

Rhodamnia angustifolia (Myrtaceae), a new and endangered species from south-eastern Queensland

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Summary

Snow, Neil & Guymer, Gordon P. (1999). *Austrobaileya* 5(3): 421-426. The new species *Rhodamnia angustifolia* N. Snow & Guymer (Myrtaceae) is described from the Cedar Creek area of the Wietalaba State Forest (583) south of Gladstone and Calliope in south-eastern Queensland. It is easily distinguished from other species of *Rhodamnia* by its narrowly elliptic leaves. The species is known from only nineteen individuals on a single ridgetop and subtending slopes in SF 583. Its recommended conservation status is Endangered under both the *Queensland Nature Conservation Act 1992* and the IUCN Species Survival Commission. The essential oils previously found in the species are discussed briefly.

Keywords: *Rhodamnia angustifolia*, Myrtaceae, Queensland, Australia, conservation, systematics, essential oils.

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Introduction

The genus *Rhodamnia* Jack comprises some thirty arborescent species and ranges from southern China and the Malay peninsula to New Caledonia, and in Australia from eastern Queensland to northern New South Wales (Scott 1979; Guymer & Jessup 1986; Guymer 1988). *Rhodamnia* is represented in Australia by eleven described species and apparently three undescribed species from Cape York Peninsula, Queensland (Guymer in Henderson 1997). In this paper we describe the new species *Rhodamnia angustifolia* N. Snow & Guymer, which is known only from a single ridgetop and subtending slopes in the Wietalaba State Forest (SF 583), about 45 km S of Gladstone in the Port Curtis pastoral district of Queensland (Halford 1998; cited as *Rhodamnia* sp. (Calliope N. Gibson 1335) by Guymer in Henderson 1997: 135).

Materials and Methods

Descriptions are based on herbarium material and from pickled material collected in the field. The list of characters studied follows closely

that of Snow & Guymer (1999). Floral measurements are based on material from the individual tree from which the type specimen was collected, currently the only known flowering specimen. Measurements of the fruit are mostly from the specimen of *J. Brushe* 1186 & *L. Brushe*, also collected from the tree from which the type was collected. In November of 1997, D. Halford and the first author spent four days at Wietalaba State Forest surveying the only known population of *R. angustifolia*. Because of the rarity of the species, all known specimens, including sterile material are cited here (see Snow & Keating 1999).

***Rhodamnia angustifolia* N. Snow & Guymer, sp. nov.** speciebus aliis generis foliis angustis (3–15 mm latis) differt. **Typus:** Australia. Queensland. PORT CURTIS DISTRICT: Wietalaba State Forest, c. 31 km S of Calliope, 24°17'09"S, 151°12'53"E, Australian metric grid reference: 9149 Calliope 188129, 20 Nov 1997, *D. Halford* & *N. Snow* Q3450 (holo: BRI [1 sheet and spirit]; iso: AD, B, BRI, CANB, DNA, GREE, HO, JEPS, K, L, MEL, MEXU, MO, NSW, NE, NY, SING, TEX, UPS, US). (All type duplicates from a single genotype.)

Single- or multi-stemmed erect trees, 4–10 m tall. Bark of main trunk smooth but furrowed and somewhat flaking in small angular patches, greyish. Branches of current year's growth rounded, brownish, smooth, sparsely short sericeous but becoming glabrous; oil glands absent. Stipules of two to several very short (and obscure) ferruginous setose hairs. Leaves opposite, decussate, discolourous, coriaceous, trinerved, mostly narrowly elliptic but occasionally narrowly obovate or falcate, 20–70(–85) mm long, (3–)5–12(–15) mm wide, cuneate at base, obtuse to acute at apex, margins flat; adaxial surface sparsely sericeous becoming glabrous, oil glands scattered to dense but usually invisible to naked eye, midvein impressed; abaxial surface very shortly and densely tomentose, lateral, tertiary and intramarginal veins usually prominent. Petioles 2.5–4.0 mm long, channelled, eglandular. Inflorescence a cluster of 2–7 flowers on short shoots less than 1 mm long in axils of leaves or leaf scars; peduncles rigid, up to 1.5 mm long, shortly sericeous. Bracteoles two, narrowly ovate, not foliaceous, c. 0.5 mm long by 0.3 mm wide, rigid, not exceeding base of sepal lobes, sericeous, caducous in fruit. Hypanthium obconic to urceloate, the tube not extending beyond ovary apex, oil glands sparse to common and visible with magnification, sparsely short sericeous. Sepals 4, distinct in bud, lobes free, 0.3–0.5 mm long, broadly ovate, apex rounded to obtuse, sparsely short sericeous above and below, persistent in fruit, mostly ascending above body of fruit. Petals four, alternate with sepals, yellowish-white, c. 2.5 mm long by 3.0 mm wide, broadly ovate to oblate, apex rounded, glabrous above but margins somewhat ciliate, glabrous below, oil glands sparse but visible with magnification. Stamens 65–75, multiseriate, excluded, folded centrewards in bud; filaments 2–4 mm long, staminal disk glabrous; anthers globose, dorsifixed near base, versatile, 0.5–0.8 mm long, dehiscent via longitudinal slits, with a single apical gland. Ovary 1-locular 1 with 2 parietal placentas; ovules 18–21 and attached irregularly. Style 1, 4.5–5.0 mm long, mostly straight, glabrous, narrowly if at all capitate. Fruit a berry, subglobose to globose, rounded at base, 3–5 mm long by 4–6 mm wide, glabrous or glabrescent, yellowish orange with some red

when fresh but increasingly red upon drying. Seeds 1 or 2(–4), globose to suborbicular to somewhat reniform, smooth, light brown; testa hard and somewhat bony; adjacent seeds not fused. Embryo slightly curved to C-shaped, lacking oil glands; hypocotyl longer than cotyledons, about same diameter as cotyledonary pair, barely swollen near radicle, the tip at same horizontal (= transverse) plane as cotyledons; cotyledons relatively thin (see Landrum and Stevenson 1986), not folded back towards hypocotyl.

Additional specimens examined: Queensland. PORT CURTIS DISTRICT: Wietalaba State Forest, adjacent to the road on ridgetop, Jan 1998 [fruit], *J. Brushe* 1186 & *L. Brushe* (BRI, MEL); Wietalaba SF, c. 31 km S of Calliope, 24°17'05"S, 151°12'49"E, Nov 1997 [bud], *D. Halford* & *N. Snow* Q3456 (BRI); State Forest 583, Wietalaba, 32 km S of Calliope, 24°17'S, 151°12'E, Nov 1993 [sterile], *N. Gibson* 1334 (BRI) and 1335 (BRI); State Forest 583, Wietalaba, 32 km S of Calliope, 24°17'S, 151°12'E, Apr 1994 [sterile], *N. Gibson* 1336 (BRI); State Forest 583, Wietalaba, 24°18'S, 151°16'E, May 1993 [sterile], *Gibson* s.n. (BRI AQ 568108); State Forest 583 Wietalaba, 24°17'02"S, 151°12'53"E, Dec 1995 [sterile], *P.I. Forster* PIF18272 *et al.* (BRI, NSW, MEL, QRS); Near headwaters of Cedar Ck, State Forest 583, 24°17'15"S, 151°13'13"E, Jul 1995 [sterile], *E.J. Thompson* CAL355 & *G.P. Turpin* (BRI); Wietalaba SF, c. 31 km S of Calliope, 24°17'12"S, 151°12'51"E, Nov 1997 [sterile], *D. Halford et al.* Q3449 (BRI); Wietalaba SF, c. 31 km S of Calliope, 24°17'18"S, 151°12'44"E, Nov 1997 [sterile], *D. Halford et al.* Q3446 (BRI); Wietalaba SF, c. 31 km S of Calliope, 24°17'36"S, 151°13'05"E, Nov 1997 [sterile], *D. Halford* & *N. Snow* Q3452 (BRI).

Distribution: *Rhodamnia angustifolia* occurs at the head of Cedar Creek along a single ridgetop and subtending slopes in the Wietalaba State Forest (SF 583), c. 45 km south of Gladstone and c. 30 km S of Calliope.

Habitat: The species grows in full sun or in a closed canopy of microphyll vineforest with *Choricarpa subargentea* (C.T.White) L.A.S.Johnson, *Barklya syringifolia* F.Muell., *Archidendropsis thozetiana* (F.Muell.) I.C.Nielsen, *Backhousia kingii* Guyer, *Sterculia quadrifida* R.Br., and *Araucaria cunninghamii* Aiton ex D. Don as the dominant tree species. The substrate is reddish or brown loam from mudstones of Muncon volcanics. The elevation range is approximately 200 to 600 metres.

Flowering period: Flowering material is known only from the type specimen, collected in November, but given the apparently good condition of abundant young bud material on Halford & Snow Q3456, flowering almost certainly extends into December.

Fruiting period: Confirmed only for January by a single specimen, Brushe 1186 & Brushe, but likely to begin as early as late November or early December.

Essential oils: Brophy et al. (1997) have studied profiles of essential oils in *Rhodamnia*. These authors (op. cit.) report that within the genus, at nearly 1% of total mass, *R. angustifolia* has one of the highest oil yields. Both mono- and sesquiterpenes are produced, and oils showing significant levels include the monoterpenes α -pinene, α -thujene, myrcene, limonene, β -phellandrene, *p*-cymene, and termpinen-4-ol. The principal sesquiterpenes include β -caryophyllene, humulene, caryophyllene oxide, globulol, and spathulenol. Five unnamed oxygenated sesquiterpenes with the general formula $C_{15}H_{24}O$ were present in amounts ranging from 0.2–16%. Sesquiterpenes of this general formula are also found in *Rhodamnia maideniana* C.T.White, which occurs from the Moreton District in Queensland southward to New South Wales (Henderson 1997).

Notes: With its shortly and densely tomentose (“hoary”) lower leaf surfaces and sparse to dense oil glands in the leaves, *Rhodamnia angustifolia* shows affinities with *R. dunicola* Guymer & Jessup, *R. whiteana* Guymer & Jessup, and *R. costata* A.J. Scott (as amended by Guymer & Jessup 1986), and it will key with these species in Guymer and Jessup (1986). However, its narrowly elliptic leaves immediately distinguish it from these species. Its closest relative may be *R. dunicola*, given similar features of the leaves and bark, the fascicled flowers occurring on very short shoots, and the relatively high number of ovules. Its leaf glands, however, generally can be seen only in bright transmitted light.

The tree from which the holotype specimen of *Rhodamnia angustifolia* was collected was growing on an open, disturbed

ridgetop, but most individuals were found on adjacent lower midslopes with a southwest or easterly aspect (Halford 1998). We found individuals occurring singly or in groups of three to six plants.

Several plants had suckers at or near the base, and regrowth was occurring from the base of one small, apparently dead tree trunk (Halford et al. Q3446). One specimen (*D. Halford & N. Snow* Q3456) growing near the edge of the forest at the ridgetop had a very dense crown, but the foliage on other specimens was more open. The juvenile foliage (Halford & Snow Q3446) has somewhat longer leaves.

Embryos were absent in most of the ten mature fruits examined. The larvae of an undetermined insect (c. 2 mm long) was seen enveloped completely within an undamaged and apparently mature seed, suggesting the insect was present before the outer testal layer of the seed solidified during ontogeny. An obvious question that could be examined in conservation studies is whether insect predation on the fruit, seed, or embryo is preventing successful sexual reproduction of *Rhodamnia angustifolia*.

The abundant flowers on the “type” tree at the time of collection in November had a faint but sweet fragrance. Bees, presumably the Italian honeybee *Apis mellifera*, were observed pollinating flowers at that time.

Etymology: The specific epithet *angustifolia*, Latin for narrow and leaf, refers to the narrow leaves, which are the narrowest of all Australian species of *Rhodamnia*.

Conservation status: The extensive fieldwork of D. Halford, N. Snow, P. Forster, and W. McDonald has revealed *Rhodamnia angustifolia* growing in only one general area of approximately 60 hectares (Halford 1998). A total of 19 plants are known in the wild. Seedling recruitment was not observed by Halford and Snow, although three saplings of approximately two metres height were noted by McDonald (pers. comm.). Portions of the area recently have been burned and are heavily infested with *Lantana camara* L., one of the

most invasive and potentially threatening weeds of native vegetation in Queensland (Fensham et al. 1994). The recommended conservation status for *Rhodamnia angustifolia* is Endangered, as defined by both the *Queensland Nature Conservation Act 1992* and the IUCN Species Survival Commission (1994). Other areas worthy of detailed searches for this species are the vineforest communities in the Kalpower area and the western slopes of KroombitTops (Halford, 1998).

Preserved material for genetic studies.

Adequate leaf material of *R. angustifolia* is available from all known collections for the purposes of DNA extraction. Each collection number of Halford & Snow or Halford et al. cited herein represents a separate genotype (Snow 1997, Appendix A). A molecular survey of *Rhodamnia angustifolia*, such as that undertaken for some species of *Austromyrtus* (e.g., Shapcott and Playford 1996), would help to assess genetic diversity of this endangered species.

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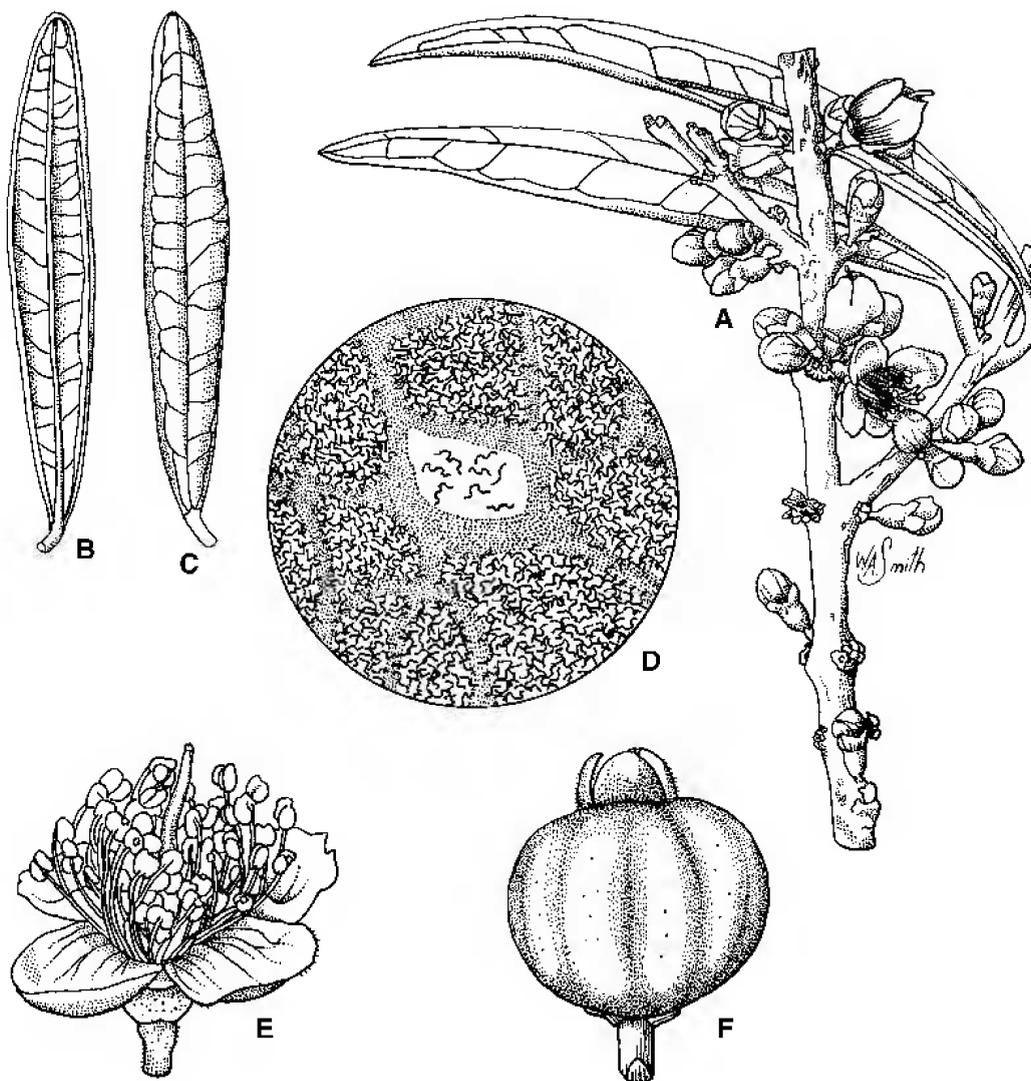


Fig. 1. Details from holotype of *Rhodammia angustifolia* A. Portion of flowering branch x 2. B. Abaxial view of leaf x 2. C. Adaxial view of leaf x 2. D. Detail of abaxial leaf surface showing dense covering of short, white, tomentose hairs x 50. E. Flower x 6. F. Fruit x 6. All drawn from Halford & Snow Q3450.



Fig. 2. Main trunk of *Rhodamnia angustifolia* at breast height (Halford & Snow Q3456) showing smooth, slightly fissured, grey bark (Photo N. Snow).