallachyanum* Baill., however, it was later synonymised by Airy Shaw (1980) with *A. bunius*.

Antidesma dallachyanum was based on an herbarium collection made by John Dallachy in 1864 from "Rockhampton, Dalrymph Cape". This locality description actually refers to two different and widely separated localities, but is correctly ascribed to Dalrymple Gap near Rockingham Bay, Queensland. The name was subsequently recognised as applying to an endemic Australian species by numerous authors (Bentham 1873; Mueller 1882; Bailey 1913; Domin 1927; Hyland 1971; Chippendale 1972; Williams 1980) until Airy Shaw (1980) reduced it to a synonym of *A. bunius*. Use of the name *A. dallachyanum* for Australian material declined thereafter (Dunlop 1987), with most accounts referring to *A. bunius* (Hyland 1982; Hyland & Whiffin 1993; Hyland et al. 2003; Cooper & Cooper 2004; Forster & Halford 2017; CHAH 2026), and Robson (1993) listing both names. In contrast, Hoffmann (2005, 2006) did not recognise *A. bunius* as occurring in Australia, mentioning that "the Australian *A. dallachyanum* has been treated as a synonym of *A. bunius* by Airy Shaw in 1980 but their fruits however are 10–18 × 6–10 mm in size, and subsessile whereas the fruits of *A. bunius* are smaller". Despite this conclusion, the Australian material has continued to be referred to *A. bunius*, either as *A. bunius* var. *bunius* in CHAH (2026), or simply as *A. bunius* at the Queensland Herbarium.

Following a review of historical publications and critical examinations of herbarium specimens, reinstatement of *A. dallachyanum* as a distinct species is here proposed based on morphological characters.

Methods

This study is based on a morphological examination of herbarium collections held at the Queensland Herbarium (BRI), Royal Botanic Gardens, Kew, U.K. (K), Naturalis Biodiversity Center, Leiden, the Netherlands (L) together with digitised specimen images of collections from the Australian Tropical Herbarium (CNS) and the National Herbarium of Victoria (MEL; herbarium acronyms per *Index Herbariorum* 2026) accessed via JSTOR Global Plants (2026) and via Australasian Virtual Herbarium (AVH 2026). Fertile specimens chosen for measurements were collected around the same season in Queensland to ensure consistency of flowering patterns. The measurements of perianth, stamens and style are based on dried material reconstituted with hot water, while all other measurements were made from dried materials or spirit collections using a ruler



Map 1. Distribution of *Antidesma dallachyanum* in Queensland, Australia.

or microscope eyepiece graticule. Stereomicroscopy (SMZ25 Stereo Microscope, Nikon, Japan) was used to visualise the flower, ovary, indumentum, stipules, leaf domatia, position of seeds, and seed coat thickness. The distribution map (Map 1) was compiled from localities and/or geocode information provided on the labels of specimens at BRI, CNS and MEL and mapped using ArcGIS Pro from Esri Inc (USA).

Written permission was granted by the Watsonville Aboriginal Corporation to conduct this bushfoods research, particularly propagation and plant/fruit chemistry analysis for the Traditional Owners' potential bushfood industry.

Taxonomic history

1767 – Description of *Stilago bunius* Linnaeus

The name *Stilago bunius* was published in 1767 by Linnaeus (1767) and largely based on the account of *Bunius sativus* in the *Herbarium Amboinense* by Rumphius (Merrill 1917). The illustration from *Herbarium Amboinense* (Rumphius 1750) became the lectotype of *S. bunius* designated by Airy Shaw (1980). This image depicts material with elliptical leaves and elliptical fruits (Fig. 1) and is distinct from the Australian material previously referred to this name. *Stilago bunius* was transferred to *Antidesma* by Sprengel (1824).

1873 – Bentham's classification (Bentham 1873)

Bentham identified one of Dallachy's collections from 'Rockingham Bay' as *Antidesma bunius* and another as *A. dallachyanum*. He distinguished the two species in his key, based on the presence of hairs on the flowers: *A. bunius* perfectly glabrous and *A. dallachyanum* with ovary pubescent or hirsute. All Australian specimens examined in this review have an ovary that is sparsely pubescent or hirsute.

1980 – Airy Shaw's synonymisation (Airy Shaw 1980)

Airy Shaw (1980) synonymised *Antidesma dallachyanum* under *A. bunius*, citing that both were collected by Dallachy from Rockingham Bay.

2005 – Hoffmann's observations (Hoffmann 2005, 2006)

Hoffmann described the leaves of *Antidesma bunius* as lacking domatia; in contrast, Australian material previously referred to this name have hairy leaf



Figure 1. *Antidesma bunius* lectotype image taken from Rumphius, G.E. (1750), *Herbarium Amboinense*. Courtesy of the Missouri Botanical Garden Library

domatia on the abaxial leaf surface, including the type material for *A. dallachyanum* (Fig. 2). Specimens from the Philippines confirmed as *A. bunius* (BRI AQ82975, AQ82960) lack domatiA. Hoffmann did not recognise *A. bunius* as occurring in Australia (Hoffmann 2005, 2006), and distinguished *A. dallachyanum* by its larger, subsessile fruits (10–18 × 6–10 mm) in size, relative to the smaller fruits of *A. bunius*.

Taxonomy

Antidesma dallachyanum Baill., *Adansonia* 6: 337 (1866)

***Type*:** Australia. Queensland: [North Kennedy District:] Dalrymple Gap, 1 Feb. 1864, *J. Dallachy s.n.* (lectotype, here designated: MEL 515922!).

Antidesma dallachyi F.Muell., *Fragm.* 6(47): 183 (1868), *orth. var.* (CHAH 2026).



Figure 2. *Antidesma dallachyanum* showing a) leaf domatia and b) obtuse leaf apex. a from *Winter s.n.* (AQ227285) (BRI); b from *Champion MRBG224* (AQ749877) (BRI). Scale bar = 1 mm.

Antidesma sinuatum Benth., *Fl. Austral.* 6:87 (1873). **Type:** [Queensland. Cook District:] Saltwater Creek [Meunga Creek], Rockingham Bay, Jan. 1863, *J. Dallachy 33* (lecto: MEL 515944!, fide Forster & Halford 2017: 163; isolecto: MEL 515943!).

Tree or shrub 3–20 m tall, evergreen. Stem fluted to 30 cm diameter, greyish or flesh-yellow, bark finely and shallowly fissured, soft and fibrous to flaky; young branches with lenticels. Stipules triangulate, recurved. Leaves*:* alternate; petioles 3–12 mm long; lamina oblong to elliptic, 5–20 × 3–7 cm, base mostly obtuse or rounded, sometimes acute, margins entire or weakly to strongly sinuate, apex mostly obtuse-acuminate or cuneate or rounded or acute or mucronate, secondary veins up to 12; leaf domatia abaxial, in the axils of the secondary veins, hairy or sparsely hairy, surfaces dark green to light green, secondary veins distinct, tertiary and higher order veins reticulate. Staminate inflorescences in spikes; flowers *c.* 2 mm long, sessile, sparsely pubescent; calyx cupular, 3–5 lobed; disc of 2–5 hairy lobes surrounding the filament bases; stamens 2–5, exserted, inserted among the disc lobes; anthers with 2 thecae widely separated by a broad, arched connective, the thecae globose and divergent; pistillode present, central, sterile, ± dome-shaped, hairy. Pistillate inflorescences axillary to terminal, racemose; flowers 4–4.5 mm long, green; pedicels mostly 1.2–2 mm long, sparsely pubescent; calyx cupular; ovary obovoid or globose, sparsely pubescent to hairy; style subterminal, short; stigmas 3–5, hyaline. Fruit a drupe, globose, 12–15(–20) × 13–15 mm, immature green to red, turning black-purple on maturity. Seeds usually 1, rarely 2, elliptic to globose, light brown, *c.* 7 × 5 mm. (Figs. 2–7).

Recognition. *Antidesma dallachyanum* differs from *A. bunius* in having hairy leaf domatia in midvein axils (*vs* absent in *A. bunius*); leaf base obtuse or rounded (*vs* mostly acute, acuminate); ovary obovoid, sparsely pubescent (*vs* ellipsoid, glabrous or rarely sparsely hairy); fruit globose, 12–15(–20) mm long, subsessile, flesh adherent to seed (*vs* ellipsoid, 7–11 mm long, pedicellate, flesh easily separating from seed). See Table 1 and Notes.

Distribution. Australia: *Antidesma dallachyanum* occurs in north-eastern Queensland from Cape York Peninsula down to the Cardwell-Ingham area of the Wet Tropics (Map 1).

Specimens examined. **AUSTRALIA. QUEENSLAND.** Cook District: Rocky River, Sept. 1971, *Hyland* 5442 (CNS); Leo Creek and Nesbit River confluence, Silver Plains, July 1997, *Forster* PIF21303 *et al.* (BRI); TR 14, Massy Creek catchment, Sept. 1973, *Hyland* 6864A (BRI, CNS); State Forest 144 Mt Windsor Tableland, Nov. 1999, *Forster* PIF25196 *& Booth* (BRI, CNS); Churchill Creek, near Mt Lewis, Oct. 1991, *Cooper & Cooper* 35 (CNS); Kuranda, Oct. 1940, *Gordon* 7024 (BRI); S end of Esplanade, Yorkeys Knob, April 1987, *Lyons* 42 (BRI); Alumbah Pocket, Peterson Creek,

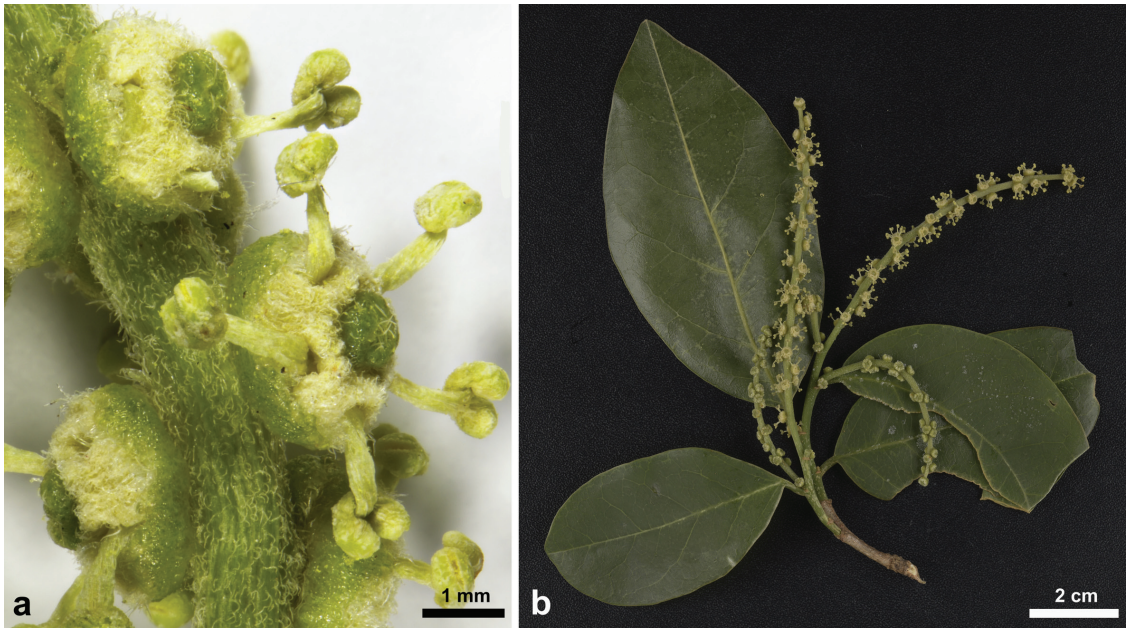


Figure 3. Staminate flowers of *Antidesma dallachyanum* showing a) anther, sessile flowers, hairy lobed disc; b) showing spike inflorescence All photos from Ngugi LBN606 (AQ1064612) (BRI). Scale bars = 1 mm (a), 2 cm (b).

Yungaburra, April 2013, *McDonald* KRM14131 *& Guymer* (BRI); Downfall Creek Road near Tinaroo Dam, June 1962, *Webb & Tracey* 5816 (BRI); Danbulla, Aug. 1948, *Smith* 3787 (BRI, CANB, L, K, A, BISH); Mulgrave River, 4 km SSW of Gordonvale, June 2003, *Forster* PIF29401 *& Jensen* (BRI, MEL, NSW); SFR 194, Sylvia LA, Aug. 1972, *Irvine* 336 (CNS); Halloran's Hill, Atherton, Sept. 1978, *Hyland* 3917RFK (BRI, CNS, NE); *ibid*., Jan. 1979, *Dockrill* 1569 (BRI, CNS); *ibid*., Jan. 1979, *Dockrill* 1570 (BRI, CNS). North Kennedy District: Herbert River, s.dat., *Bailey s.n.* (BRI [AQ0082983]); Near Tully River mouth, May 1963, *MacDonald s.n.* (BRI [AQ001648]); Near margin of Fan Palm Swamp, near Barretts Lagoon, E of Euramo, March 1966, *Smith* 13071 (BRI).

Habitat. *Antidesma dallachyanum* occurs sporadically (never abundant when encountered) in wetter rainforests (notophyll to mesophyll vineforests) and gallery forests from near sea level to 900 m elevation on a variety of substrates ranging from metamorphics to volcanics (basalts and granites). Flowers July–Dec.; fruits Feb.–Oct.

Conservation status. Not Evaluated (NE). *Antidesma dallachyanum* is endemic to Queensland, where it is known from Cape York Peninsula to the Cardwell-Ingham area and occurs at low density in rainforest

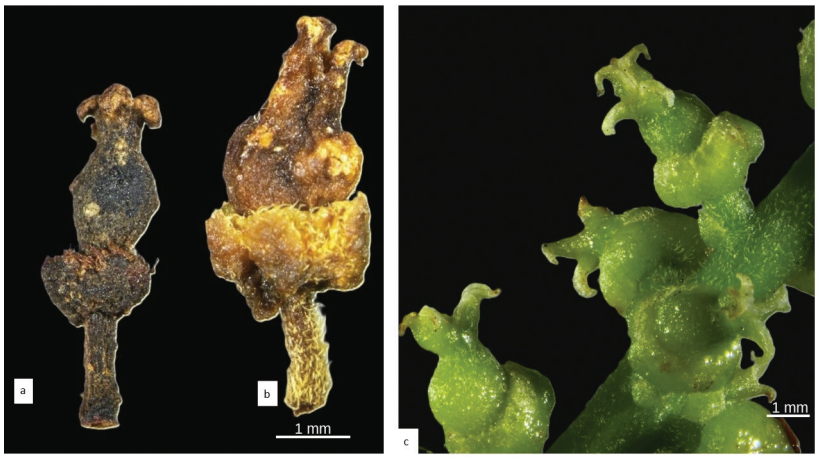


Figure 4. Pistillate flowers: a) *Antidesma bunius* showing ellipsoid ovary and terminal style; b & c) *A. dallachyanum* showing globose ovary and slightly lateral style. a from *Celestino 2099-1* (AQ82971) (BRI); b from *Dockrill 1569* (AQ874361) (BRI); c from *Ngugi* s.n. (AQ1051785) (BRI). Scale bar = 1 mm.



Figure 5. Unripe fruits of *Antidesma dallachyanum*, showing light green colour. Plant photographed, originally from Rex Range (Photo courtesy of Garry Sankowsky), collection *Ngugi LBN600* (AQ1061324).

and gallery forest. As it has until now been treated as a synonym of *A. bunius*, it has not been considered in state and national threatened species assessments, and it has not been assessed against the IUCN Red List Categories and Criteria (IUCN 2012). A formal assessment is recommended.

Notes. *Antidesma dallachyanum* is morphologically distinct from *A. bunius* in multiple characters (Table 1) with the most useful field characters being the leaf apex mostly obtuse-acuminate and presence of hairy leaf domatia.

The potential of these plants for their fruit created keen interest, with Dallachy returning to multiple locations for material, one of his collections at MEL bears the annotation "this is the tree that the jam was made from" (Table 2), indicating experimentation with the fruit's use in preserves. There are numerous collections attributed to Dallachy at MEL and one at K that are *Antidesma dallachyanum* (Table 2). Two primary localities were visited: Dalrymple Gap (type locality for *A. dallachyanum*) where plants have non-wavy leaf margins and purple fruit on maturity; and Saltwater

Table 1. Morphological differences between *Antidesma dallachyanum* and *A. bunius*.

	Antidesma dallachyanum	***Antidesma bunius***
Leaf domatia	Hair-tufts present in midvein axils (Fig. 2)	Absent
Leaf base	Obtuse or rounded	Mostly acute, acuminate
Leaf apex	Mostly obtuse-acuminate, sometimes truncate (Fig. 2)	Mostly acute, acuminate
Staminate flower	4–5 stamens, sessile (Fig. 3)	3–4 stamens, rarely 5; pedicellate
Pistillate flower	Ovary obovoid, sparsely short-pubescent; style attached slightly lateral (Fig. 4)	Ovary ellipsoid, glabrous rarely with sparse hairs; style mostly terminal
Fruit	Globose, 12–15(–20) mm long, subsessile; flesh adheres to endocarp (Fig. 6)	Ellipsoid, 7–11 mm long, pedicellate; flesh easily separates from seed
Seed shape	Globose, 7 × 5 mm	Ellipsoid, 6.0 × 3.3 mm (Crieta *et al.* 2022)

Key to *Antidesma* in Australia

1. Leaf lamina always less than 30 mm long, obovate, base cuneate, apex rounded or truncate; always a shrub ..... ***A. parvifolium***
— Leaf lamina more than 30 mm long, obovoid to elliptic, rarely apex emarginate; tree or shrub 2
2. Disc in staminate or pistillate flowers densely hairy; leaf lamina mostly elliptic, discolorous; style attached laterally ... ***A. hylandii***
— Disc in staminate or pistillate flowers hairy to sparsely hairy; leaf lamina mostly obovoid, abaxial surface light green; style slightly lateral or terminal 3
3. Leaf apex mostly acute acuminate, or obtuse; fruit elliptic, *c.* 11 mm long ..... ***A. erostre***
— Leaf apex obtusely acuminate, rounded or cuneate; fruits globose 4-15 mm long 4
4. Leaf apex mostly obtuse-acuminate, sometimes acute or rounded; stipule triangulate, recurved; secondary veins up to 12; fruit up to 15 mm diameter; habitat closed or margins of rainforests or vineforests ..... ***A. dallachyanum***
— Leaf apex mostly rounded or sometimes emarginate, sometimes obtusely acuminate; stipules straight; secondary veins 7–8; fruit up to 5 mm diameter; habitat open areas, widespread ..... ***A. ghaesembilla***



Figure 6. *Antidesma dallachyanum* showing globose fruits. Plant photographed at Rex Range, Queensland (photo: Garry Sankowsky).

Creek [later Meunga Creek, type locality for *A. sinuatum*] where plants had sinuate leaf margins and white fruit on maturity.

Typification

Baillon in his account (1866) of this species stated "EXS. *Dallachy* (1864), Rockhampton, Dalrymple Cape (herb. *F. Muell*!).". Airy Shaw (1980: 693) stated for the type of the name "Q., Rockhampton, 'Dalrymple Cape', 1864, *Dallachy* (P, MEL)". In the intervening 45 years, specimens with this precise wording have not been located; however, the sheet MEL 515922 is undoubtedly the material viewed by Baillon due to multiple points of evidence: (1) the sheet has an original flimsy in Dallachy's hand stating "Dalrymples Gap…1st February 1864"; (2) the sheet is annotated "*Antidesma dallachyanum* Baill.!"; (3) Baillon (1866) provided a detailed description especially of the flowers which are present on the specimen.



Figure 7. *Antidesma dallachyanum* showing flower bud spikes. Plant photographed originally from Rex Range (photo: Garry Sankowsky). Collection *Ngugi LBN600* (AQ1061324).

While the MEL sheet has been labelled as an isotype, the accumulated evidence indicates it is the specimen studied by Baillon. In the absence of any other extant material with equivalent evidence, and to fix the application of the name, we designate MEL 515922 as the lectotype of *Antidesma dallachyanum* Baill. (lectotype, designated here.)

Ethnobotanical Notes

Bailey (1913) listed common names Herbert River Cherry, Je-jo, and Top-kie for *Antidesma dallachyanum* together with a fruit illustration; here we propose the informal name Roobyberry, reflecting its distinctiveness from the Asian *A. bunius* and ruby fruit colour. Ethnobotanical uses for edible fruit are consistent with those reported for other *Antidesma* species in the region (Islam *et al*. 2018; Nguyen-Ngoc *et al*. 2024).

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Table 2. Collections of *Antidesma dallachyanum* made by J. Dallachy and held at K and MEL (from online examination of the former, and *in situ* and online examination of the latter). FM = F. Mueller, Botanical Museum of Melbourne.

Collection details	Date of collection	Locality	Notes
K 000061633	s.dat.; ex FM in 1872	Rockingham's Bay	Cited by Bentham (1873: 85–86). Flowers and fruit.
K 000061640	s.dat.; ex Herb. F. Mueller 1872	Rockingham's Bay	Fruit.
MEL 0250874A	June 1865	Sea View Range. Rockingham's Bay	Fruit. "Small thin black fruit."
MEL 0250877A	5 April 1865	Saltwater [=Meunga] Creek	Flowers.
MEL 0250881A	2 March 1865	Salt Water [=Meunga] Creek	Flowers.
MEL 0250882A	s.dat.	Dalrymple Creek	Fruit. "Fruit white."
MEL 0250891A	5 Nov. 1869	Rockingham Bay, Meunga Creek	Flowers.
MEL 0250892A	5 Nov. 1869	Rockingham Bay, Meunga Creek	Flowers.
MEL 0251055A	4 July 1865	Dalrymple Gap	Fruit. "Fine red fruit".
MEL 0251056A	7 April 1865	Dalrymple Gap	Fruit. "White fruit"
MEL 0251063A	12 June 1864	Dalrymple Gap	Fruit. "small bunches of black fruit when ripe."
MEL 0251072	17 Nov. 1867	Dalrymple Gap	Fruit. "The fruit is black when ripe; some of them are as large as small cherries."
MEL 0251073A	s.dat.	Sea View Range	Fruit. "Small bunches of white fruit, the fruit is very acid."
MEL 0515922	1 Feb. 1864	Dalrymple's Gap	Lectotype (designated here) of *Antidesma dallachyanum* Baill. Flowers.
MEL 0515940	s.dat.	Rockingham's Bay	Syntype of *A. sinuatum* Benth. Fruit.
MEL 0515941	s.dat.	Rockingham's Bay	Syntype of *A. sinuatum* Benth. Fruit.
MEL 0515942	25 Jan. 1869	Meunga Creek. Rockingham's Bay	Syntype of *A. sinuatum* Benth. Fruit. "This is the tree that the jam is made from…"
MEL 0515943A	9 Jan. 1865	Salt Water [=Meunga] Creek, Rockingham's Bay	Syntype of *A. sinuatum* Benth. Flowers and fruit.
MEL 0515944A	Jan. 1865	Salt Water [=Meunga] Creek/ Rockingham's Bay	Syntype of *A. sinuatum* Benth. Flowers and fruit. Lectotype of *A. sinuatum* Benth. (Forster & Halford 2017).

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