

Revision of *Thorncroftia* (Lamiaceae)

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ABSTRACT

Thorncroftia, a genus endemic to South Africa and Eswatini, is revised using morphological characters, with particular emphasis on indumentum. Eight species are recognized, with two species, *T. coddii* and *T. malot-jaensis*, being newly described. A key to species and descriptions for each species along with notes on diagnostic characters, distribution, habitat, phenology and conservation status are provided. In view of restricted distribution ranges, habitat specificity and threats imposed by alien tree encroachment and informal mining, two species are Critically Endangered, four species are Endangered and one is Critically Rare.

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1. Introduction

Thorncroftia N.E.Br. was described by N.E. Brown in 1912 with a single species, *Thorncroftia longiflora* N.E.Br., and was named for Mr. George Thorncroft (1857–1934), a keen amateur botanist who collected extensively around Barberton, South Africa. The genus belongs in the large and widespread family Lamiaceae (Labiatae) which has about 232 genera and nearly 8100 species worldwide (World Flora Online, 2024) occurring in warm and temperate regions (Retief, 2000) and 42 genera and 305 species in southern Africa, occurring mainly in the mountainous eastern areas of the country (Koekemoer et al., 2023). Molecular studies have led to 12 subfamilies and 22 tribes being recognized (Zhao et al., 2021), with *Thorncroftia* (represented by *Thorncroftia media* Codd) being in the Ocimeae clade of Nepetoideae (Li et al., 2016). In a phylogenetic study of *Plectranthus* L'Hér. and allies (Paton et al. 2006), *Thorncroftia* is sister to *Tetradenia* Benth. in the Plectranthinae. *Tetradenia* shares deflexed anterior and free lateral corolla lobes with *Thorncroftia*, along with several genera in the tribe Ocimeae (Paton et al. 2006). In a subsequent study, Paton et al. (2018) point out that *Tetradenia* differs from *Thorncroftia* by having actinomorphic funnel-shaped (not zygomorphic tubular) corollas and by being dioecious rather than hermaphrodite.

To assess whether the generic status was justified, Lesley Codd required more material and so enlisted the assistance of George Thorncroft's son and grandson (Codd, 1961). *Thorncroftia longiflora*

was eventually rediscovered in March 1957 by the Thorncrofts and Clarkes in the mountains above Joe's Luck Siding (Codd, 1961). While searching around Barberton, it was noted that *Plectranthus thorncroftii* S.Moore shared characters with *T. longiflora* and Codd then transferred that species as well as *Plectranthus succulenta* R.A.Dyer & E.A. Bruce to *Thorncroftia* bringing the number of species in the genus to three (Codd, 1961). Characters used by Codd (1961) to distinguish species of *Thorncroftia* from *Plectranthus* as it was then constituted and *Ocimum* L. included bracts not being clearly differentiated from the leaves, flowers being borne singly in the axils of the bracts rather than in several-flowered cymes or verticils, and the corolla being 4-lobed with the lower lip being boat-shaped and the upper lip comprising an erect, emarginate upper lobe (actually two fused lobes) and two lateral, narrowly oblong lobes that are deflexed on each side of the lower lip (Codd, 1964). After his 1961 account, Codd provided an account for the Flora of southern Africa (Codd, 1985), in which he also recognized three species. Since that time, *Thorncroftia media* was described from material collected by Dave Hardy (Codd, 1986), *Thorncroftia lotteri* T.J. Edwards & McMurtry (Edwards, 2006) was segregated from *T. succulenta* (R.A.Dyer & E.A. Bruce) Codd, and *Thorncroftia greenii* Changwe & K. Balkwill was described from material collected in northern KwaZulu-Natal (Balkwill et al., 2009).

Trichomes are defined as unicellular or multicellular appendages, which originate from epidermal cells and develop outwards on the surface of various plant organs (Werker, 2000). To qualify as trichomes, structures must include both cell wall and lumen and be of a critical height to distinguish them from papillae, bladder cells,

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tubercles or epidermal cells (Werker, 2000). Trichomes vary in size, morphology, surface microstructure, number of cells, origin, location, and capability to secrete (Cutler, 1978; Theobald et al., 1979; Werker, 2000). Thus, trichomes on the outer surfaces of plant organs, such as roots, stems, leaves, bracts, calyces and seeds have facilitated recognition of species in the angiosperms (Theobald et al., 1979). Eglandular trichomes can be diverse in morphology, anatomy and microstructure (Werker, 2000), including unicellular or multicellular, branched or unbranched (Hallahan, 2000) and uniseriate, biseriate or multiseriate (Werker et al., 1985; Dudai et al., 1988; Werker, 2000). In Lamiaceae, two types of glandular trichomes are found, capitate and peltate, depending on the shape of the secretory head (Werker et al., 1985; Ascensão et al., 1995; Hallahan, 2000). Capitate glandular trichomes are commonly composed of a basal cell, one or more stalk cells, and either one or two cells in the head (Ascensão et al., 1995). Peltate glandular trichomes are larger, with a single basal cell, a single stalk cell and four or more head cells (Hallahan, 2000). The outer surfaces of trichomes can be smooth or exhibit micro-ornamentation, so that they appear micropapillate, warty, reticulate or striate (Werker, 2000). Descriptions of types of trichomes may include shape, size, number of cells and thickening of the wall (Cutler, 1978; Werker et al., 1985; Balkwill, 1985). In Lamiaceae, the morphology, distribution and frequency of trichomes have been used as taxonomic characters in the delimitation of species or genera (Bini Maleci and Servettaz, 1991; Hanlidou et al., 1991; Servettaz et al., 1992; Karousou et al., 1992; Demissew and Harkey, 1992; Falciani et al., 1995; Ascensão et al., 1995) or subfamilial or tribal groups (Werker et al., 1985). Previous taxonomic treatments of *Thorncroftia* relied mainly on morphology to delimit taxa and did not investigate the diversity of trichome types.

One aim of this paper is to investigate the distribution of trichome types between species to assess whether they are helpful in distinguishing between species. Another is to provide an updated account of the genus that includes all known species as well as a key to species and descriptions of each species along with notes on diagnostic characters, distribution, habitat, phenology and conservation status.

2. Materials and methods

Specimens: We worked with herbarium specimens at J and borrowed material from NH and PRE (abbreviations follow Thiers (n.d.) [continually updated]) and BMLH (Barberton Mountainlands Herbarium). We visited BOL, LYD, NBG, NH, NU and PRE and photographed specimens. Other herbaria (e.g. E, K, MO, RSA) are those to which J distributes duplicates. We viewed types on JSTOR Global Plants (<https://plants.jstor.org/>). Herbarium specimens that we have collected have been deposited in J, with duplicates as indicated in the lists of specimens. Successful field trips resulted in specimens with K. Balkwill or K. Changwe as collectors and all specimens collected are listed under the relevant species. We also worked with cultivated material from The Walter Sisulu Botanical Garden and material we observed and collected on fieldtrips.

Measurements: All measurements were based on dried material with the exception of fresh specimens of *T. greenii* from the Walter Sisulu Botanical Garden and *T. malotjaensis* provided by Mr. Simon Attwood. To avoid confusion from developmental plasticity, mature organs were measured. Where possible, characters were measured on between one and four leaves and flowers from each specimen and on as many specimens as were available; values were averaged and these means were used to provide ranges in descriptions. Features <2 mm were measured under a Wild Heerbrugg dissecting light microscope.

Micromorphology: A survey of trichome types was undertaken using a dissecting light microscope (Wild Heerbrugg) at magnification 50X on all the available material (c. 50 specimens) and then another dissecting microscope with higher magnification (Nikon

SMZ 1500 at 11.25 pixels) and a Nikon Digital Camera with a 21-inch monitor. For scanning electron microscope (SEM) studies, mature plants and organs were selected. Calyces were examined between the pedicel and the lower part of the calyx teeth, leaves at the middle of the lower surface and stems at the internode just below the inflorescence. Some specimens were from dried herbarium material, but were dehydrated through a graded series of ethanol of 20 %, 40 %, 50 %, 60 %, 70 %, 80 %, 90 % and 95 % with a 60 to 90 min interval in each dilution and then into 100 % ethanol and finally dried over molecular sieve beads. Specimens from liquid preservative (alcohol: water: glycerine = 11: 9: 1) were dehydrated using a similar procedure. Because of the succulence of stems and leaves, specimens were left in each alcohol concentration longer than the normal 5–15 min to ensure that alcohol penetration was complete. Material was critical point dried using a Hitachi Critical Point Dryer, then mounted on stubs, coated with gold palladium and viewed with a JEOL JSM 840 SEM. Trichome metric data were measured on stems, leaves and calyces from the micrographs and means and standard errors were determined.

Arrangement of species: Species are arranged to reflect their similarities and gradation from the usually herbaceous *T. thorncroftii* (S. Moore) Codd with open inflorescences, short corolla tubes and simple eglandular trichomes to the shrubby *T. succulenta* with dense inflorescences, long corolla tubes and dendroid eglandular trichomes.

Conservation Status: Conservation status (extinction risk) for each species was determined using the Categories and Criteria of the IUCN Red List (IUCN 2012) and the guidelines for their use (IUCN Standards and Petitions Subcommittee, 2024). Extent of occurrence (EOO) and Area of Occupancy (AOO) were calculated using area polygons inserted on Google Earth. Criteria for the South African National Categories were found at <http://redlist.sanbi.org/redcat.php> (SANBI, 2025) and accessed on 29 Mar 2025.

3. Results

Measurements: Lengths of petioles, pedicels, corolla tubes and eglandular trichomes proved valuable for differentiating species of *Thorncroftia* (Fig. 1). The petioles of *T. media* are longer than all other species, those of *T. lotteri* and *T. succulenta* are shorter than those of *T. media* but longer than the other species (Fig. 1A). The pedicels of *T. greenii*, *T. longiflora* and *T. thorncroftii* are longer than those of the other species (Fig. 1B). The corolla tubes of *T. longiflora* are usually longer than those of *T. coddii* Changwe & K. Balkwill; the corolla tubes of these species are longer than those of *T. greenii*, which in turn are longer than those of *T. lotteri*, *T. media* and *T. succulenta*, whereas those of *T. thorncroftii* are much shorter than the other species (Fig. 1C). The eglandular trichomes of *T. thorncroftii* and *T. lotteri* are longer than those of the other species, which grade from the shortest in *T. greenii* to those of *T. media* (Fig. 1D).

Indumentum types: Two major trichome types occur in *Thorncroftia*: eglandular and glandular trichomes. Eglandular trichomes may be unicellular and uniseriate, which are present in all species, as are the multicellular uniseriate and unbranched trichomes (Fig. 2A). Complex eglandular trichomes may be biramous (Fig. 2B), or dendritic (Fig. 2C). Dendritic trichomes are present on stems, leaves and calyces of *T. succulenta* and *T. media* (Table 1). Two types of glandular trichomes occur. Capitate trichomes consist of a 1-celled stalk and a broader 1-celled head in all the species. The capitate trichomes are approximately 20(±5) µm high and 12(±2) µm wide. Peltate trichomes possess a short stalk cell almost completely embedded in the epidermal appendages and a large four-celled head, which is approximately 46 (±5.5) µm in diameter. There are no cells in the central circle and 8 cells in the circumference arranged in a circular pattern in *T. thorncroftii*. The glandular trichomes on the calyx of *Thorncroftia longiflora* have a tapering stalk comprising up to 3 cells and a glandular head that is much smaller than the diameter of the base of the stalk.

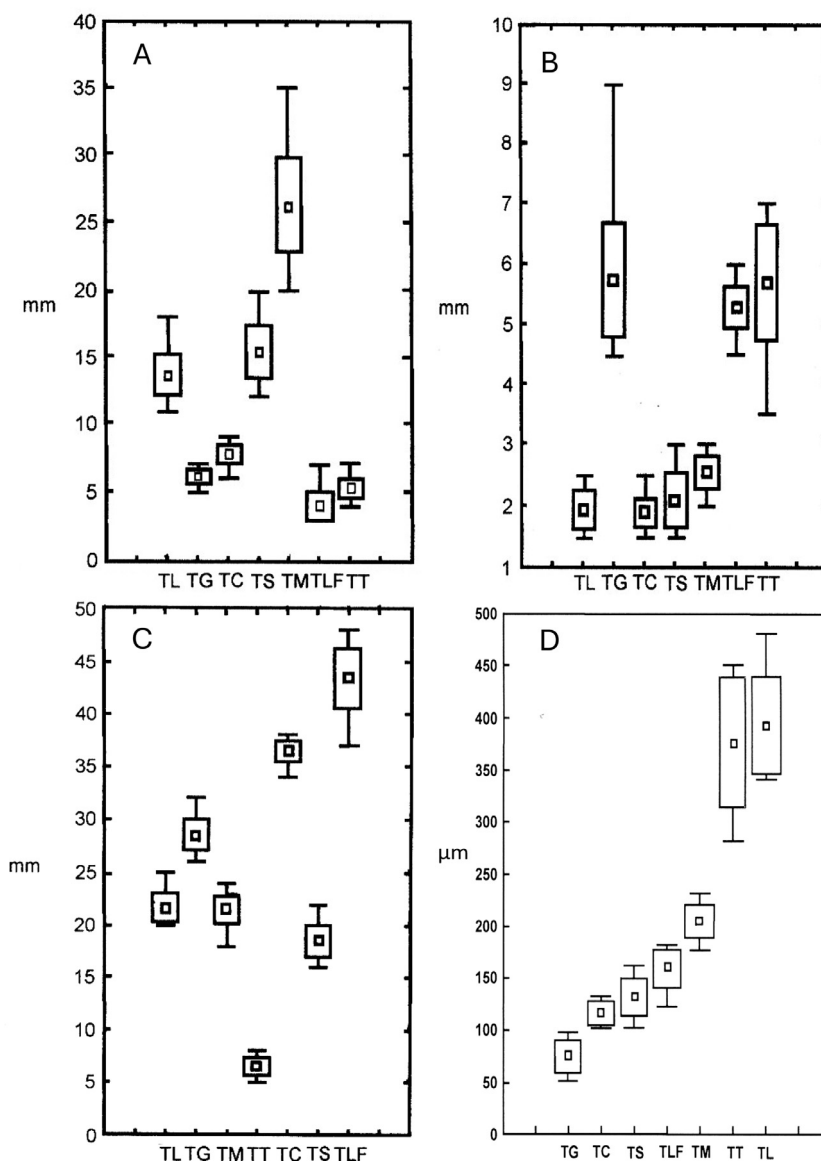


Fig. 1. Lengths of various structures in *Thorncroftia*. A. Petioles; B. Pedicels; C. Corolla tubes; D. Eglandular trichomes. Line = range; Broad rectangle = 95 % confidence interval; Small rectangle = mean; TC = *Thorncroftia coddii*, TG = *Thorncroftia greenii*, TL = *Thorncroftia lotteri*, TLF = *Thorncroftia longiflora*, TM = *Thorncroftia media*, TS = *Thorncroftia succulenta*, TT = *Thorncroftia thorncroftii*.

Glandular trichomes occur on the leaves, stems and calyces of all species, but at different densities. *K. Balkwill and Oosthuizen 13,966* appears aberrant in that it has dense coarse eglandular trichomes on most structures, including the calyx.

Conservation Status: Of the eight taxa in the genus, two species are assessed as Critically Endangered and four species as Endangered, mainly because of their restricted distributions, their habitat specificity and the threats imposed on them by alien vegetation invasion and informal mining. One species is assessed as Critically Rare (SANBI, 2025). One species is widespread in the Soutpansberg and is assessed as Least Concern.

4. Taxonomy

4.1. Genus description

***Thorncroftia* N.E.Br.** in Kew Bull. 1912: 281 (1912); **Codd** in Bothalia 7: 429 (1961); **R.A.Dyer**, Gen. 537 (1975); **Codd** in FSA 28(4): 237–239 (1985). Type species: *T. longiflora* N.E.Br.

Perennial herbs to semi-succulent suffrutices or shrubs to 2 m tall. *Stems* leafy, almost circular in cross-section, pubescent with eglandular and glandular trichomes. *Leaves* opposite or whorled, often crowded on short shoots, obovate, ovate or elliptic-oblong; apex obtuse; margins entire or crenate towards the tip or occasionally over most of the margin. *Inflorescence* terminal on main stem or on side branches; flowers solitary in axils of leaf-like bracts; bracts persistent, opposite, semi-succulent, becoming progressively smaller towards the apex of the inflorescence; inflorescences die after fruiting and usually remain attached to the plant. *Calyx* bilabiate, 5-toothed; tube campanulate; upper tooth larger than the lower 4, ovate-lanceolate to broadly ovate; lower 4 teeth sub-equal, narrowly deltoid, acuminate. *Corolla* with tube and then bilabiate; tube usually long, laterally compressed, saccate upwards in one species; upper lip of 2 erect upper lobes united for most of their length and sometimes folded backwards along their length and two free strap-shaped, spreading lateral lobes which usually point down at 45° or sometimes reflexed; lower lip of a single boat-shaped lobe extended and reflexing as anthesis proceeds. *Stamens* 4, didynamous, declinate;

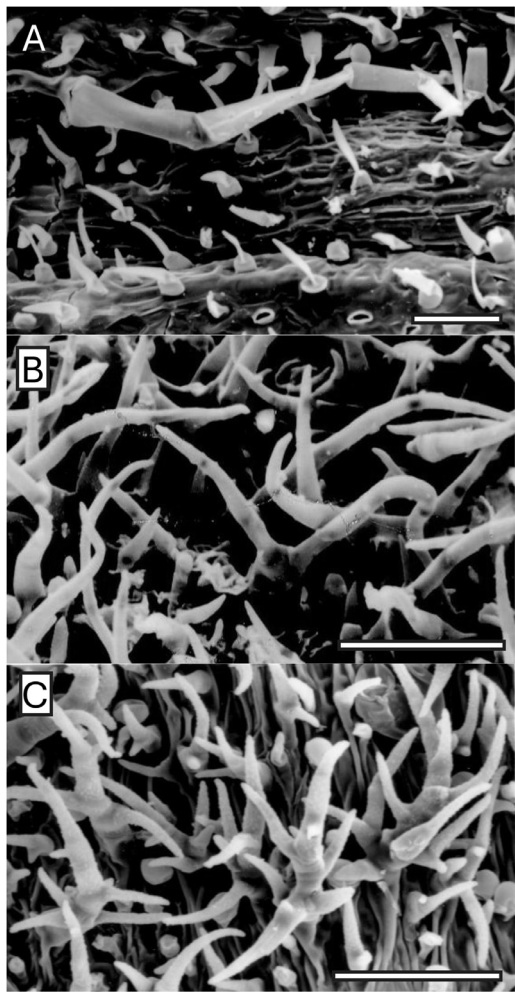


Fig. 2. Eglandular trichomes of *Thorncroftia*. A. Multicellular uniseriate trichome from stem of *T. lotteri*, Clarke 213 (PRE); B. Biramous trichome from leaf of *T. media*, Hardy 3966 (PRE); C. Dendroid trichome from calyx of *T. succulenta*, Sebothoma 322 (PRE);. Scale bars = 100 μ m.

filaments attached to the throat of corolla then free; anthers 1-the-cous. *Disc* a shallow saucer-shaped structure, with 4 lobes at the sinuses between mericarps; the abaxial lobe almost as high as the mericarps and the other 3 about one fifth as high as the mericarps. *Style* exerted, as long as stamens; stigma bifid. *Nutlets* ellipsoid.

Diagnostic characters: The two lateral lobes of the corolla that point downwards are characteristic of the genus. Codd (1961) commented that the remarkably long, narrowly cylindrical corolla tube that is common in *Thorncroftia* species is not a generic character as a similar trend is to be found in such species as *Plectranthus ambiguus* (Bolus) Codd (= *P. dregei* Codd) and *Ocimum tubiforme* (R.D.Good) A.J.

Paton. *Thorncroftia thorncroftii*, *T. longiflora* and *T. succulenta* are reported to often be parasitized by a weevil, *Apion* sp., which causes swellings in the stems (Codd, 1961). It is not known how specific this weevil is, but swellings are rarely seen on specimens of *Plectranthus* or *Ocimum* (Codd, 1961). During fieldwork in Ngotshe District, Kwa-Zulu-Natal, swellings were observed on *T. greenii* and have been noted on herbarium specimens of *T. thorncroftii* (e.g. K. Balkwill et al. 10,879) and *T. succulenta* (e.g. K. Balkwill & M-J. Balkwill 6383, Galpin 14,881 and Loock sub NH 41,603).

Taxonomically important characters: Species of *Thorncroftia* can be distinguished from one another on the basis of sizes of structures (e.g. petioles, pedicels and corolla tube lengths, Fig. 1) as well as habit, with *T. thorncroftii* being a herb to suffrutex usually up to 400 mm but sometimes up to 600 mm rather than a suffrutex to shrub up to 1.2 m tall. Some trichome types are diagnostic of species (Table 1) and trichomes are present at different densities in various species. Inflorescences are open in *T. thorncroftii*, *T. media* and *T. longiflora*, but dense in *T. succulenta*, *T. lotteri* and *T. coddii*.

Distribution and habitat: *Thorncroftia* is endemic to South Africa and Eswatini, occurring from the Soutpansberg in the north, along the Limpopo-Mpumalanga-Eswatini Escarpment (Clark et al., 2022) to northern KwaZulu-Natal in the south. Based on their geographical distributions (Figs. 3& 4), the affinities of species of *Thorncroftia* are the Soutpansberg Centre for *T. succulenta*, the Wolkberg Centre for *T. coddii* and *T. media*, the Barberton Centre for *T. thorncroftii*, *T. lotteri*, *T. longiflora* and *T. malolotjaensis* and the Maputaland-Pondoland Region for *T. greenii* (Van Wyk and Smith, 2001). Members of the genus most commonly occur on quartzite, particularly in crevices or where the vegetation is sparse so that they are protected from fire and avoid competition. The areas in which they grow are often shrouded in mist and it is possible that their complex trichomes enable uptake of water that may then be released into the soil (Burgess and Dawson, 2004; Nadezhdina et al., 2010; Cas-sana et al., 2016).

Pollination: In their account of the long-proscid fly pollination system in southern Africa, Goldblatt and Manning (2000) included *T. longiflora*, *T. media* and *T. succulenta* in their inferred members of the *Prosoeca ganglbaueri*-*Pr. robusta* pollination system guild. Because of its long corolla tube (30–38 mm), Potgieter and Edwards (2001) suggested that *T. longiflora* is pollinated by *Prosoeca ganglbaueri* Lichtwardt and *T. succulenta*, with its tube of 15–20 mm, is more likely to be pollinated by *Pr. robusta* Bezzi. Paton et al. (2006) suggest that the deflexed lateral corolla lobes in *Thorncroftia* may be associated with long-tongued hovering insects, which thus do not need a landing platform. Edwards (2006) states that it is probable that *Thorncroftia lotteri* shares a long-tongued nemestrinid fly pollinator with *T. succulenta* and *T. media*. Two long-tongued flies, one a species of *Stenobasipteron* Lichtwardt and one undescribed member of the Nemestrinidae as well as an African humming bird moth, *Macroglossum trochilus* (Hübner), have been photographed while visiting *T. lotteri* (D. Oosthuizen, pers. comm.). Honey bees, *Apis mellifera scutellata* Lepeletier and a butterfly have been observed visiting *T. thorncroftii* (D. Oosthuizen, pers. comm.).

Table 1
Distribution of eglandular trichome types on species of *Thorncroftia*.

Taxon	Multicellular uniseriate trichomes			Biramous trichomes			Dendroid trichomes		
	Stem	Leaf	Calyx	Stem	Leaf	Calyx	Stem	Leaf	Calyx
<i>T. thorncroftii</i>	✓	✓	✓	X	X	X	X	X	X
<i>T. longiflora</i>	✓	✓	✓	X	X	X	X	X	X
<i>T. malolotjaensis</i>	✓	✓	✓	X	X	X	X	X	X
<i>T. greenii</i>	✓	✓	✓	X	X	X	X	X	X
<i>T. media</i>	✓	✓	✓	✓	✓	X	✓	✓	X
<i>T. lotteri</i>	✓	✓	✓	X	X	X	X	X	X
<i>T. coddii</i>	✓	✓	✓	X	✓	X	X	X	X
<i>T. succulenta</i>	✓	✓	✓	X	X	X	✓	✓	✓

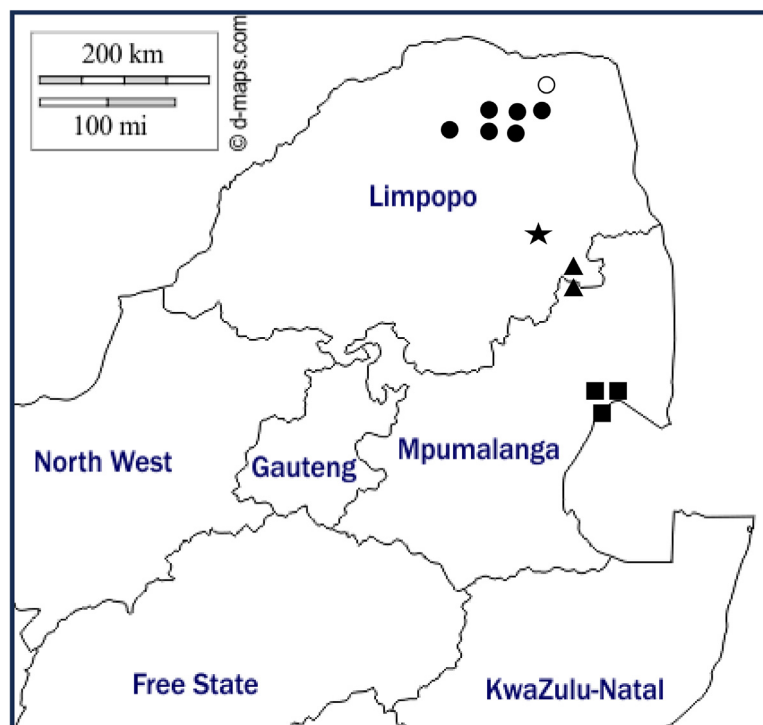


Fig. 3. Distribution of species of *Thornecroftia*. Circles. *T. succulenta*; Star. *T. media*; Triangles. *T. coddii*; Squares. *T. lotteri*. Solid symbols based on herbarium specimens; open symbol based on an iNaturalist observations.

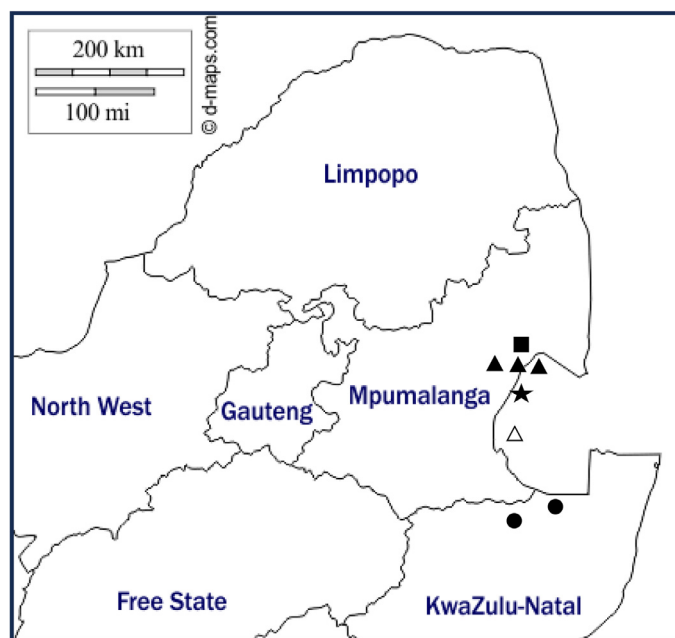


Fig. 4. Distribution of species of *Thornecroftia*. Squares. *T. longiflora*; Triangles. *T. thornecroftii*; Star. *T. malolotjaensis*; Circles. *T. greenii*. Solid symbols based on herbarium specimens; open symbol based on an iNaturalist observation.

4.2. Key to species of *Thornecroftia*

- 1a. Corolla tube to 10 mm long; herb or suffrutex to 400 (– 600) mm tall **1. *T. thornecroftii***
- 1b Corolla tube longer than 15 mm; suffrutex to shrub usually considerably taller than 400 mm **2**
- 2a. Leaves (including petioles) to 25 mm long, usually entire or obscurely crenate **3**

2b Leaves (including petioles) longer than 25 mm, usually crenate **5**

3a. Young stems below the inflorescence with many more eglandular than gland-headed trichomes; calyx either with eglandular trichomes or long-stalked small-headed glandular trichomes in addition to short-stalked large-headed glandular trichomes **4**

3b Young stems below the inflorescence with many more gland-headed than eglandular trichomes (Fig. 6F); calyx with short-stalked, large-headed glandular trichomes and very few, if any, eglandular trichomes (Fig. 6C) **4. *T. greenii***

4a. Young stems below the inflorescence with dense ornamented eglandular trichomes 58–97 μm long (Fig. 6D); calyx with long-stalked small-headed glandular trichomes in addition to short-stalked large-headed glandular trichomes (Fig. 6A) ... **2. *T. longiflora***

4b Young stems below the inflorescence with less dense non-ornamented eglandular trichomes about 135–195 μm long (Fig. 6E); calyx with eglandular trichomes in addition to short-stalked large-headed glandular trichomes (Fig. 6B) **3. *T. malolotjaensis***

5a. Inflorescence lax; petiole longer than 20 mm **5. *T. media***

5b Inflorescence dense; petiole shorter than 20 mm **6**

6a. Mature leaves white furry below; occurring in the Barberton area **6. *T. lotteri***

6b Mature leaves hairy below, but not white furry; occurring north of 25° South **7**

7a. Corolla tube longer than 25 mm; trichomes on undersurface of leaves mainly simple or rarely biramous **7. *T. coddii***

7b Corolla tube shorter than 25 mm; most trichomes on the undersurface of the leaves branched **8. *T. succulenta***

4.3. Taxonomic descriptions

1. *Thornecroftia thornecroftii* (S.Moore) Codd in Bothalia 7: 430 (1961), Codd in FSA 28(4): 237 (1985). Type: South Africa, Transvaal [Mpumalanga], Barberton, *Thornecroft sub* Rogers 14,987 (BM, holo. BM000910149–Global Plants!; PRE, iso.).

Plectranthus thorncroftii S.Moore in J. Bot. 56: 39 (1918); Pott in Ann. Tvl Mus. 6: 133 (1920). Type: as above.

Succulent herb to suffrutescent, 0.1–0.4(–0.6) m tall; stems erect, sparingly branched, about 8 mm in diameter at the base, tapering to 4 mm in diameter above, pubescent with short coarse sessile capitate trichomes, and unicellular and multicellular uniseriate eglandular trichomes. Leaves opposite or whorled, oblong-elliptic to obovate, (13–) 15–18(–20) × 5–9 mm, dark green above, lighter green below, often with purple margin, pubescent with sessile capitate and peltate glandular trichomes, and simple and multicellular uniseriate eglandular trichomes on both surfaces, midvein slightly channelled proximally, otherwise veins level with upper surface and midrib and secondary veins slightly raised below; apex rounded to obtuse; margin sparingly crenate-dentate with about 3 teeth on each side of the leaf in the upper third to half; base cuneate; petioles 4.5–7.0 mm long. Inflorescence a terminal raceme, with 1 or 2 lateral branches near the base, up to 80 mm long, sparse; axis with similar indumentum as on the stems; bracts leaf-like, 5–6 × 2–3 mm at the base, becoming progressively smaller and narrower until 2–3 × 1 mm at the tip, green with purple margins; pedicel 3–7 mm long, maroon to purple. Calyx 4–7 mm long and 2–3 mm broad, green flushed purple with age, pubescent with glandular trichomes, and coarse unicellular and multicellular uniseriate trichomes especially on the veins and margins; the longest teeth 2–3 mm long, shortest teeth 1–1.5 mm long, ovate, acuminate, the lower 4 teeth sub-equal, lanceolate to linear-triangular. Corolla white with purple spots on the upper lobe, tube saccate upwards, 4–8 mm long, with eglandular and shorter glandular trichomes; lobes 4–8 mm long, upper lobes erect, strongly folded back along the suture line, fringed with eglandular trichomes, lateral lobes diverging, obliquely elliptic, sometimes involute on upper edge, tip acute or sometimes attenuate, sometimes with a few purple spots, lower lobe directed forwards initially and then downwards, boat-shaped, with eglandular trichomes around keel. Stamens 5–7 mm long; filaments white; anthers dark purple; pollen greenish yellow. Style 5–7 mm long, prevalent after stamens have recoiled, white proximally, darkening through lilac distally, style branches about 0.5 mm long, purple (Fig. 5).

Nomenclatural notes: Article 23.4 of the International Code of Nomenclature for algae, fungi, and plants (Turk et al., 2018) disallows tautonyms, but the specific epithet differs from the generic name by the last letter and thus is not an exact repeat and so is allowed.

Diagnostic characters: *Thorncroftia thorncroftii* has a corolla tube shorter than 10 mm and is a herb usually to 400 mm tall or rarely a suffrutescent to 600 mm tall rather than a shrub, which distinguishes it from all other species of *Thorncroftia*. Although it is superficially similar to species of *Coleus* Lour. and *Plectranthus* (e.g. *C. tetragonus* (Gürke) Robyns & Levyns), the solitary flowers in the axils of the bracts, the leaf-like bracts and the outer two free lobes of the upper corolla lip distinguish it.

Distribution and habitat: The species has a restricted distribution and has been collected between Barberton in Mpumalanga and Pigg's Peak in Eswatini within the mountains around Barberton and then further southwards between Khelekhele and Bhahwini in Eswatini (Fig. 4). The species mainly occurs among quartzite rocks in montane grassland at elevations of 900–1600 m.

Phenology: Flowering is from February to May, but mainly in March. Flowers have a pleasant strong sweet scent (D. Oosthuizen pers. obs.).

Conservation notes: Extent of occurrence (EOO) including the southernmost iNaturalist observation (<https://www.inaturalist.org/observations/18349664>) in Eswatini is approximately 1544 km². The Barberton subpopulation occurs in an approximate triangle of 226 km². Plants occur in a very specific habitat – amongst quartzite boulders on cliffs that face in a way that they receive sufficient moisture through mist and the right balance between light and blazing

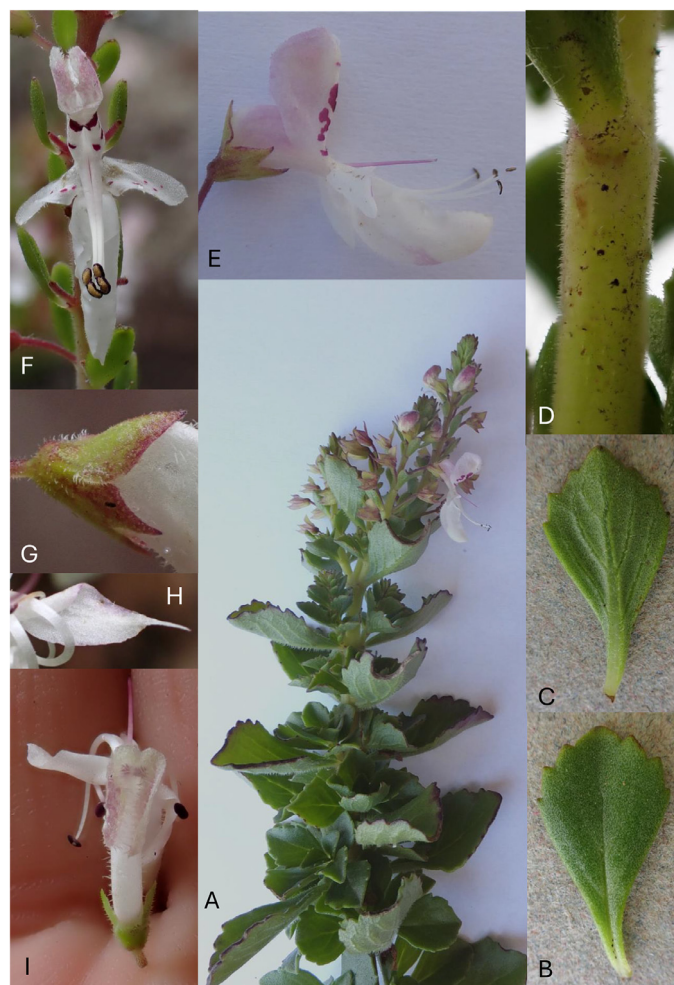


Fig. 5. *Thorncroftia thorncroftii*. A. flowering branch, × 1.75; B. Upper leaf surface, × 3.5; C. Lower leaf surface, × 3.5; D. Young stem, × 5; E. Side view of flower, × 5; F. Front view of flower, × 5; G. Side view of calyx, × 7.5; H. Lateral lobe of corolla, × 7.5; I. Top view of flower, × 7.5.

sun. Far <5 % of the Extent of Occurrence will be suitable, thus the Area of Occupancy (AOO) will be a maximum of 78 km² for the total known population and 12 km² for the Barberton subpopulation. The two known subpopulations are separated by 80 km, and there are about 7 known locations in the Barberton subpopulation. The major threat to the species is forestry plantations, which have caused major fragmentation and degradation of the habitat in the past. Although there are controls on new plantings, trees escape from forestry and invade the habitat or the areas surrounding the habitat and lead to excessive shading. Conservation authorities are under-funded and thus control of alien invasion is not as effective as it should be. Previously, *T. thorncroftii* was assessed as Vulnerable D2 by Lötter et al. (2006a), but the new subpopulation (<https://www.inaturalist.org/observations/18349664>) found in 2017 increases the estimated AOO beyond that threshold. However, the EOO is <5000 km², the AOO is <500 km², the known subpopulations are separated by 80 km, there are fewer than ten locations and there has been fragmentation due to forestry in the past and the lack of control of alien trees is causing continuing decline of the extent and quality of the habitat. Thus, *T. thorncroftii* qualifies as Endangered (EN B1ab(iii)+B2ab(iii)).

Additional specimens examined:

South Africa. MPUMALANGA. **2530 (Lydenburg):** Barberton district, above Cythna Letty Nature Reserve, forest margin (–DD), 29 May 1985, Hardy 6396 (PRE). **2531 (Komatipoort):** Barberton district, Songimvelo Game Reserve, Panhandle, on the farm Twello 373 JU,

1445 m (–CC), 2 Feb 2017, K. Balkwill & Oosthuizen 13,958 (B, J, RSA); Songimvelo Game Reserve, on the Barberton-Havelock road, near sign to Angle Station (–CC), 1 Feb 1999, K. Balkwill et al. 10,879 (J); 2 Feb 2017, K. Balkwill & Oosthuizen 13,964 (J); 17 Mar 2025, K. Balkwill & Oosthuizen 15,014 (J); Barberton district, Havelock road, koppie near Angle Station (–CC), 24 Mar 1956, Clarke 41 (PRE); Angle Station, on slope near summit of mountain (–CC), 2 Aug 1978, van Jaarsveld 3384 (NBG); across gorge to west of Angle Station (–CC), 14 Mar 2000, Lötter 829 (PRE); Brommers Farm, top of Saddleback Ridge (–CC), 31 Mar 1975, De Souza 538 (LYD, PRE); between Barberton and Piggs Peak (–CC), 6 Feb 1959, Werdermann & Oberdieck 2197 (PRE); on the farm De Bilt 372 JU (–CC), 19 Mar 1982, Venter 7778 (LYD); Tienie Louw Nature Reserve (–CC), 9 Mar 2000, Hankey 1075 (LYD).

Eswatini. **2531 (Komatipoort):** Piggs Peak district, Piggs Peak, rocks (–CD), 18 Mar 1960, Compton 30,002 (NBG, PRE).

iNaturalist observations: 18349664, 40872199, 86070922, 122057746, 191967610, 223070195, 223070177, 245358380.

2. *Thorncroftia longiflora* N.E.Br. in Kew Bull. 281 (1912); **Prain** in Bot. Mag. plate 8828 (1919); **Pott** in Ann. Tvl Mus. 6: 133 (1920); **Codd** in Fl. Pl. Afr. 36: plate 1425 (1964). Type: Transvaal [Mpumalanga], near Barberton, Joe's Luck Footpath, Apr 1911, *Thorncroft* 795 (K, holo. K000404625–Global Plants!; NH, iso., PRE, iso.).

Semi-succulent multi-stemmed suffrutex or shrub, 0.3–0.8 mm tall; stems arising from a thickened rootstock, 10 mm in diameter at the base, tapering to 4–5 mm in diameter above, sparingly branched, succulent at the base and brittle above, with dense unicellular and multicellular uniseriate eglandular trichomes and sessile capitate and peltate glandular trichomes. *Leaves* opposite or whorled, elliptic to obovate, (7–)10–18(–20) × 3–10 mm, with midrib slightly sunken for its length, other veins level with upper surface, midrib and secondary veins slightly raised below, pubescent with sessile capitate and peltate glandular trichomes and unicellular and multicellular uniseriate eglandular trichomes on both surfaces, succulent; apex obtuse, rarely rounded; margin with 1–3 teeth on each side of leaf in the upper third or rarely entire; base cuneate; petiole 2–5(–7) mm long. *Inflorescence* a terminal panicle, sometimes with additional subsidiary racemes at upper axils of stems, with flowers solitary in the axil of each bract; main axis (100–)160–250(–420) mm long, with stalked and sessile glandular trichomes and occasional eglandular trichomes; bracts 4–6 × 1.5–2.5 mm at the base becoming progressively smaller and narrower upwards until 2.0–2.5 × 1–1.5 mm at the tip; pedicel 4.5–6 mm long, green proximally, becoming dark green or maroon distally; pubescent with sessile capitate and peltate glandular trichomes and simple and multicellular uniseriate eglandular trichomes. *Calyx* 6–7(–8) mm long, green, with thin maroon edge, pubescent with sessile capitate and peltate glandular trichomes and more common stalked glandular trichomes with a tapering stalk comprising up to 3 cells and a glandular head that is much smaller than the diameter of the base of the stalk; upper lobe about twice as broad as others, diverging upward; the longest teeth 2–2.5 mm long; short teeth 1–1.5 mm long. *Corolla* light lilac proximally darkening to lilac distally, with purple spots on the lateral lobes, pubescent with glandular trichomes with a tapering stalk comprising up to 3 cells and a glandular head that is much smaller than the diameter of the base of the stalk; tube narrowly cylindrical, hardly widening apically, laterally compressed, (35–)40–46(–48) mm long; upper lobes oblong, slightly broader distally, but outer margins folded back, with fine, faint speckling in lower half; lateral lobes narrowly oblong with sharply acute tips, held at about 30° to the vertical, 5–7 mm long, with purple blotches or lines; lower lobe narrowly boat-shaped, initially projecting forward, then gradually lowering until reflexed. *Stamens* 6–7(–8) mm long; filaments light lilac; anthers dark purple; pollen orangey green. *Style* 6–7(–8) mm long, lilac, prevalent after stamens have recoiled. (Fig. 7)

Diagnostic characteristics: The taller habit and much longer corolla distinguish *T. longiflora* from *T. thorncroftii* and the sparse

inflorescence distinguishes it from *T. succulenta*, *T. lotteri* and *T. coddii*. The leaves of *T. longiflora* are much smaller (7–20 × 3–10 mm) than those of *T. media* (27–65 × 13–35 mm). *Thorncroftia longiflora* has longer corolla tubes (35 mm or longer, not shorter than 32 mm) than *T. malolotjaensis* and *T. greenii*. Its young stems below the inflorescences have shorter and denser trichomes (Fig. 6A) than those of *T. malolotjaensis* (Fig. 6B), whereas the young stems of *T. greenii* have very short eglandular trichomes that are less common than the glandular trichomes (Fig. 6C). The calyx of *T. longiflora* has long-stalked small-headed glandular trichomes that are much more common than the short-stalked large-headed glandular trichomes (Fig. 6A), whereas *T. malolotjaensis* has dense eglandular trichomes that are more common than the short-stalked large-headed glandular trichomes (Fig. 6B) and *T. greenii* has mainly short-stalked large-headed glandular trichomes and very few eglandular trichomes on the calyx (Fig. 6C).

Distribution and habitat: *Thorncroftia longiflora* occurs only in the vicinity of where it was originally collected south of Joe's Luck (Fig. 3). It occurs on rocky quartzite hillsides, often growing in crevices between rocks.

Phenology: Flowering is from February to July. *Justicia linifolia* (Lindau) V.A.W. Graham (Acanthaceae) and *Radinosiphon leptostachya* (Baker) N.E.Br. (Iridaceae) flower simultaneously and the flowers of the three are remarkably similar (Fig. 8) and they possibly form a pollination guild.

Conservation notes: All the known localities for *T. longiflora* occur in a tight cluster close to the old Joe's Luck Mine. A generous polygon drawn around where the species might occur has an area of 44 km², but suitable habitat (visible on Google Earth) is way <10 % of that area (i.e. a maximum of 4 km²). Although there is a similar block of mountains to the east of this area, the slopes are not as steep and no quartzite ridges are visible on Google Earth, so *T. longiflora* is unlikely to occur there. Although there are many quartzite ridges south of the population, they are at higher elevations and they are occupied by *T. thorncroftii* and *T. lotteri*. Access to this area is easier than that from which *T. longiflora* is known, and some of this area would have been searched by the Thorncrofts and Clarkes when they were requested to find more material of *Thorncroftia* by Lesley Codd (Codd, 1961), but no *T. longiflora* has been found in that intervening area. In the previous assessment of *T. longiflora* (van Jaarsveld et al., 2009), it was assumed that the species also occurred in Eswatini and KwaZulu-Natal and that it occurred as localized populations from Joe's Luck through to Bivane Dam. Since then, the KwaZulu-Natal subpopulation has been described as a separate species (Balkwill et al., 2009) and we are now describing the Eswatini population as a separate species. Thus, the total EOO for *T. longiflora* is 44 km² and the total AOO is 4 km². There is a single subpopulation and although it occurs in a formally declared nature reserve, the Joe's Luck area has been impacted by illegal mining, leading to reduction in the quality of the habitat. Thus, a classification of Critically Endangered (CR B1ab(iii)+B2ab(iii)) is recommended for *T. longiflora*, because the EOO is <100 km², the AOO is <10 km², there is only one subpopulation and that subpopulation has recently experienced decline in quality of habitat.

Additional specimens examined:

South Africa. **2531 MPUMALANGA. (Komatipoort):** Barberton district, Joe's Luck Footpath, between Joe's Luck Gold Mine and Joe's Luck Siding (–CA), 26 Jul 1994, Archer 2105 (PRE); Joe's Luck Footpath (CA), 1 May 1913, *Thorncroft* sub Transvaal Museum 12,775 (PRE); Barberton Mountainlands Nature Reserve, about 800 m north of Joe's Luck Mine, 1000 m (–CA), 21 Feb 2017, K. Balkwill & Oosthuizen 13,966 (J, K); 9 June 2016, Froneman 951 (PRE); Barberton district, Joe's Luck Footpath (–CA), 15 Mar 1957, *Thorncroft & Clarke* sub PRE 59,078 (PRE); near Barberton (–CA), 16 Apr 1963, *Thorncroft & Clarke* sub PRE 40,698 (PRE).

Cultivated material — GAUTENG. **2528 (Pretoria):** Pretoria district, cultivated at National Botanical Gardens (–CB), 10 May 2001, K. Balkwill & McCallum 12,115 (J).



Fig. 6. Trichomes on calyx (A–C) and young stems just below the inflorescence (D–F). A & D. *T. longiflora*, B & E. *T. malolotjaensis*. C & F. *T. greenii*. A – C $\times 18$; D – F $\times 9$.

3. *Thorncroftia malolotjaensis* K.Balkwill **sp. nov.** Type: Eswatini, Malolotja Nature Reserve, next to the hiking trail to the Malolotja Waterfall viewpoint, 1244 m, 17 Dec 2024, Attwood 47 (J, holo.; K, iso., PRE, iso.).

Semi-succulent multi-stemmed suffrutex or shrub, up to 1 m tall; stems about 10 mm in diameter at the base, tapering upwards to 3–5 mm in diameter, sparingly branched, succulent at the base and brittle above, with unicellular and fine multicellular uniseriate eglandular trichomes and sessile capitate and peltate glandular trichomes. *Leaves* opposite, elliptic, 12–20 $\times$ 7–9 mm, midrib slightly sunken for its length, other veins level with upper surface, midrib and secondary veins slightly raised below, pubescent with sessile capitate and peltate glandular trichomes and unicellular and multicellular uniseriate fine eglandular trichomes on both surfaces, succulent; apex acute to obtuse, rarely rounded; margin usually entire, occasionally with 1–3 teeth on each side of leaf in the upper third; base cuneate; petiole 4–8 mm long, covered with dense, fine trichomes. *Inflorescence* a terminal raceme, sometimes with many additional subsidiary racemes at upper axils of stems; main axis 70–90 mm long, pubescent with sessile capitate and peltate glandular trichomes and simple and multicellular uniseriate fine eglandular trichomes, with flowers solitary in the axil of each bract; bracts leaf-like, 6–10 $\times$ 3.5–5.5 mm at the base becoming progressively smaller and narrower upwards; pedicel 4.5–6 mm long, green proximally, becoming dark green or maroon distally or green abaxially and dark green or maroon adaxially. *Calyx* 6–7(–8) mm long; light green to pink with maroon upper lobe, pubescent with sessile capitate and peltate glandular trichomes and unicellular and multicellular uniseriate fine eglandular trichomes that are longer than and as common as or more common than the glandular trichomes; upper lobe broader than lateral lobes, diverging upward,

decurrent on tube, keeled; lateral lobes at least twice as broad as abaxial lobes, asymmetric, keeled; the longest teeth 2–2.5 mm long, short teeth 1–1.5 mm long. *Corolla* light lilac proximally darkening to lilac distally; pubescent with sessile capitate and peltate glandular trichomes, stalked glandular trichomes with a tapering stalk comprising up to 3 cells and a glandular head that is much smaller than the diameter of the base of the stalk and simple and multicellular uniseriate eglandular trichomes; tube narrowly cylindrical, hardly widening apically, laterally compressed, 28–36 mm long; upper lobes oblong to obovate, but outer margins folded back to make them appear triangular, with 3 areas flushed lilac in lower half; lateral lobes narrowly oblong with sharply acute tips, held at about 30° to the vertical, 5–7 mm long, with purple blotches and / or broad lines; lower lobe narrowly boat-shaped, initially projecting forward, then gradually lowering until reflexed. *Stamens* with filaments 6–7(–8) mm long, light lilac; anthers dark purple; pollen orangey green. *Style* 7–10 mm long, lilac, prevalent after stamens have recoiled. (Fig. 9)

Diagnostic characteristics: The taller habit and much longer corolla distinguish *T. malolotjaensis* from *T. thorncroftii* and the sparse inflorescence distinguishes it from *T. succulenta*, *T. lotteri* and *T. coddii*. The leaves of *T. malolotjaensis* are much smaller (12–20 $\times$ 7–9 mm) than those of *T. media* (27–65 $\times$ 13–35 mm). *Thorncroftia malolotjaensis* is similar to *T. greenii*, but can be distinguished by its young stems (especially inflorescence axes) and calyx that have as many or more fine eglandular trichomes than gland-headed trichomes and the eglandular trichomes are at least twice as long as the glandular trichomes, rather than more glandular than eglandular trichomes with eglandular trichomes about as long as the glandular trichomes as in *T. greenii*. The fine rather than coarse eglandular trichomes on the calyx and young stems distinguish *T. malolotjaensis* from *T. longiflora*

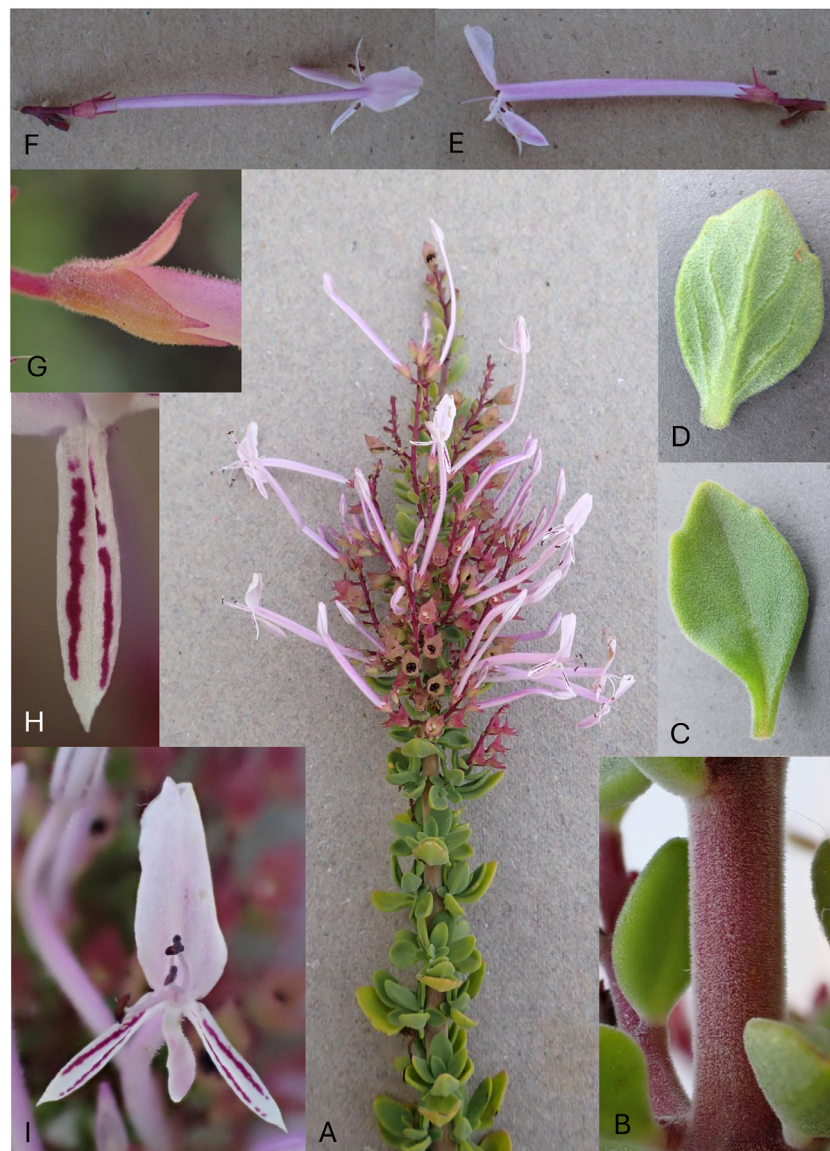


Fig. 7. *Thorncroftia longiflora*. A. flowering branch, $\times 1$; B. Young stem, $\times 11$; C. Upper leaf surface, $\times 4.5$; D. Lower leaf surface, $\times 4.5$; E. Side view of flower, $\times 2$; F. Top view of flower, $\times 2$; G. Side view of calyx, $\times 12$; H. Lateral lobe of corolla, $\times 12$; I. Front view of flower, $\times 6$.

as do the shorter corolla tubes (28–36 mm long rather than (35–)40–46(–48) mm long).

Distribution and habitat: *Thorncroftia malotjaensis* occurs in Malolotja Nature Reserve in Eswatini (Fig. 3), amongst rocks on steep rocky quartzite hillsides, often in the shade of *Englerophytum magalis-montanum* (Sond.) T.D.Penn.

Phenology: Flowering is from March to May.

Conservation notes: All the known localities for *T. malotjaensis* (those on iNaturalist included) occur in a tight cluster in Eswatini, close to Malolotja Falls. A generous polygon drawn around these records, taking elevation and potentially suitable habitat into account, provides an area of 4 km², but suitable habitat is much <5 %, making an area of 200 m². There are many quartzite ridges between where *T. malotjaensis* and *T. longiflora* occur, but neither species is likely to occur there (see the discussion under *T. longiflora*). Although the limited EOO and AOO and single location could qualify *T. malotjaensis* for Critically Endangered, the lack of any known threat would mean it only qualifies for a classification of Critically Rare in the South African system (SANBI, 2025).

Additional specimens examined:

Eswatini. MBABANE. **2631 (Mbabane):** Malolotja Nature Reserve, on slopes above Malolotja River, below Malolotja Falls (–AA), 12 Apr 1987, Heath 589 (PRE); Hhohho, Malolotja Nature Reserve, Silotfwane Viewpoint trail to Malolotja River (–AA), 6 May 1990, Braun 961 (PRE).

iNaturalist observations: 11020337, 22572709, 117955801, 150715530, 255528620.

4. *Thorncroftia greenii* Changwe & K.Balkwill in Balkwill et al., Fl. Pl. Afr. 61: 112–117 (2009). Type: Ngotshe district, about 30 km west of Louwsburg on the road to Bivane Dam (formerly known as Paris Dam), 1109 m (–CA), 9 Apr 2002, K. Balkwill, Changwe & Green 12,202 (J!, holo.; E!, K!, NH!, PRE!, iso.).

Herb or shrub (0.3–)0.5–1.0 m tall; stems brittle, semi-succulent, leafy, erect, almost rounded in cross-section, sparingly branched, arising from a thickened rootstock, ± 12 mm in diameter at the base, tapering to 3–4 mm in diameter above; pubescent with very thin glandular trichomes 75 ± 15 μ m long and sparse spreading thin simple unicellular and multicellular uniseriate eglandular trichomes. Leaves opposite, elliptic to obovate, (7–)10–18(–20) $\times$ 3–10 mm, with veins level with upper and lower surfaces, pubescent with thin

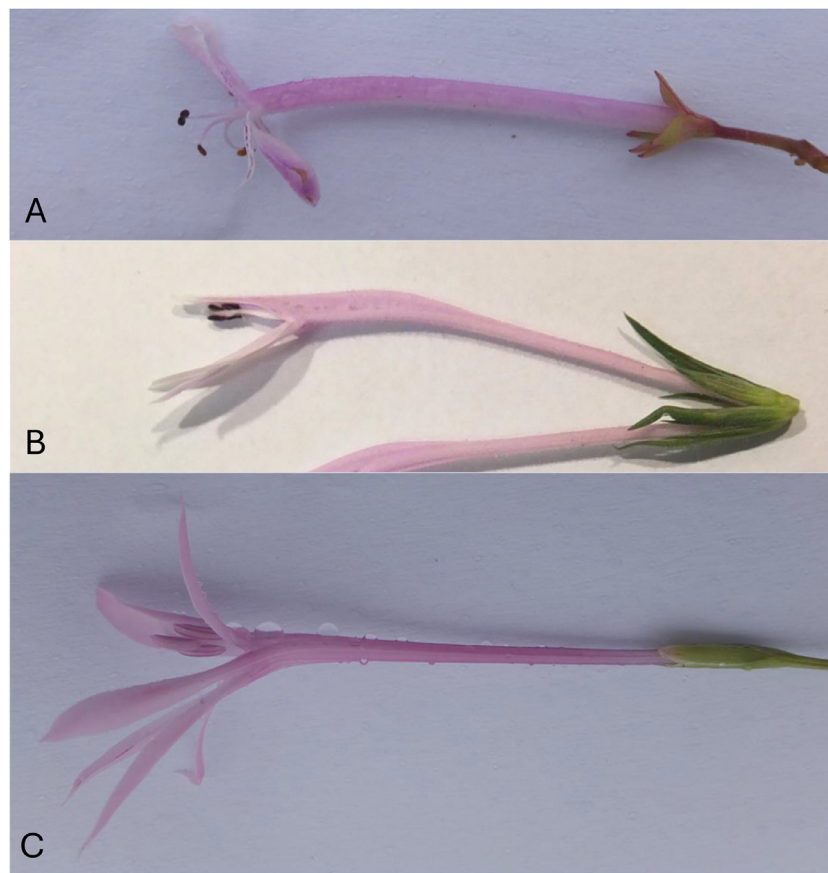


Fig. 8. Possible pollination guild that may include *Thorncroftia longiflora*. A. *T. longiflora*; B. *Justicia linifolia*; C. *Radinosiphon leptostachya*. All $\times 2$. Photographer D. Oosthuizen.

capitate glandular trichomes, and simple unicellular and multicellular uniseriate eglandular trichomes on both surfaces; apex rounded; margin entire or rarely with 1–2 teeth on each side near the apex; base broadly cuneate; petiole 5–6.5 mm long. *Inflorescence* a terminal raceme on the main stem and several upper side branches, with a solitary flower in axil of each bract, pubescent with glandular trichomes and multicellular uniseriate eglandular trichomes; main axis (100–)120–200(–260) mm long; bracts leaf-like, 4–6 $\times$ 1.5–2.5 mm at the base, becoming progressively smaller and narrower until 2.0–2.5 $\times$ 1–1.5 mm at the tip; pedicel 4–9 mm long. *Calyx* 6–7(–8) mm long, covered with short-stalked peltate glandular trichomes and with few eglandular trichomes that are hardly longer than the glandular trichomes; upper lobe ovate-lanceolate, acuminate, decurrent on the tube; lower 4 teeth lanceolate-triangular; the longest teeth 2–2.5 mm long, short teeth 1–1.5 mm long. *Corolla* light lilac, pubescent with glandular and eglandular trichomes; tube narrowly cylindrical, hardly widening apically, laterally compressed, (25–)28–30(–32) mm long; upper lobes broadly oblong, 5–7 mm long, sometimes folded back along their length; lateral lobes narrowly elliptic, with acute to sharply acute tips, held at about 40° to the vertical, with mauve or purple speckles or small blotches in one or two rows or broad lines, 5–7 mm long. *Stamens* with filaments 6–7.5 mm long, light lilac; anthers dark purple; pollen orangey yellow. *Style* (4–)5–6.5(–8) mm long, light lilac, lobes magenta, growing into position once stamens have recoiled (Fig. 10).

Eponymy: This species was named for Dave Green (1937–2007), a farmer, amateur botanist, amateur palaeontologist, and cultural, political and natural historian from Estcourt, who drew our attention to this species.

Diagnostic characteristics: The taller habit and much longer corolla distinguish *T. greenii* from *T. thorncroftii* and the sparse inflorescence

distinguishes it from *T. succulenta*, *T. lotteri* and *T. coddii*. The leaves of *T. greenii* are much smaller (7–20 $\times$ 3–10 mm) than those of *T. media* (27–65 $\times$ 13–35 mm). *Thorncroftia greenii* is morphologically similar to *T. longiflora* but has capitate glandular trichomes more common than eglandular trichomes on the calyx and inflorescence axis and the two types of trichomes are of about the same length, whereas *T. longiflora* has coarse eglandular trichomes that are more common than and at least twice as long as the glandular trichomes on the calyx and mask the glandular trichomes on the inflorescence axis. The corolla tube is shorter (28–32 mm long) in *T. greenii* than in *T. longiflora* (35–48 mm long).

Distribution and habitat: Currently, *T. greenii* is only known to occur in northern KwaZulu-Natal in the Louwsburg area (Fig. 4). Initially it had only been found in the area surrounding Bivane Dam, but more recently (July 2024) Ms Lindsay Balkwill found it at Pakamisa Game Lodge near Pongola, about 50 km east of the previously known localities. *Thorncroftia greenii* grows in fissures and cracks on quartzite rock outcrops at elevations of 700 to about 1150 m.

Phenology: It flowers from March to April.

Conservation notes: Prior to the 2024 collection of *T. greenii* by Lindsay Balkwill at Pakamisa Game Lodge, all the records of *T. greenii* were from a single arc of quartzite that is crossed twice by the road from the R69 (from Vryheid to Louwsburg) to Bivane Dam, and thus effectively from one location. The extent of that quartzite area is about 6 km², with possibly 50 % of the area being suitable habitat (i.e. 3 km²). Other potential quartzite areas close to the known localities (and including the known area) are about 60 km² and 55 km² in extent, with possibly 10 % of the area being of suitable habitat thus making potential AOO of 11.5 km². At the Pakamisa locality, there is a quartzite massif about 27 km² in extent, of which about 30 % may be suitable habitat, thus yielding potential AOO of 8.1 km². Total area



Fig. 9. *Thoncroftia malotjaensis*. A. flowering branch, $\times 1$; B. Young stem, $\times 6$; C. Upper leaf surface, $\times 4$; D. Lower leaf surface, $\times 4$; E. Side view of flower, $\times 2.5$; F. Top view of flower, $\times 2.5$; G. Front view of flower, $\times 7$; H. Lateral lobe of corolla, $\times 11$; I. Side view of calyx, $\times 8$.

including the potential extent of the known populations and the intervening area is about 1720 km², of which a maximum of 5 % is suitable habitat, giving a total AOO of 86 km². The two known subpopulations are 50 km apart. The Pakamisa subpopulation is in a privately protected area, but the Bivane population is in community lands with heavy unmanaged grazing and trampling and invasion by aliens, especially *Acacia mearnsii* De Wild. On a trip to try to relocate *Ceropegia craibii* J.E. Victor at Bivane Dam in December 2022, we did not find any *T. greenii* in the reserve around the dam. On the basis of an EOO <5000 km², and AOO <200 km², distance between the two known populations being 50 km and only one population being protected, while the other faces threats that are likely to increase into the future, a category of Endangered (EN B1ab(iii)+B2ab(iii)) is recommended. This concurs with the 2014 assessment (Balkwill et al., 2014), despite a new population having been found.

Additional specimens examined:

South Africa. KWAZULU-NATAL. **2731 (Louwsburg):** About 9 km SW of Pongola, Pakamisa Game Lodge, On hill SW of main lodge, 730 m (–BC), 17 Jul 2024, L.C. Balkwill 32 (J, PRE); Ngotshe district, about 30 km west of Louwsburg beside road to Paris Dam on the Bivane River (–CA), 9 Apr 2002, K. Balkwill, Changwe & Green 12,203 (B, J, K, MO); *ibidem*, further on the same road (–CA), 9 Apr 2002, K.

Balkwill, Changwe & Green 12,204 (J); Vryheid district, road to Bhivane (Paris) Dam, 11 Dec 2002, Bruyns 9350 (BOL); Ngotshe district, on the road to Bivane Dam (–CA), 9 Apr 2002, Changwe, K. Balkwill & Green 102 (J); June 1966, Hankey 548 (PRE).

Cultivated material – GAUTENG. **2628 (Johannesburg):** Witwatersrand Botanical Garden (–AA), no date, Changwe, K. Balkwill & Paton 101 (J). KWAZULU-NATAL. **2929 (Underberg):** Estcourt district, Rensburg Spruit, cultivated at Dave Green's residence (–CC), 06 May 2001, Green 915 (J, K).

iNaturalist observations: 144295411, 144304329, 144350543, 144350586, 144881939, 144881943, 201681320, 201960558, 202187707, 202439146, 202962356, 203748931, 203915856, 207378402, 207451033, 207535746, 208258596, 208258601, 245358379, 256660227, 258456750, 258456753.

5. *Thoncroftia media* Codd in Bothalia 16:1 (1986). Type: Limpopo Province [Transvaal], Drakensberg range, west of Trichardtsdal, cultivated in BRI nursery, Hardy 3966 (PRE, holo.!; C C10000904–Global Plants!, iso.; K K000237527–Global Plants!, iso.; K K000385679–Global Plants!, iso.; MO MO4297642–Global Plants!, iso.).

Semi-succulent suffrutescent, to about 0.6 m tall, branching at the base; stems erect, sparingly branched, with sessile and stalked glandular trichomes and with fine multicellular uniseriate, biramous and



Fig. 10. *Thorncroftia greenii*. A. flowering branch, $\times 0.7$; B. Young stem, $\times 5$; C. Upper leaf surface, $\times 1.8$; D. Lower leaf surface, $\times 1.8$; E. Side view of calyx, $\times 4$; F. Top view of flower, $\times 1.8$; G. Side view of flower, $\times 1.8$; H. Front view of flower, $\times 5$; I. Lateral lobe of corolla, $\times 4$.

dendroid trichomes. *Leaves* opposite, ovate to elliptic, (27–)30–55(–65) $\times$ 13–35 mm, midrib, secondary and tertiary veins channelled above, midrib, secondary and tertiary veins strongly raised below to form a network of recesses, tomentose and gland-dotted on both surfaces with multicellular uniseriate, biramous, and dendroid trichomes; apex rounded, margin with about 6 shallow scallops on the distal half of each side of the leaf; base cuneate; petiole (20–)22–28(–35) mm long. *Inflorescence* a sparse terminal panicle with subsidiary racemes in upper axils of stem, main axis (95–)120–260 mm long, with similar indumentum to the stem, except glandular trichomes are more common; bracts leaf-like, 5–7 $\times$ 3–5 mm at the base becoming smaller upwards until 1.5–4 $\times$ 1–1.5 mm at the tip; pedicels 2–3 mm long. *Calyx* 5–7 mm long at flowering, with sessile and stalked glandular trichomes and occasional uniseriate eglandular trichomes, especially on the margins, initially mauve proximally and lilac distally then red proximally and pink distally; upper tooth curving upwards, broadly ovate-triangular, sharply acute, 2–2.5 mm long; lower 4 teeth sub-equal, broadly triangular and acuminate, 1–1.5 mm long. *Corolla*

lilac with sessile and stalked glandular trichomes; tube narrowly cylindrical, slightly arcuate and very slightly deeper in middle, laterally compressed, (18–)20–25 mm long, white; upper lobes broadly oblong or margins curled back to appear almost circular, 5–6 mm long, white flushed light lilac with blue to purple lines parallel to midline; lateral lobes curving downward, pointing forward at about 45° and held at between 20° and 45° to the vertical, strap-shaped with long acuminate tip, 5–6 $\times$ 1 mm long, white flushed lilac with purple stripes and blotches; lower lobe boat-shaped, lilac, initially projecting forward, but then recurving until completely reflexed. *Stamens* 3–7 mm long; filaments white proximally, light lilac distally, initially held straight out, but then diverging and recurving; anthers dark purple; pollen dark yellow. *Style* initially straight then curving upward, lilac proximally darkening distally to a purple tip (Fig. 11).

Diagnostic characteristics: *Thorncroftia media* is similar to *T. succulenta*, but *T. media* has considerably larger leaves (35–65 mm long) with very shallow scallops along the margins whereas *T. succulenta* leaves are shorter (16–30 mm long) with 6–7 obvious scallops on the

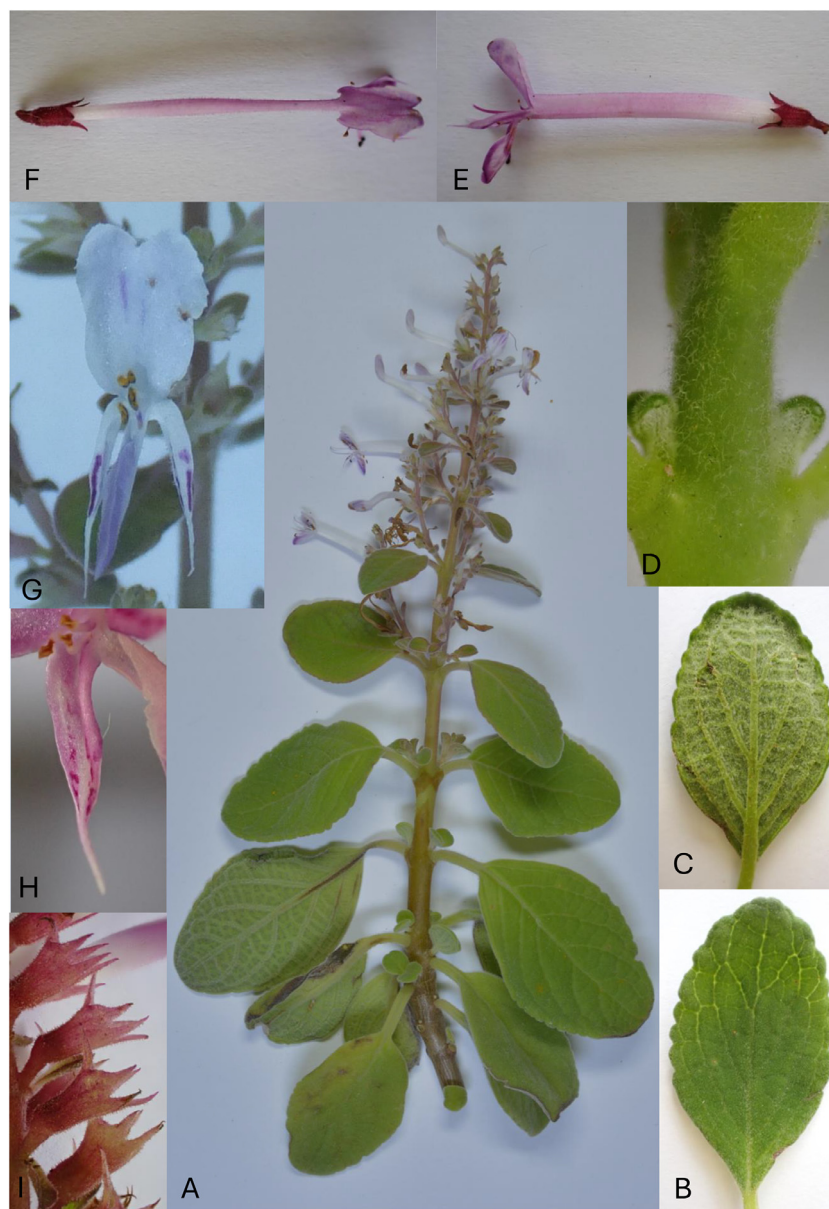


Fig. 11. *Thorncroftia media*. A. flowering branch, $\times 0.75$; B. Upper leaf surface, $\times 1$; C. Lower leaf surface, $\times 1$; D. Young stem, $\times 6$; E. Side view of flower, $\times 2$; F. Top view of flower, $\times 2.5$; G. Front view of flower, $\times 5$; H. Lateral lobe of corolla, $\times 7$; I. Side view of calyx, $\times 4$.

distal half of each margin. Inflorescences are sparse in *T. media*, but dense in *T. succulenta*. *Thorncroftia coddii* and *T. lotteri* are also similar to *T. media*, which is the only species with three types of complex eglandular trichomes (biramous and dendroid) on stems and leaves. *Thorncroftia succulenta* has only one type of complex trichomes (dendroid trichomes), which are much coarser than those in *T. media*, with *T. lotteri* having none of the branched trichome types and *T. coddii* having mainly simple trichomes with rare biramous trichomes on some veins in the leaves.

Distribution and habitat: *Thorncroftia media* has until very recently been known only from the type gathering, collected on rocky slopes of the Drakensberg Mountain Range (Wolkberg Centre) west of Trichardtsdal, Limpopo Province (Fig. 3) in April 1976. Many botanists collected at Lekgalameetse Nature Reserve, slightly north of the locality given by Mr Dave Hardy, and Dr Marc Stalmans undertook extensive collecting there (Stalmans et al., 1997) and it is unlikely that he would have missed *T. media* if it occurred in that area. Nonetheless Kevin Balkwill (KB) and various colleagues have returned to look for the species at Lekgalameetse (April and November 2017) and near

Mafefe Camp (November 2017) and at Lekgalameetse again in November 2021. The Mpumalanga Plant Specialist Group (PSG) has searched for *T. media* on the farm Gibraltar 79 KT and then on the Ga-Ditepsu Trail above Sedawa village and about 7 km northwest of that above Ntswele Motse village with Mr Simon Attwood (SA) reaching Lefahla Peak in March 2025. Despite these efforts, *T. media* had not yet been relocated in the wild until SA found the species near the summit of the escarpment at the top of Gibraltar Kloof on Gibraltar 79 KT on 19 April 2025. Dave Hardy reported the plant to occur on rocky wooded slopes. Simon Attwood found it on rocky quartzite boulders just above the forest edge.

Phenology: *Thorncroftia media* flowers in April.

Conservation notes: *Thorncroftia media* was previously assessed as Critically Rare, as it was not suspected to be in any danger (Von Staden, 2018a). Although previous attempts were made to relocate *T. media*, none was successful until SA relocated the plant in the wild in April 2025. He reported about 70 plants on two massive boulders on one side of Gibraltar Kloof and about 1,000 plants on the other side, together representing an AOO of 20 ha. A polygon that includes

a potentially suitable mountain in Lekgalameetse to the west of Trichardtsdal and the site where *T. media* has recently been found provides a maximum EOO of 40 km² and assuming that a maximum of 2 % of that area is suitable habitat, a maximum AOO of 0.8 km². The locality is about 5 km from the nearest settlement, in very rugged terrain, but *Solanum mauritanium* Scop. and *Opuntia* sp. co-occur and are threats to the habitat of *T. media*. Thus, on the basis of current knowledge, with EOO <100 km², AOO <10 km², only one known location and threat from alien invasive weeds, a classification of Critically Endangered (CR B1a b(iii)+B2 ab(iii)) is recommended.

Additional specimens examined:

LIMPOPO. **2430 (Pilgrim's Rest):** Drakensberg range, about 5 km NE of Orsted and 12 km SSW of Trichardtsdal, on the farm Gibraltar 79 KT, near the summit of the escarpment at the top of Gibraltar Kloof, 1465 m (–AD), 19 Apr 2025, Attwood 48 (J, K, MO, PRE).

6. *Thorncroftia lotteri* T.J. Edwards & McMurtry in Edwards, S. A. J. Bot. 72: 202 (2006). Type: Mpumalanga, east of Barberton, near Shiyalongubu Dam, Ugutugulu Gorge, 21 Mar 2004 (–CD), McMurtry 11,764 (NU, holo.!, PRE, iso.!).

Semi-succulent shrub, up to 1 m high, stems erect, 8–15 mm in diameter at the base, with sessile glandular trichomes masked by dense silky, grey tomentose indumentum of multicellular and unbranched trichomes. Leaves opposite, ovate to elliptic-obovate, (25–)30–40(–45) × (10–)20–30(–35) mm, midrib, secondary and tertiary veins channelled above and raised below, forming a network of recesses, with sessile glandular trichomes and multicellular uniseriate unbranched trichomes dense above and very dense below; apex rounded or acute; margin crenate with 9 or more scallops on each side of the leaf in the upper three-quarters; base cuneate to obtuse; petiole (10–)12–15(–19) mm long. Inflorescence a terminal compact panicle, main axis (63–)100–200 mm long, with sessile glandular trichomes and dense eglandular unbranched trichomes; bracts leaf-like, 6–12 × 3–9 mm near the base becoming progressively smaller until 2–5 × 1–2 mm at the tip. Calyx 5-toothed, 2-lipped, (5–)7–9 mm long at fruiting stage, with short sessile glandular trichomes and multicellular uniseriate eglandular trichomes, purple to maroon; upper tooth 2–3 mm long, shortest teeth 1–1.5 mm long, ovate-lanceolate, acuminate. Corolla pubescent with short-stalked large-headed and long-stalked small-headed glandular trichomes; tube narrowly cylindrical, hardly widening apically, laterally compressed, 20–23(–26) mm long, light lilac and lightening distally; upper lobes erect, 6–7 × 4–5 mm, outer edges folding backwards, sometimes strongly so, lilac with fine purple spots forming streaks or with purple blotches and spots; lateral lobes held at about 45° to 75° to the vertical and projecting forwards, 2–4 × 2–3 mm, light lilac with purple blotches; lower lobe initially projecting forward, but then lowering until completely reflexed, 6–9 mm long, light lilac. Stamens 5–7 mm long; filaments white to light lilac; anthers dark purple; pollen yellow or orange. Style light lilac with a purple tip, extending once stamens have recoiled (Fig. 12).

Eponymy: Named for Mervyn Lötter (b. 1972), Biodiversity Planner & GIS Manager at Mpumalanga Tourism and Parks Agency and one of those who assisted with the collection of material that enabled description of the species (Edwards, 2006).

Diagnostic characters: *Thorncroftia lotteri* is very similar to *T. succulenta* and *T. coddii* but can be distinguished from these species on the basis of having simple and long multicellular uniseriate trichomes. The whole plant of *T. lotteri* is heavily covered with dense eglandular trichomes whereas in *T. succulenta* dendroid trichomes are common on the vegetative and reproductive organs and in *T. coddii* the trichomes are much shorter and less dense. In *T. lotteri* the leaf margin is crenate with about 12 evenly spaced teeth on each side of the leaf whereas the teeth on the leaf margins are irregular and less than nine on each side of the leaf in both *T. succulenta* and *T. coddii*.

Distribution and habitat: The known distribution of *T. lotteri* is currently restricted to the mountains around Barberton in Mpumalanga

(Fig. 4) on stony mountain tops and quartzite ridges in loam to sandy soils at 1000–1400 m above sea level. It was first collected by Mr Clarke in 1957 in the Hyslop's Creek near Barberton and was reported to be fairly common. The species was recorded in Songimvelo Game Reserve on the farm Duurstede by Marc Stalmans in 1992 and then subsequently in Ugutugulu Gorge in 2004 by Trevor Edwards et al. and then Douglas McMurtry.

Phenology: It flowers in January (rare) and in March to April.

Conservation notes: A polygon drawn around the currently known locations provides an EOO of 100 km², but if an adjacent area that seems suitable is included, an EOO of 250 km² is obtained. Because of the specificity of the habitat (quartzite ridges on the tops of hills or quartzite cliffs at an elevation between 850 and 1400 m), a maximum of 2 % of this area would be suitable, giving an AOO between 2 and 5 km². There are six known locations with the suitable habitat being naturally fragmented and intense forestry activities in the area providing further considerable fragmentation. Some of the EOO is affected by informal mining, which leads to habitat degradation as does the uncontrolled escape of alien trees from the forestry plantations. It is surprising that there are no iNaturalist records of such a striking and attractive plant, which may also point to its rarity. Some of the localities are in nature reserves (i.e. Songimvelo Nature Reserve and Mountainlands Nature Reserve). In the previous assessment (Lötter et al., 2006b), a status of Vulnerable D2 was assigned, but since that time, more locations have come to light and threats from informal mining and alien vegetation have increased substantially. With an EOO <5000 km², an AOO <500 km², a severely fragmented habitat due to forestry and threats to habitat quality from informal mining and invasion by alien woody species, a classification of Endangered (EN B1ab(iii)+B2ab(iii)) is recommended.

Additional Specimens examined:

South Africa. MPUMALANGA. **2531(Komatipoort):** Barberton, Hyslop's Creek (–CA), 22 Apr 1957, Clarke 213 (PRE); Mountainlands Nature Reserve, farm Dycedale 368 JU, 10 May 2014, Oosthuizen 853 (BMLH, J); Barberton, Louws Creek Timbers, Waaiheuvel Farm (–CB), 10 Mar 1980, Buitendag 1289 (PRE); Barberton, Louws Creek (–CB), 21 Apr 1979, Muller 29 (PRE); Barberton, Mountainlands Reserve, E of farm Dycedale (–CC), McMurtry 15,323 (J); Barberton, Songimvelo Game Reserve, on the farm Duurstede 361 JU, Lufafa (–CD), 27 Apr 1992, Stalmans 2762 (J, LYD); Shiyalongubu Dam (–CD), 13 Jan 2004, Edwards et al. 3202a (NU).

7. *Thorncroftia coddii* Changwe & K. Balkwill sp. nov. Type: Mpumalanga, Blyderivierspoort Nature Reserve, on the farm Steenveld 229 KT, About 5 km ENE of the Steenveld Picket, 1445 m (–DB), 6 Apr 2024, Attwood sub K. Balkwill 14,916 (J, holo.; E, K, LYD, MO, PRE iso.).

Succulent stemmed shrub usually 0.8–1.2 m high with several stems arising from a thickened rootstock, stems ascending, sparingly branched, with sessile capitate and peltate glandular trichomes and dense unicellular and multicellular uniseriate eglandular trichomes. Leaves opposite, ovate-elliptic to obovate, (5–)8–18(–24) × 4–10 mm, midrib and secondary veins channelled above, midrib, secondary and tertiary veins strongly raised below to form a network of recesses, with sessile large-headed glandular trichomes and multicellular uniseriate unbranched eglandular trichomes on both surfaces and rare biramous trichomes on the veins below; apex rounded; margin crenate with 6–7 distinct scallops in distal two-thirds of each side of the leaf; base cuneate; petiole 4–8 mm long, grooved above. Inflorescence a terminal compact panicle, main axis 120–240 mm long, with indumentum like that of the stem; bracts leaf-like, 4–6 × 2–4 mm near the base becoming progressively smaller until 2–3 × 1–1.5 mm at the tip. Calyx 5-toothed, 2-lipped, 5–7 mm long at flowering, pubescent with sessile and stalked capitate and peltate glandular trichomes, and short multicellular uniseriate eglandular trichomes, dark red to maroon; upper tooth 2–3 mm long; shortest teeth 1–1.5 mm long, ovate-lanceolate, acuminate. Corolla with common sessile large-headed glandular trichomes and small-headed glandular trichomes

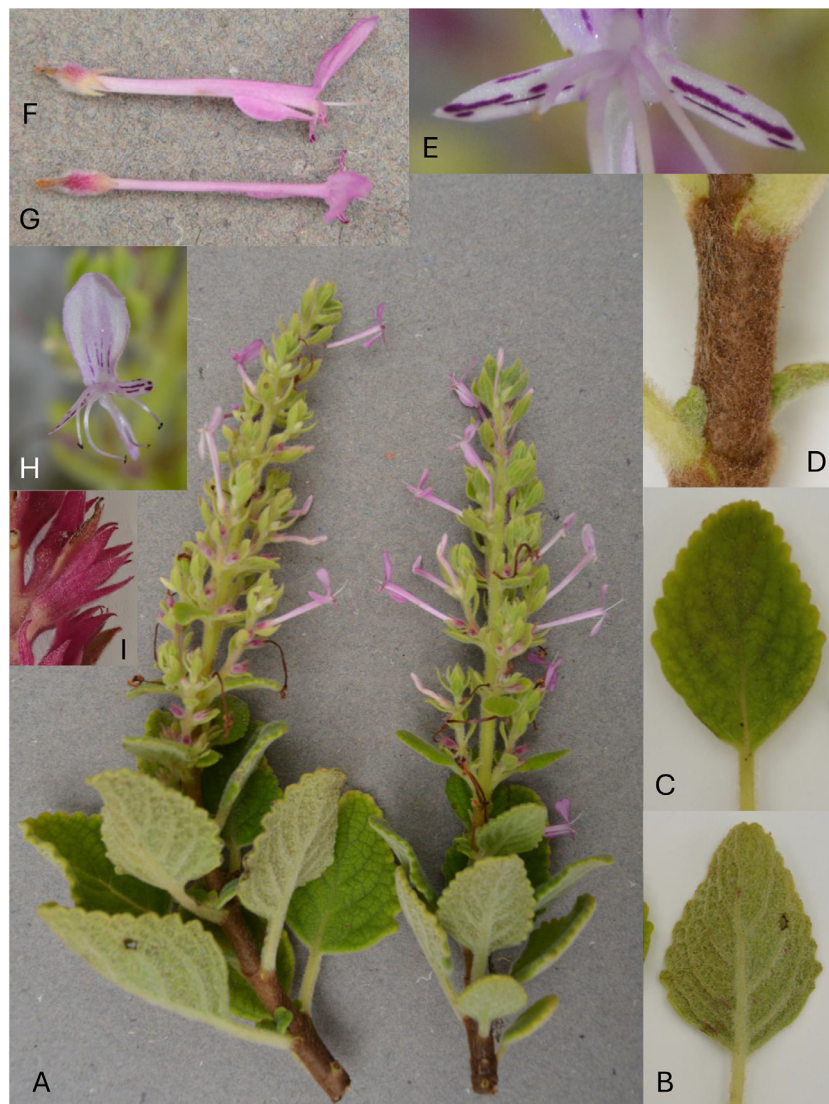


Fig. 12. *Thorncroftia lotteri*. A. flowering branch, $\times 0.6$; B. Lower leaf surface, $\times 1.2$; C. Upper leaf surface, $\times 1.2$; D. Young stem, $\times 4$; E. Lateral lobe of corolla, $\times 8$; F. Side view of flower, $\times 2.2$; G. Top view of flower, $\times 2.2$; H. Front view of flower, $\times 3$; I. Side view of calyx, $\times 3$.

with long few-celled conical stalked glandular trichomes and some multicellular uniseriate eglandular trichomes on outer surfaces; tube narrowly cylindrical, not widening apically, laterally compressed, (29–)35–38 mm long, lilac to light mauve darkening distally; upper lobes 6–8 mm long, lilac with purple spots or with purple speckles above throat; lateral lobes curving downwards and held at about 10° to 30° to the vertical, 5–6 mm long, lilac with purple spots; lower lip shallowly boat-shaped, initially held pointing forwards, then slowly recurving until completely reflexed, 6–8 mm long, lilac with purple spots on inner surface. *Stamens* 5–7 mm long; filaments lilac or mauve, lightening distally; anthers dark purple; pollen yellow. *Style* lilac darkening to mauve distally, extending once stamens have recoiled (Fig. 13).

Diagnostic characters: *Thorncroftia coddii* is distinguished from *T. succulenta* on the basis of having mainly multicellular uniseriate unbranched trichomes on the stems, leaves and calyces whereas *T. succulenta* has dense dendroid trichomes in addition to the multicellular uniseriate trichomes on the stems, leaves and calyces. In addition, the corolla tube length in *T. coddii* is longer ((29–)35–38 mm long) than in *T. succulenta* (15–20(–22) mm long, Fig. 1C).

Note: The specimen *van Jaarsveld* 22,010, has unusually narrow and pointed leaves and has dense trichomes on the undersurface of

the leaves, almost as if there may be some influence of *T. lotteri*. Mr Simon Attwood (SA) has gone to the locality and found that most plants match usual *T. coddii* although some plants do have narrower and more pointed leaves. He did not find any plants with dense trichomes on the underside of the leaf.

Distribution and habitat: *Thorncroftia coddii* was first collected by Dr Lesley Codd near Mariepskop in 1953, but he considered it to be *T. succulenta*. In June and July 2001 Mr John Rushworth drew KB's attention to it on the mountains above Chester Farm, near Hoedspruit (about 18 km northwest of the original collection) and SA recollected the species near that locality in April 2024, but accessing it from above the escarpment, via the farm Steenveld 229 KT. Several unsuccessful attempts were made to relocate the "near Mariepskop" population, but then SA used the background in the slides provided by Codd to pinpoint the original locality and KB relocated it at that point simultaneously with SA finding it about 1 km away in clefts on the north-east facing slopes of the northwest corner of the Hebronberg. Subsequently, SA found the species on the farm Erasmushoop, some 13 km south and we collected it in flower at that locality in February 2025 (Fig. 3). *Thorncroftia coddii* grows in south-facing clefts and cracks in quartzite cliffs and boulders or it may grow on quartzite outcrops or very occasionally on massive quartzite boulders.

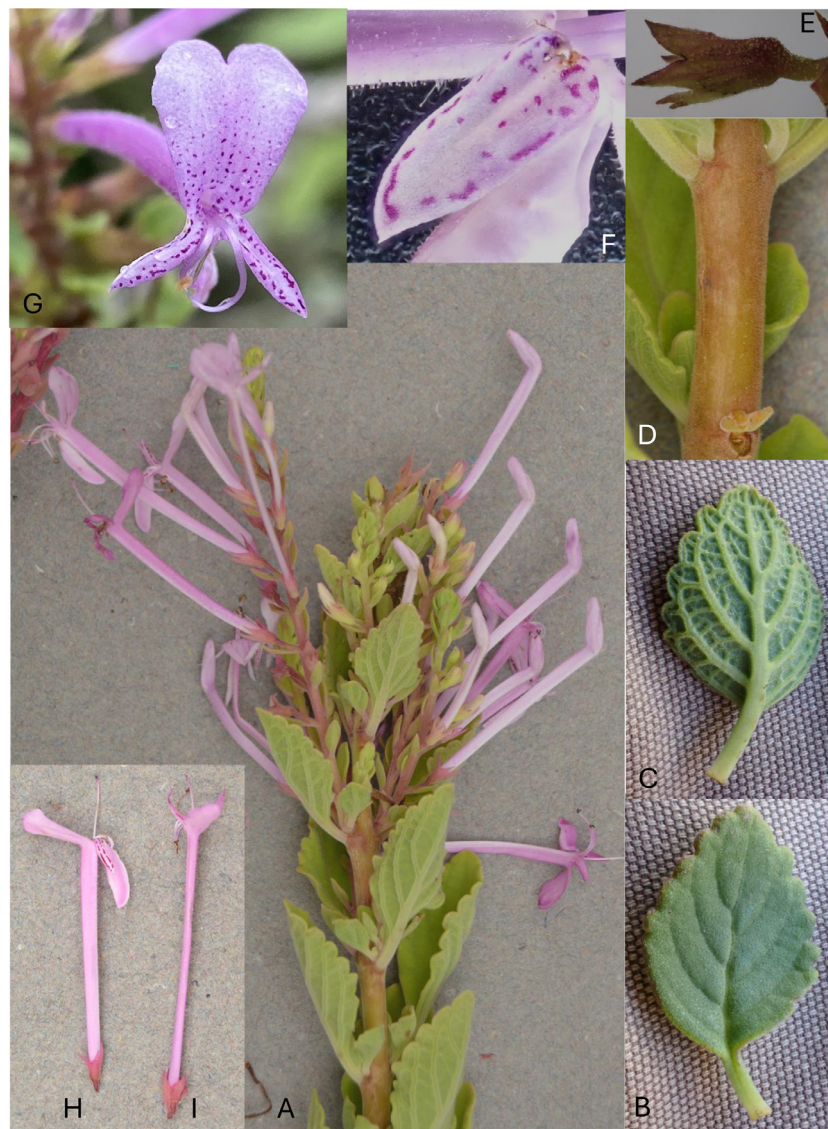


Fig. 13. *Thorncroftia coddii*. A. flowering branch, $\times 0.8$; B. Upper leaf surface, $\times 1.5$; C. Lower leaf surface, $\times 1.5$; D. Young stem, $\times 4$; E. Side view of calyx, $\times 5$; F. Lateral lobe of corolla, $\times 9$; G. Front view of flower, $\times 5$; H. Side view of flower, $\times 1.6$; I. Top view of flower, $\times 1.6$. Photographer: B. Simon Attwood as iNaturalist Observation 205925785.

Phenology: *Thorncroftia coddii* flowers from February to April and possibly in May.

Conservation notes: Based on a polygon including the three known localities for *T. coddii* and intervening areas where there may be quartzite cliffs, an EOO of 162 km² is obtained. The two northern sites have a maximum length of suitable cliffs of 13 km and the width of the area including cliffs and clefts that might be suitable is about 150 m broad, giving an area of 1.95 km². At the southern locality, there is an area with suitable habitat of about 1.2 km², making a total AOO of 3.15 km². Currently there are three known locations, two of which are in nature reserves, with 20 km between the northern and central population and 12 km between the central and southern population. All locations are threatened by invasive alien trees and the southern one is also potentially threatened by informal mining. On the basis of an EOO <5000 m², an AOO <500 km², a fragmented population and a habitat that is threatened by alien trees from forestry plantations and illegal mining, a status of Endangered is recommended (EN B1ab(iii) + B2ab(iii)).

Additional specimens examined:

South Africa. MPUMALANGA. **2430 (Pilgrim's Rest):** Pilgrims Rest district, near Mariepskop (–BD), flowered at PRE 24 Apr 1954, *Codd 7904* (PRE); Pilgrim's Rest district, 20 km southwest of Hoedspruit, Chester Farm (–BD), 4 Jun 2001, *Rushworth sub K. Balkwill 12,124* (J, K, PRE); 23 Jul 2001, *K. Balkwill & Rushworth 12,125* (E, J, MO); Blyderivierspoort, Three Tondawels Viewpoint (cultivated at Kirstenbosch) (–DB), 12 May 2005, *van Jaarsveld 22,010* (PRE); North of Graskop, On the Farm Erasmushoop, about 2 km due south of office, above Treur River, 1555 m (–DB), 21 Feb 2025, *K. Balkwill et al. 15,009* (J, K, MO, PRE).

iNaturalist observations: 205925785, 211650163, 223120512, 243847746, 243849942, 244173187, 262523057.

8. *Thorncroftia succulenta* (R.A.Dyer & E.A.Bruce) *Codd* in *Bothalia* 7: 431 (1961), Type: Transvaal [Limpopo Province], Entabeni, *Loock s.n.* (sub PRE 27,461 PRE, holo!; sub NH 41,603 NH, iso!).

Plectranthus succulentus R.A.Dyer and E.A.Bruce in *Fl. Pl. Afr.* 27: plate 1073 (1949).

Succulent-stemmed shrub, 0.6–1.2 m high with several stems arising from a thickened root stock; stems ascending, 7–15 mm in diameter at the base, sparingly branched, pubescent with sessile capitate glandular trichomes, and multicellular uniseriate and dense coarse dendroid eglandular trichomes. *Leaves* opposite, ovate-elliptic, obovate or almost round, (16–)20–40(–58) × (11–)15–36(–45) mm, midrib sunken above for the proximal half otherwise veins level with upper surface, midrib and secondary veins strongly raised below but tertiary veins only partially raised, with dense sessile glandular trichomes masked by dense coarse dendroid eglandular trichomes on both surfaces; apex rounded to broadly cuneate; margin crenate with 6–8 scallops in the upper two-thirds of each side of the leaf; base broadly cuneate; petiole (12–)14–18(–20) mm long. *Inflorescence* a dense terminal panicle with subsidiary racemes at the tips of upper side-branches on stem, main axis (77–)100–180 mm long, with indumentum like that of stem; bracts leaf-like, 3–6 × 1.5–3 mm near the base becoming progressively smaller until 2–3 × 1–1.5 mm at the tip. *Calyx* 5–7 mm long at flowering stage, with dense sessile large-headed glandular trichomes and coarse dendroid eglandular trichomes; upper tooth 2–3 × 1–1.5 mm, shortest teeth 1–1.5 × 0.5 mm. *Corolla* with sessile and short-stalked glandular trichomes and dendroid and uniseriate eglandular trichomes; tube

narrowly cylindrical, widening very slightly distally, laterally compressed, 15–20(–22) mm long, lilac to light mauve; upper lobes erect, obovate, but appearing oblong due to folding of outer margin, 6–8 mm long, deeply notched, lilac with purple lines, blotches and spots; lateral lobes hanging straight down and held almost vertical, strap-shaped with long attenuate tip, 5–6 mm long, lilac with bold purple lines, blotches and spots; lower lobe boat-shaped, initially projecting forwards, then recurving until completely reflexed, lilac to light mauve. *Stamens* 5–7 mm long; filaments very pale lilac proximally darkening to lilac distally; anthers dark purple; pollen yellow. *Style* held straight out, once stamens have recoiled, lilac with mauve style branches.

Diagnostic characteristics: *Thorncroftia succulenta* is similar to *T. media*, *T. coddii* and *T. lotteri* but it is distinguishable from these species on the basis of its coarse dendroid trichomes on both vegetative and reproductive organs, whereas *T. media* possesses three types of complex trichomes (fine biramous and dendroid), *T. coddii* mainly has uniseriate with rare biramous trichomes and *T. lotteri* only has uniseriate eglandular trichomes. The corolla tube of *T. succulenta* ranges from 15–22 mm long which separates it from *T. coddii* (29–38 mm long) and some specimens of *T. media* (18–25 mm long) and *T. lotteri* (20–26 mm long; Fig. 14).

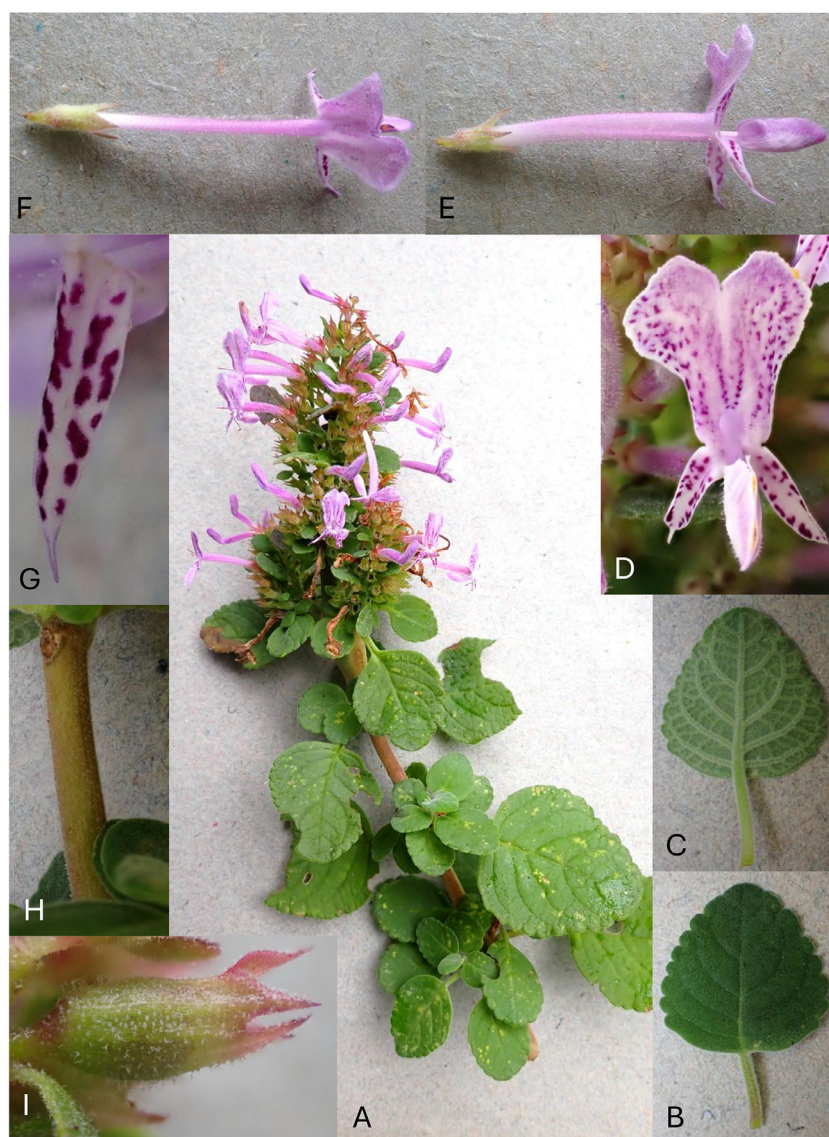


Fig. 14. *Thorncroftia succulenta*. A. flowering branch, × 1; B. Upper leaf surface, × 1.3; C. Lower leaf surface, × 1.3; D. Young stem, × 4; E. Side view of calyx, × 8; F. Lateral lobe of corolla, × 12; G. Front view of flower, × 6; H. Side view of flower, × 1.4; I. Top view of flower, × 1.6.

Distribution and habitat: *Thorncroftia succulenta* is the most widespread and well collected species in the genus and occurs on the Soutpansberg mountains in Limpopo (Fig. 3). KB has been to the locality of the specimen supposedly collected south of Nylstroom, but the plant was not found and no suitable habitat seems to exist there – the label might have been confused. Habitat notes include full sun on rocky ridges on mountain tops, south-west-facing hill slopes and north-facing edge of mist belt forest with grey or brown sandy loam.

Phenology: Flowering is from summer into winter (January to July with a peak in April).

Conservation notes: There are many localities in which *T. succulenta* has been recorded, stretching across the Soutpansberg, with just over 100 km between the most distant ones. EOO is about 1 200 km² and suitable habitat may be about 10 %, giving an AOO of 120 km². Many of the localities are in private or government protected areas. Although there is some forestry in the eastern end of the distribution of *T. succulenta*, there is little forestry in most of its range, so that plantations do not serve as a source of seeds of alien invasive trees. The previous assessment (von Staden, 2018b) recorded a far larger EOO, but this was because *T. lotteri* and *T. coddii* were treated as part of *T. succulenta*. Although the EOO and AOO would qualify for Vulnerable under Criterion B and although the species is limited to particular habitats (but not as tightly as the other species), there are >10 locations and the threats to this species are not severe. This species also does not meet any of the national criteria for Rare (SANBI, 2025) and so it is assessed as Least Concern.

Additional specimens examined:

South Africa. LIMPOPO. **2229 (Waterpoort):** Soutpansberg, Franz Hoek Peak (–DD), 10 Jul 1935, Galpin 14,881 (NH); Soutpansberg, about 32 km west along the road that leads off Mountain Inn, Dr. Bird's Farm (–DD), 25 Feb 1957, Meeuse 9787 (PRE); Louis Trichardt, Hanglip (–DD), 18 Feb 1946, Gerstner 5903 (PRE); *ibidem* (–DD), 17 Apr 1949, McKay sub PRE 40,711 (PRE); Louis Trichardt, north of Hanglip, on Harnham Farm (–DD), 1 Apr 1980, Davis & Davis 219 (NU); Soutpansberg district, on the crest of the Soutpansberg, on the farm Swarthoek (–DD), 10 May 1991, K. Balkwill & M-J. Balkwill 6383 (J); Soutpansberg, about 12.5 km west of Mountain Inn (–DD), 20 Mar 2000, McDade, et al. 1281 (J, K, MO, TUC). **2230 (Messina):** North of Louis Trichardt, 10 km along the road to Witvlag, Vreemdeling Farm (–CC), 23 Apr 1994, Joffe 1056 (PRE); *ibidem* (–CC), 26 Mar 1996, Klapwijk 223 (PRE); Soutpansberg, Entabeni Forest Reserve, Muchindudi Falls (–CC), 1 Jun 1947, Bruce & Kies 7 (PRE); *ibidem* (–CC), 5 Jun 1948, Codd 4194 (NBG, PRE); Soutpansberg, Studholme Farm (–CC), 4 Apr 1997, Sebothoma 361 & 322 (PRE); Sibasa district, Tate Vondo (–CD), not flowering 6 Oct 1971, Hemm 298 (J); *ibidem* (–CD), 15 Mar 1978, Hemm 576 (J, PRE); *ibidem* (–CD), 17 Apr 1979, van Wyk 2736 (PRE); Venda, 11 km from Dzamba on road to Rambuda (–CD), 12 Apr 1980, van Wyk 4086 (PRE). **2329 (Pietersburg):** Mount Letjuma, Lajuma Farm (–AB), 23 Feb 1982, Venter 7556a (PRE); 23 May 1982, Venter 8749 (LYD); 27 Mar 2017, K. Balkwill et al. 13,998 (J); Louis Trichardt district, Hanglip State Forest, near Hanglip (–BB), 25 Apr 1982, K. Balkwill 144 (NU); on the farm Holworth 783 MS (–BB), 14 Jan 1987, Raal & Raal 1341 (LYD); mountains near Louis Trichardt (–BB), Mar 1953, Mackay F (NBG). **2330 (Tzaneen):** Soutpansberg district, Louis Trichardt, Entabeni State Forest, near Masika's Lookout (–AA), 6 May 1984, K. Balkwill 1612 (E, J, LISC, MO); Entabeni State Forest (–AA), 5 Jun 1948, Codd 4194 (NBG); From Entabeni, cultivated and flowered at Pretoria National Botanic Garden, 22 Mar 1972, Codd 8397 (J). **2428 (Nylstroom):** Waterberg, 8 km south of Nylstroom, 14 Apr 1954, Anon. sub NBG 485/50 (NBG) – likely a confused label.

iNaturalist observations: 9530316, 10949525, 20910807, 20912580, 20967817, 71411036, 188549799, 222265768, 246145306, 246145402, 250264730, 259128656, 259344714, 261222848.

Declaration of competing interest

The authors declare that they have no conflict of interest.

CRediT authorship contribution statement

K. Balkwill: Writing – review & editing, Writing – original draft, Validation, Supervision, Resources, Methodology, Investigation, Formal analysis. **K. Changwe:** Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

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