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TWO NEW SPECIES OF *CYRTANDRA* (GESNERIACEAE) FROM THE BIRD'S TAIL PENINSULA OF PAPUA NEW GUINEA: *CYRTANDRA MOROBENSIS* AND *C. RABARABANA*

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New Guinea is a major centre of species richness for *Cyrtandra* (Gesneriaceae), a megadiverse genus of understorey herbs, yet much of this diversity remains undescribed. Here, two species are newly described from the Bird's Tail Peninsula of Papua New Guinea: *Cyrtandra morobensis* S.Hatt & Bramley and *C. rabarabana* S.Hatt & Bramley. Both are similar to *Cyrtandra menyamyana* S.Hatt & Bramley and provisionally assessed as Threatened. Detailed descriptions and illustrations are provided, as is a table of key morphological characters that separate *Cyrtandra morobensis*, *C. rabarabana* and *C. menyamyana*.

Keywords. Biodiversity, conservation, *Cyrtandra morobensis*, *Cyrtandra rabarabana*, taxonomy, understorey.
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Introduction

Cyrtandra J.R.Forst. & G.Forst. (Gesneriaceae) is a megadiverse genus of c.800 species, distinguished from other genera of Gesneriaceae by having two fertile stamens and indehiscent fruits. Comprising predominantly herbs, epiphytes, shrubs and small trees, *Cyrtandra* are prominent in the rain-forest understorey across tropical Asia and the Pacific (Atkins *et al.*, 2013). Most species are endemic to particular islands or localised regions (Atkins *et al.*, 2021), making many of them likely to be threatened with extinction (Gaston & Fuller, 2009; Pimm *et al.*, 2014). The unwieldy size of the genus also poses significant taxonomic challenges, with many islands across its range still lacking comprehensive study (Atkins *et al.*, 2013), although the process of taxonomic revision in the major centres of diversity (i.e. Sumatra, Borneo and the Philippines) has been initiated through a series of checklists (Olivar *et al.*, 2022; Wang *et al.*, 2022; Atkins *et al.*, 2024). In New Guinea, c.100 species are currently recognised according to the latest checklist (Bramley *et al.*, 2024), with the addition of some recently described species (Bramley *et al.*, 2025; Hatt *et al.*, 2026a, 2026b), although this is most likely an underestimate: it has been c.100 years since the last taxonomic revision (Schlechter, 1923), and the proportion of unidentified specimens in herbarium collections worldwide remains high (GBIF.org, continuously updated). The recent revival of taxonomic activity on New Guinea *Cyrtandra* has led to the publication of 10 new

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species (Atkins *et al.*, 2019; Bramley *et al.*, 2025; Hatt *et al.*, 2026a, 2026b). Ongoing research suggests many more remain to be described.

During preparation for a revision of the red-flowered *Cyrtandra terrae-guilelmi* complex (Hatt *et al.*, 2026a), a new species was identified with a combination of subequal leaf pairs, the major leaf oblanceolate with a crenate margin, the calyx hairy, and the corolla hairy and creamy-white to orange-yellow corolla with lobes in 2 + 3 configuration. This species, *Cyrtandra menyamyana* S.Hatt & Bramley, was subsequently described by Hatt *et al.* (2026b), together with the unrelated species *C. wagauensis* S.Hatt & Bramley. Since then, further examination of herbarium material from New Guinea, the Bismarck Archipelago and the Solomon Islands has identified a further two new species that are morphologically similar to *Cyrtandra menyamyana* but that are distinct in a suite of morphological characters known to have taxonomic significance in the genus (Atkins & Kartonegoro, 2021). Here, we describe and illustrate these two new species and provide a table of key morphological characters that separate all three morphologically similar species.

Materials and methods

All available type specimens were examined to establish the identity of these unidentified collections. Specimens at various herbaria were examined in person (A, B, BISH, BM, BO, CANB, E, K, LAE, LY, MAN, NY, P, SING and WRSL) and/or digitally (BR, CANB, L and US). Herbarium codes follow Index Herbariorum (updated continuously). Measurements were taken from dried material, with flowers dissected after rehydration by soaking in 10% aqueous solution of Aerosol OT 5% solution (Syensqo, Brussels, Belgium). Botanical terminology follows Beentje (2016). Locality information is recorded as written on the herbarium specimen labels. Given the limited available material, floral measurements were taken from flowers that appeared closest to anthesis. However, as *Cyrtandra* flowers are protandrous, filament and style lengths may vary more than indicated in the descriptions. Colour descriptions are based on collectors' notes from specimen labels. We apply a morphological species concept, defining species based on distinct and consistent differences in three or more characters considered taxonomically significant (following McDade, 1995).

Proposed IUCN conservation categories were determined using the *IUCN Red List Categories and Criteria*, version 3.1 (IUCN, 2012) and IUCN guidelines (IUCN Standards and Petitions Committee, 2022). The Extent of Occurrence (EOO) and Area of Occupancy (AOO) were estimated, where possible, using GeoCAT with a 2 km × 2 km grid cell (Bachman *et al.*, 2011). Owing to the limited number of collections from Papua New Guinea, these estimates may be lower than the actual values in some cases, or overestimates where populations at documented sites no longer persist. The distribution map was produced in ArcGIS Pro 3.2 (ESRI, 2023), using coordinate data georeferenced from herbarium specimens.

Taxonomic treatment

Species descriptions

Cyrtandra morobensis S.Hatt & Bramley, **sp. nov.**

This species is most similar to *Cyrtandra menyamyana*, with which it shares subequal leaves and a hairy corolla with more or less equal lobes. It differs from *Cyrtandra menyamyana* by its leaf upper surface mostly glabrous on blade and veins (vs distinctly hairy along midrib and base of primary veins), pedicel 5–14 mm long (vs 1–5 mm long), calyx distinctly thick and completely rigid when dried (vs delicate and paper-like when dry), external surface of corolla densely red-brown hairy, hairs < 0.8 mm long, becoming glabrous at base (vs very densely pale hairy, hairs > 1 mm long, remaining hairy at base), and inflorescence 1(–2)-flowered in axils among leaves or on older leafless stems below leaves (vs 1- to 6-flowered in axils among leaves). – Type: Papua New Guinea, Morobe Province, Wagau, c.1340 m, 6°50'S, 146°50'E, 10 vi 1964, *Millar* NGF 23457 (holotype K [K001515636]; isotypes BISH [BISH24988], BO [BO-1979954], BRI [BRI AQ0221616], E [E00632439, E00632685], L [L.2823425], LAE [LAE98048], SING [SING0202163]). **Figures** 1, 2.

Erect to spreading shrub, 0.5–2 m tall. *Stems* woody, terete, striate, young stems densely dark-brown pilose, older stems becoming glabrous. *Leaves* opposite, those of a pair subequal. *Major leaves*, petiole 9–20(–25) mm long, densely dark-brown pilose; blades lanceolate to lanceolate-oblanceolate, 110–210 × 35–65 mm, base attenuate to cuneate; apex acuminate to acute; margin irregularly serrate-dentate, teeth to 2 mm long; 5–8 pairs of lateral veins, rising gradually from midrib veins terminating at margin, tertiary venation faintly visible, often faintly so, but not prominent; upper surface dark green, mostly glabrous; lower surface pale green, red-brown hairy across blade, more densely so along midrib and veins. *Minor leaves* same as major leaves but c.60–70% smaller. *Inflorescence* sessile, axillary sometimes on older leafless stems below leaves, 1(–2)-flowered. *Bracts* 2, free to base, linear, 2–6 mm long, densely red-brown hairy. *Pedicel* 5–14 mm long, densely red-brown hairy. *Calyx* orange red, tubular-campanulate to campanulate, 9–15 mm long, distinctly thick, completely rigid when dried, exterior densely red-brown hairy, interior glabrous; lobes 5, equal or indistinctly 2-lipped in 2 + 3 configuration with 2 lobes slightly longer than other 3, 3–6 mm long, narrowly triangular-attenuate to acuminate. *Corolla* orange red to greenish yellow, or red with yellowish tinge, tubular, distinctly arcuate, 12–22 mm long; lobes 5, rounded-triangular, not hooded, more or less equal except slightly longer lower lobe; upper and lateral lobes 1–3 × 1–3 mm; lower lobe 2–4 mm long; external surface of corolla densely red-brown hairy, becoming glabrous at base, hairs > 0.8 mm long, pilose, slightly paler than calyx hairs, internal surface glabrous except lobes, which are sparsely glandular-hairy. *Filaments* 5–10 mm long, glabrous, inserted 5–10 mm up

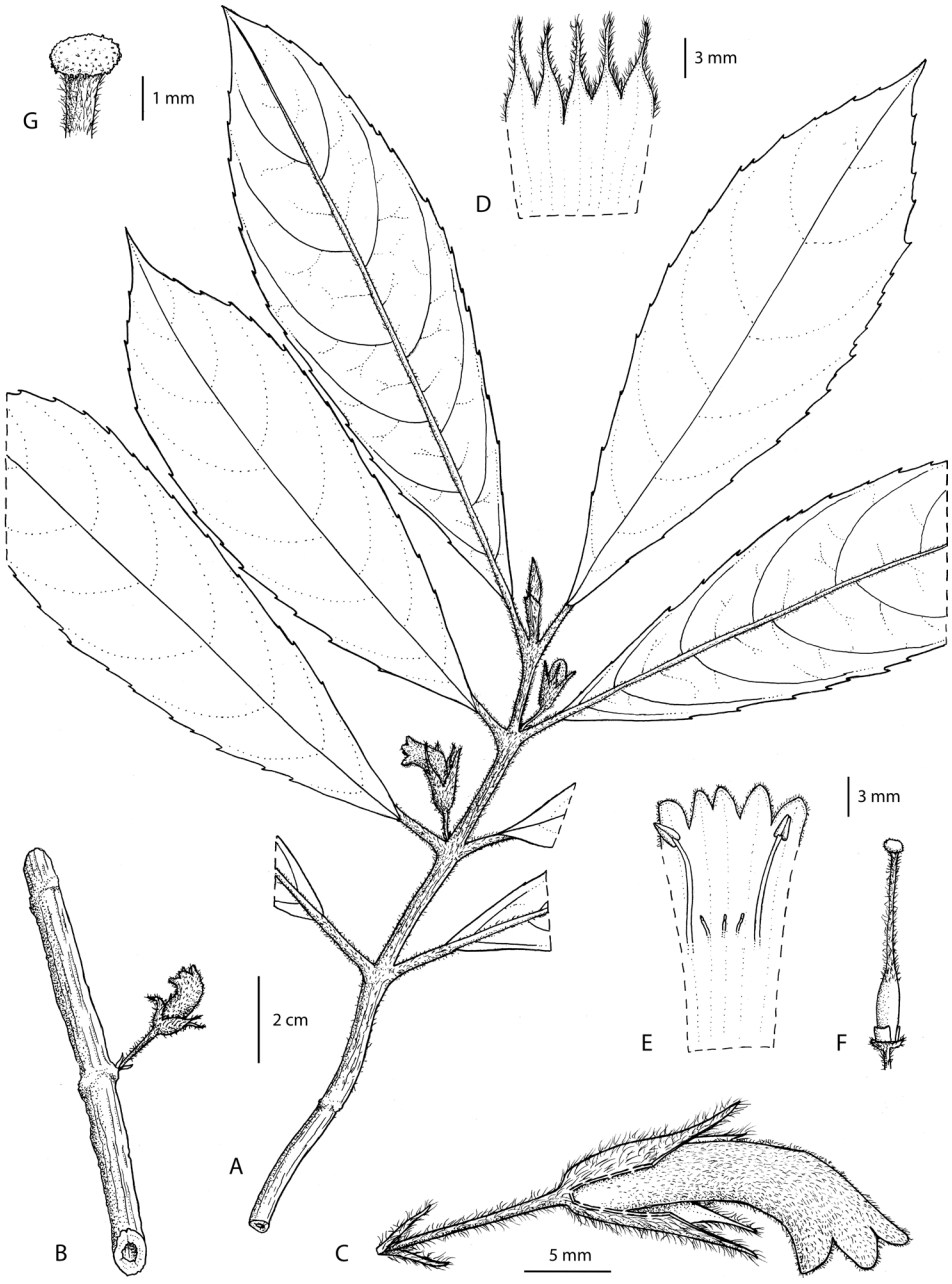

Figure 1. *Cyrtandra morobensis* S.Hatt & Bramley, sp. nov. A, Upper stem with leaves and flowers; B, section of lower stem with flower; C, flower with bracts; D, dissected calyx; E, dissected corolla, showing two stamens and three staminodes; F, gynoecium, showing disc; G, close-up drawing of simple, capitate stigma. All drawn by Sebastian A. Hatt: A and C–G, from *Millar* NGF 23457 (K); B, from *Womersley & Millar* 7884 (K).

Figure 2. Holotype specimens of *Cyrtandra morobensis* (A) and *C. rabarabana* (B). Photographs: A © The Board of Trustees of the Royal Botanic Gardens, Kew; B © Centre for Australian National Biodiversity Research, Canberra.

from base of corolla; lateral staminodes 2, to 2 mm long; central staminode 1, to 2 mm long. *Anthers* oblong-sagittate, c.2 mm long, not observed cohering at tip or exserted beyond corolla. *Gynoecium* c.16 mm long; style not observed exserted beyond corolla; ovary glabrous; disc annular with deep split, with irregularly undulate margin, glabrous, c.1.5 mm long; style densely eglandular hairy; stigma capitate, 1–1.5 mm in diameter, shortly glandular-pilose. *Fruit* white when ripe, ovoid with acuminate tip from style, 16–17 × 6–8 mm, glabrous, calyx persistent, split. *Seeds* not observed.

Distribution. Thus far known only from Morobe Province in Papua New Guinea (Figure 3).

Habitat and ecology. Lower to mid-montane rain forest; elevation 850–2180 m.

Etymology. The specific epithet refers to Morobe province of Papua New Guinea, within which all known specimens of this plant have been collected.

Proposed IUCN conservation category. The last known collection of this species was in 2000. The estimated EOO is 5000 km^2, and the AOO is 36 km^2. There are five known locations (*sensu* IUCN Standards and Petitions Committee, 2022): Aseki, Garaina, Mainyanda, Wagau

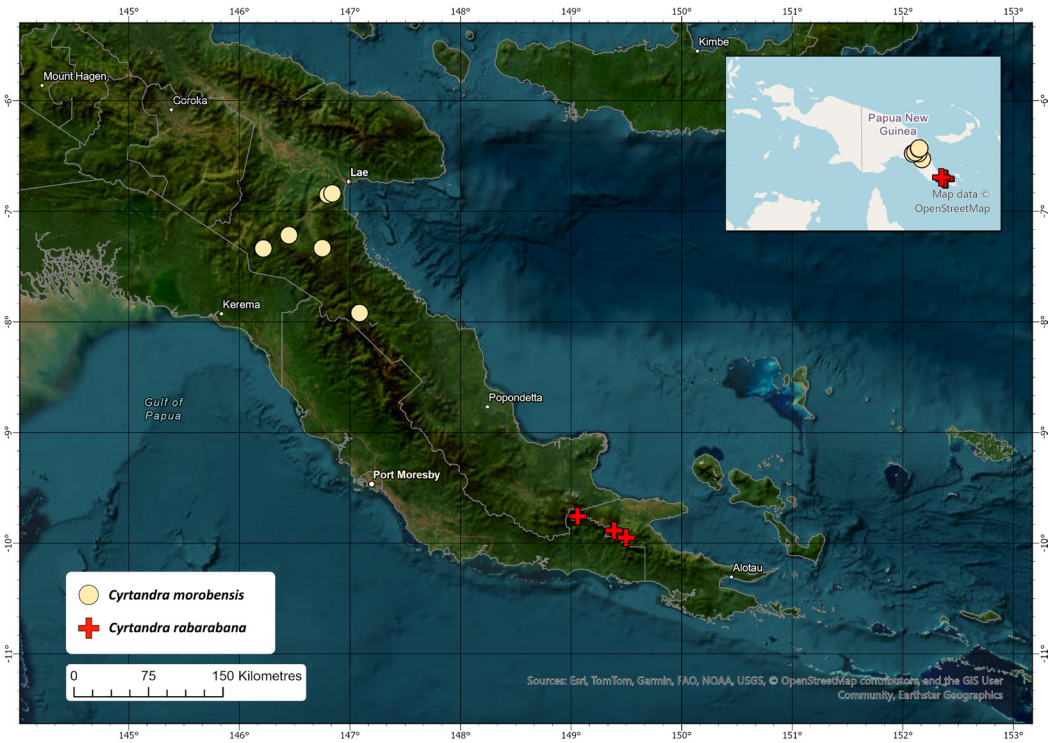

Figure 3. Distribution of *Cyrtandra morobensis* and *C. rabarabana*. Base map from ESRI (2023).

and Wau. However, the area is under-collected, and the EOO, AOO, and number of locations are very likely to be underestimated, extending the threshold for Endangered but still within the range of Vulnerable. Owing to the limited number of occurrence points available, the estimated AOO is highly uncertain and therefore not used here. All five locations occur in or nearby populated valleys showing clearance for smallholder farming and settlement, with encroachment up the slopes into the surrounding montane forests (Google Earth: Landsat/Copernicus, dated 2025, viewed December 2025). Satellite imagery (Google Earth: Landsat/Copernicus, dated 1984–2025, viewed December 2025) dating back to 1984 and Global Forest Watch (2026) data suggest that deforestation is ongoing at all five locations, particularly around Mainyanda and Wau, where it appears to be occurring at an increasing rate. Recent satellite imagery (Google Earth: Landsat/Copernicus, dated 2025, viewed December 2025) suggests that considerable tracts of montane forest (probably suitable habitat for this species) occurring between the five locations remains intact.

Collecting efforts are required in these areas to assess the presence or absence of this species. The region is also threatened by future development plans of a potential economic corridor linking either side of the peninsula (Department of National Planning and Monitoring, 2010). Based on the small number of locations (five) and ongoing threats

(identified above) to which they are all subject, leading to an expected decline in EOO, AOO, habitat extent and quality, we provisionally assess *Cyrtandra morobensis* as Vulnerable VU B1ab(i,ii,iii).

Notes. Corolla colour appears to be quite variable in this species. Most specimen labels report reddish tones from orange red to vermillion to red brown, while others report greenish yellow (*Womersley & Millar* NGF 7884) or red with gold tinge (*Millar* NGF 23457).

For a morphological comparison with *Cyrtandra meynamyana* and the new species described below, see the Table.

Table. A comparison of diagnostic characters between *Cyrtandra menyamyana*, *C. morobensis* and *C. rabarabana*

Character	*C. menyamyana*	*C. morobensis*	*C. rabarabana*
Leaf shape	Distinctly oblanceolate	Lanceolate to lanceolate-oblanceolate	Oblanceolate to broadly oblanceolate
Leaf margin	Serrate-crenate	Serrate-dentate	Serrate-crenate
Leaf upper surface	Distinctly hairy along midrib and base of lateral veins	Mostly glabrous on blade and veins	Glabrous
Inflorescence position	Only axillary among leaves	Axillary among leaves and/or on older leafless stems below leaves	Only on older leafless stems below leaves
Flower number	1- to 6-flowered	1(–2)-flowered	1- or 2-flowered
Pedicel length	1–5 mm	5–14 mm	5–6 mm
Calyx colour	Yellowish to white, sometimes with reddish base	Orange red	Red to cerise
Calyx lobes	Narrowly triangular-attenuate	Narrowly triangular-attenuate to acuminate	Abruptly acuminate-filiform from the top of the tube
Calyx thickness	Thin, delicate and paper-like when dry	Distinctly thick, completely rigid when dry	Moderately thick, somewhat rigid when dry
Corolla colour	Creamy white to yellow orange or pale green	Orange red to greenish yellow, or red with yellowish tinge	Red to cerise
Corolla lobes	Not hooded, rounded-triangular	Not hooded, rounded-triangular	Hooded, triangular
Corolla external surface indumentum	Very densely hairy, hairs pale, > 1 mm long; hairy throughout	Densely red-brown hairy, hairs < 0.8 mm long; becoming glabrous towards base of corolla	Hairy with very short pilose brown hairs; hairs < 0.5 mm long; hairy throughout
Ovary indumentum	Glabrous	Glabrous	Densely hairy

Additional specimens examined. Papua New Guinea. **Morobe Province**: above Bakaia, about 15 mi SW of Garaina, 2133 m, 23 i 1964, *Hartley* TGH 12726 (A [A02312956], LAE [LAE65264]); ridge NNE of Wagau, 1800 m, 15 i 1965, *Jermy* 4848 (E [E00632483]); Gumi Divide, 21 km W of Bulolo, 2180 m, 7°13'S, 146°27'E, 9 xi 1980, *Kairo* 780 (A [A02313065], K [K001515741], L [L.2823376], LAE [LAE249754]); Wagau-Labu Track, Mumeng, 850 m, 6°51'S, 146°48'E, 8 iii 2000, *Lovave* 38 (E [E00196522], L [L.3794987], LAE [LAE277407]); Wagau, c.1340 m, 6°50'S, 146°50'E, 10 vi 1964, *Millar* NGF 23457 (BISH [BISH24988], BO [BO-1979954], BRI *n.v.* [BRI AQ0221616], E [E00632439, E00632685], K [K001515636], L [L.2823425], LAE [LAE98048], SING [SING0202163]); Wagau, c.1420 m, 5 i 1965, *Sayers* NGF 21508 (BM); Aseki area, Angabena ridge near Haumuga Village, c.1700 m, 31 iii 1966, *Schodde & Craven* 4754 (CANB [CANB 167025.1, CANB 167026.1, CANB 167027.1]); Wau-Salamaua road, c.1680 m, 7°10'S, 147°E, i 1956, *Womersley & Millar* NGF 7884 (BO [BO-1976218], BRI *n.v.* [BRI AQ0221723], K [K001515733], L [L.2823272], LAE [LAE17888]); Edie Creek Road, 4 miles from Wau, c.1520 m, 7°20'S, 146°45'E, 12 iii 1964, *Womersley* NGF 19181 (E [E00632700], LAE [LAE67956]); Saureli to Arabuka, c.1675 m, 12 v 1968, *Woods* 1144 (A [A02313080], E [E00632508], LAE [LAE260233]).

Cyrtandra rabarabana S.Hatt & Bramley, **sp. nov.**

This species is similar to *Cyrtandra menyamyana* and *C. morobensis*, with which it shares subequal leaves and a hairy corolla with more or less equal lobes. However, it is most similar to *Cyrtandra menyamyana* but differs by its calyx lobes abruptly acuminate-filiform from the top of the tube (vs narrowly triangular-attenuate), red to cerise corolla (vs creamy white to yellow orange or pale green), with hooded, triangular lobes (vs not hooded, rounded-triangular lobes), and densely hairy ovary (vs glabrous). It also differs in having leaves with conspicuous, often prominent tertiary venation (vs only faintly visible), and flowers developing on bare stems below the leaves (vs among leafy stems). – Type: Papua New Guinea, Milne Bay Province, Rabaraba subdistrict, track from Mayu 2 to Otukai pon., 9°45'S, 149°3'E, 1805 m, 2 vii 1972, *Stevens & Veldkamp* LAE 54368 (holotype CANB [CANB 515608.1]; isotypes BRI *n.v.* [BRI AQ0353249], E [E00632448, E00743726], L [L.2823503], LAE). Figure 4.

Herbaceous shrub or shrub, 0.3–1.5 m tall. *Stems* herbaceous to woody, terete, striate, little-branched, young stems densely dark-brown pilose, older stems becoming glabrous. *Leaves* opposite, those of a pair subequal. *Major leaves*, petiole 10–20 mm long, densely dark-brown pilose; blades oblanceolate to broadly oblanceolate, 130–170 × 40–60 mm, base attenuate, somewhat decurrent; apex attenuate; margin irregularly, serrate-crenate, teeth to 3 mm long; 7–9 pairs of lateral veins, rising gradually to steeply from midrib usually terminating 2–3 mm before margin, tertiary venation conspicuous, often prominent; upper surface dull dark green, glabrous; lower surface pale green, sparsely dark-brown hairy across blade, more densely so along midrib and veins. *Minor leaves* same as major leaves, but to 70% smaller. *Inflorescence* sessile to subsessile, axillary on stem below leaves, 1- or 2-flowered. *Bracts* 2, linear, 2–5 mm long, red-brown hairy. *Pedicel* 5–6 mm long, red-brown hairy. *Calyx* red to cerise, tubular-campanulate, 9–12 mm long, somewhat rigid, exterior hairy

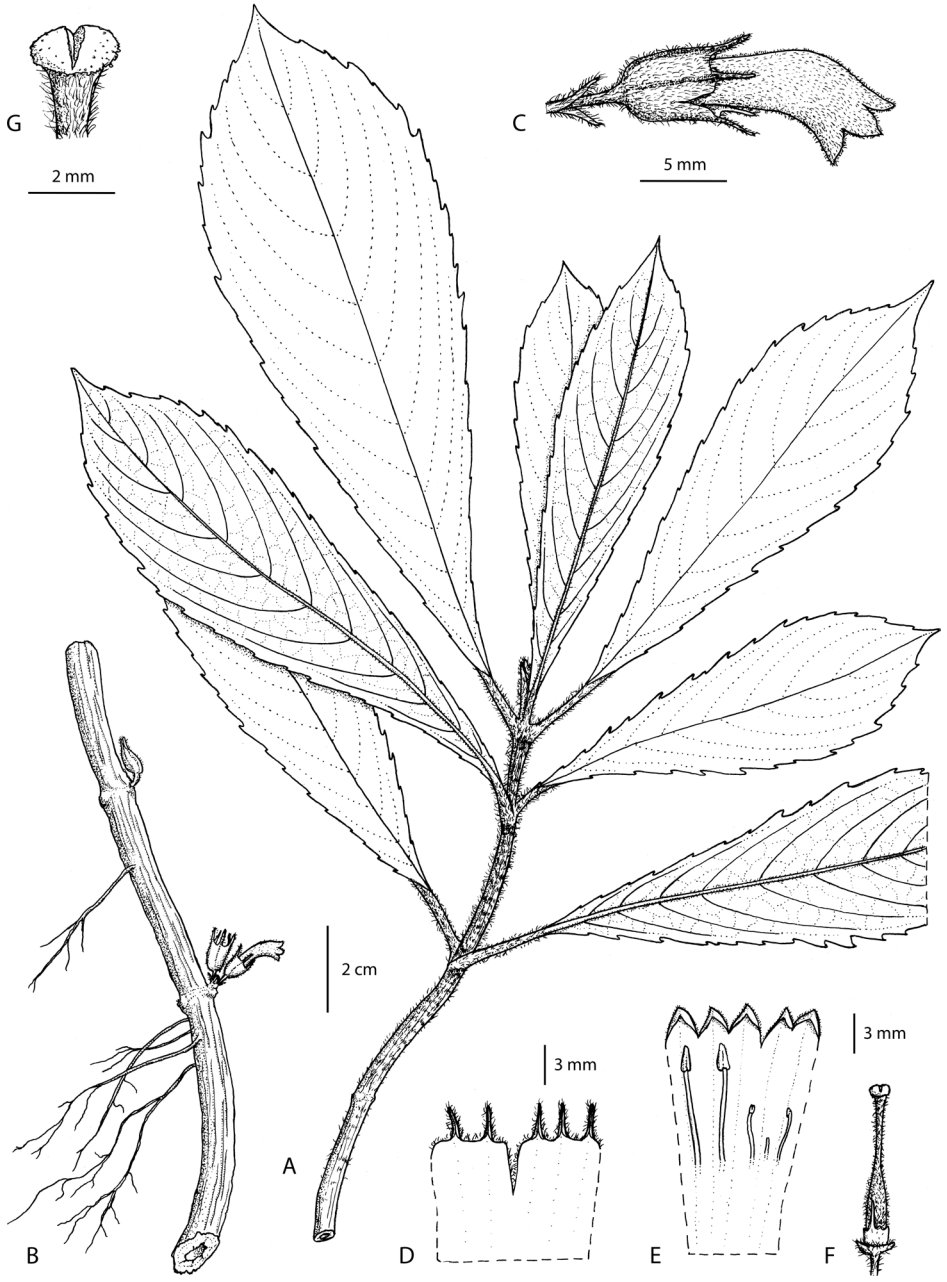

Figure 4. *Cyrtandra rabarabana* S.Hatt & Bramley, sp. nov. A, Upper stem with leaves; B, section of lower stem with flower, showing occasional root development; C, flower with bracts; D, dissected calyx; E, dissected corolla, showing two stamens and three staminodes; F, gynoecium, showing disc; G, close-up drawing of grooved, capitate stigma. All drawn by Sebastian A. Hatt from *Stevens & Veldkamp* LAE 54368 (CANB).

with short, pilose brown hairs, denser along midrib of lobes running to base of calyx, interior glabrous, lobes 5, lobes more or less equal, indistinctly 2-lipped in 2 + 3 configuration with 2 lobes more separated from the other 3, 2–3 mm long, abruptly acuminate-filiform from the top of the tube. *Corolla* red or cerise, sometimes with yellow lines, tubular, distinctly arcuate, 14–20 mm long, lobes 5, in 2 + 3 configuration but more or less equal; upper 2 lobes triangular, hooded, 1.5–2 × 1.5–2 mm; lateral and lower 3 lobes triangular, hooded, c.2 × 2 mm; external surface of corolla hairy with very short, < 0.5 mm long, pointed pilose brown hairs, internal surface glabrous except sparsely glandular-hairy on lobes. *Filaments* 6–8 mm long, glabrous, inserted 5–6 mm up from base of corolla; lateral staminodes 2, 2–4 mm long; central staminode 1, 0.5–1 mm long. *Anthers* oblong-sagittate, 1.5–2 mm long, not observed cohering at tip or exserted beyond corolla. *Gynoecium* c.8–12 mm long; style not observed exserted beyond corolla; ovary densely hairy with very short, pale, pointed hairs; disc annular with irregularly undulate margin, sometimes with singular acuminate projection c.3 mm long, otherwise 1–1.5 mm long, with a few scattered hairs; style densely hairy with very short, pale, pointed hairs; stigma capitate, grooved down middle, 1–2 mm across, shortly pilose. *Fruit* not seen but reported green (when unripe). *Seeds* not seen.

Distribution. Thus far known only from Milne Bay Province in Papua New Guinea (see **Figure 3**).

Habitat and ecology. Mid-montane rain forest, elevation 1100–1805 m.

Etymology. The specific epithet refers to the Rabaraba subdistrict of Milne Bay province, Papua New Guinea, within which all known specimens of this plant have been collected.

Proposed IUCN conservation category. The last known collection of this species was in 1972. The estimated EOO is 40 km^2, and the AOO is 12 km^2. There are two known locations (sensu IUCN Standards and Petitions Committee, 2022): the montane rain forest around Mount Suckling, and the populated valleys nearer to Mount Simpson. Satellite imagery (Google Earth: Landsat/Copernicus, dated 2025, viewed December 2025) suggests that the forested slopes around Mount Suckling remain largely intact. The populated valleys around Bonenau, Gisem and Nepesi near Mount Simpson show forest clearance for smallholder farming and settlement, with encroachment up the slopes into the surrounding montane forests (Google Earth: Landsat/Copernicus, dated 2025, viewed December 2025). Satellite imagery (Google Earth: Landsat/Copernicus, dated 1984–2025, viewed December 2025) dating back to 1984 and Global Forest Watch (2026) data suggest that deforestation is ongoing in these valleys at a steady rate. The region is also threatened by future development plans of a potential economic corridor linking either side of the peninsula (Department of National Planning and Monitoring, 2010). Owing to the limited number of occurrence points available, the estimated AOO is highly uncertain and therefore not used here. However, it is worth noting that inclusion of the AOO in this case would not alter the category. Based on the small

number of locations (two) and ongoing threats identified above to one of the locations, leading to an expected decline in EOO, AOO, habitat extent and quality, we provisionally assess *Cyrtandra rabarabana* as Endangered EN B1ab(i,ii,iii).

Notes. Certain duplicates of the '*Woods* 2237' collection are *Cyrtandra rabarabana* (those listed above), while others (A [A02313012], BO [BO-0008594], E [E00632631], L [L.2823249, L.2823250] and US [US00662101]) are a different species, *Cyrtandra milneensis* S.Hatt & Bramley. Duplicates at B [B 10 0056094] and LAE [LAE259672] have not been seen, and thus their identity cannot be confirmed. The duplicates corresponding to *Cyrtandra rabarabana* are referred to here as *Woods* 2237[A] to distinguish them.

For morphological comparison with *Cyrtandra meynamyana* and *C. morobensis*, see the **Table**.

Additional specimens examined. Papua New Guinea. **Milne Bay Province**: Rabaraba subdistrict, track from Mayu 2 to Otukai pon., 9°45'S, 149°3'E, 1805 m, 2 vii 1972, *Stevens & Veldkamp* LAE 54368 (BRI *n.v.* [BRI AQ0353249], CANB [CANB 515608.1], E [E00632448, E00743726], L [L.2823503], LAE); Birat to Nepesip, above Maup Waterfall, river Iao, 1460 m, 10 vii 1968, *Woods* 2237[A] (E [E00632526], K [K001515720]); Daga Bonenau to Agaun over Mt Garetun, 1000–1200 m, 27 vii 1968, *Woods* 2780 (E [E00632583], L [L.2823922], LAE [LAE259679]).

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