Rhodamnia zombi I.J.Paxton, Fensham & Guymer (Myrtaceae), a new species of rainforest tree from south-east Queensland

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Summary

Paxton, I.J., Fensham, R.J. & Guymer, G.P. (2025). Rhodamnia zombi I.J.Paxton, Fensham & Guymer (Myrtaceae), a new species of rainforest tree from south-east Queensland. Austrobaileya 15: 42–51. Rhodamnia zombi I.J.Paxton, Fensham & Guymer is described from the south-east Queensland biogeographic region. It shares characters with R. pauciovulata Guymer, which is restricted to the Central Queensland Coast biogeographic region. Rhodamnia zombi and R. pauciovulata are the only species of Rhodamnia with a mixture of tomentose and villous indumentum on the abaxial leaf lamina. Rhodamnia zombi differs from R. pauciovulata by having a denser sericeous indumentum on the hypanthium and peduncle and the presence of domatia on the abaxial leaf lamina. Rhodamnia zombi has a small discrete geographic range and is restricted to semi-deciduous notophyll vine forest usually with Araucaria cunninghamii Mudie (hoop pine). The species is severely impacted by myrtle rust and given the damage to new growth and the lack of seedlings the species may not survive beyond the current generation. The populations are 'living dead', hence the species epithet.

Key Words: Myrtaceae; Rhodamnia; Rhodamnia pauciovulata; Rhodamnia zombi; flora of Australia; flora of Queensland; new species; taxonomy; identification key; myrtle rust

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Introduction

Rhodamnia Jack is a genus belonging to the mostly pantropical family Myrtaceae, and consists of 41 species from the South Pacific, New Guinea, China, Indo-China and in northeastern and eastern Australia where 19 species occur (Snow 2007; Vasconcelos et al. 2017; Kew 2024). Rhodamnia species are all trees or shrubs with rough, textured, fissured or even papery bark; brochidodromous or acrodromous venation; generally with 4-merous flowers with free petals and free sepals which are persistent in the fruit; parietal placentation; small and berry like fruits with a bony testa and few seeds (Snow 2007; Wilson 2011).

The most important diagnostic feature used to delineate Australian species of *Rhodamnia* is the type and density of indumentum on the abaxial and adaxial leaf surfaces (Snow 2007). Five indumentum types are recognised.

- 1. Glabrescent: possessing little to no indumentum cover resulting in a smooth glossy feel and appearance to leaves.
- 2. Stellate: with branching hairs that radiate from a central point giving a star like appearance.
- 3. Hoary: possessing dense short hairs referred to as tomentose, sometimes with distinct kinks, which may be confined between lateral veins resulting in a 'frosty' appearance.
- 4. Pearly: having dense sericeous hairs resulting in a lustrous appearance to the abaxial surface.
- 5. Villous: characterised by longer more erect hairs.

The presence or combination of these indumentum types and whether they appear on the adaxial or abaxial surface is sufficient to delineate most species (Snow 2007).

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Unlike most other baccate genera of Myrtaceae, many *Rhodamnia* have acrodromous venation, a character that within Australia is only shared with some members of *Rhodomyrtus* (DC) Rchb. (Snow 2007; Vasconcelos *et al.* 2017). Common names include malletwood, due to the high density of the wood and turpentine owing to the scent exuded from oil dots on the leaves, stems and reproductive structures of many *Rhodamnia* species (Snow 2007).

The current paper provides a taxonomic description of the new species *Rhodamnia zombi* and presents morphological and geographical differences from other previously described species. The distribution of the species and association with rainforest is also assessed in the current study.

Materials and methods

Morphological description

Description was undertaken by making observations of twenty-six specimens held at the Queensland Herbarium (BRI). All specimens were inspected to confirm consistent characters and as such were all the same species. In particular, the abundance and location of indumentum on the abaxial and adaxial leaf surfaces was inspected. Both qualitative (e.g. villous, tomentose) and quantitative (e.g. sparse, dense) descriptions of indumentum are characterised by Snow (2007) and in particular the micrographs and illustrations therein. Specimens determined to be *Rhodamnia zombi* were then compared to specimens of other Australian Rhodamnia to identify similarities and differences. The species demonstrating the most similarities were examined in depth. Two morphological differences from the most similar species were used to delineate a new species according to Snow (2007) and the same criterion was adopted here. The 'Phylogenetic Species Concept' was employed due to its focus on morphological characters as indicators of species (Wheeler & Platnick 2000). Once the specimens had been confirmed to meet these thresholds, measurements and observations of specimens were undertaken. A species description was developed following the format of a previous study of *Rhodamnia* (Snow 2007) with other characters of importance selected from the description of *R. pauciovulata* (Guymer 1988). Field observations of plants determined to be *R. zombi* provided information for the description including height and habit. The species phenology was derived by reviewing the presence or absences of reproductive structures on specimens held at the Queensland Herbarium identified as *R. zombi* and cross referencing this with the collection date.

Common abbreviations used in the specimen citations include LA (Logging Area), NP (National Park) and SF (State Forest). Descriptive measurements are inclusive, i.e. 1.6–3.0 is given as 1.6–3.

Survey for extent of occurrence and habitat

Field surveys were conducted in November and December of 2023 and April of 2024 to confirm historical records (AVH 2024), to search for new populations within and up to 50 km from the geographic range as it was known from collecting locations in 2023, and to assess the habitat association of the species following the procedures of Keith (2000). Aspect, elevation, topography, land zone and regional ecosystems were investigated as potential determinants of occurrence. Land zones and regional ecosystems form the basis of ecosystem mapping in Queensland and Regional Ecosystems can be grouped up to represent broad vegetation groups such as rainforest (Neldner et al. 2023; RE 2024) This also allowed for the refinement of locations which were updated on AVH (2025).

Results

The species is morphologically most similar to *Rhodamnia pauciovulata*, although there is a wide disjunction in their distribution. *Rhodamnia zombi* occurs in the south-east Queensland bioregion inland from Gympie and Hervey Bay, and *R. pauciovulata* from the Central Mackay Coast (**Map 1**) (Snow 2007; AVH 2025). *Rhodamnia zombi* is the southern variant of *R. pauciovulata* mentioned by Snow (2007) from specimen NSW 462366 and

additional specimens have been subsequently recognised by one of the authors (G. Guymer) under the informal place-holder name *Rhodamnia* sp. Glastonbury. The species was first collected by S.F. Kajewski from Bauple and Gundiah in the 1920s; however, most collections have been in the 45-year period up to the present.

Distinction from other species

Of the 41 currently described species of Rhodamnia, four were selected for comparison with R. zombi due to their morphological similarities, in particular the presence of villous indumentum along the abaxial vein of the leaf laminae (Table 1). All four species compared share a flaky bark type typical of the genus. Rhodamnia zombi and R. pauciovulata are the only species which possess a mixture of tomentose and villous indumentum on the abaxial leaf laminae. Oil dots are abundant on the adaxial leaf laminae of R. zombi and R. longisepala but are less abundant in the other species. The maximum length of the leaf laminae in R. zombi is up to 10 cm (n=120), which is similar to R. rubescens (Benth.) Mig. (10 cm; n=20) and R. longisepala (8.3 cm, n=24), but distinctly different from R. sessiliflora Benth. (14.5 cm; n=18) and R. pauciovulata (5.3 cm; n=19). A dense sericeous indumentum is found on the hypanthium and peduncle of R. zombi. Whereas some of the species have a sericeous indumentum on the hypanthium and/or peduncle (excluding R. sessiliflora which lacks a peduncle), it is not as dense as that of R. zombi. The calyx lobes are not persistent in the fruit of R. zombi, a trait shared with all of the species examined. The number of ovules per placenta in R. zombi is similar to that of R. sessiliflora (14–18), but the number of ovules per placenta in R. longisepala (2 or 3), R. pauciovulata (4-6) and R. rubescens (35-40) are notably different. The trunks of Rhodamnia zombi and R. rubescens buttress on large individuals but this habit is absent in the other species.

Taxonomy

Rhodamnia zombi I.J.Paxton, Fensham & Guymer, **sp. nov.**

Similar to R. pauciovulata, but differing in its abundance of oil dots on the adaxial leaf lamina (versus occasional to absent oil dots). densely sericeous hypanthium and peduncle (versus sparsely sericeous hypanthium and peduncle), calyx lobes not persistent in fruit (versus persistent in fruit), trunk occasionally buttressing (versus trunk never buttressing), domatia present (versus domatia not present), maximum leaf lamina length 10 cm (versus maximum leaf lamina length 5.3 cm). In addition, R. zombi grows to 15 m tall and R. pauciovulata to 6 m tall only. Type: Queensland. WIDE BAY DISTRICT: Diggings Road, c. 100 m W of Reinke Road, 3.8 km NNW of Glastonbury, 16 October 2011, G.P. Guymer 3753 (holo: BRI [AQ1054058, comprising 2 sheets]; iso: K, MEL, NSW distribuendi).

Erect, spreading, tree-like shrubs or trees, buttressing when mature, 3-15 m tall. Bark papery, flaky, grey-brown. Branchlets smooth, brown to grey, villous (hairs whitish), oil glands present. Stipules setose, 2-7, ferruginous. Petioles 5-9 mm long, green-brown, adaxially slightly channelled. Leaf lamina ovate, elliptic, ovate-lanceolate, 2.5–10 cm long, 1.8–6 cm wide, discolorous, tip acute to acuminate or blunt, base cuneate or rounded, margins flat; prominent lateral veins originating on or slightly above leaf base converging at leaf tip 2-7 mm from margin at midpoint of leaf, intramarginal vein indistinct, 0.5–1 mm from margin at midpoint of leaf, midvein impressed on adaxial surface, lateral primary veins present either side of midrib; adaxially glabrous to sparsely villous (hairs 0.3-0.5 mm long, whitish), abaxially densely short-tomentose-villous (hairs 0.2–0.6 mm long, whitish), tomentose hairs sometimes absent on some leaves while present on others in same individual plant, villous hairs arising from veins (hairs whitish and rarely reddish at base); domatia

Table 1. Character comparison between *Rhodamnia zombi* and the four most similar Australian *Rhodamnia* species based on morphology. Arranged left to right from most alike to least. Shading indicates if a character is similar to that observed in *R. zombi*. The characters selected are observable on live plants or herbarium material, using a hand lens or dissecting microscope.

	R. zombi	R. pauciovulata	R. rubescens	R. longisepala	R. sessiliflora
Bark colour	Grey- brown	Brown, grey or reddish- orange	Brown, orange to brown	Light brown, brown or reddish	Light brown
Tree height	to 15 m	to 6 m	to 15 m	to 5 m	to 8 m
Adaxial oil dots on leaf lamina (>50 µm diame- ter/ mm²)	4–8	1 or 2	2 or 3	4–11	0 or 1
Indumentum on adaxial leaf lamina	Occasional villous	Glabrous to occasional short villous	Glabrous to occasional villous	Sparsely to moderately villous,	Glabrous to sparsely short villous
Indumentum on abaxial leaf lamina	Mixture of tomentose and villous	Mixture of tomentose and villous	Villous	Villous	Sparsely villous-tomentose
Indumentum on hypanthium	Densely sericeous	Sparsely sericeous	Villous	Densely villous	Densely sericeous to densely tomentose
Indumentum on peduncle	Densely sericeous	Sparsely sericeous	Sparsely and shortly sericeous to villous	Densely villous	Peduncles absent
Calyx lobes persistent in fruits	No	Yes	No	No	No
Size of leaf lamina	2.5–10 cm long, 1.8–6 cm wide	(1.5–)2.5–5.3 cm long, 1.8-4 cm wide	(2.5–)3.5–10 cm long, (0.8–)1.5–4 cm wide	3.5–8.6 cm long and 2–4.2 cm wide	5.5–14.5 cm long, 2.2–6.6 cm wide
Buttressing trunk	Yes	No	Yes	No	No
Ovules per placenta	14–20	4–6	35–40	2 or 3	14–18
Domatia	Present	Absent	Absent	Present	Absent

present below at junction of lateral veins and midrib; oil glands abundant from adaxial leaf surface (4–8 glands >50 µm diameter/ mm²). Inflorescence a monad or triad, solitary paired or fascicled in leaf axils. Peduncles rigid, c. 0.8 mm wide, may be highly reduced giving the inflorescence the appearance of being sessile, densely sericeous. Bracts present, caducous. Pedicels ridged, 2-5mm long, c. 0.5 mm wide, densely sericeous. Bracteoles 2, opposite, ascending, midrib absent, tip reaching or slightly extending beyond the base of calyx lobes, narrowly triangular, 1-2 mm long, 0.3-0.5 mm wide, sparsely sericeous to sericeous. Hypanthium cupulate, 1.3–2.5 mm long, densely sericeous, oil glands present but often obscured by hairs. Calyx lobes triangular to broadly ovate, apex obtuse to rounded, ascending, 2–3 mm long, c. 1 mm wide, green, glabrous adaxially, sparsely sericeous to sericeous abaxially, not persistent in fruit. Petals widely elliptic to ovate, 3-4 mm long, 1.8-2.5 mm wide, white to whitish yellow, adaxially glabrous, fimbriate on margins, abaxially glabrous, oil glands sparse. Stamens 45–81; staminal disk glabrous; filaments 1–6 mm long; anther sacs globose to subcylindrical, basifixed, connective apex with a single oil gland, 0.4– 0.6 mm long. Ovary apex shortly hairy; style 3-5 mm long, glabrous; placenta capitate; ovules 14–20 per placenta, borne irregularly. Fruit globose, circular in cross section, base rounded, glabrous to glabrescent, c. 5 mm long, 4-7 mm in diameter, maroon, dark purple to nearly black at maturity. Seed globose to reniform, 1-7, 2.5-4 mm long, brown, equatorial ridge or wing absent. Other features unknown. Fig. 1 & 2.

Additional specimens examined: Queensland. BURNETT DISTRICT: Goodnight Scrub SF 169, Aug 1995, Sparshott KMS587 & Turpin (BRI); Goodnight Scrub NP, 450 m NNW of water tank on One Tree Hill Road, May 2024, Hede DH_030 et al. (BRI); 'Mt Macella', N edge of Round Scrub, Sep 1996, Grimshaw PG2574 & Francis (BRI); Grongah NP, 11 km NNE of Tansey, Mar 2008, Forster PIF33399 (BRI); Headwaters of Reedy Creek (Reedy LA), SF 67 Grongah, Feb 1988, McDonald 4157 (BRI). WIDE BAY DISTRICT: Woowoonga NP, walk to summit, Sep 2020, Halford JJH821 (BRI, MEL, NSW); Woowoonga NP, on Tawah Creek, Mar 2021, Halford JJH1004 (BRI); Lower slopes of Mt Woowoonga, along

Tawah Creek, Jun 2020, Radford-Smith 21 (BRI); Tawah Creek, foothills of Woowoonga Range, Oct 1995, Young 2031 (BRI); Mt Walsh NP, Waterfall Creek-Utopia, Jan 2023, Halford JJH1534 et al. (BRI); Gundiah, Mar 1927, Kajewski s.n. (BRI [AQ44923]); 600 m SSW of Gundiah Gap, May 1998, Olsen s.n. [AQ664185] (BRI); Graphite Mine Road, Mt Bauple, Jan 1994, Forster PIF14626 (BRI); ibid, Dec 1992, Smyrell s.n. (BRI [AQ561555]); Mt Bauple, 27 miles [43.5 km] from Gympie, Dec 1922, Kajewski s.n. (BRI [AQ44922]); At base of Guyra Mt, below Mt Bauple, Feb 1988, Forster PIF3531 et al. (BRI); SF 648, NW base of Boogooramunya, Jan 1989, Forster PIF4906 (BRI); SF 67, just below summit of Mt Boogooramunya, Dec 1995, Grimshaw PG2272 & Price (BRI); 0.5 km S Grassy Mt, c. 5 km SSW of Bauple, Dec 1982, Guymer 1837 & Dillewaard (BRI); Munna Creek, 2 km E of Blowers Road, Aug 2023, Moonie MC001 (BRI); SF 50, 1.5 km N of Mt Urah, Nov 1988, Forster PIF4857 (BRI); Glenbar NP, 8 km NW of Miva, Oct 2011, Forster PIF34916 et al. (BRI); 4 km NE of Gunalda, Repeater Station Road, Nov 2006, Nicholson NJN2658 (BRI); Oakview SF 220, 4.7 km past barracks, Dec 1988, Forster PIF4885 & Bird (BRI); Oakview SF, Kilkivan, Apr 2003, Nicholson NJN724 (BRI); Reinke Road, NNW of Glastonbury, Oct 1993, Bean 6745 (BRI); Glastonbury SF, Apr 2024, Paxton s.n. (BRI [AQ1049083]); Jimmys Scrub SF, SSE Goomeri, Dec 2018, Forster PIF45962 et al. (BRI, MEL).

Distribution and habitat: Seven populations of Rhodamnia zombi were confirmed from historical records and two new populations were located at Mudlo National Park (unvouchered) and Glastonbury State Forest (Maps 1 & 2). Seven historical records were not revisited. The absence of R. zombi was confirmed at one site (-25.799, 151.966) within its known distribution despite the presence of potentially suitable habitat. Additionally, three locations outside the known distribution of potentially suitable habitat were surveyed, and R. zombi was likewise absent (-25.150, 152.777; -26.444, 152.320; -26.066, 151.777). The presence records have a distribution forming a convex polygon of 4901 km² (Map 2). Within this area R. zombi is known from elevations between 140–550 m and is recorded from semi-deciduous notophyll vine forest (Webb et al. 1984), a rainforest type often with hoop pine (Araucaria cunninghamii). It occurs on metamorphosed sediments (land zone 11), granite (land zone 12) and finegrained sediments (land zone 9), within regional ecosystems 12.9-10.16, 12.11.10, 12.11.11, 12.11.12, 12.12.13 and 12.12.16 (RE 2024).



Fig. 1. Rhodamnia zombi. A. Oil glands on adaxial leaf surface (Forster PIF45962 et al., BRI). B. Buttressing trunk (from population of Forster PIF4885 & Bird, BRI). C. Flowers and buds (Guymer 3753, BRI). D. Abaxial lamina indumentum showing a villous and tomentose mixture (Forster PIF45962 et al., BRI). E. Papery bark (Nicholson NJN724, BRI). F. Domatia at base of abaxial leaf surface between lateral vein and midrib, as indicated by yellow arrows (Nicholson NJN2658, BRI). G. Densely sericeous hypanthium and pedicel (Nicholson NJN2658, BRI). H. Immature fruit with calyx lobes abscised (Kajewski s.n., BRI [AQ0044923]). Photos: A: R.J. Fensham; B, D & F-H: I.J. Paxton; C: G.P. Guymer; E: N.J. Nicholson.

Phenology: Flowering October-December; fruiting January through March.

Conservation status: A more detailed assessment of the conservation status of Rhodamnia zombi will be conducted elsewhere. However, the species is severely impacted by myrtle rust (Fensham et al. 2021). Large mature trees killed by the disease are evident in places. Growing tips and developing flowers and fruit are infected by the disease, seedlings have not been observed in the wild and the species seems unable to survive beyond the current generation.

Etymology: The word *zombi* is a noun in apposition and originates from the Haitian-French term used in voodoo culture. The species epithet alludes to the mythical creatures, zombies, for which *R. zombi* shares a similar fate due to the impact of the myrtle

rust disease. Within the context of modern Eurocentric pop-culture, zombies while having the appearance of life, are unable to perform functions associated with such, namely healing and reproduction.

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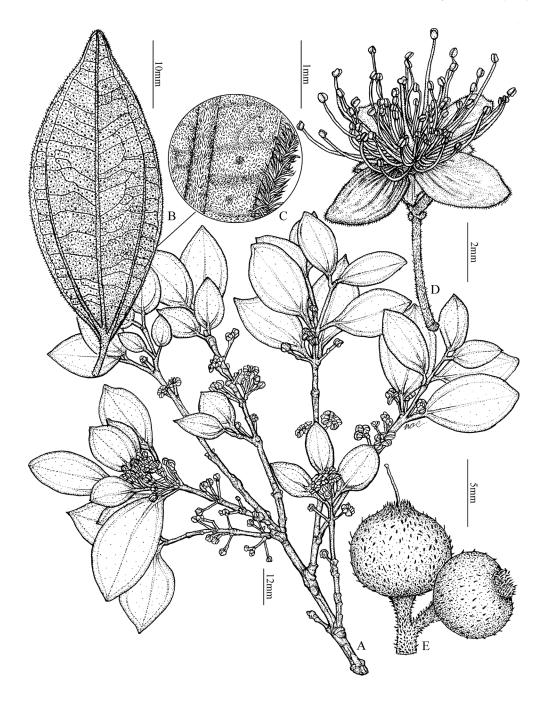


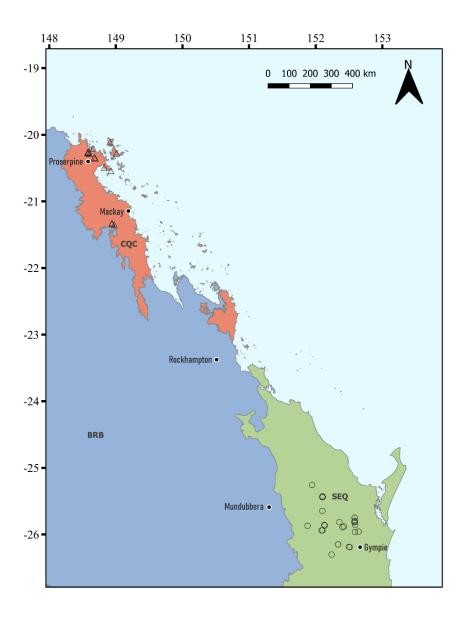
Fig. 2. *Rhodamnia zombi*. A. flowering branchlet. B. leaf abaxial view. C. leaf abaxial view magnified. D. flower. E. fruits. Scale as indicated. A–D from *Guymer 3753* (BRI), E from *Halford JJH1004* (BRI). Del. N. Crosswell.

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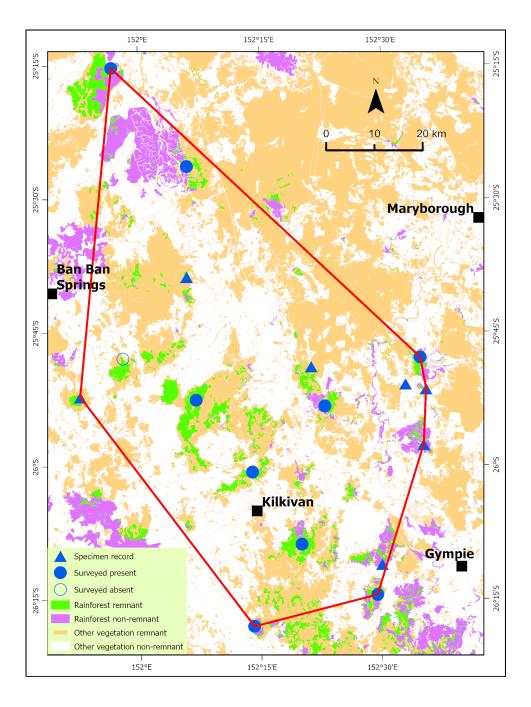
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Map 1. Distribution of *Rhodamnia zombi* \circ and *R. pauciovulata* Δ in relation to the Queensland biogeographic regions (Neldner *et al.* 2023; RE 2024). SEQ, south-east Queensland; BRB, Brigalow Belt; CQC, Central Queensland Coast. Records downloaded from AVH (2025) for mapping purposes.



Map 2. Distribution of *Rhodamnia zombi* in relation to remnant and non-remnant rainforest habitat with a convex polygon around specimen records and records confirmed in the current study.