

A synopsis of *Ruellia* (Acanthaceae) in Angola, including two species new to science

Darbyshire I.^{1*}, Tchamba J.^{2,3} & E.A. Manzitto-Tripp⁴

¹Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AE, United Kingdom

²Instituto Superior de Ciências da Educação da Huíla, ISCED-Huíla;
Centro de Estudos em Biodiversidade e Educação Ambiental (CEBEA), Angola

³Universidade de Lisboa, Instituto Superior de Agronomia, Centro de Estudos Florestais (CEF), Portugal

⁴Museum of Natural History (COLO Herbarium), University of Colorado, Boulder, C105 Ramaley Hall,
Campus Box 334, Boulder, CO 80309-0350, U.S.A.

*E-mail: i.darbyshire@kew.org

Abstract: A synoptic revision of the genus *Ruellia* L. (Acanthaceae: Acanthoideae: Ruellieae: Ruelliinae) in Angola is provided. Eight species are documented, including two species new to science, *R. angolensis* I.Darbysh. & E.Tripp and *R. quipungoensis* I.Darbysh. & E.Tripp, both of which are known from specimens collected between the 1930s–1970s. The affinity of the two new species is discussed; both are hypothesised to belong to sect. *Discifolia* E.Tripp & I.Darbysh. In addition, *R. togoensis* (Lindau) Heine, a rare species previously known from seasonally dry forests of west and west-central Africa, and *R. praetermissa* Lindau, a widespread west and central African species, are recorded in Angola for the first time. Full descriptions and accompanying notes on habitat requirements are provided for these species as well as for the localised Kaokoveld endemic *R. currorii* T.Anderson and the Angolan-Namibian form of *R. bignoniiflora* S.Moore. A key to Angolan *Ruellia* is provided. A preliminary assessment of the conservation status (extinction risk) is made for all of the species; the two new species are assessed as Endangered whilst the other six species are assessed as of Least Concern. The present account doubles the number of *Ruellia* species documented for Angola in the national plant checklist.

Keywords: Conservation, IUCN Red List, Monograph, Ruellieae, Taxonomy.

Introduction

Ruellia L. (Acanthaceae: Acanthoideae: Ruellieae: Ruelliinae) is the third most species-rich genus in the Acanthaceae, with c. 350 species globally (Tripp *et al.*, 2013; Manzitto-Tripp *et al.*, 2022; Manzitto-Tripp & Daniel, 2023). Although it extends into warm temperate regions, diversity in *Ruellia* is

concentrated in the tropics with by far the most species in the neotropics (Tripp & Darbyshire, 2017; Manzitto-Tripp & Daniel, 2023). However, the palaeotropical taxa of the genus, whilst much less species-rich (Tripp & Darbyshire, 2017), comprise the earliest diverging lineages within the genus and so are critical for understanding its evolutionary and biogeographic history (Tripp, 2007; Tripp *et al.*, 2013).

Ruellia is diverse morphologically and so can be challenging to differentiate from related genera in Ruellieae, with no unambiguous single-trait synapomorphies. However, the following combination of characters typically aids recognition of the genus: four fertile stamens with anthers lacking appendages; presence of a filament curtain; stigma 2-lobed but often with the dorsal lobe \pm suppressed; calyx typically \pm deeply divided into 5 (sub-) equal lobes, less frequently with unequal lobes; corolla limb (sub-) equally 5-lobed or less frequently zygomorphic; pollen (with rare exceptions) spherical, with coarsely reticulate exine, and lacking pseudocolpi or sexine lips; and seeds with hygroscopic hairs (Manzitto-Tripp *et al.*, 2022). This character suite, and in particular the combination of filament curtain, pollen morphology and seed hairs, can be considered synapomorphic for the genus.

Using evidence from molecular phylogenetic analysis based on one nuclear and three chloroplast markers, and supported by morphological studies, Tripp and Darbyshire (2017) recognised five sections amongst palaeotropical *Ruellia*, all of which are confined to that region. Three of these, sect. *Eusiphon* (Benoist)

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E.Tripp & I.Darbysh., sect. *Madagasikara* E.Tripp & I.Darbysh. and sect. *Pseudoruellia* (Benoist) E.Tripp & I.Darbysh., are endemic to Madagascar, whilst sect. *Discifolia* E.Tripp & I.Darbysh. is found across Africa and Arabia, and sect. *Dipteracanthus* (Nees) Benth. is widespread across the palaeotropics. In the same study, species from southwest Africa with a highly zygomorphic calyx, *Ruellia marlothii* Engl. and allies, were found to form a separate lineage in Ruellieae, only distantly related to *Ruellia s.s.*, resulting in resurrection of the genus *Dinteracanthus* Schinz, with five constituent species (Tripp & Darbyshire, 2017).

Currently, ± 25 native species of *Ruellia* are accepted in continental Africa (adapted from POWO, 2023). Whilst this includes several widespread, common and variable taxa, notably *R. patula* Jacq., *R. praetermissa* Schweinf. ex Lindau and *R. prostrata* Poir. (Vollesen, 2008, 2013), there are also a number of scarce and highly localised species across the continent. For example, *R. boranica* Ensermu is known only from the dry woodlands and wooded grasslands over limestone in the Negele-Filtu area of Borana, Sidamo floristic region in southern Ethiopia (Ensermu, 1999), whilst *R. richardsiae* Vollesen is recorded only from *Acacia-Commiphora* woodland and wooded grassland in and around the Ruaha National Park of southern Tanzania (Vollesen, 2008). Elsewhere, *R. brandbergensis* Kers is restricted to the rocky slopes of the Brandberg Mountain in western Namibia (Tripp & Dexter, 2012) and recent attempts to re-find it have been unsuccessful (E.A. Manzitto-Tripp, pers. obs.).

There has been no modern Africa-wide treatment of *Ruellia*, although many taxa have been included within one or more of the major African Flora accounts for Acanthaceae (see Heine, 1963; Ensermu, 2006; Hedrén & Thulin, 2006; Vollesen, 2008, 2013). In the most recent checklist of the vascular plants of Angola (Figueiredo & Smith, 2008), Makholela (2008) recorded five species of *Ruellia*: *R. bignoniiflora* S.Moore, *R. currorii* T.Anderson, *R. diversifolia* S.Moore, *R. otaviensis* P.G.Mey. and *R. patula* Jacq. *Ruellia otaviensis* has since been treated as a synonym of *R. prostrata* (Tripp & Dexter, 2012), whilst *R. diversifolia* is now included in *Dinteracanthus* (Tripp & Darbyshire, 2017), resulting in four species of *Ruellia* in Angola. However, whilst this checklist provided a major advance in our knowledge of the

flora of Angola, many plant families and genera lack comprehensive and contemporary taxonomic study in the country, including the Acanthaceae (Darbyshire *et al.*, 2019; Goyder & Goncalves, 2019). A review of herbarium material of Angolan *Ruellia* by the current authors has revealed several specimens that do not fit within these four species recorded by Makholela (2008) and including two potentially undescribed and distinct species of *Ruellia* from western Angola. These latter species were first collected as long ago as the 1930s–1970s, but have not been formally described until now. This current work therefore brings the account of *Ruellia* in Angola up to date with a synoptic treatment of all known species, including investigation of these new species.

This work is part of wider research into the Acanthaceae diversity in Angola and southwestern Africa, and is also an early contribution to a proposed global monograph of the genus *Ruellia* by the current authors and colleagues.

Materials and Methods

Herbarium collections of *Ruellia* from Angola and, where applicable, from neighbouring countries or from the wider distribution of the species were studied at or on loan from the following herbaria with relevant holdings: BM, COI, K, LISC, LISU (digital images only), LUBA, PRE and WIND, with additional material from other herbaria including type specimens studied online via electronic herbarium catalogues and JSTOR Global Plants (<https://plants.jstor.org/plants>). The WIND herbarium catalogue was accessed via the Brahms specimen database of the National Botanical Research Institute (National Herbarium of Namibia (WIND), 2023). Herbarium abbreviations follow *Index Herbariorum* (Thiers, updated continuously). For type specimen citations, all duplicates seen by at least one of the authors are marked with an exclamation mark “!”; type specimens or duplicates seen only in the form of digital images are marked as “digital image!”. Barcodes are included for all type specimens where available.

As noted in Darbyshire *et al.* (2019), the majority of non-type Angolan collections of Acanthaceae from the main colonial Portuguese herbaria in Lisbon (LISC, LISU) and Coimbra (COI) were loaned to the Luanda (LUAI) herbarium in the early- to mid-1970s before Angolan independence from Portugal,

in preparation for a full treatment of the family in *Conspectus Flora Angolensis*. Most of these collections were sadly lost during the Angolan civil war (1975–2002) and have never been recovered, hence reference material for the family in Angola is rather sparse, particularly historical material. We supplemented herbarium collections, wherever possible, by field studies by the third author and by reference to online photographic resources, most notably iNaturalist (<https://www.inaturalist.org/>) and Biodiversidade Angola (<https://biodiversidadeangola.com/>). The latter website has been established by Antonio Martins, with whom we have corresponded on the Acanthaceae of Angola including *Ruellia*.

Herbarium specimens were analysed using standard herbarium practices. Prior to dissection, flowers were soaked in Aerosol OT 5% solution; measurements of vegetative organs were made on dry material. The floral measurements are based on pressed specimens, hence the diameter measurements for the corolla tube and throat may not match exactly that of living, unpressed flowers.

Species descriptions are only provided for: (a) little-known species that have not been included in previous synthetic treatments of the family in Africa, or (b) more widespread and variable species where the Angolan (and immediately neighbouring) populations are rather distinct from other geographic variants. In cases where full descriptions are deemed unnecessary, we provide reference to recent treatment(s) with descriptions.

Species conservation (extinction risk) assessments were conducted and follow the Categories and Criteria of IUCN (2012) and the guidelines for their application (IUCN, 2022). Extent of Occurrence (EOO) and Area of Occupancy (AOO) were calculated using the GeoCAT tool (Bachman *et al.*, 2011).

The distribution maps for each species were created in QGIS Version 3.2; see QGIS.org (2023).

Results and Discussion

Eight species of *Ruellia* are here recognised in Angola. Two of these eight species are new to science and are formally named as *Ruellia angolensis* I.Darbysh. & E.Tripp and *R. quipungoensis* I.Darbysh. & E.Tripp, both of which are endemic to western Angola as currently understood. Two further species are here recorded as present in Angola for the first time: *R. praetermissa* and *R. togoensis*, both of which otherwise

occur widely but disjunctly in West and Central Africa and have the southwestern-most extent of their ranges in Angola.

All eight species occur in the western portions of the country, with no records from east of 17° E longitude. Similar patterns of known distribution in Angola are also recorded in other genera of Acanthaceae, such as *Barleria* L. and *Petalidium* Nees (Darbyshire *et al.*, 2021; Dexter *et al.*, 2023), and in other plant groups such as the species-rich genus *Euphorbia* L. (Frazão *et al.*, 2020). This may in part be an artefact of collecting effort within Angola, with the eastern portion of the country being very sparsely botanised (Sosef *et al.*, 2017: Fig. 1; Goyder *et al.*, 2018; Goyder & Goncalves, 2019). However, the deep Kalahari Sands that cover much of the eastern half of the country (Thomas & Shaw, 1991) are heavily leached and of low fertility (Goyder & Goncalves, 2019). This has resulted in a restricted floristic composition (Frazão *et al.*, 2020) with particularly low species richness in plant groups that favour a high soil nutrient content, such as the Acanthaceae (Darbyshire *et al.*, 2021; Manzitto-Tripp *et al.*, 2022). Hence, the ecological conditions in eastern Angola may not be favourable for *Ruellia*. This is supported to some extent by the fact that in the *Flora Zambesiaca* account of Acanthaceae, no *Ruellia* species were recorded in the Barotseland floristic region of Zambia that borders Angola to the east (Vollesen, 2013), although it should be noted that this region is also under-collected botanically. Furthermore, recent, wide-ranging botanical surveys in Moxico and Cuando Cubango provinces in the east of Angola under the National Geographic Okavango Wilderness Project have not resulted in any collections of *Ruellia* (Goyder *et al.*, 2018; D. Goyder, pers. comm. 2023). We may nevertheless expect to find one or more of the widespread species of *Ruellia*, such as *R. patula*, in eastern Angola following more extensive surveys.

In terms of the infrageneric classification of the palaeotropical lineages of *Ruellia* (Tripp & Darbyshire, 2017), *R. bignoniiflora* is known to belong to sect. *Discifolia* and the two new species are also considered likely to belong in that section based on morphology. Of the remaining five species, *R. patula*, *R. praetermissa* and *R. prostrata* are confirmed members of sect. *Dipteracanthus*, whilst *R. currorii* and *R. togoensis* are also most likely to belong to sect. *Dipteracanthus* based on fruit and seed morphology

but are somewhat atypical: *R. currorii* for its \pm broadly ovate leaves and lax inflorescences, and *R. togoensis* for its unique pollen type. These are discussed in more detail under the species accounts, below.

Of the eight species, *Ruellia angolensis* and *R. quipungoensis* are currently assessed as Endangered under criterion B of the IUCN Red List; both are known from fewer than five locations and their habitats are experiencing ongoing declines in extent and quality. The remainder of the species are considered to be of Least Concern, although *R. currorii* is highly localised and may in the longer term be impacted by climate change.

Taxonomic Treatment

Key to species of *Ruellia* in Angola*:

1. Corolla tube with narrow cylindrical portion shorter than or subequal in length to expanded throat (ratio 0.35–0.9 : 1), corolla infundibular to broadly so 2
1. Corolla tube with narrow cylindrical portion of corolla tube markedly longer than expanded throat (ratio 1.8–3.5:1), corolla appearing salver form except for expanded throat 6
2. Both lobes of stigma well-developed; stamens subequal in length, not didynamous; calyx lobes linear, 19–24.5 mm long; stems and young foliage densely eglandular-pilose to -villose; seeds with hygroscopic hairs occurring across the surface though most dense on the rim 6. *R. angolensis*
2. Only one of the stigma lobes well developed, the second lobe suppressed; stamens clearly didynamous; calyx lobes lanceolate to linear, 2.2–13 mm long; stems and young foliage not so densely pilose to villose, or if conspicuously pilose (*R. praetermissa*) then hairs mainly glandular; seeds with hygroscopic hairs confined to the rim, surfaces elsewhere glabrous or with very short inconspicuous hairs only 3
3. Leaves \pm broadly ovate with base shallowly cordate or truncate; inflorescences conspicuously pedunculate, peduncles sometimes curved-ascending, 5–52 mm long; corolla 48–51 mm long; calyx lobes densely glandular-pilose to -villose 5. *R. currorii*
3. Leaves ovate, elliptic or somewhat obovate, base (broadly) cuneate or attenuate; inflorescences (sub-)sessile in leaf axils; corolla 15–33 mm long; calyx more sparsely hairy, either with short eglandular hairs only or mixed eglandular and glandular hairs 4
4. Stems densely glandular-pilose; leaves ovate, petioles 15–43 mm long; capsule puberulous; calyx 5.5–8.5 mm long, lobes up to 6.2 mm long. 2. *R. praetermissa*
4. Stems lacking glandular hairs or rarely very few present around the nodes (can be present on the petioles); leaves variously shaped but usually not so long-petiolate, petioles 2–23 mm long; if capsule puberulous then calyx (6–)7.5–14.5 mm long, lobes usually over 6.5 mm long 5
5. Ovary and capsule puberulous; calyx (6–)7.5–14.5 mm long with linear lobes (4.3–)6.5–12.5 mm long; leaves typically ovate to ovate-elliptic with apex acute or attenuate; stems antrorse-puberulous and with spreading or ascending longer hairs or only the latter 1. *R. prostrata*
5. Ovary and capsule glabrous; calyx 3.3–5.7 mm long with lanceolate lobes 2.2–4 mm long; leaves typically elliptic, oblong-elliptic, ovate-elliptic or some elliptic-obovate, often with apex obtuse or rounded; stems retrorse-pubescent to -puberulous, rarely also with longer crisped spreading hairs 3. *R. patula*
6. Stigma with only one lobe well-developed; basal cylindrical portion of corolla tube 26–33.5 mm long; calyx 5–9.5 mm long, lobes linear-lanceolate, with short \pm ascending eglandular hairs on margins and midveins only, rarely with few scattered glandular hairs; leaf bases broadly cuneate or shortly and broadly attenuate 4. *R. togoensis*
6. Stigma prominently 2-lobed; basal cylindrical portion of corolla tube 41–61 mm long; calyx 14–29 mm long, lobes either linear and eglandular-pilose to villose, or ligulate and shortly glandular-pubescent with longer eglandular hairs along margins, midveins and fused basal portion; leaf bases rounded, shallowly cordate or broadly obtuse 7
7. Capsule puberulous; stems with mixed dense short white retrorse eglandular hairs and long patent lustrous yellow-brown eglandular hairs; calyx lobes linear, densely long eglandular-pilose

to -villose with interspersed shorter eglandular and few glandular hairs; bracteoles narrowly oblong-elliptic, 3.5–4 mm wide; corolla lobes with only eglandular hairs externally; anthers 3.4–4.2 mm long7. *R. quipungoensis*

7. Capsule glabrous; stems shortly viscid glandular-pubescent and retrorse-puberulous, and with long white eglandular hairs often confined to older stems, not lustrous; calyx lobes ligulate, shortly glandular-pubescent with longer eglandular hairs confined to margins and midveins of each lobe and to fused basal portion; bracteoles ovate to broadly so, 5.5–16 mm wide; corolla lobes with both glandular and eglandular hairs externally; anthers 4.7–5 mm long8. *R. bignoniiflora*

* Key refers only to specimens from Angola and immediately neighbouring regions and so (intentionally) does not necessarily reflect the full range of variation within the widespread species.

- 1. *Ruellia prostrata*** Poir. in Lam. *et al.*, Encycl. 6: 349. 1804; C.B. Clarke in Fl. Trop. Afr. 5: 46. 1899; Hiern, Catalogue Afr. pl. coll. Friedrich Welwitsch 1853–1861, Dicotyledons, part IV: 808. 1900; Vollesen in Fl. Trop. E. Afr. Acanth. (Part 1): 204. 2008 & in Fl. Zambes. 8(5): 137. 2013. *Type*: INDIA, *s.loc.*, *M. Dupuis s.n.* (holo P, n.v.).

Ruellia otaviensis P.G.Mey. in Mitt. Bot. Staatssamml. München 2: 171. 1956; Makholela in Figueiredo & Smith, Pl. Angola: 24. 2008. *Type*: NAMIBIA, **Otjozondjupa region**, distr. Grootfontein, Asis, fl. & fr., 08.01.1934, *O.H. Volk* 694 (holo M [M0109659 digital image!]).

Figs. 1a–c & 2

Flowering & fruiting: This species has been recorded as flowering in Angola mainly in January to April but also in November; the few fruiting records are from January and October. Peak flowering corresponds to the latter half of the rainy season in Angola.

Habitat: Occurs in a variety of woodland types, gallery forest margins and sometimes in more open grasslands; *c.* 20–1700 m elevation.

Distribution: Widespread in eastern and southern tropical Africa, Arabia and the Indian subcontinent with scattered records elsewhere in tropical Asia and the Pacific region. In Angola it occurs in the west in Bengo, Benguela, Cuanza Sul, Cunene, Luanda and Namibe provinces.

Specimens examined: ANGOLA, **Bengo prov.**, Ambriz, fl. & fr., 12.1872, *J.J. Monteiro s.n.* (K); *Ibid.*, fl., 03.1873, *J.J. Monteiro & R. Monteiro s.n.* (K); Quicama, escarpment base below Cauá, fr., 02.10.1974, *B.J. Huntley* 3535 (LUBA); Dande, fl., 03.2014, *R. Ferreira* (photo <https://www.inaturalist.org/observations/66702379>); Santa Amboleia, fl., 11.2022, *A. Martins* (photos <https://biodiversidadeangola.com/plants/specimen/175>). **Benguela prov.**, along dirt track to W that leaves main highway between Benguela and Lubango, fl., 09.04.2017, *E. Tripp & K. Dexter* 6911 (COLO, K, LUBA). **Cuanza Sul prov.**, Picada para o Agro-Catuto a 5 km do cruzamento de estr. Novo Redondo [Sumbe]–Gabela, fl., 26.04.1967, *B. Teixeira et al.* 11524 (COI, digital image). **Cunene prov.**, Curoca, Chitado, na estrada para a Chipa, fl. & fr., 23.01.1962, *O. Azancot de Menezes & C. Henriques* 137 (K). **Luanda prov.**, Loanda, fl. & fr., *s.d.*, *F. Welwitsch* 5063 (BM [BM001124281] *pro parte*, LISU [LISU223326 digital image, excl. right-hand plant])—see note to *R. bignoniiflora*. **Namibe prov.**, Mocamedes, andados 8 km de Camuciuo para Lola, fl., 07.01.1956, *E.J. Mendes* 1230 (LISC); Mocamedes, Vila Arriaga [Bibala], fl., 25.01.1962, *G. Barbosa & F. Moreno* 10129 (K, LUBA); Curoca, ao km 30 do trajecto Oncócuá–Ompupa, fl., 19.03.1973, *A. Menezes et al.* 4766 (LUBA).

Conservation status: A widespread and often locally common species, here assessed as of Least Concern (LC).

Notes: For a full description, bibliography and synonymy of *Ruellia prostrata* relevant to continental Africa, see Vollesen (2008, 2013). Only specimens seen from Angola are cited here, and only those from Angola and immediately neighbouring areas (primarily Namibia) were considered when developing the key. Several taxa–infraspecific or separate species–may ultimately be recognised within this widespread and variable species following additional study.

In Angola, the flowers are usually white (Fig. 1a,b) but in some specimens (*e.g.* *Mendes* 3840) they are recorded as pink or tinged pale purple. Pink and purple flowers are frequent elsewhere within its range (Fig. 1c is faintly pink).

- 2. *Ruellia praetermissa*** Schweinf. ex Lindau in Bot. Jahrb. Syst. 20: 15. 1894; C.B. Clarke in Fl. Trop. Afr. 5: 45. 1899; Heine in Fl. W. Trop. Afr. 2: 396. 1963; Vollesen in Fl. Trop. E. Afr. Acanth. (Part 1):



Fig. 1. Angolan *Ruellia* species *in situ*. **a-c.** *R. prostrata* Poir. From Benguela prov., Angola, collected as *Tripp & Dexter* 6911; **c.** From Ruacana Falls, Namibia, collected as *Nyatoro et al.* 32. **d & g.** *R. patula* Jacq.; From near Opuwo, Namibia, not collected. **e & f.** *R. togoensis* (Lindau) Heine; From near Cambondo village, Angola, not collected. **h & i.** *R. currorii* T. Anderson; From Equiminha, Angola, not collected; **j.** From south of Virei towards Pediva, Angola, collected as *Tripp & Dexter* 6958. **k & l.** *R. bignoniiflora* S. Moore; From north of Campanda, Angola, collected as *Tripp & Dexter* 6909 (photos a, b, j-l by E.A. Manzitto-Tripp, c, d, g by I. Darbyshire, e, f, h, i by A. Martins).

208. 2008 & in Fl. Zambes. 8(5): 140. 2013. *Lectotype* (designated by Vollesen, 2013): SOUTH SUDAN, **Warrap state**, Bongo, Gir, fl. & fr., 27.07.1869, G. Schweinfurth 2155 (K [K000393976!]; isolecto P [P00436143 digital image!], S [S09-2682 digital image!]). *Residual syntypes*: SOUTH SUDAN, **Western Equatoria state**, Niamniam, Nabambisso, fl., 01.05.1870, G. Schweinfurth 3754 (n.v.); Tukamis, Saiba Indimma, fr., 26.05.1870, G. Schweinfurth 3789 (n.v.).

Ruellia patula sensu C.B. Clarke in Fl. Trop. Afr. 5: 45. 1899, *pro parte quoad spec. ex W Africa, non* Jacquin, Misc. Austrac. 2: 358. 1781.

Fig. 2

Weak-stemmed perennial herbs or subshrubs, 25–160 cm tall; young stems 4-angular, sulcate in dry state, glandular-pilose with patent, multicellular often somewhat crisped hairs 1–1.2 mm long, with occasional interspersed longer multicellular eglandular hairs 1.5–1.7 mm long. Leaves on slender petioles 15–43 mm long, indumentum as for stems, dense; blade ovate to broadly so, 48–73 × 27–43.5 mm (l : w ratio 1.4–2.1 : 1), base broadly cuneate or shortly and broadly attenuate, margins entire or shallowly crenulate, apex attenuate to shortly acuminate, upper surface eglandular-pilose, hairs

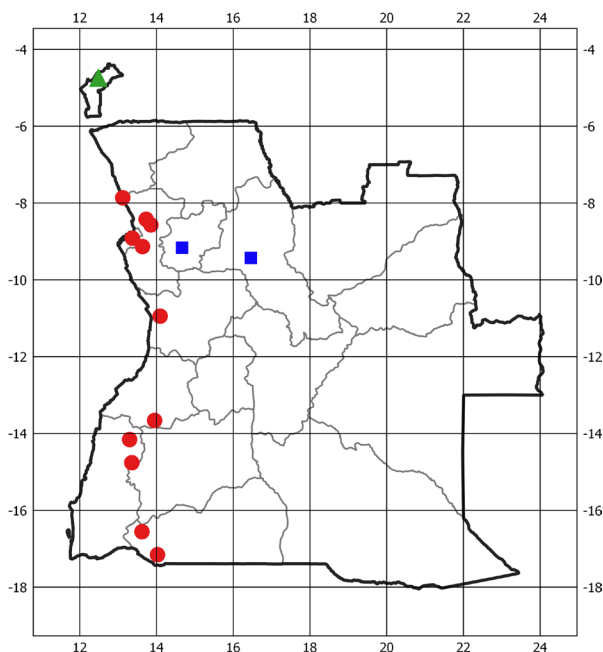


Fig. 2. Distribution in Angola of *Ruellia prostrata* Poir. (red circles), *R. praetermissa* Schweinf. ex Lindau (green triangle), and *R. togoensis* (Lindau) Heine (blue squares); note that the locality for the lattermost species in Namibe province could not be geolocated. Map created in QGIS Version 3.2 (QGIS.org 2023).

multicellular, 1.5–2.3 mm long, appearing deflated in dry state, lustrous and often pale yellowish, with or without numerous additional fine, short eglandular hairs to 0.2 mm long, sometimes with occasional glandular hairs along margins; lower surface pubescent, hairs coarser and longer on the main veins; cystoliths numerous, linear; lateral veins 5–6 per side. Inflorescences axillary in distal leaf axils, each 1–2-flowered, opposite, sessile; bracteoles elliptic or oblanceolate, 6.5–16 × 2–5.5 mm, indumentum as leaves. Calyx 5.5–8.5 mm long, fused at base for 1.2–2.2 mm; lobes linear-lanceolate, 0.5–0.8 mm wide, each with prominent midvein, can be glaucous particularly along margin, external surface pilose with mixed eglandular and glandular hairs, the latter sometimes mainly towards base. Corolla infundibular, 26–33 mm long, white (but see note), eglandular-pubescent externally; tube with cylindrical basal portion 7–10 × 1.7–2 mm, expanded throat 14–17 mm long, 6.5–7 mm wide towards mouth (ratio of cylindrical tube : expanded throat 0.5–0.6 : 1), lobes subequal, c. 6–8 mm long, rounded. Stamens included within corolla throat, inserted c. 11.5 mm from base of tube, pairs markedly didynamous; filaments of anterior stamens free for 6–7 mm long, those of posterior stamens 3.6–4 mm long, glabrous, filament curtain extends to near base of corolla tube; anthers ± 2–2.3 mm long, those of posterior stamens marginally smaller. Pistil drying brown, ovary eglandular-puberulous, hairs pale; style shortly pubescent; stigma with anterior lobe 0.9–1.5 mm long, posterior lobe not or barely developed. Capsule stipitate, 13–16 mm long including stipe ± 7 mm long, finely eglandular-puberulous, 4–12-seeded (fide Vollesen, 2013; *R. praetermissa* s.l.); seeds, c. 2.5 × 2.2 mm, with dense hygroscopic hairs along marginal rim, elsewhere glabrous or with sparse minute spreading hairs.

Vernacular name and uses: At Buko-Zau, the leaves are used as a food by local communities, under the local name “mupoko” (*Missão de Estudos Florestais a Angola* 628).

Flowering & fruiting: The single record from Angola was recorded to be flowering and fruiting in June which is early in the dry season in this region.

Habitat: The single Angolan collection of this species is from moist forest at ± 100 m elevation. More generally, *R. praetermissa* is found in a wide range of habitats from grassland and woodland through to

forest margins, and in the southern part of its range often grows on termitaria (Vollesen, 2008, 2013).

Distribution: Widespread in western and central Africa, extending from Senegal and Mauritania, east to South Sudan and south to Angola, Zambia, Malawi and Mozambique; it also occurs in southern Arabia. In Angola it occurs only in the Maiombe region of Cabinda province.

Specimens examined: ANGOLA, **Cabinda prov.**, Maiombe, Buco Zau, Fazenda Caio, fl. & fr., 08.06.1960, M.E.F.A. [*Missão de Estudos Florestais a Angola*] 628 (LISC). CONGO (BRAZZAVILLE), **Kouilou region**, Goumina (Mayombe), fl. & fr., 28.11.1990, I.F. la Croix 4961 (K). D. R. CONGO, **Kongo Central prov.**, Léopaldville, Boma, Luki INEAC, fl. & fr., 1959, J. Dubois 389 (K).

Conservation status: A widespread and locally common species in a range of habitats, this species is considered to be of Least Concern (LC) globally. However, in Angola it is only known from the forests of Cabinda. Large areas of these forests are now included within the 1,930 km² Maiombe National Park, gazetted in 2011, as part of the Mayombe Forest Transfrontier Initiative. The park is still inhabited by 56,000 residents, many of whom continue to engage in unsustainable slash-and-burn subsistence or small-scale commercial agriculture (Ron, 2020). Further, Buco-Zau is an expanding urban settlement with nearby mining activities and associated infrastructure and transport routes, and there is continued logging activity in Cabinda, both legally and illegally (Romeiras *et al.*, 2014). All of these factors impact the forest through clearance, degradation and fragmentation. The National Park has very limited resources with which to manage or mitigate these threats (Ron, 2020). Hence, *Ruellia praetermissa* may be nationally threatened. A management plan for the park was established in 2019 and supported by wide stakeholder engagement including at the community level and it is hoped that this will result in more sustainable land use practices in the future (Ron, 2020).

Notes: The cited specimen from Angola matches material from the Maiombe (or Mayombe) hills of adjacent D. R. Congo and Congo (Brazzaville), for which the specimens seen are cited above, which has been proposed as a distinct species by Dominique Champluvier, namely *Ruellia mayombensis* Champl. *ined.* In an unpublished manuscript seen by the

current authors, Dr. Champluvier noted that the Maiombe specimens differ markedly from other specimens of *R. praetermissa* studied in preparation for the account of Acanthaceae for *Flore d'Afrique Centrale*, noting (1) the more slender and longer petioles; (2) the leaf indumentum being diplotrichous with numerous short thin hairs mixed with scattered much longer stout multicellular hairs (*vs.* leaves with only scattered stout multicellular hairs); (3) the smaller, straw yellow-coloured capsules which are densely pubescent (*vs.* capsules rusty brown, glabrous); and (4) the uniformly white corolla [colour stated on four out of eight specimens seen] (*vs.* blue-mauve or pink in *R. praetermissa*). She also noted the strict association of the Maiombe taxon with rainforests, whilst *R. praetermissa* grows in a wider range of habitats, including moist forests but more frequently in wooded grasslands, dry forests, woodlands, termitaria and disturbed habitats (D. Champluvier, unpubl. data). The Angolan specimen matches all of these characters except for the diplotrichous leaves, as it has long multicellular hairs only.

There is no doubt that there is considerable variation within *Ruellia praetermissa* *s.l.* and that the Maiombe populations form a somewhat discrete morphological variant. The lectotype of *R. praetermissa* from South Sudan (G. Schweinfurth 2155) and similar specimens from across much of the range of the species bear glabrous, often rich-brown capsules very similar to those of *R. patula* (and they also typically have short calyx lobes similar to those of *R. patula*). However, plants similar to those from the Mayombe populations are found elsewhere in the range of *R. praetermissa*, most notably in Zambia (*e.g.*, W.L. Astle 4516 and 5557 from the Luangwa Valley, both K!), where some specimens have straw-yellow, puberulous capsules as in Maiombe and have similarly long-petioled leaves (Vollesen, 2013). These populations have blue to pink flowers and have only scattered long hairs on the upper surface of the leaves but are otherwise a good match for the Maiombe material. Furthermore, some of the characters noted as diagnostic by Dr. Champluvier are not consistent. In particular, flower colour varies within *R. praetermissa* and includes white forms (Vollesen, 2013), although these are admittedly rare. Similar variation in flower colour is also seen in both *R. patula* and *R. prostrata* (see *Notes* to those species), indicating that flower colour may not be diagnostic

within *Ruellia* sect. *Dipteracanthus*. Secondly, capsule colour also shows some variation, with occasional straw-yellow or yellow-green, glabrous capsules noted in *R. praetermissa* (e.g., *H. M. Richards* 19491 from Mbala district, Zambia, K!) which otherwise looks similar to specimens with puberulous fruits. Hence, the variation within *R. praetermissa* s.l. is complex and we do not feel that the Maiombe populations can be unambiguously separated as a distinct species based on morphological evidence alone. The description above nevertheless focusses on the Maiombe populations in case *R. mayombensis* is formally described in the future.

There is little doubt that *Ruellia praetermissa* is closely related to both *R. patula* and *R. prostrata* and the populations pertaining to all three may not always be fully differentiated at present. In the study area, they are very easily separated by the characters listed in the key, but these may not hold up across the full ranges of the three species. Vollesen (2008, 2013) notes that *R. praetermissa* is day-flowering whilst the other two species apparently drop their flowers early in the morning and so are likely to be night-flowering. However, our observations from Angola and Namibia suggest that both *R. patula* and *R. prostrata* can be day-flowering.

3. *Ruellia patula* Jacq., Misc. Austriac. 2: 358. 1781; C.B. Clarke in Fl. Trop. Afr. 5: 45. 1899, *pro parte*; Hiern, Catalogue Afr. Pl. coll. Friedrich Welwitsch 1853-1861, Dicotyledons, part IV: 808. 1900; Makholela in Figueiredo & Smith, Pl. Angola: 24. 2008; Vollesen in Fl. Trop. E. Afr. Acanth. (Part 1): 207. 2008 & in Fl. Zambes. 8(5): 138. 2013. *Type*: Cult. in hort. Vienna from seeds from INDIA; probably not preserved (*fide* Vollesen, 2008). **Figs. 1d,g & 3**

Flowering & fruiting: This species has been recorded as flowering and fruiting in Angola between November and June, corresponding to the rainy season and the onset of the dry season.

Habitat: Occurs in a variety of open to more shaded habitats, generally in dry to mesic areas, often persisting in disturbed areas such as roadside scrub and field margins; 5–1500 m elevation.

Distribution: Widespread in tropical and southern Africa, Arabia, and the Indian subcontinent. In Angola it is widespread in the west occurring in Benguela, Cuanza Sul, Cunene, Huíla, Luanda and Namibe provinces.

Specimens examined: ANGOLA, **Benguela prov.**, Elephants' Bay, fl., 1842, *Curror* 21 (K); andados 20 km de Chongoroi para Benguela, fl. & fr., 16.11.1955, *E.J. Mendes* 620 (LISC, LUBA digital image). **Cuanza Sul prov.**, Estrada Cachoeiras–Bimbe ao km 8 do lado direito, fl., 19.04.1967, *B. Teixeira et al.* 11301 (LISC); Aeroporto de Novo Redondo, fl. & fr., 12.04.1967, *B. Teixeira et al.* 11383 (LISC). **Cunene prov.**, Cahama, junto da jangada no rio Caculovar, fl., 10.02.1956, *E.J. Mendes* 1682 (LISC, LUBA digital image). **Huíla prov.**, Mossamedes, Shella Mountains [Serra de Chela], fl. & fr., 1920, *s.coll.* [? *J. Gossweiler*] s.n. (K); Ganguelas, Vila Artur de Paiva [Cuvango], Missão, vale do Cuvango, fl., 09.04.1960, *E.J. Mendes* 3518 (LUBA). **Luanda prov.**, Loanda, fr., s.d., *F. Welwitsch* 5069 (BM, K, LISU digital image), *Ibid.*, *F. Welwitsch* 5121 (BM, LISU digital image); *Ibid.*, *F. Welwitsch* 5139 (BM, LISU digital image); distr. Loanda, pr[o]pe Maianga do Povo, fl. & fr., 01.1858, *F. Welwitsch* 5127 (BM, K, LISU digital image); distr. Loanda, prope Teba et Boa Vista, fl. & fr., 06.1858, *F. Welwitsch* 5186 (BM, LISU digital image); Loanda, fr., 1903, *J. Gossweiler* 370 (BM, K); Musseque, Ponta das Lagostas, fl. & fr., 14.03.1937, *A.W. Exell & F.A. Mendonça* 7 (BM). **Namibe prov.**, near km 108.5 on the Mossamedes Railway, fr., 29.04.1909, *H.H.W. Pearson* 2830 (K); Moçamedes, perto da encruzilhada Bruco–Bumbo–Assunção, fl., 01.12.1955, *E.J. Mendes* 955 (LISC); Moçamedes, Caluungo, entre a casa e o rio, fl., 16.11.1962, *A. Figueira de Sousa* 247 (LUBA); Moçamedes, de Caluundo para o Chingo, fl., 21.11.1962, *C. Henriques & F. Moreno* 100 (BM); between Bibala and Assunção, fl. & fr., 10.04.2017, *E. Tripp & K. Dexter* 6915 (COLO, K, LUBA).

Conservation status: A widespread and often locally abundant species, tolerant of disturbance, here assessed as of Least Concern (LC).

Notes: For a full description, bibliography and synonymy of *Ruellia patula* relevant to continental Africa, see Vollesen (2008, 2013). This species is highly variable across its broad range and only plants from Angola and immediately neighbouring areas were considered when preparing the key above. Elsewhere within its range, the length of the corolla tube, and in particular the cylindrical basal portion, can vary considerably and the cylindrical portion can be longer than the expanded throat, as is the case in many populations in the southeast of its African range (Vollesen, 2013). It is possible that several taxa,

intraspecific or separate species, may be involved in this single name following additional study. However, the Angolan material is fairly uniform morphologically.

In Angola, the flowers are typically pink to purple, and hence often separable from *Ruellia prostrata* where the flowers are usually white in Angola (see above), but white-flowered forms are common elsewhere in the range of *R. patula* *s.l.* In addition, in Angola the corollas are 15–24 mm long with the cylindrical portion of the tube only 3.8–6 mm long, whilst in *R. prostrata* the corollas are 24.5–31.5 mm long with the cylindrical portion of the tube 6.5–9 mm long, but these differences do not hold up in other parts of the ranges of these species where they are sympatric.

Given that there appears to be no original material for *Ruellia patula*, this name requires neotypification. However, we refrain from doing so until a full revision of this complex species is carried out.

4. *Ruellia togoensis* (Lindau) Heine in Kew Bull. 16: 181. 1962; Heine in Fl. W. Trop. Afr. 2: 397. 1963. *Dischistocalyx togoensis* Lindau in Bot. Jahrb. Syst. 33: 188. 1902. *Stenoschista togoensis* (Lindau) Bremek. in Bot. Jahrb. Syst. 73: 148. 1943. *Type*: TOGO, **Maritime region**, prope Lomé, fl., 10.1900 [*vide* Lindau, 1902], O. Warnecke 264 (holo P [P00436147 digital image!]; iso BR [BR0000006293406 digital image!], HBG [HBG502248 digital image!], K [K000394007!]).

Ruellia ardeicollis Benoist Bull. Soc. Bot. France 61 (Mém. 8e): 278. 1917. *Lectotype* (designated here): CÔTE D'IVOIRE, **district du Woroba**, vallée de la Moyenne Sassandra: Orodougou, entre Sifié et Séguéla, fl., 02.06.1909, A. Chevalier 21816 (P [P00436144 digital image!]; isolecto K [K000394006!], P [P00436145 digital image!]). *Residual syntype*: CÔTE D'IVOIRE, **district du Lacs**, Moréno, entre Anoumaba et Sahoua, fl., 23–24.11.1909, A. Chevalier 22436 (P [P00436146 digital image!]).

Figs. 1e,f & 2

Slender perennial herbs, decumbent or erect, 10–70 cm tall, often rooting along trailing basal stems; young stems 4-angular, sulcate in dry state, with sparse to more numerous spreading-antrorse somewhat hispid hairs or these rarely shorter and appressed-antrorse, (0.2–)0.5–0.8 mm long, and with few to more numerous wispy glandular hairs 0.5–1.3 mm long;

mature stems less angular and can be glabrescent. Leaves on petioles 5–27 mm long, with antrorse somewhat hispid hairs mainly above and with shorter antrorse hairs in the adaxial groove; blade ovate, 36–100 × 14–52 mm (l : w ratio 1.7–2.6 : 1), base broadly cuneate or shortly and broadly attenuate, margins entire, apex (sub-)attenuate, surfaces with somewhat hispid eglandular hairs, evenly distributed on upper surface, most dense along main veins beneath and along margin, at first numerous but rather sparse at maturity, often with few wispy glandular hairs along margin towards base, midvein with short antrorse hairs on upper surface; cystoliths numerous, linear; lateral veins 4–6 per side. Inflorescences axillary in distal leaf axils, each 1(–2)-flowered, opposite, sessile; bracteoles (oblong-)oblanceolate to spatulate, 2.5–13 × 0.7–3.3 mm, indumentum as leaves. Calyx 5–9.5 mm long, fused at base for 1.3–2.2 mm; lobes linear-lanceolate, 0.5–0.8 mm wide, each with prominent midvein, external surface with short ± ascending eglandular hairs along margins and sometimes along midveins of lobes, rarely with few scattered glandular hairs; cystoliths very numerous and giving calyx a glaucous appearance. Corolla salverform, 42–55 mm long, white or very rarely pale lilac-purple, retrorsely eglandular-pubescent externally; tube with cylindrical basal portion 26–33.5 × 1–1.3 mm, expanded throat 9–12 mm long, 5–9 mm wide at mouth (ratio of cylindrical tube : expanded throat 2.3–3.5 : 1), lobes subequal, 6.5–10.5 × 6.8–10.5 mm, rounded, sometimes with shallowly emarginate centre. Stamens included within corolla throat or anthers held at mouth, inserted c. 12 mm from base of tube, pairs didynamous; filaments of anterior stamens free for 6.8–7.5 mm long, those of posterior stamens 5–5.2 mm long, glabrous; anthers of anterior stamens ± 1.9–2.2 mm long, those of posterior stamens ± 1.7–2.1 mm long. Pistil drying brown, ovary densely eglandular-puberulous, hairs pale brown; style shortly pubescent; stigma with anterior lobe ± 1 mm long, posterior lobe not or barely developed. Capsule stipitate, 19–24.5 mm long including stipe 9–10 mm long, retrorsely eglandular-puberulous, 8–12-seeded; seeds, c. 2.8 × 2.5 mm, with dense hygroscopic hairs along marginal rim, elsewhere glabrous or with sparse minute spreading hairs.

Flowering & fruiting: From the limited data available for Angola, this species has been recorded to flower in the rainy season between December and April.

Habitat: “Scrub forest” (Dawe 381); seasonally moist forest with *Khaya anthotheca* (Welw.) C.DC. (Meliaceae) and *Milicia excelsa* (Welw.) C.C.Berg (Moraceae); c. 380–1160 m elevation.

Distribution: Widespread but scarce in western and southwestern tropical Africa, occurring in Côte d’Ivoire, Ghana, Togo, Benin, Nigeria, D. R. Congo and Angola. In Angola, it is recorded from Cuanza Norte, Malange and Namibe provinces (see *Notes*).

Specimens examined: ANGOLA, **Cuanza Norte prov.**, close to Cambondo village, fl., A. Martins (photo record). **Malange prov.**, Casal, fl., 18.04.1922, M.J. Dawe 381 (K). **Namibe prov.**, Moçamedes, Caluungo, junto as rio, fl., 16.12.1962, A. Figueira de Sousa 249 (LUBA digital image). BENIN, **Mono department**, Logdo, 11 km NE Athiémé, fl., 25.02.1965, J. Raynal & A. Raynal 13516 (P digital image). CÔTE D’IVOIRE, **district du Lacs**, Orumbo Boka, fl., 05.04.1967, Y. Sell 547 (P digital image). **District de la Vallée du Bandama**, c. 70 km W of Bouaké, Forêt Classée Matiamba, c. 25 km S of Béoumi, 5 km SE of Ando, fl. & fr., 27.05.1963, W.J.J.O. de Wilde 95 (WAG digital image). D. R. CONGO, **Kongo-Central district**, Koma, village de Kalamu, fl. & fr., 11 [Nov.], without year, A. Dacremont 111 (BR digital image, K); Moanda, fl. & fr., 06.1903, J. Gillet 3248 (BR digital image); Jardin Agronomique de Kisantu, fl. & fr., 16.08.1930, H. Vanderyst 24647 (BR digital image); *Ibid.*, fl., 02.1932, H. Vanderyst 28538 (BR digital image). GHANA, **Ashanti region**, top of Ejura Scarp, fl. & fr., 10.12.1953, J.K. Morton in GC 9798 (K, WAG digital image); Agogo, fl., 10.04.1954, C.D. Adams 2635 (K). **Bono region**, mile 95.5 on Sunyani–Berekum road, fl., 19.12.1954, C.D. Adams 2776 (K); Mpameso Forest Reserve 20 miles S of Dormaa–Ahenkro, W Ashanti, fl., 23.12.1954, C.D. Adams 2958 (K). **Bono East region**, Brong-Ahafo Region, Nkuranza dist., Boabeng-Fiema Monkey Sanctuary, fl., 05.12.1990, S.J. Manktelow *et al.* 111 (K). **Eastern region**, Koforidua road, Begoro, fl., 01.11.1953, J.K. Morton A33 (K, WAG digital image); Ampam, Kwahu, fl., 22.12.1957, C.D. Adams 5026 (K). NIGERIA, **Ondo state**, Ikare dist., Iha–Ipe Akoko, fl. & fr., 16.05.1978, B.O. Daramola & P.C. Ihe BO.451 (FHI digital image).

Conservation status: This is widespread species with an EOO in excess of 2,000,000 km² across west and west-central Africa. However, it is apparently scarce

and is absent from large parts of this range, with fewer than 20 known locations. Further, it is almost certainly in decline due to widespread destruction of its seasonally wet forest habitat. Therefore, whilst it is likely to qualify as of Least Concern (LC) under IUCN criterion B, it would nevertheless be desirable to gather more data on current range and population size.

Notes: This species appears to be associated with seasonally moist semi-deciduous forests in west and west-central Africa, apparently being absent from the permanently wet forests of Lower Guinea and much of the Congo Basin. The description above covers specimens from across the range of this widespread but scarce species; as a result, all specimens seen are cited above, not just those from Angola. Despite the wide range and large disjunction between specimens from the northern part of the range in Upper Guinea (Côte d’Ivoire to Nigeria) and those from the southern part of the range south of the Congolian region (D.R. Congo and Angola), the plants are remarkably consistent morphologically with only minor variation. The flower colour is usually white, but *de Wilde* 95 (WAG) from Côte d’Ivoire is recorded as having “pale purplish-lilac” flowers.

The specimen *A. Figueira de Sousa* 249 at LUBA has only been seen as a digital image by the first and third author; it appears to be a close match for this species, but the locality in southern Angola is rather out-of-range for the typical distribution of this species, as it is otherwise found only in the north. It is included tentatively here but it would be ideal to examine this specimen more closely to make sure it belongs to the species.

Ruellia togoensis is remarkable amongst palaeotropical *Ruellia* for being the only species known to lack the coarsely reticulate pollen exine that is typical for the genus. Instead, it has a clavate exine and a densely granulate surface (Furness & Grant, 1996). Different pollen types are rare elsewhere in *Ruellia* although are notable in the sect. *Blechum* (P.Browne) E.Tripp & T.F.Daniel of the New World, where species have 3-syncolporate pollen grains (*i.e.*, the apertures meet at the poles), often and with a finely to coarsely reticulate exine (Tripp *et al.*, 2009; Manzitto-Tripp & Daniel, 2023), and so differing from the typical 3- (or 5-)porate spherical grains with coarse exine in *Ruellia*. *Ruellia togoensis* would otherwise fit well within sect. *Dipteracanthus*, most notably in having

stipitate capsules with seeds with the hygroscopic hairs concentrated along the marginal rim. However, given the odd pollen type, this species should be a priority for future inclusion in molecular phylogenetic studies to confirm its infrageneric placement.

Typification: A lectotype is chosen for *Ruellia ardeicollis* from amongst the original syntypes, with the P sheet of Chevalier 21816 being selected as it is the most informative specimen amongst the original material.

5. *Ruellia currorii* T.Anderson in J. Proc. Linn. Soc., Bot. 7: 24. 1863; C.B.Clarke in Fl. Trop. Afr. 5: 48. 1899; Makholela in Figueiredo & Smith, Pl. Angola: 24. 2008. *Type:* ANGOLA, **Benguela prov.**, Elephants' Bay, fl., 1842, *Curror* in herb. Hooker 17 (holo K [K000394002!]). **Figs. 1h–j & 4**

Shrubs 40–100 cm tall; young stems grey-green, only slightly angular, with numerous shallow longitudinal ribs, densely eglandular-puberulent, sometimes also with interspersed glandular hairs of \pm equal length, softly velutinous to the touch; mature stems becoming woody, terete, grey or sandy-coloured, indumentum persistent. Leaves on petioles 7.5–17 mm long, indumentum as young stems; blade \pm broadly ovate, 19–39 \times 13–20 mm (l : w ratio 1.1–1.5(–1.95) : 1), base shallowly cordate or truncate,

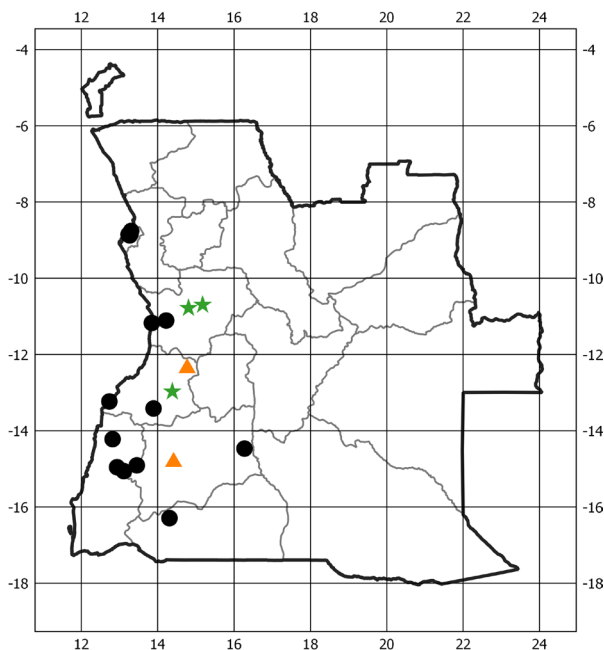


Fig. 3. Distribution in Angola of *Ruellia patula* Jacq. (black circles), *R. angolensis* I.Darbysh. & E.Tripp (green stars), and *R. quipungoensis* I.Darbysh. & E.Tripp (orange triangles). Map created in QGIS Version 3.2 (QGIS.org 2023).

margins entire or shallowly repand, apex obtuse to bluntly acute, surfaces eglandular-puberulous, hairs widespread or mainly along margin and veins beneath at maturity, with minute short-stalked glandular hairs beneath and sometimes also along margin; cystoliths numerous, short and of unequal length; lateral veins 3–6 per side. Inflorescences axillary in distal leaf axils, each 1–3-flowered; peduncle conspicuous, sometimes curved-ascending, 5–52 mm long, secondary branch(es) if present 8–21 mm long, eglandular-puberulous with slightly retrorse hairs, often also with few to numerous short glandular hairs; bracteoles spatulate to subulate, 2.5–8.5 \times 0.7–2.3 mm, can be caducous; flowers sessile or with pedicels to 2.5 mm long. Calyx 11–19 mm long, proximal \pm 1/3 fused by hyaline tissue between lobes, extending somewhat in fruit; lobes narrowly lanceolate, 1.2–1.4 mm wide, external surface densely glandular-pilose to -villose, hairs yellowish to cream-coloured, 0.8–1.5 mm long, shortening towards lobe apices where glandular-pubescent, also with interspersed eglandular hairs mainly along margins. Corolla broadly infundibular, 48–51 mm long, tube pale green-yellow externally, throat white, limb purple or white, glandular-pilose to sparsely so externally; tube with cylindrical basal portion 13–18 \times 2.2–3.3 mm, broadly expanded portion 23–29 mm long, 17–18 mm wide at mouth (ratio of cylindrical tube : expanded throat 0.55–0.9 : 1), lobes subequal, 8.5–10.5 \times 13.5–15 mm, broadly rounded with shallowly emarginate centre. Stamens included within corolla throat, pairs didynamous; filaments of anterior stamens free for \pm 12.5 mm long, those of posterior stamens 7 mm long, glabrous; anthers of anterior stamens \pm 5 mm long, those of posterior stamens \pm 4.5 mm long. Pistil drying brown, ovary minutely glandular; style shortly pubescent, with or without scattered sessile glands; stigma with anterior lobe 3.5–5 mm long, can be inrolled in dry material, posterior lobe not or barely developed. Capsule narrow oblong-ellipsoid with short, poorly differentiated basal stipe, 21.5–30 mm long, with few minute glandular hairs towards apex, (10–)12–16(–18)-seeded; seeds \pm 2.2 mm in diameter, with dense hygroscopic hairs along marginal rim, elsewhere glabrous.

Flowering & fruiting: This species has been recorded to flower and fruit between January and August; rainfall is intermittent and unpredictable within its range hence the relationship to rainfall patterns is unclear.

Habitat: Recorded from sparse desert shrubland and plains, *Commiphora-Acacia-Rhigozum* scrub and along dry stony, gravelly or sandy riverbeds; 0–650 m elevation.

Distribution: Restricted to the Namib Desert of southwest Angola (Benguela and Namibe Provinces) and northwest Namibia (Kunene Region).

Specimens examined: ANGOLA, **Benguela prov.**, Equiminha, fl., 05.2022, A. Martins (photos <https://biodiversidadeangola.com/plants/specimen/173>). **Namibe prov.**, Pediva, near Porto Alexandre, fl., 27.06.1954, R. Brain s.n. (PRE digital image); Moçamedes, Pediva, st., 01.06.1965, R. Correia 2917 (LUBA digital image); c. 55.8 km ESE of Tombua, fl. & fr., 19.01.2009, S.P. Bester 9161 (PRE digital image); Omauha Rest Camp, ± 60 km from Iona National Park, fl. & fr., 20.01.2009, F. Crawford FC406 (K, LUBA, PRE digital image); Omahua Lodge, fl. & fr., 20.01.2009, A. Hankey & K. van der Walt 2715 (PRE digital image) – see also iNaturalist observation: <https://www.inaturalist.org/observations/19967714>; Iona National Park, fl., 04.2018, C. Neto (photos <https://biodiversidadeangola.com/plants/specimen/173>); 59 km S of Virei en route to Pediva, fl. & fr., 16.04.2017, E. Tripp & K. Dexter 6958 (COLO, K, LUBA). **Namibe/Cunene prov.**, Coroca [R.] to Palmfontein, fl., 24.08.1899, H. Baum 13 (Z digital image). NAMIBIA, **Kunene region**, Kapupa valley, fl., 16.08.1956, R. Story 5836 (K, PRE digital image); about 8 miles up Kapupa R. (Otjihipa Mountains), fl. & fr., 07.07.1959, Davies *et al.* 55 (PRE digital image).

Conservation status: This is a very localised species from the northernmost extent of the Namib Desert, with an EOO of 29,160 km² and an AOO of 44 km² based on known occurrence data. It has been noted as locally fairly frequent (Story 5836) to occasional or uncommon (S.P. Bester 9161; F. Crawford FC406). Several of the known subpopulations are within the Iona National Park of Angola. This site experienced degradation during and after the war of independence (1961–1974) and the subsequent Angolan civil war (1975–2002), with problems of illegal hunting and increased settlement and associated domestic livestock numbers within the park, putting pressure on the natural environments. However, since 2019 the park has been managed by African Parks in conjunction with the government, and considerable effort has been put into both ecological and socio-economic sustainability (African Parks, 2023).

Further north, this species is probably under-recorded in the largely unbotanised Namib between Iona and Equiminha, hence the AOO is likely to be considerably higher than currently recorded, and as the human population is rather sparse across much of this area, threats are unlikely to be severe. In Namibia, it is highly localised but the localities are remote and unlikely to be threatened, hence in the *National Red Data Book of Namibian Plants* (Loots, 2005) the species was assessed naturally as “Rare”, *i.e.*, meeting one of the agreed criteria for rarity (SANBI, 2023), but not exposed to any direct or plausible potential threat and so not qualifying for a category of threat under the five IUCN criteria. Globally, it has been assessed as of Least Concern (LC) by Craven (2004) due to the lack of current or plausible threats, although that assessment was based upon a smaller dataset with an EOO of 1250 km² cited. We concur with this assessment here. However, in the longer term, climate change, in particular prolonged drought, may impact this species given its small range in what is already a harsh environment.

Notes: Tripp and Darbyshire (2017) earlier noted the challenge in placing this species to section within Old World *Ruellia*. The general facies of the plant, including the broadly ovate leaves and pedunculate cymes are similar to members of sect. *Discifolia* but the long slender capsule and seeds with hygroscopic hairs confined to the rim suggest placement in sect. *Dipteracanthus* and Tripp and Darbyshire (2017) placed it tentatively in that latter section on that basis. However, this species should be a priority for inclusion in future molecular studies in *Ruellia*.

This is one of a number of endemic Acanthaceae species that occur in the arid northernmost portion of the Kaokoveld centre of plant endemism in the border region between Namibia and Angola. This area is particularly important for diversity in the genera *Petalidium* Nees (Tripp *et al.*, 2017; Loiseau *et al.*, 2023; Dexter *et al.*, 2023), *Barleria* L. including the recently described *Barleria deserticola* I.Darbysh. & E.Tripp (Darbyshire *et al.*, 2019, 2021), *Pogonospermum* Hochst. (formerly members of *Monechma* Hochst.) including *P. eriniaie* (I.Darbysh.) I.Darbysh. & Kiel (Darbyshire & Goyder, 2019; Darbyshire *et al.*, 2020, 2022), and *Blepharis* Juss. (Vollesen, 2000). Other endemic Acanthaceae of this region include *Rhinacanthus kaokoanus* K.Balkwill & S.D.Will. (Balkwill, 1995; Darbyshire *et al.*, 2018)

and the monospecific genus *Mcdadea* E.Tripp & I.Darbysh. (Tripp & Darbyshire, 2020).

6. *Ruellia angolensis* I.Darbysh. & E.Tripp, sp. nov. Figs. 3, 5a–k & 6

Ruellia angolensis is unlikely to be confused with any other species of continental African *Ruellia*, by the unique combination of densely pilose to villose stems, broadly infundibular white corolla, 4 subequal stamens, conspicuously 2-lobed stigma and broadly obovoid capsule with seeds with hygroscopic hairs across the surface. It superficially resembles *Ruellia congoensis* Benoist but differs most notably in having longer, linear calyx lobes (*vs.* calyx lobes lanceolate, \pm 9 mm long *vide* Benoist, 1916), the four stamens being subequal in length (*vs.* stamens didynamous) and both lobes of the stigma being well developed (*vs.* only one lobe of the stigma well developed).

Type: ANGOLA, **Benguela prov.**, Membassoco (Capacca), Cubal, 18 km inland, fl. & fr., 11.1941, H.G. Faulkner A.14 (holo K [K001009372!]; iso BM [BM001124106!], PRE digital image!).

Suffruticose perennial herbs, with few to numerous erect stems 10–30 cm tall arising from a short woody base (rhizome) with thick, fleshy roots; whole plant drying dark brown or green-brown; stems densely pilose to somewhat villose with patent long multicellular eglandular hairs 1.7–3.3

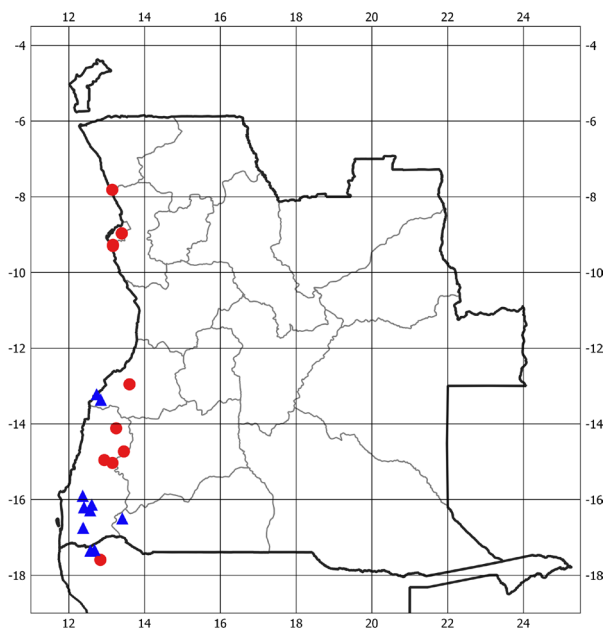


Fig. 4. Distribution in Angola and neighbouring northwest Namibia of *Ruellia currorii* T.Anderson (blue triangles), and *R. bignoniiflora* S.Moore (red circles). Map created in QGIS Version 3.2 (QGIS.org 2023).

mm long, these (pinkish-)brown, lustrous, straight or the longest hairs becoming somewhat crisped, also with two opposite lines of inconspicuous short, \pm retrorse eglandular hairs, distal portions of stems with interspersed minutely gland-tipped hairs, these shorter than or subequal to the long eglandular hairs. Leaves petiolate, petiole 3–14 mm long, pilose; blade ovate to ovate-elliptic or narrowly so, 4.3–8 \times 1.9–5 cm (l : w ratio 1.4–3 : 1), base rounded, obtuse or cuneate, margins entire or very shallowly crenate-serrate, apex acute, surfaces eglandular-pilose, densely so when young, hairs can be most dense on veins beneath, sometimes with few interspersed glandular hairs; cystoliths numerous; lateral veins 6–7 per side. Inflorescences axillary in distal leaf axils, single-flowered; peduncle 4–10 mm long, indumentum as young stems but with more numerous glandular hairs; paired bracteoles variable in shape and size, from oblong-elliptic to narrowly oblanceolate, 11–37 \times 2–12.5 mm, those at distal-most nodes typically smallest and proportionally narrowest, those at lower fertile nodes can be leaf-like, indumentum as leaves; flowers sessile above bracteoles. Calyx divided almost to base into 5 linear lobes, 16–24.5 \times 0.7–1 mm, eglandular-pilose and with some interspersed glandular hairs of similar length. Corolla 37–40 mm long, white, eglandular-pilose externally on distal portion of tube and on lobes, hairs longest on veins, proximal portion and internal surface of tube glabrous, lobes shortly glandular-pubescent internally; tube broadly infundibular, cylindrical basal portion 9.5–11 \times 2.3–2.5 mm, expanded portion c. 12–16.5 mm long, 7.5–13 mm wide at mouth (ratio of cylindrical tube : expanded throat 0.6–0.9 : 1), lobes subequal, c. 8.5–11.5 mm long, apices obtuse or rounded. Stamens included within corolla throat, pairs only very slightly unequal in length; filaments free for 4.8–5 mm long, glabrous; anthers 3.7–3.8 mm long. Pistil drying brown, ovary glabrous except at attachment of style; style shortly pubescent, hairs becoming sparser distally; stigma bilobed, only slightly unequal, anterior lobe 2.1–3.1 mm long, posterior lobe 1.8–2.2 mm long. Capsule obovoid above short basal stipe, 23.5–28 mm long including stipe c. 4.5–8 mm long, apex with a short beak to 1.5 mm long, surfaces glabrous; only immature seeds seen, 6(or more?)-seeded, with silky hygroscopic hairs across surface, most dense along margin.



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Fig. 5. Line drawings of *Ruellia angolensis* I.Darbysh. & E.Tripp (a–k) and *R. quipungoensis* I.Darbysh. & E.Tripp: **a.** Habit–flowering stem; **b.** Habit–fruiting plant with woody rootstock; **c.** Leaf–broader variant; **d.** Leaf margin–abaxial surface; **e.** Detail of stem indumentum; **f.** Flowering branch (based on painting by H. Faulkner); **g.** Edge-on view of glandular hairs on inner face of petal; **h.** Stamens *in situ* with style and stigma; **i.** Style and stigma, with enlarged detail of stigma (left); **j.** Bracteoles, calyx, ovary and style base; **k.** Capsule. **l.** Corolla. (a, b, d–k from Faulkner A.14; c from Henriques 1597; l from Pittard 39. Scale bars: single-line bar = 1 mm; graduated single-line bar = 2 mm and 5 mm; double-line bar = 1 cm; graduated double-line bar = 5 cm. (Drawn by Andrew Brown). © the Board of Trustees of the Royal Botanic Gardens, Kew, reproduced with kind permission.



Fig. 6. Painting of *Ruellia angolensis* I. Darbysh. & E. Tripp by Helen Faulkner, with the illustrator's annotations; reproduced from Helen Faulkner's papers: FAU/1/6 (Sketchbooks) [drawing no. 318], Library and Archives, Royal Botanic Gardens, Kew. Reproduced with the kind permission of the Board of Trustees of the Royal Botanic Gardens, Kew.

Flowering & fruiting: From the limited data available, this species is recorded to flower and fruit in October and November, which corresponds to the early rainy season in western Angola.

Habitat: This species has been recorded from open miombo (*Brachystegia* Benth., Fabaceae) woodland on stony soils and from bushland, and neighbouring young plantations of sisal; c. 1050–1300 m elevation.

Distribution: Restricted to western Angola, occurring in Benguela and Cuanza Sul provinces.

Etymology: This species is named for the Republic of Angola.

Specimens examined: ANGOLA, **Cuanza Sul prov.**, Quibala, na estrada para Cariango, fl.* & fr., 25.10.1973, C. Henriques 1597 (LUBA); Quibala, entre Quibala e Condé, fl.*, 29.10.1973, R. Santos, C. Henriques & Daniel 3354 (LUBA digital image). [* - flower colour mentioned on the label of Henriques

1597 and Santos *et al.* 3354 but no flowers seen on the duplicates at LUBA].

Conservation status: This species is currently known only from the three cited specimens from west Angola, each considered to be a separate location within an EOO of approximately 4720 km². This falls within the range threshold for Endangered under criterion B1. It is considered likely to be scarce, given how few collections are known of what is a showy species. However, botanical exploration within its range has been very limited, and there is the additional complication that some herbarium records of this species may have been lost (see Materials and Methods). Miombo woodland habitat is threatened throughout this species' range, with extensive woodland clearance noted through much of eastern Benguela and central Cuanza Sul provinces (Mendelsohn, 2019). With regard to the three known locations for the species, Membassoco is on the EN110 road, the main route inland from Benguela

towards Huambo, and there is now extensive agricultural land, with natural vegetation limited to the scattered rocky hills in this area. The areas around Quibala (to the west and east) are also heavily settled and farmed with some areas of commercial irrigation along the road towards Carianga (Google Earth Pro, 2023). As this species has been recorded from areas around sisal plantations, it may be tolerant of some disturbance, but it is considered unlikely to persist in transformed landscapes. Using a standard 2 × 2 km grid cell size, this species has an AOO of 12 km², and, while almost certainly an underestimate, the actual AOO is considered likely to fall within the Endangered threshold of 500 km² under criterion B2 given the extent of habitat loss and fragmentation within its range. With a continuing decline in quality and extent of habitat, this species is therefore assessed as Endangered (EN) B1ab(iii)+B2ab(iii).

Notes: Based on the broadly obovoid capsule and seeds with hygroscopic hairs covering the surface, this species is here placed tentatively in sect. *Discifolia* as defined by Tripp and Darbyshire (2017). The leaves are less broadly ovate than in most species in that section, but additional morphological characters in support of placing this species in that section include the conspicuously bilobed stigma (present in several species in that section including in *R. bignoniiflora*) and the pedunculate cymes. The sympatric species in sect. *Discifolia*, *R. bignoniiflora* and the newly described *R. quipungoensis* below, are unlikely to ever be confused with *R. angolensis* as these have very long cylindrical portions to the corolla tube (ratio of cylindrical tube : expanded throat length 1.8–3.45 : 1) amongst other differences; see also Table 1 and the diagnosis section for *R. quipungoensis* below for additional differences to that species.

As noted in the diagnosis section, *R. angolensis* bears a superficial resemblance to the type specimen of *Ruellia congoensis* Benoist (*J. Dybowski* 610, P [P00436136 digital image!]), a little-known species from Congo and Central African Republic. However, that species has much shorter and more lanceolate calyx lobes, didynamous stamens and only one lobe of the stigma is well developed, amongst other differences. The two species are not likely to be closely related, and *R. congoensis* is tentatively placed in sect. *Dipteracanthus*, possibly related to *R. praetermissa*.

7. *Ruellia quipungoensis* I. Darbysh. & E. Tripp, sp. nov. Figs. 3 & 5I

Ruellia quipungoensis resembles *Ruellia bignoniiflora* but differs in the stem indumentum being a mixture of short white retrorse eglandular hairs and long patent lustrous yellow-brown eglandular hairs (*vs.* shortly viscid glandular-pubescent and retrorse-puberulous, longer eglandular hairs often confined to older stems and much finer, white, not lustrous in *R. bignoniiflora*); the bracteoles being narrowly oblong-elliptic to oblanceolate, 2–4 mm wide (*vs.* ovate to broadly so, 5.5–16 mm wide); the calyx lobes being linear and densely long eglandular-pilose to -villose with interspersed shorter eglandular and few or no glandular hairs (*vs.* lobes ligulate to lanceolate, shortly glandular-pubescent with longer eglandular hairs confined to margins and midveins of each lobe and to fused basal portion); corolla lobes being eglandular-pubescent externally (*vs.* mixed glandular- and eglandular-pubescent); the stamens being somewhat more didynamous and with anthers 3.4–4.2 mm long (*vs.* anthers 4.7–5 mm long); and the capsule being densely puberulous (*vs.* capsule glabrous). It also resembles *Ruellia angolensis* in vegetative characters but differs in the narrow cylindrical portion of the corolla tube being *c.* 53.5 mm long and much longer than the expanded throat, ratio *c.* 3.45 : 1 (*vs.* cylindrical portion of tube only 9.5–11 mm long and shorter than the broadly expanded throat, ratio 0.6–0.9 : 1 in *R. angolensis*); the corolla lobes being glabrous internally (*vs.* lobes shortly glandular-pubescent internally); the stamens being somewhat didynamous (*vs.* anthers held at ± an equal height); and the capsule being densely puberulous (*vs.* capsule glabrous).

Type: ANGOLA, **Huíla prov.**, Quipungo, Morro do Posto Emissor, Mai-Mai, fl. & fr., 04.02.1966, *R. Correia* 3422/A (holo LISC [LISC048174!]; iso LUBA!).

Perennial herbs, to 60 cm tall (*vide* *Correia* 3422/A), basal parts not seen; stems eglandular-puberulous, hairs 0.2–0.3 mm long, white, retrorse to sub-appressed, and with numerous interspersed patent long multicellular eglandular hairs 2.5–3 mm long, these yellow-brown, lustrous, straight or somewhat curled towards tips. Leaves petiolate, petiole 5–14 mm long, indumentum as stems; blade drying dark green-brown above, paler and greyish beneath due to indumentum, ovate to narrowly so, 4.1–10.2 × 1.6–5.7 cm (l : w ratio 1.6–2.5 : 1), base rounded, broadly obtuse or shallowly cordate, margins shallowly crenate-serrate, apex acute to bluntly so, upper surface eglandular-puberulous and with long yellow-brown, lustrous hairs 1.5–3 mm long as on stems, these becoming more numerous and shorter along margin where there are sometimes occasional

interspersed short glandular hairs, lower surface pale-villose, largely obscuring surface; cystoliths numerous, linear, conspicuous on upper surface; lateral veins 5–9 per side. Inflorescences axillary in distal leaf axils, single-flowered; peduncle 1.5–3.5 mm long, indumentum as young stems, dense; paired bracteoles narrowly oblong-elliptic to oblanceolate, 11–21 × 2–4 mm, indumentum as leaves but more dense; flowers sessile above bracteoles. Calyx divided almost to base into 5 linear lobes, 17–24.5 × 1–1.2 mm in flower, extending up to 29 mm long in fruit, densely long eglandular-pilose to villose with hairs patent, typically 1–2 mm long, can be somewhat crisped, and with ± numerous interspersed short eglandular hairs, sometimes with very few interspersed glandular hairs. Corolla c. 82 mm long, colour unknown, eglandular-pubescent externally on distal portion of tube and on lobes, hairs longest on veins, proximal portion of tube glabrous, internal surface of tube unknown, lobes glabrous internally; tube with cylindrical basal portion c. 53.5 × 2.3 mm, expanded portion campanulate, c. 15.5 mm long, 12 mm wide at mouth (ratio of cylindrical tube : expanded throat 3.45 : 1), lobes c. 13 mm long, rounded. Stamens included within corolla throat, didynamous, anthers of posterior pair overlapping those of anterior (longer) pair by c. half their length; filaments glabrous; anthers of longer stamens ± 4.2 mm long, those of shorter stamens 3.4–3.8 mm long. Ovary not seen; style shortly pubescent; stigma bilobed, longer lobe c. 0.8–1.8 mm long, curved in dry state, shorter lobe c. 0.6–1.1 mm long. Capsule only seen in immature state, broadly obovoid, 19 mm long, densely puberulous with fine pale hairs throughout; seeds not seen.

Flowering & fruiting: From the limited data available, this species is recorded to flower and fruit in February and March, which corresponds to the latter half of the rainy season in western Angola.

Habitat: Recorded from *Brachystegia spiciformis* Benth. (Fabaceae) (miombo) woodland on a hill (*Correia* 3422/A; habitat not recorded on *P. Pittard* 39). Pittard lists the elevation of his collections as being 3000 ft, but Balombo is at c. 1200 m, hence the approximate elevation range is 1200–1320 m asl.

Distribution: Restricted to western Angola, occurring in Benguela and Huíla provinces.

Etymology: This species is named after the municipality of Quipungo in Huíla province of

Angola, from where the type collection is derived.

Specimen examined: ANGOLA, **Benguela prov.**, Balombo, fl. 14.03.1938, *P. Pittard* 39 (BM [BM001124107]).

Conservation status: This species appears to be scarce, currently known from only the two collections cited despite its large and showy flowers. However, botanical exploration within its range has been very limited, and there is the additional complication that some herbarium records of this species may have been lost (see Materials and Methods). Threats are widespread in its favoured habitats across its range, with extensive woodland clearance and high frequency of burning noted throughout much of northern Huíla and eastern Benguela provinces (Mendelsohn, 2019). With regard to specific locations for this species, the area around the town of Balombo is extensively settled and farmed, although with some wooded hilly country to the southwest (Google Earth Pro, 2023) where this species may persist. The area around Maimai (Chicócuá) to the west of Quipungo in Huíla is now heavily transformed with little natural vegetation remaining. However, the Bicuar National Park is not far to the south of this area, and it is possible that this species occurs there where there are extensive areas of intact miombo habitat, but this would require confirmation. Using a standard 2 × 2 km grid cell size, this species has a known AOO of 8 km², and, while almost certainly an underestimate, the actual AOO is considered likely to fall well within the Endangered threshold of 500 km² under criterion B2 given the extent of habitat loss and fragmentation within its range. With two locations currently known and a continuing decline in quality and extent of habitat, this species is therefore assessed as Endangered (EN) B2ab(iii).

Notes: As with *Ruellia angolensis* above, this species is placed tentatively within sect. *Discifolia* based on the broadly obovoid capsule and bilobed stigma. It is similar to *R. bignoniiflora* in having a long-cylindrical corolla tube much longer than the limb, stamens included within the corolla throat and a bilobed stigma. However, the two species are readily separated by the characters listed in the diagnosis and key. In addition, they differ clearly where they are sympatric in Angola in *R. bignoniiflora* having a more pronounced widened corolla throat, the ratio of the cylindrical tube : enlarged throat being 1.8–2.1 : 1, whilst in *R. quipungoensis* the throat is shortly campanulate and

the ratio is c. 3.45 : 1. However, in some populations of *R. bignoniiflora* from eastern Africa the throat can be less abruptly widened and the ratio of the tube to the throat has a much wider range, 1.7–4.9(–5.9) : 1 (see note below under that species). In a vegetative state, *Ruellia quipungoensis* is most similar to *R. angolensis*, described above, but the corolla form is very different, and the fruits are puberulent rather than glabrous. See Table 1 for a comparison of these three species.

The measurements of the flowers in the description of *Ruellia quipungoensis* are based on the one mature flower observed, on Pittard 39, Hence they may not represent the full range of variation in flower size in this species.

8. *Ruellia bignoniiflora* S.Moore in J. Bot. 18: 198. 1880; C.B.Clarke in Fl. Trop. Afr. 5: 48. 1899; Hiern, Catalogue Afr. pl. coll. Friedrich Welwitsch 1853–1861, Dicotyledons, part IV: 809. 1900; Makholela in Figueiredo & Smith, Pl. Angola: 24. 2008; Vollesen in Fl. Trop. E. Afr. Acanth. (Part 1): 204. 2008 & in Fl. Zambes. 8(5): 141. 2013. *Dischistocalyx bignoniiflorus* (S.Moore) Lindau in Engler & Prantl, Nat. Pflanzenfam. 4, 3b: 307. 1895. *Dipteracanthus bignoniiflorus* (S.Moore) Bremek. in Bot. Jahrb. Syst. 73: 149. 1943. *Lectotype* (designated by Vollesen, 2008): ANGOLA, **Luanda prov.**, distr. Loanda, fl. & fr., 16.01.1859 [date on C sheet only], *F. Welwitsch* 5063 (BM [BM001124282!]; isolecto C [C10000052 digital image!], K [K000394003!], LISU [LISU223323, LISU223326–right-hand plant only; digital image!], P [P00436134 digital image!]) (see *Notes*). *Residual syntypes*: ANGOLA, **Bengo prov.**, prope Banzado Regulo Quisembo, fl., 11.1853, *F. Welwitsch* 5126 (BM [BM001124111!], LISU [LISU223328 digital image!]); **Luanda prov.**, distr. Loanda, fl., *s.d.*, *F. Welwitsch* 5130 (BM [BM001124113!], LISU [LISU223327 digital image!]); Loanda, Praia de Zomba Grande, fl. & fr., 16/18.01.1859, *F. Welwitsch* 5202 (BM [BM000931018], LISU [LISU223324, LISU223325 digital image!]).

Ruellia megachlamys S.Moore in J. Bot. 32: 134. 1894; C.B.Clarke in Fl. Trop. Afr. 5: 48. 1899. *Type*: KENYA, **Taita Taveta co.**, Teita Mts [Hills], Ndara Ndi, Ngurunga Kifaniko, fl., 1892–1893, *J.W. Gregory s.n.* (holo BM [BM000931019!]).

Ruellia cygniflora Lindau in Bot. Jahrb. Syst. 33: 186. 1902. *Type*: ETHIOPIA, **Harari Regional State**, Haqim [Gara Hakim], fl., 05.1900, *H. Ellenbeck* 963 (holo B† [*fide* Ensermu, 2006]).

Ruellia oxysepala C.B.Clarke in Schinz, Denkschr. Kaiserl. Akad. Wiss., Wien. Math.-Naturwiss. Kl. 78: 439. 1906 **syn. nov.** *Lectotype* (designated here): MOZAMBIQUE, **Tete prov.**, Boruma beim Sambesi, Mfidzi, fl., 1891, *L. Menyhart* 1076 [no. not listed in protologue] (WU [WU0043023 digital image!]; isolecto Z [Z-000000898 n.v.]). **Figs. 1k, l & 4**

Subshrubs 60–80 cm tall, can be sprawling and wider than tall; leafy stems 4-angled, shortly patent viscid-glandular pubescent with hairs to 0.2 mm long, and with fine white retrorse eglandular hairs often concentrated in two opposite lines; mature stems becoming softly woody with pale grey or sandy-coloured bark, glandular hairs more sparse to absent, with few to very numerous long patent white eglandular hairs 2.7–5 mm long. Leaves on petioles 8–17 mm long, glandular- and eglandular-pubescent; blade ovate to broadly so, 32–43 × 19–37 mm (length : width ratio 1.1–1.7 : 1), base rounded or shallowly cordate, margins entire, apex acute or shortly attenuate, surfaces pubescent, with mainly eglandular hairs above, these intermixed with ± numerous short glandular hairs beneath and along margins; cystoliths numerous, linear; lateral veins 4–5 per side. Inflorescences axillary in distal leaf axils, each single-flowered; peduncle 1.5–7.5(–18) mm long, indumentum as for young stems; bracteoles ovate to broadly so, foliaceous, 11–19.5 × 5.5–16 mm including short stalk, shortly glandular- and eglandular-pubescent; flowers sessile. Calyx 14–18 mm long in flower, extending somewhat up to 20.5 mm in fruit, fused at based for 1.7–2.8 mm; lobes ligulate, 1–2.2(–3.2) mm wide, external surface shortly glandular-pubescent and with longer fine eglandular hairs along margins and midvein of lobes, these more widespread on fused basal portion. Corolla salverform, 78–101 mm long, white with pale green-yellow tube externally, pubescent externally, hairs mainly eglandular on tube, mainly glandular on lobes; tube with cylindrical basal portion 41–61 × 2.2–2.5 mm, expanded throat 22–29.5 mm long, 8.5–12 mm wide at mouth (ratio of cylindrical tube : expanded throat 1.8–2.1 : 1), lobes subequal, 11–17 × 11–12.5 mm, rounded or somewhat elliptic, with rounded or shallowly emarginate apex. Stamens included within corolla tube, pairs subequal in length; filaments free for 14.5–15.5 mm, pairs fused for 3–4 mm, largely glabrous except for few minute hairs towards base and apex; anthers 4.7–5 mm

Table 1. Morphological comparison of *Ruellia angolensis*, *R. quipungoensis* and *R. bignoniiflora*. Note: the characters listed for *R. bignoniiflora* include populations from across its range and so differ in some cases from the description of that species provided in the text which is limited to populations from Angola and neighbouring Namibia.

Character	<i>Ruellia angolensis</i> I.Darbysh. &E.Tripp	<i>Ruellia quipungoensis</i> I.Darbysh. &E.Tripp	<i>Ruellia bignoniiflora</i> S.Moore
Stem indumentum	Dense long patent eglandular lustrous (pinkish-)brown hairs, and with two opposite lines of short pale eglandular hairs, distal portions of stems with interspersed minutely gland-tipped hairs	Mixed short white retrorse eglandular hairs and long patent lustrous yellow-brown eglandular hairs	Shortly viscid glandular-pubescent and retrorse-puberulous, longer eglandular hairs often confined to older stems and much finer, white, not lustrous
Leaf indumentum	Eglandular-pilose, densely so when young, hairs lustrous, sometimes with few interspersed glandular hairs	Upper surface eglandular-puberulous and with long yellow-brown, lustrous hairs, lower surface pale-villose, largely obscuring surface, can be few short glandular hairs along margins	Pubescent with mainly eglandular hairs above, these intermixed with \pm numerous short glandular hairs beneath and along margins
Bracteoles	Oblong-elliptic to narrowly oblanceolate, 2–12.5 mm wide	Narrowly oblong-elliptic to oblanceolate, 2–4 mm wide	Ovate to broadly so, 5.5–16 mm wide
Calyx lobes	Linear, eglandular-pilose, with some interspersed glandular hairs of similar length	Linear, densely long eglandular-pilose to -villose with interspersed shorter eglandular and few or no glandular hairs	Ligulate to lanceolate, shortly glandular-pubescent with longer eglandular hairs confined to margins and midveins of each lobe and to fused basal portion
Corolla tube	Cylindrical portion of tube 9.5–11 mm long, shorter than the broadly expanded throat, ratio 0.6–0.9 : 1	Narrow cylindrical portion of the corolla tube c. 53.5 mm long, much longer than the expanded throat, ratio c. 3.45 : 1	Narrow cylindrical portion of the corolla tube 41–110 mm long, \pm much longer than the expanded throat, ratio 1.7–4.9(–5.9) : 1
Corolla indumentum	Lobes and distal portion of tube eglandular-pilose externally, hairs longest on veins, lobes shortly glandular-pubescent internally	Lobes and distal portion of tube eglandular-pubescent externally, glabrous internally	Lobes and distal portion of tube mixed glandular- and eglandular-pubescent externally (glandular hairs becoming more numerous on lobes), glabrous internally
Stamens	Pairs subequal in length	Somewhat didynamous	Pairs subequal in length
Anthers	3.7–3.8 mm long	3.4–4.2 mm long	4.7–5 mm long
Capsule	Glabrous	Densely puberulous	Glabrous

long. Pistil drying brown, ovary glabrous; style shortly pubescent; stigma 2-lobed, anterior lobe 2.6–3.5 mm long, posterior lobe 1.7–2 mm long. Capsule 19–24 mm long, obovoid with only very short stipe, glabrous; seeds discoid, 5.5–6.7 mm in diameter, with short hygroscopic hairs throughout.

Flowering & fruiting: This species has been recorded in Angola as flowering in November to April, with peaks in January and April, and fruiting in January to July. The flowering period corresponds with the rainy season.

Habitat: This species occurs in bushland, dry woodland and riparian areas, rock outcrops and sandy areas, typically in shade; c. 0–1050 m elevation.

Distribution: Widespread but scattered in tropical Africa, occurring in South Sudan, Ethiopia, Uganda, Kenya, Tanzania, Malawi, Mozambique, Zambia, Zimbabwe, Angola and Namibia. In Angola it is found in the west in Bengo, Benguela, Luanda and Namibe provinces.

Specimens examined: ANGOLA, **Benguela prov.**, km 108.5 on the Mossamedes railway, fl. & fr.. 29.04.1909, *H.H.W. Pearson* 2846 (K); 18 km N of Campanda between Benguela and Lubango, fl. 08.04.2017, *E. Tripp & K. Dexter* 6909 (COLO, K). **Luanda prov.**, distr. Loanda, fl., 1903, *J. Gossweiler* 371 (BM, K); Luanda, beira do C. F. no traçado novo para o Congo, fl., 20.04.1958, *R. Monteiro et al.* 95D (BM); Viana, fl., 12.2021, *R. Ferreira* (photo <https://www.inaturalist.org/observations/102593651>); Tombo, fl., 12.2021, *A. Martins* (photos <https://biodiversidadeangola.com/plants/specimen/172>). **Namibe prov.**, Moçamedes, prox. de Camucuiu, estrada de Lola, fl., 20.04.1958, *R. Monteiro et al.* 8397 (LUBA); Bibala, fl., 15.01.2009, *A. Hankey* (photos <https://www.inaturalist.org/observations/19966164>); road from Leba Pass to Caraculo, 4.1 km W of riparian tall mango forest, fl., 16.01.2009, *P.J.D. Winter* 7653 (LUBA digital image). NAMIBIA, **Kunene region**, nordwestlich von Otjitanda, [?]fr., 06.07.1969 [fl. in cult., hort. W. Giess, 20.12.1970–09.01.1971], *P.G. Meyer* 1281 (WIND).

Conservation status: A widespread but rather scattered species, it can nevertheless be locally frequent typically in habitats not favoured for agriculture. It is therefore assessed as of Least Concern (LC).

Notes: *Ruellia bignoniiflora* is a widespread but scattered species with several disjunctions in its range. There are three main population centres: (a) West Angola

and just extending into northwest Namibia; (b) East Africa from Ethiopia through to central Tanzania; and (c) southeast Africa around the Zambesi Basin and into southern Zimbabwe. There is considerable morphological variation between and within these groups and the description above covers only the form from Angola and Namibia. This form (*R. bignoniiflora* s.s.) differs from most of the eastern populations most notably in having a relatively short cylindrical portion of the corolla tube and a broader and more abruptly widened throat. In other populations, the cylindrical tube is 43–110 mm long but often over 60 mm long, the throat is 16–28 × 3.5–10 mm, and the ratio of the cylindrical tube : expanded throat is 1.7–4.9(–5.9) : 1, but often 3 : 1 or more. Eastern populations with a relatively short cylindrical portion to the tube are mainly found in Uganda (ratio 1.7–2.2 : 1). These overlap with the Angolan populations in this character but differ markedly in having a narrow throat, sometimes only weakly differentiated from the cylindrical tube. Some of the populations from southeast Africa also have a somewhat shorter cylindrical portion of the tube (ratio 2–2.4 : 1) but these populations differ from the Angolan material in having a somewhat more campanulate (less abruptly widened) throat and larger corolla lobes, as well as having conspicuously lanceolate calyx lobes. Occasional specimens with large corolla lobes are recorded elsewhere within its range, for example *Y. E. Symes* 541 (K) from Uganda. Several taxa may be involved but the variation is complex and requires further study and, ideally, supporting molecular data.

Welwitsch 5063, the lectotype of *Ruellia bignoniiflora*, is in fact a mixed collection. One of the sheets of this number at LISU [LISU223326] excluding the small right-hand plant, and most of one of the two sheets of this number at BM [BM001124281] are referable to *Ruellia prostrata*. Therefore, it is necessary to clarify that Vollesen's (2008) lectotypification of *R. bignoniifolia* is based on the second sheet at BM, BM001124282.

Typification: *Ruellia oxysepala* is newly synonymised here and the sheet of *Menyhart* 1076 at WU, which is available to view online and is an informative specimen, is selected as the lectotype.

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