

Taxonomic Novelties in Namibian *Ruellia* (Acanthaceae)

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Abstract—Recent fieldwork in Namibia has led to the discovery of two undescribed species of *Ruellia*, *Ruellia acetabula* and *Ruellia kaokoana*. These taxa are described and illustrated. Additionally, new lectotypifications are proposed for *Ruellia marlothii* and *Ruellia diversifolia*. Some specimens previously identified as *Ruellia diversifolia* are ascribed to the two new species. A revised checklist and a key to distinguish the nine species of *Ruellia* native to Namibia plus the Angolan *R. diversifolia* are provided.

Keywords—Africa, discovery, new species, Ruellieae, sympatry, systematics.

Recent fieldwork and taxonomic work on Acanthaceae in Namibia has uncovered two species of *Ruellia* that cannot be assigned to any known species. Both species are morphologically similar to *R. diversifolia* S. Moore from Angola and *R. marlothii* Engl. from Namibia, the latter often being mistakenly identified as *R. diversifolia* in most major herbaria. These two named species, the two new species described here, and *R. aspera* (Schinz) Phillips (also from Namibia) are strongly pungent and produce odors reminiscent of citronella, the essential oils of *Cymbopogon* Spreng. They all share congested, densely bracteate inflorescences and a “1 + 2 + 2” zygomorphic calyx configuration with the dorsalmost lobe having conspicuous brochidodromous venation. We predict a close relationship among these five taxa owing to these similarities. Phylogenetic study to test this prediction and to re-delimit sections within the genus as a whole is ongoing by the first author.

In preparation for our upcoming treatment of the Acanthaceae of Namibia in collaboration with Dr. I. Darbyshire (Royal Botanic Gardens, Kew) and Dr. E. Kwembeya and E. Klaassen (National Botanical Research Institute, Windhoek), we describe two species new to science, and lectotypify the names *Ruellia diversifolia* and *R. marlothii*. A revised checklist (cf. Craven 1999) and a dichotomous key to distinguish the nine species of *Ruellia* in Namibia plus the Angolan *R. diversifolia* are presented.

MATERIALS AND METHODS

We conducted fieldwork in Namibia in March and April 2010 to increase knowledge and collections of Acanthaceae in preparation for our collaborative treatment of the family in *Flora of Namibia* (Tripp et al., in prep.). Because results from that trip suggested that the Acanthaceae flora was incompletely known (see Darbyshire et al. in press), we organized and conducted a second fieldtrip in August 2011.

To identify the two unknown *Ruellia*, we reviewed relevant holdings at WIND, K, and RSA, which included all collections made during our two field trips. Additionally, we searched for any possible reference to these putatively new species in Meyer's (1968) treatment of the family.

Because pollen structure is important to understanding the systematics of Acanthaceae, and specifically *Ruellia* (Lindau 1895; Tripp 2007; Tripp et al. 2009; Tripp 2010), we used scanning electron microscopy (SEM) to examine pollen of the two new species. Floral material from recent collections was preserved in the field using FPA (formalin:propionic acid: ethanol). Pollen samples were sputter coated with gold using a PELCO SC-7 auto sputter coater and then examined using an International Scientific Instruments DS-130 / WB-6 scanning electron microscope.

RESULTS

Searches through the Acanthaceae holdings at WIND, K, and RSA and in Meyer (1968) revealed no names that we could apply to the two unidentified species. As such, the two entities were deemed to represent undescribed species. Additional collections representing the two new species were found in the general collection at WIND, incorrectly determined to other species of *Ruellia* (mostly to *R. diversifolia*).

The SEM study revealed that both of the new species have round, triporate pollen grains with coarsely reticulate exine sculpturing (Fig. 1). This morphology is consistent with that of the vast majority of other species in *Ruellia* (Tripp 2007).

REVISED CHECKLIST AND A KEY TO THE *RUELLIA* OF NAMIBIA

Craven (1999) included eight species of *Ruellia*: *R. aspera* (Schinz) Phillips [endemic], *R. bignoniiflora* S. Moore, *R. brandbergensis* Kers [endemic], *R. currorii* T. Anderson, *R. diversifolia*, *R. otavensis* P. G. Meyer, *R. sp. nova 1* (Kasselt 29, de Winter & Leistner 5216), and *R. sp. = aff. R. diversifolia* (Craven 2368). Craven (1999) noted that *R. patula* does not occur in Namibia but that Cadman's *sp. nova 1* was previously identified as *R. patula*. The revised checklist presented below excludes *R. diversifolia*, includes *R. marlothii*, treats *R. otavensis* as a synonym of *R. prostrata*, and resolves *R. sp. nova 1* as *Ruellia patula*. We were unable to examine Craven's *R. aff. diversifolia*, which we could not find at WIND where it is purportedly deposited, and thus cannot assess its taxonomic status. We here treat a total of nine species of *Ruellia* as native to Namibia, four of which are endemic based on currently available herbarium collections: *R. acetabula* E. Tripp & K. G. Dexter, *sp. nov.* [endemic], *R. aspera* (Schinz) Phillips [endemic], *R. bignoniiflora* S. Moore, *R. brandbergensis* Kers [endemic], *R. currorii* T. Anderson, *R. kaokoana* E. Tripp & K. G. Dexter, *sp. nov.* [endemic], *R. marlothii* Engl., *R. patula* Jacq. (syn. “*R. sp. nova 1*”), *R. prostrata* Poir. (syn. *R. otavensis*),

Excluded Species—*R. diversifolia*: Meyer (1968) incorrectly treated *R. marlothii* as a synonym of *R. diversifolia*. The two are clearly distinct species, with the latter not yet known from Namibia.

KEY TO NAMIBIAN *RUELLIA*

1. Corollas > 10 cm long; calyx lobes 3 *R. bignoniiflora*
1. Corollas < 10 cm long; calyx lobes 4 or 5 2

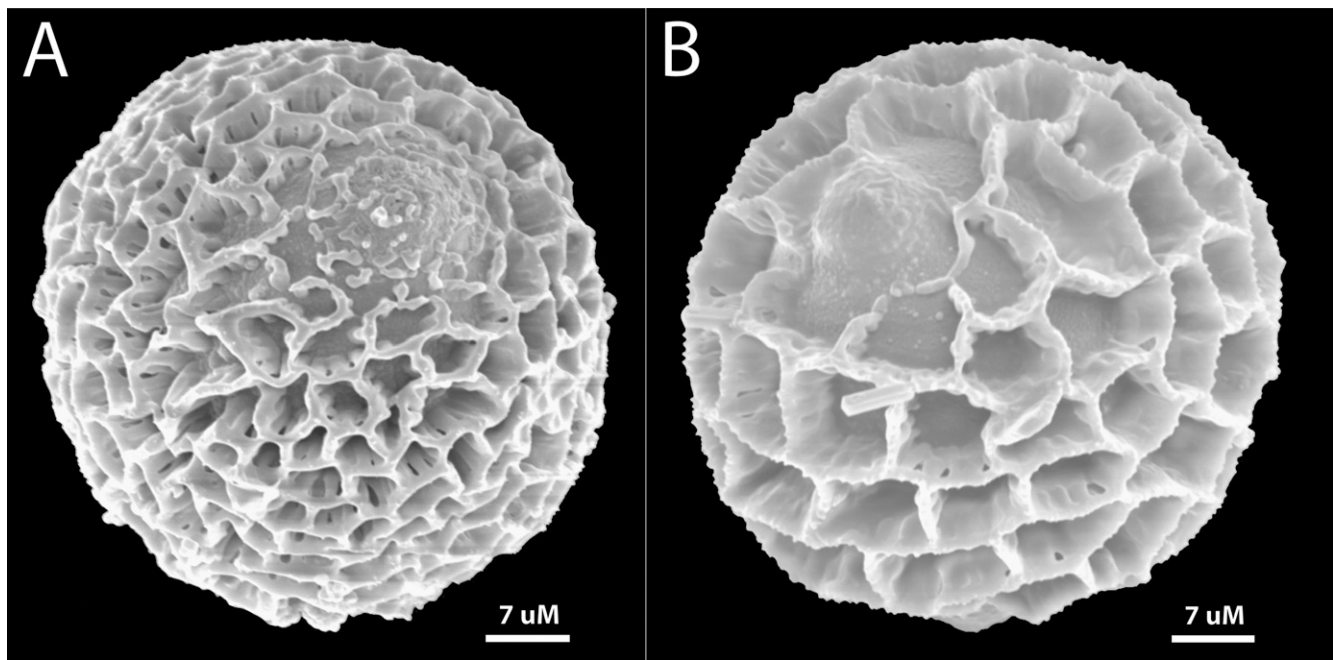


FIG. 1. SEM micrographs of pollen. A. *Ruellia acetabula* (Tripp & Dexter 1991, RSA). B. *Ruellia kaokoana* (Tripp et al. 2019, RSA).

2. Calyx actinomorphic, composed of 5 more or less equally sized lobes, generally linear in shape; dorsalmost lobe without brochidodromous venation; inflorescences not as below; plants not strongly odoriferous vegetatively when crushed 3
3. Corollas pure white or cream colored, ≥ 5 cm long (excluding lobes) *R. curreri* 4
3. Corollas with purple pigmentation in throat, < 5 cm long (excluding lobes) 4
 4. Corollas ≥ 4 cm long (excluding lobes) *R. brandbergensis* 5
 4. Corollas < 4 cm long (excluding lobes) 5
 5. Capsules densely puberulent throughout *R. prostrata*
 5. Capsules glabrous *R. patula*
2. Calyx strongly zygomorphic, lobes in a "1+2+2" arrangement with the dorsalmost lobe the largest (longest and widest), the two ventral lobes intermediate in size, and the two lateral lobes the smallest; dorsalmost lobe with brochidodromous venation; inflorescences extremely congested with leaf-like bracts; plants strongly smelling of citronella when crushed 6
6. Leaves extremely asperous [rough to the touch, both on living and dried, herbarium material] *R. aspera*
6. Leaves not asperous 7
 7. Stamens and styles strongly exserted; corollas mostly brick red but pink, yellow and white variants not uncommon, especially in northwestern Namibia (Kunene Region) *R. marlothii*
 7. Stamens and styles included within corollas; corollas white or purple 8
 8. Corollas purple *R. kaokoana*
 8. Corollas white 9
 9. Corollas with a pigmented spot in throat, < 30 mm long, narrow unexpanded portion of tubes < 15 mm long (see McDade and Tripp 2007 for floral terminology), all five lobes more or less with similar orientation with respect to the corolla opening; seeds with hygroscopic trichomes restricted to margins *R. diversifolia*
 9. Corollas without dark, pigmented spot in throat, ≥ 30 mm long, narrow unexpanded portion of tubes ≥ 15 mm long, ventralmost lobe distinctly cup-shaped and oriented 90° from adjacent lateral two lobes; seeds covered by hygroscopic trichomes *R. acetabula*

TAXONOMIC TREATMENT

Ruellia acetabula E. Tripp & K. G. Dexter—TYPE: NAMIBIA. Kunene Province: Kaokoland, base of slate rocks ~150 km north of Sesfontein en route to Oropembe, 460 m elevation, 20 Aug 2011, E. Tripp & K. Dexter with H. Hasheela & L. Lanyeni 1991 (holotype: WIND; isotypes: CAS, K, MO, NY, RSA, US).

Similar to *R. diversifolia* but differs by its longer corollas, longer corolla tubes, and lack of spot in throat. Like *R. marlothii* and *R. kaokoana* but differs by its white flowers, and different from the former by its included stamens and styles. Different from all three species by its cup-shaped ventral corolla lobe.

Shrubs to 0.4 m, woody, erect, the younger stems subquadrangular, densely pubescent with long straight eglandular trichomes to ca. 3–4 mm long and shorter glandular trichomes, the older stems terete, less densely pubescent to glabrous,

cystoliths conspicuous on both young and old stems, the internodes of stems to 4.5 cm long. Leaves with petioles to 1.3 cm long, pubescent like young stems, the blades ovate to rounded, $1.0\text{--}2.5 \times 0.8\text{--}1.9$ cm, $0.9\text{--}1.8$ times longer than wide, acute to obtuse to rounded apically, rounded to obtuse basally, the margins entire, the adaxial and abaxial surfaces pubescent to sparsely pubescent, trichomes eglandular, cystoliths and sessile patelliform glands present, conspicuous in areas with sparse trichomes, glands drying pale yellow. Inflorescences of congested simple or compound dichasia in axils of leaf-bearing nodes. Bracts foliaceous, dense, both first and second order bracts like leaf blades in shape, pubescence, and glandularity but becoming reduced in size towards distal portions of inflorescences. Flowers sessile. Calyces strongly zygomorphic, the lobes free to the receptacle, the dorsalmost lobe the largest (ca. $1.7\text{--}1.8 \times 0.8$ cm, elliptical), the two ventral lobes intermediate (ca. $1.5\text{--}1.7 \times 0.25$ cm, oblanceolate),

and the two lateral lobes the smallest (ca. 1.3–1.4 × 1 mm, linear), the dorsalmost lobe with conspicuous marginal collecting veins. Corollas white with distinctive purple lines on all surface of throat and lobes, these usually apparent on dried material, infundibular, 3.6–3.8 cm long, the narrow unexpanded portions 21–23 × 2–2.5 mm, the expanded portions 0.9–1 × 0.6–0.8 cm, the lobes ca. 5–9 × 3–4 mm, rounded to emarginate apically, the ventralmost lobe distinctly cup shaped and oriented 90° to adjacent dorsal two lobes. Stamens

included within corolla ca. 2 mm proximal to upper corolla lobes, didynamous, the filaments 28 mm long (longer pair) or 25 mm long (shorter pair), the free portions of filaments 4.5 mm (longer pair) and 2.5 mm (shorter pair), the fused filament sheath (“curtain”) enclosing all of unexpanded portion of tube; anthers bithecos, 2–3 mm long, mucronate basally. Styles 3–3.3 cm long, with sparse, short ascending eglandular trichomes, included within corolla tube. Stigmas bifid but dorsal lobe completely reduced, anterior

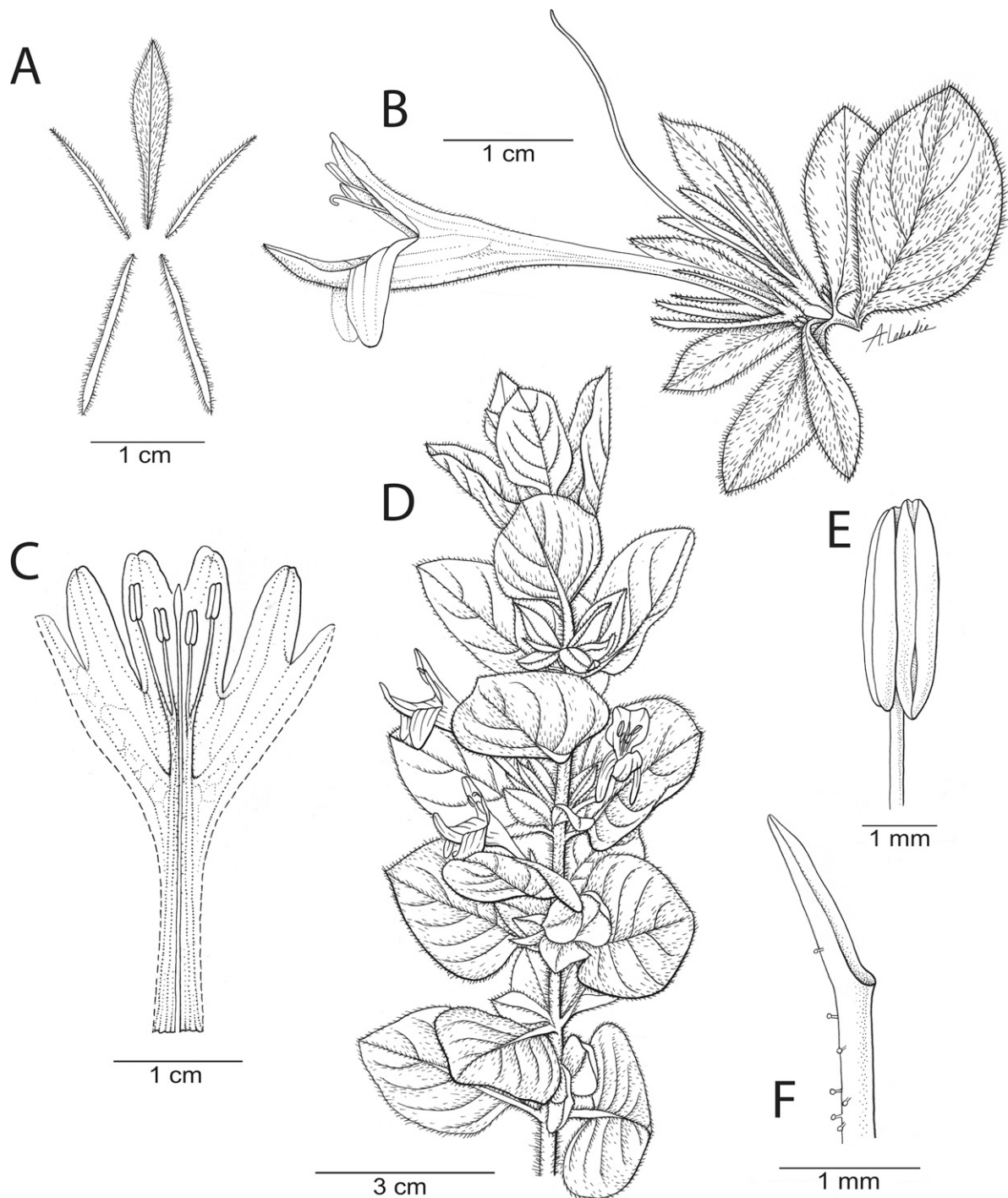


FIG. 2. *Ruellia acetabula*. A. Zygomorphic calyx with lobes in a “1 + 2 + 2” arrangement (see text). B. and D. show unique, cup-shaped lowermost corolla lobe, congested nature of inflorescences, and typical upright plant growth form. C. Opened corolla showing didynamous stamens and filament curtain. E. Bithecos anther. F. Style and bifid stigma with dorsal lobe completely reduced. Illustrated by Amanda Labadie

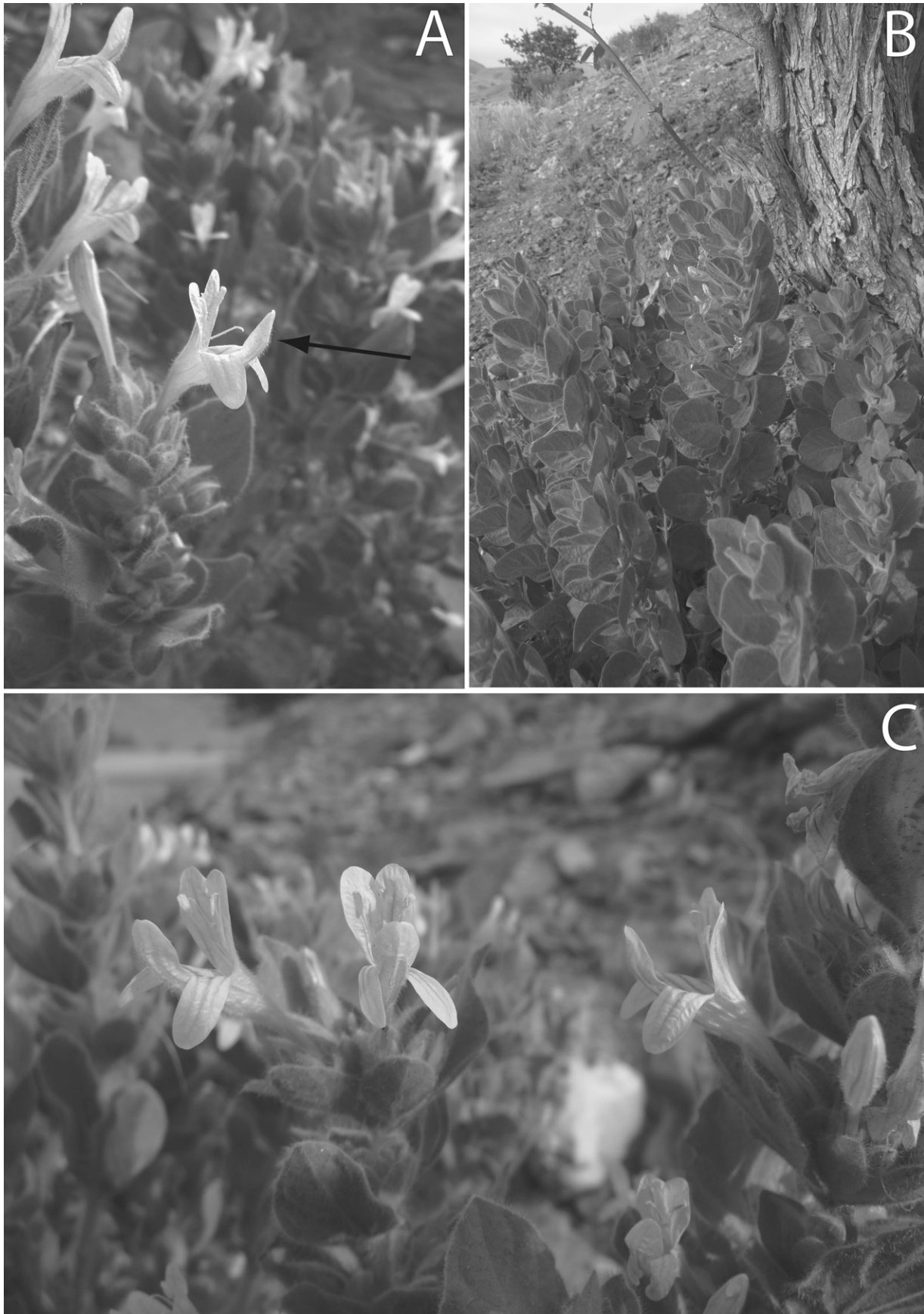


FIG. 3. *Ruellia acetabula* in native habitat. A. Distinctive, cup-shaped lowermost corolla lobe (labeled with arrow). B. Upright growth form. C. Congested nature of inflorescences (Tripp & Dexter 871).

lobe ca. 1–1.25 mm long. Capsule (only one seen) 1.2 × 0.3 cm, elliptical. Seeds 1.5 mm long, discoid, 18 per capsule, covered by dense mucilaginous hygroscopic trichomes. Figures 1A, 2, 3.

Etymology—From the Latin *acetabulum*, meaning a “spoon” or “cup,” the specific epithet refers to the shape of the ventral corolla lobe, which is oriented 90° to adjacent dorsal two lobes. This highly distinctive morphology has never before been observed in any species of *Ruellia* seen in the field by the first author. This corolla lobe configuration is also apparent on dried, herbarium material.

Habitat—*Ruellia acetabula* is distributed in desert or semi-desert environments of three phytochoria sensu White (1993), particularly in the area where the phytochoria intersect: the Kalahari-Highveld Regional Transition Zone, the Karoo-Namibi Regional Center of Endemism, and the Zambezi Regional Center of Endemism. Plants have been observed growing near the base of dry, slate mountains. Paratype collections indicate plants also occur on calcareous slopes.

Ecology—Nothing is known about the field ecology or pollination biology of this species beyond limited observations of its habitat, growth form, and phenology. The shape of the corolla conforms to a Lepidoptera pollination syndrome, but no floral visitors were observed by us. Additional study is needed to better understand this species.

Phenology—Available data indicate that plants of *R. acetabula* flower and fruit between March and August. However, other species of Namibian Acanthaceae that similarly occupy desert or semi-desert habitats apparently flower according to rainfall such that flowering times may vary from year to year.

Range and Conservation Status—*Ruellia acetabula* is currently known from six total collections in areas between Sesfontein and Oropembe as well as a small river drainage area on the Skeleton Coast west of Purros (Fig. 4). It is likely that the species is more widespread in the Kunene Region than these six collections indicate, as much of the region is relatively inaccessible and undercollected. Both populations we have observed in the field contained few (< 5) individuals.

Near Sesfontein, plants of *R. acetabula* were observed growing in immediate proximity (within 50 m) to, and flowering concomitantly with, plants of *R. marlothii*. Populations of *R. acetabula* also occur within ca. 10 km of populations of *R. kaokoana*. Further study exploring reproductive isolating barriers among these putatively closely related species is warranted.

Taxonomic Notes—All specimens studied at WIND attributable to *R. acetabula* (see paratypes) were previously identified as *R. diversifolia* from Angola, which also has white flowers. However, *R. acetabula* is easily differentiated from *R. diversifolia* by its longer corollas, longer corolla tubes (the narrow, unexpanded portion), and its distinctive, cup-shaped ventral corolla lobe. It is distinctive from the geographically proximal *R. marlothii* and *R. kaokoana* by its flower color and oddly shaped ventral lobe. It is also distinguished from *R. kaokoana*, by its erect (vs. prostrate) growth form.

Label data indicate that *Sullivan 302* (WIND) has white flowers (like *R. acetabula*), however only buds are preserved on the collection. It may represent an additional collection of *R. acetabula* but is not included in the paratypes cited below because of taxonomic uncertainty.

Paratypes—NAMIBIA. Kunene: Kaokoveld, “25 Meilen NW Sesfontein am Wege nach Purros,” *Giess 3198* (WIND); Kunene: Hunkab, *Burke 4089* (WIND); Kunene: Kaokoveld, “calcareous slope at Sesfontein,” *de Winter & Liestner 5859* (WIND); Kunene: 7 km N of Sesfontein, *Tripp & Dexter 871* (RSA, WIND).

Ruellia kaokoana E. Tripp & K. G. Dexter—TYPE: NAMIBIA.

Kunene Province: Kaokoland, slate cliffs 9.4 km E east of Sesfontein, 580 m elevation, 23 Aug 2011. *E. Tripp & K. Dexter with H. Hasheela & L. Lanyeni 2019* (holotype: WIND; isotypes: CAS, K, MO, NY, RSA, US).

Similar to *R. diversifolia* but differs by its larger, purple flowers. Like *R. marlothii* and *R. acetabula* but differs from both by its prostrate habit, smaller flowers, and purple corollas.

Shrubs to 0.3 m, woody, sprawling and prostrate against substrates, the younger stems subquadrangular, densely pubescent with eglandular trichomes of varying lengths, the older stems terete, less densely pubescent with eglandular trichomes and becoming glabrous towards proximal portions of plants with conspicuous cystoliths, the internodes of young stems mostly < 1 cm long, congested and obscured, the internodes of older stems to 4 cm long. Leaves with petioles to 4 mm long, the petioles pubescent like young stems, the blades ovate to rounded, 1.0–2.5 × 0.8–1.9 cm, 0.9–1.8 times longer than wide, acute to obtuse to rounded apically, rounded to acute basally, the margins entire, the adaxial and abaxial surfaces pubescent or, more frequently, tomentose, trichomes eglandular, cystoliths and sessile patelliform glands present but inconspicuous, glands drying pale yellow to dark red. Inflorescences of congested simple or compound dichasia in axils of leaf-bearing nodes. Bracts foliaceous, dense, both first and second order bracts like leaf blades in shape, pubescence, and glandularity but becoming reduced in size towards distal portions of inflorescences. Flowers on pedicels to 1 mm long. Calyces strongly zygomorphic, the lobes free to the receptacle, the dorsalmost lobe the largest (ca. 1.5–2 × 0.3–0.8 cm, elliptical), the two ventral lobes intermediate (ca. 1.3–1.7 × 0.1–0.3 cm, oblanceolate), and the two lateral lobes the smallest (ca. 1.1–1.7 × < 1 mm, linear), the dorsalmost lobe with conspicuous marginal, brochidodromous collecting veins, all lobes together with first and second order bracts drying pale yellowish brown during fruiting stages. Corollas purple,

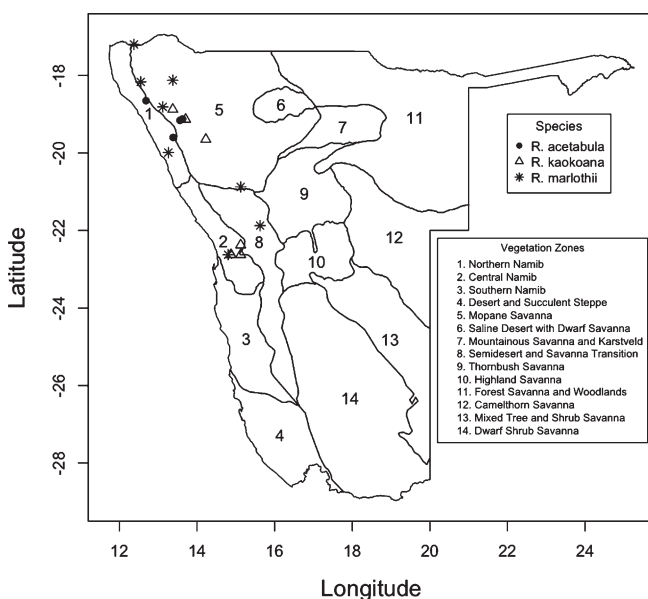


FIG. 4. Distribution map of *Ruellia acetabula*, *R. kaokoana*, and *R. marlothii* in Namibia (all known populations of the two new species, and select populations of *R. marlothii*). Vegetation zones based on Giess (1998).

drying white to blue (especially towards lobe tips) with yellow markings in throat, infundibular, 2.8–3.1 cm long, the narrow unexpanded portions 13–16 × 2.5 mm, the expanded portions 1–1.8 × 0.8–1.0 cm, the lobes ca. 4 × 2.5 mm, rounded to emarginate apically. Stamens included within corolla tube, didynamous, the filaments 2.5–2.9 cm long (longer pair) or 2.1–2.3 cm long (shorter pair), the free portions of filaments 7 mm (longer pair) and 5 mm (shorter pair), the fused filament sheath (“curtain”) enclosing $\frac{3}{4}$ of unexpanded portion

of tube; anthers bitheous, 3–3.5 mm long, mucronate basally. Styles ca. 2.5–2.9 cm long, with short ascending eglandular trichomes, included within corolla tube. Stigmas bifid but dorsal lobe completely reduced, anterior lobe ca. 2.5–3 mm long. Capsules (only two seen) ca. 12–13.5 mm long, elliptical. Seeds 1.25 mm long, discoid, ca. 16–18 per capsule, covered by mucilaginous hygroscopic trichomes. Figures 1B, 5, 6.

Etymology—The specific epithet refers to the region in which this plant was discovered by the authors, the Kaokoveld

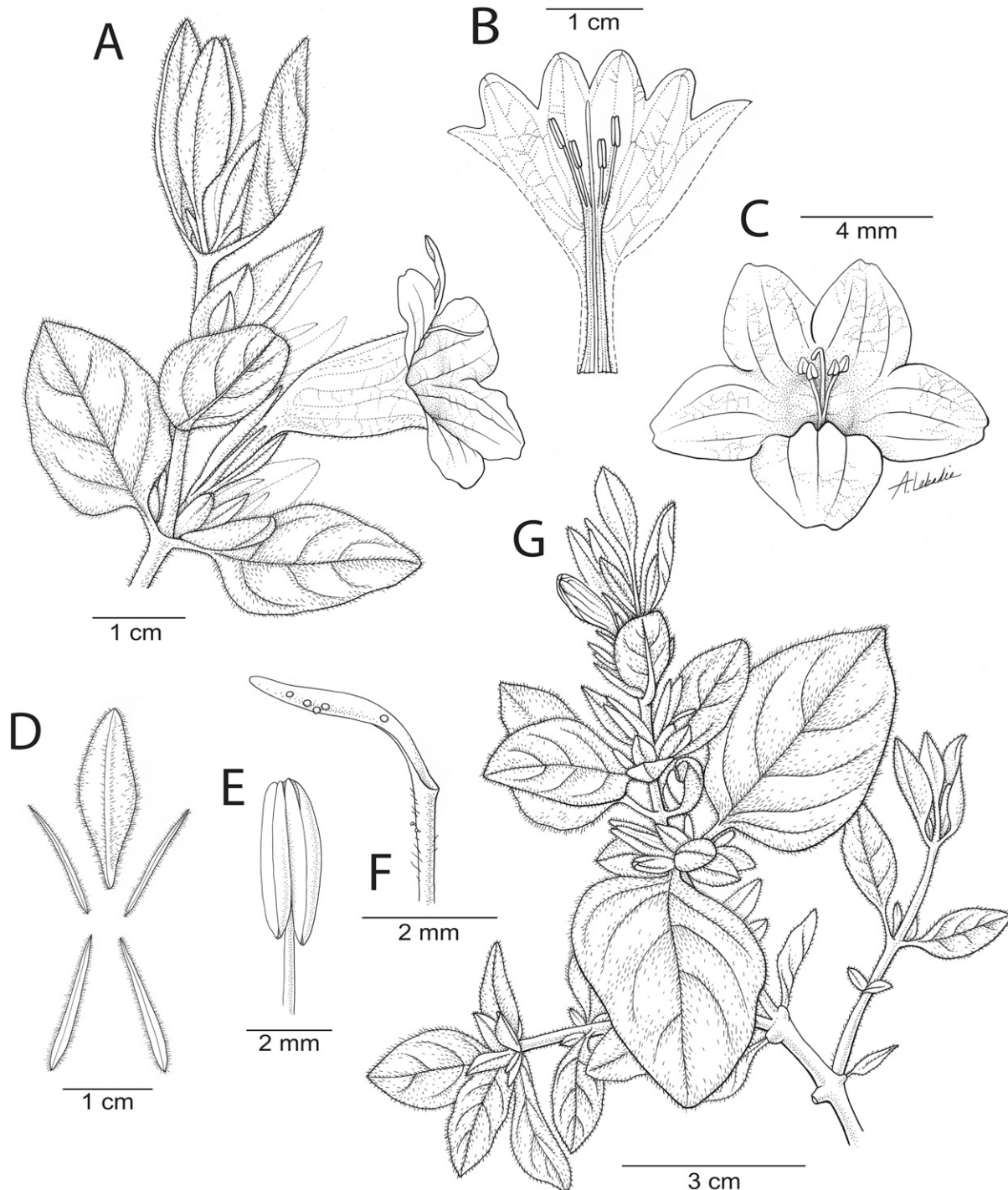


FIG. 5. *Ruellia kaokoana*. A. and G. show congested nature of inflorescences (G drawn without flowers). B. Opened corolla showing didynamous stamens and filament curtain. C. Frontal view of corolla opening; D. Zygomorphic calyx with lobes in a “1+2+2” arrangement (see text). E. Bitheous anther. F. Style and bifid stigma with dorsal lobe completely reduced. G. Vegetative and inflorescence portions (lacking flowers) of plant. Illustrated by Amanda Labadie.

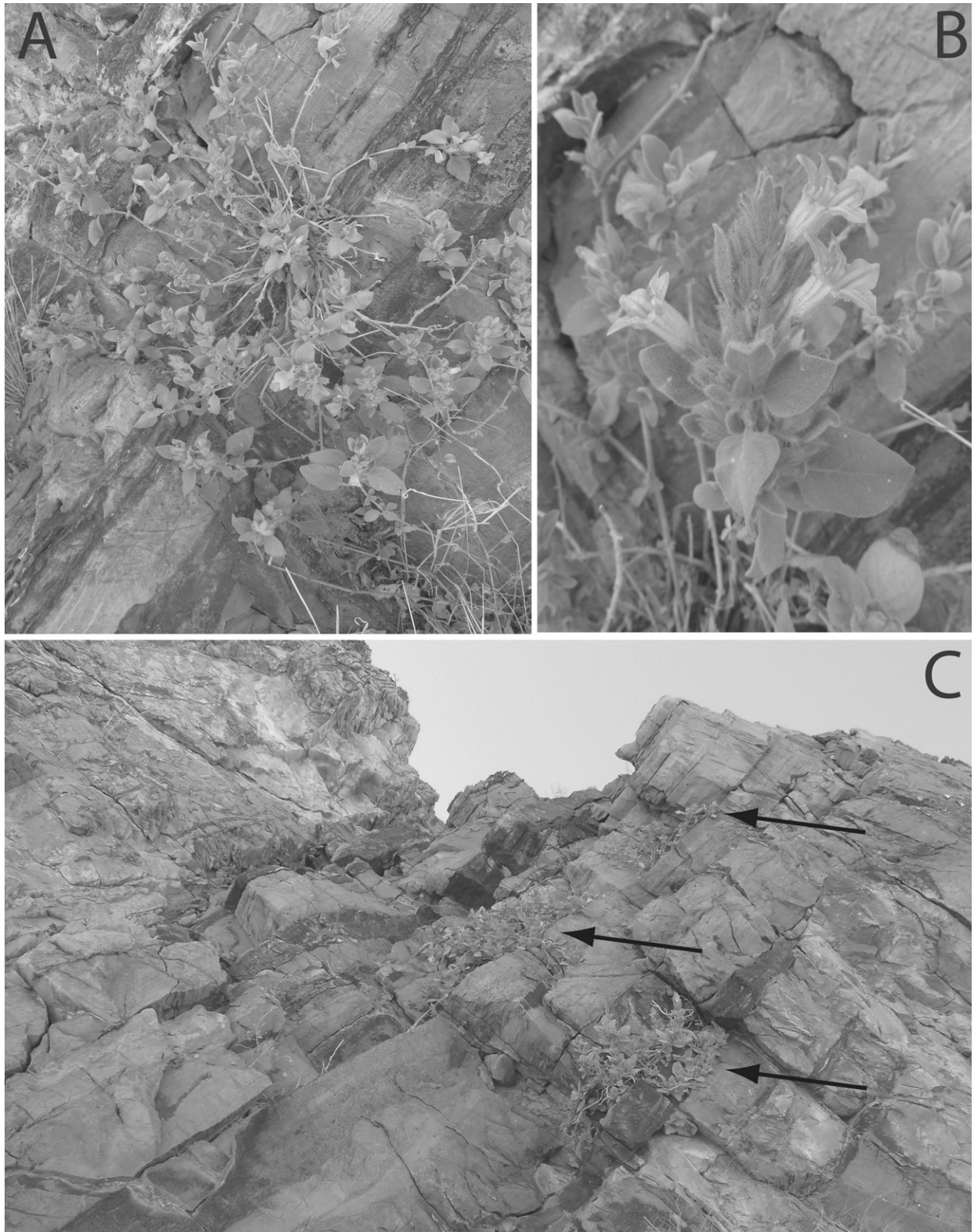


FIG. 6. *Ruellia kaokoana* in native habitat. A. Sprawling growth form. B. Congested nature of inflorescence. C. Plants growing from cracks in rocks on slate hillside (labeled with arrows; Tripp *et al.* 2019).

or “Kaokoland” of northwestern Namibia (Kunene Region), a region of tremendous geological and botanical diversity.

Habitat—*Ruellia kaokoana* is distributed in desert or semi-desert environments of three phytochoria *sensu* White (1993),

particularly in the area where the phytochoria intersect: the Kalahari-Highveld Regional Transition Zone, the Karoo-Namibi Regional Center of Endemism, and the Zambezian Regional Center of Endemism. Plants have been observed growing

from cracks in steep, rocky outcrops, particularly on dry, slate substrates. Paratype collections indicate occurrence in similar habitats as well as additionally in sandy environments, such as in riverbeds.

Ecology—Nothing is known about the field ecology or pollination biology of this species beyond limited observations of its habitat, growth form, and phenology. The shape of the corolla conforms to an insect pollination syndrome, but no floral visitors were observed by us. Additional study is needed to better understand this species.

Phenology—Available data indicate that plants of *R. kaokoana* flower between February and August. However, other species of Namibian Acanthaceae that similarly occupy desert or semi-desert habitats apparently flower in response to rainfall such that flowering times may vary from year to year. Fruiting specimens have been collected from January to March.

Range and Conservation Status—*Ruellia kaokoana* is currently known from 11 total collections (Fig. 4). Given the sizeable geographic area encompassed by these collections (e.g. Swakopmund to Sesfontein to Ohopoho), we predict that the species is probably more widespread than current collections suggest. Additional fieldwork is needed to determine the full range of *R. kaokoana*.

In at least two areas, Sesfontein and the Rössing Mine in the vicinity of Swakopmund, *R. kaokana* is sympatric with *R. marlothii*. The two have been observed to flower concurrently near Sesfontein, which calls for additional research on reproductive isolating barriers between these putatively closely related species. No putative hybrids were seen in the area.

Taxonomic Notes—All specimens studied at WIND attributable to *R. kaokoana* (see paratypes) were previously identified as the similar *R. diversifolia*, which is currently known from Angola but not Namibia. *Ruellia diversifolia* was described from the mouth of the Bero River near Mossamedes (Pt. Moçâmedes; an earlier name for the present day city of Namibe), a region of arid to semi-arid coastal desert and grassland habitats. The main features distinguishing *R. kaokoana* from *R. diversifolia* are its purple (vs. white) flowers and its larger corollas (ca. 26–31 mm [12–16 mm for narrow unexpanded portion] vs. 23–24 mm [8.5–10 mm for narrow unexpanded portion] in *R. diversifolia*). We are not aware of any collections of *R. diversifolia* with anything other than white flowers, but in putatively closely related species, e.g. *R. marlothii*, floral color variants are known. If future research determines that *R. diversifolia* is variable in floral color and that plants produce purple flowers and larger flowers, the taxonomic status of *R. kaokoana* should be reviewed. Although the protologue of *R. diversifolia* states that the ovaries contain 12 ovules each, examination of the syntypes indicates that ovaries bear > 12 ovules each. The seeds of both *R. diversifolia* and *R. kaokoana* are similarly covered by dense trichomes. As such, these two features do not help to discriminate between the two species.

Ruellia kaokoana is also similar to the Namibian species *R. marlothii* and *R. acetabula* but is easily differentiated from both by its smaller, differently shaped corollas that are purple instead of red, yellow, or white, and by its distinctly prostrate growth form.

Paratypes—NAMIBIA. Swakop River, “Rochers bordant la vallée,” *Evrard* 9257 (BR); location unknown, *Pearson* 7530 (K); Orekkopje [presumably Trekkopje?], “im sand im rivier unterhalb Khanmine. Häufig,” *Giess* 9556 (K, WIND); Ohopoho, “op klipperige ground aan voet van berge. Giribesvlakte – berge by waterloop,” *Viljoen* 303 (WIND); Swakopmund, “Kahn River east of Rössing Mine. In river bed with steep sides,” *Craven* 1932 (WIND); Orekkopje [presumably Trekkopje?], “Rossing mine area,”

Craven 2356 (WIND); Swakopmund, “Farm Palmenhorst: SW 38, häufig, in Granitgeröll und kleinen Rivierläufen der Randberge des Swakops,” *Giess* 11632 (WIND); Damaraland, near Welwitsch, *Pearson* 4148 (K); Damaraland, Welwitsch, *Pearson* 4420 (K); Welwitsch, *Galpin & Pearson* 7530 (K).

RUPELLIA MARLOTHII Engl., Bot. Jahrb. Syst. 10: 257–258. 1889.—

TYPE: Namibia. Kunene: Hereroland, Usakos, *Marloth* 1434 (holotype: B, destroyed; isotypes: GRA-photo!, K!, M!, SAM-photo!; lectotype: K-000393977!, designated here).

Note—The K specimen was chosen over others because it is the only one that contains Engler’s handwriting, as verified by the online collection of handwriting examples provided by the Conservatoire et Jardin Botaniques Ville de Genève.

RUPELLIA DIVERSIFOLIA S. Moore, J. Bot. 18: 198. 1880.—TYPES:

ANGOLA. Bumbo, *Welwitsch* 5042 (syntypes: BM!, K!), *Welwitsch* 5033 (syntypes: K!, P-photo!; lectotype: BM-000931016!, designated here).

Note—The *Welwitsch* 5033 duplicate at BM was selected over others because in Spencer Moore’s introduction to his treatment of Welwitsch’s Angolan plants, he clearly states that he used specimens at BM in preparing the protologues; moreover, the BM specimen is in an excellent preservation state and has ample flowering, fruiting, and vegetative material.

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