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Petalidium etendekaense (Acanthaceae), a new species from Namibia, with notes on the taxonomic identity of *P. glutinosum*

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Abstract

Petalidium etendekaense, previously mistaken for *P. glutinosum* and *P. variabile*, is now described as a new species. The name *P. pilosibracteolatum* is considered synonymous with the older *P. glutinosum*, the latter of which is also lectotypified. The newly described species is currently only known from the vicinity of Bergsig and slightly further west towards the Skeleton Coast National Park in the Kaokoveld Centre of Endemism, northwestern Namibia. It typically grows on hillsides and along ephemeral riverbeds, primarily in soils derived from Etendeka Group basalt. Diagnostic characters for *P. etendekaense* include its tomentose-strigulose indumentum, the inflorescence main axis and secondary branches that invariably become spiny with age, and a corolla with an ovate front lobe that is longer than it is wide. Additionally, all lobes of the corolla exhibit similar colours, ranging from dark burgundy to carmine to pink towards the apices. A comparison of some morphological features is provided to differentiate *Petalidium etendekaense* from *P. glutinosum* and *P. variabile*. Based on the IUCN Red List categories and criteria, we conducted a conservation assessment, resulting in the new species being classified as of Least Concern (LC).

Keywords: desert, endemism, flora, Kaokoveld, lectotypification, Ruellieae, Bergsig, taxonomy

Introduction

Currently, there are 40 described species of *Petalidium* Nees von Esenbeck (1832: 75) recognized in Africa. The main centre of diversity for the genus is in northwestern Namibia and adjacent southwestern Angola, with Namibia having 30 recorded species and Angola with 13 (Craven 2009, Tripp *et al*. 2017, Loiseau *et al.* 2023). Some species of African *Petalidium* also occur in South Africa, Botswana, and Zimbabwe, with two of those not being found in Angola or Namibia (Germishuizen & Meyer 2003, Figueiredo & Smith 2008, Swanepoel 2020, Swanepoel & Manzitto-Tripp 2022, Swanepoel *et al.* 2022, Dexter *et al*. 2023, Swanepoel & Van Wyk 2023a, 2023b).

In this contribution a new species of *Petalidium* is described. Through field work and examination of distribution records in herbaria, it has been determined that this undescribed species is restricted to the northern, western, and southwestern areas centred on the village of Bergsig in the Kunene Region of Namibia.

During several botanical expeditions to the Bergsig area, one of us (WS) encountered an unfamiliar *Petalidium* characterised by its dwarf shrub habit with a short trunk or multi-stemmed from ground level. It has cream-coloured, greyish white or grey-black fissured bark, and produces flowers in spinescent dichasia. The corollas of the flowers exhibit a dark burgundy throat and carmine to pink corolla lobes. Initially the plants were thought to be a variant of *P.*

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variabile Clarke (1899: 92). However, upon closer examination, differences in indumentum and floral characters were observed, leading to the conclusion that these plants represent an undescribed species.

Within its wider distribution range, when not in flower and fruit, the new species can also be mistaken for the species currently referred to as *P. pilosibracteolatum* Merxm. & Hainz in Suessenguth & Merxmüller (1955: 69). These two species share a similar habit and habitat. Previously, in herbaria, the new species has been misidentified as either *P. variabile* or *P. pilosibracteolatum*. However, it differs from these species in terms of indumentum, leaf morphology, inflorescence structure, and flower characters.

The known distribution of this species is situated within the Kaokoveld Centre of Endemism, which is a biogeographical region in northwestern Namibia and adjacent southwestern Angola, known for its abundance of plants and animals with limited ranges (Van Wyk & Smith 2001, Craven 2009). The Kaokoveld Centre is a prominent centre of diversity and endemism for *Petalidium* (Craven 2009, Tripp *et al*. 2017, Dexter *et al*. 2023, Loiseau *et al.* 2023) and related Acanthaceae (e.g., Tripp & Dexter 2012, Darbyshire *et al*. 2020). Therefore, the identification of a new species in this region is not surprising. During a study of the *Petalidium* specimens held in Herb. WIND, several earlier collections of the new species were found, all of which have been filed either as *P. variabile* or *P. pilosibracteolatum*.

Upon examining the type material associated with the names assigned to *Petalidium* species, it was discovered that the original gathering on which the name *P. glutinosum* (Engler 1888: 259) Clark (1899: 92) was based is actually conspecific with the taxon currently referred to as *P. pilosibracteolatum* and not *P. variabile*, of which it is currently considered a synonym (Meyer 1968). Therefore, in this contribution, we also reinstate the species and designate a lectotype for the name *P. glutinosum*, while considering *P. pilosibracteolatum* as a synonym of the former.

Material and methods

Morphological descriptions and ecological information presented here are based on field observations and material collected following extensive field work in Namibia by all authors. Diagnostic features were determined through examination of fresh material, as well as high-resolution images of type material available through JSTOR Global Plants (https://plants.jstor.org/). This was supplemented by the study of protologues and herbarium collections from the National Botanical Research Institute in Namibia (WIND), the South African National Biodiversity Institute, Pretoria (PRE), and the University of Pretoria (PRU). These herbaria were consulted for potential collections of the new species (herbarium abbreviations follow Thiers 2023). Morphological features were studied using a 6.5–45.0× magnification stereo microscope. Descriptive terminology follows Beentje (2016) and Manktelow (2000). Locality information for cited specimens also includes the quarter degree grid squares following the degree reference system of Edwards & Leistner (1971). The distribution map was compiled from specimen data using ArcView 3.1 software. Conservation assessment follows the recommendations of IUCN (2012).

Identity of *Petalidium glutinosum*

In the second half of the 19th century, some herbarium specimens collected by the South African botanist Rudolf Marloth were sent by him to Germany, where Adolf Engler and others documented them in two instalments published in 1888 under the title “Plantae Marlothianae”. Among these specimens was the collection *Marloth 1435*, which was gathered in May 1886 in northwestern Namibia. Engler (1888) described it as a new species, *Pseudobarleria glutinosa* Engler (1888: 259). The pollen morphology of this species was studied and illustrated by Lindau (1893: t. 1–13). Subsequently, Clarke (1899: 90) transferred the species to *Petalidium* with the new combination *Petalidium glutinosum*.

Upon arriving in Germany, Marloth’s herbarium specimens, which included the aforementioned gathering, were taken up in the private herbarium of Engler. From 1884 to 1889, Engler worked in Breslau, where he focused on the Marloth material along with other projects. In 1889, when Engler relocated to Berlin, his private herbarium became part of the Berlin Herbarium (Urban 1916, J. Paule, pers. comm.). In the protologue of *Pseudobarleria glutinosa*, Engler (1888) mentioned only the Marloth gathering but did not specify a particular specimen or the institution housing it. This suggests that all existing duplicates of *Marloth 1435* should be regarded as syntypes (McNeill 2014). We have encountered duplicates of this gathering in Herbs BOL, K, SAM in NBG, and PRE. However, in Herb. B, where one would expect to find material examined by Engler, no specimens of this gathering are extant, leading to the assumption that the original specimen(s) were likely destroyed in the fire resulting from a bombing raid during World War II in

1943. Nonetheless, the duplicate in Kew bears a printed label of "Herbarium A. Engler" with the original handwriting on the label, including the name "*Pseudobarleria glutinosa* Engl.", matching that of Adolf Engler (confirmed by N. Kilian, pers. comm.). Engler must have received more than one specimen of this gathering from Marloth and exchanged this specific duplicate with Kew, a practice that was quite common at the time (Kaiser 2022). We designate the *Marloth 1435* sheet at Kew as the lectotype for the name *Pseudobarleria glutinosa*. We have chosen this particular specimen because it is of good quality, contains all relevant information, and is also the only one among the duplicates that was certainly examined by Engler as it originated from his private herbarium and bears his handwriting.

In her revision of *Petalidium* in South Africa and Namibia (then still South West Africa), Obermeijer (1936) upheld *P. glutinosum* as a separate species. However, she did not provide a new description but instead referenced additional herbarium specimens and referred to Engler's (1888) account, which described the flowers as "dusky orange". In the subsequent comprehensive revision of *Petalidium* in Namibia, Meyer (1968) regarded *P. glutinosum* as a synonym of *P. variabile*, a perspective that has since been adopted by all researchers studying the group. Here, however, we follow Obermeijer (1936) in recognizing *P. glutinosum* as a species distinct from *P. variabile* (Table 1).

In 1955, Hermann Merxmüller and Richard Hainz described the new species *P. pilosibracteolatum* (as "*pilosi-bracteolatum*") in Suessenguth & Merxmüller (1955). They speculated that this species could potentially be a stable hybrid between *P. variabile* and *P. setosum* C.B.Clarke ex Schinz (1916: 434). However, according to the authors of *P. pilosibracteolatum*, the statement "very common everywhere" ("sehr verbreitet, überall") made by the collectors of the original material makes such a possibility rather unlikely in our opinion. After extensive fieldwork and conducting a thorough morphological analysis of the original material, we have concluded that *P. pilosibracteolatum* is conspecific with *P. glutinosum*. The presence of long, whitish, simple trichomes on the bracteoles and the green colour of the bracteoles are particularly significant diagnostic features (instead of grey-white bracteoles in *P. variabile*, which turn brown or greenish brown in herbarium material). While examining the leaves of the type gathering of *P. pilosibracteolatum* (*E. & H. Walter 1261* in Herb. WIND), it was noted that they are densely strigulose. Such trichomes appear to be absent in the available images of *Marloth 1435*. However, the bracteoles of *Marloth 1435* exhibit the distinctive long simple trichomes, similar to those in *E. & H. Walter 1261*. The apparent absence of strigulose trichomes in Marloth's collection might be attributed to relatively young shoots or leaves transitioning to a glabrescent state, a variability commonly observed in living plants. Additionally, it is important to mention that the type collections of both *P. pilosibracteolatum* and *P. glutinosum* are from the vicinity of Usakos, a botanically well-known area. From this region, only a single entity is known, possessing the specific combination of morphological characters observed in these two collections. Based on priority, the correct name for this entity is *P. glutinosum*. Therefore, we here place *P. pilosibracteolatum* into synonymy with *P. glutinosum*.

Petalidium glutinosum (Engl.) Clarke (1899: 92).

Type:—[NAMIBIA.] Namaland [Damaraland], [in lapidosus], Usakos, alt. 900 m [850 m], May 1886, *Marloth 1435* (lectotype K000394073 scan! **designated here**; isolectotypes BOL138559 photo!, PRE0118630-0!, SAM0039812-0 in NBG scan!).

≡ *Pseudobarleria glutinosa* Engler (1888: 259). Type: as above.

= *Petalidium pilosibracteolatum* (as "*pilosi-bracteolatum*") Merxm. & Hainz in Suessenguth & Merxmüller (1955: 69), *syn. nov.* Type: Südwest-Afrika [Namibia], Damaraland, farm Nudis [Dr. R. Seydel], [im Gamikaubibrivier], Distr. Karibib, "sehr verbreitet, überall", [13-02]-1953, *H & E Walter 1261* (holotype M0109674 scan!; isotype WIND!).

Taxonomic treatment

Petalidium etendekaense Swanepoel, E.Tripp & A.E.van Wyk, *sp. nov.* (Figs 1–3)

Diagnosis:—A woody shrub up to 1 m tall, morphologically most similar to *Petalidium glutinosum* and *P. variabile*, but differing from both in having indumentum on leaves tomentose-strigulose (*vs*. strigulose); corolla lobes ascending-spreading with respect to the corolla tube axis (*vs*. patent or upper lobes in line with tube to sub-patent), lobes all similarly coloured (*vs*. anterior and sometimes lateral lobes differently coloured or shaded than upper lobes); differing from *P. glutinosum* in absence of long, simple trichomes on bracteoles abaxially; differing from *P. variabile* in absence of short geniculate simple trichomes on bracteoles abaxially.

Type:—NAMIBIA. Kunene Region: Farm Driefontein 716, ca. 4 km south of old homestead, southern tributary to Springbok River, 2014AC, 912 m, 4 April 2023, *Swanepoel 624* (holotype WIND!; isotypes PRE!, PRU!).

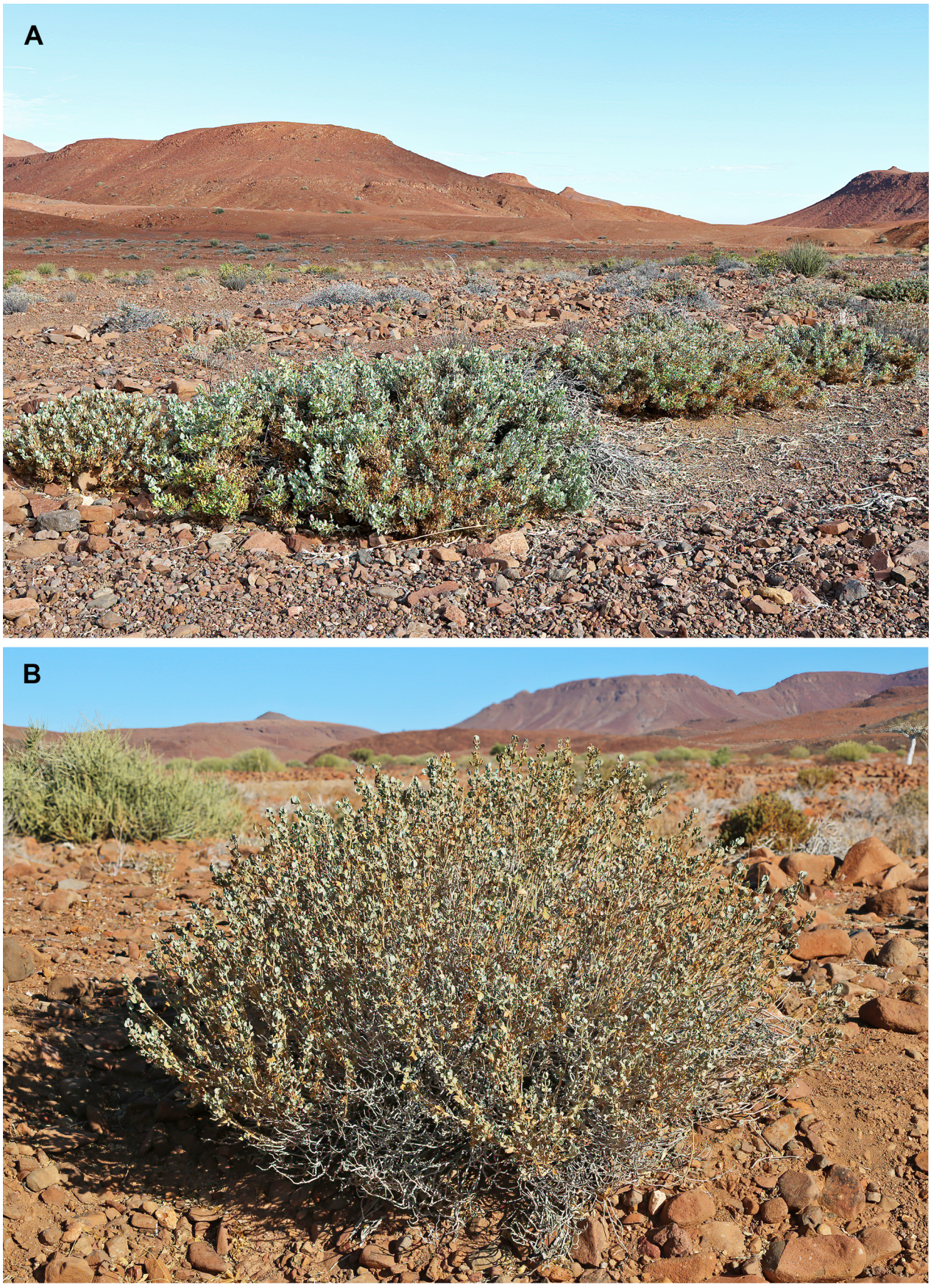

FIGURE 1. *Petalidium etendekaense*. Habitat and habit. **A.** Several plants (foreground and greyish dwarf shrubs in the background) growing on the gently sloping ground between rocky hills in stony soil derived from Etendeka Group basalt. **B.** Mature plant (ca. 600 mm high) with very short main stem and greyish appearance. Photographs by W. Swanepoel.

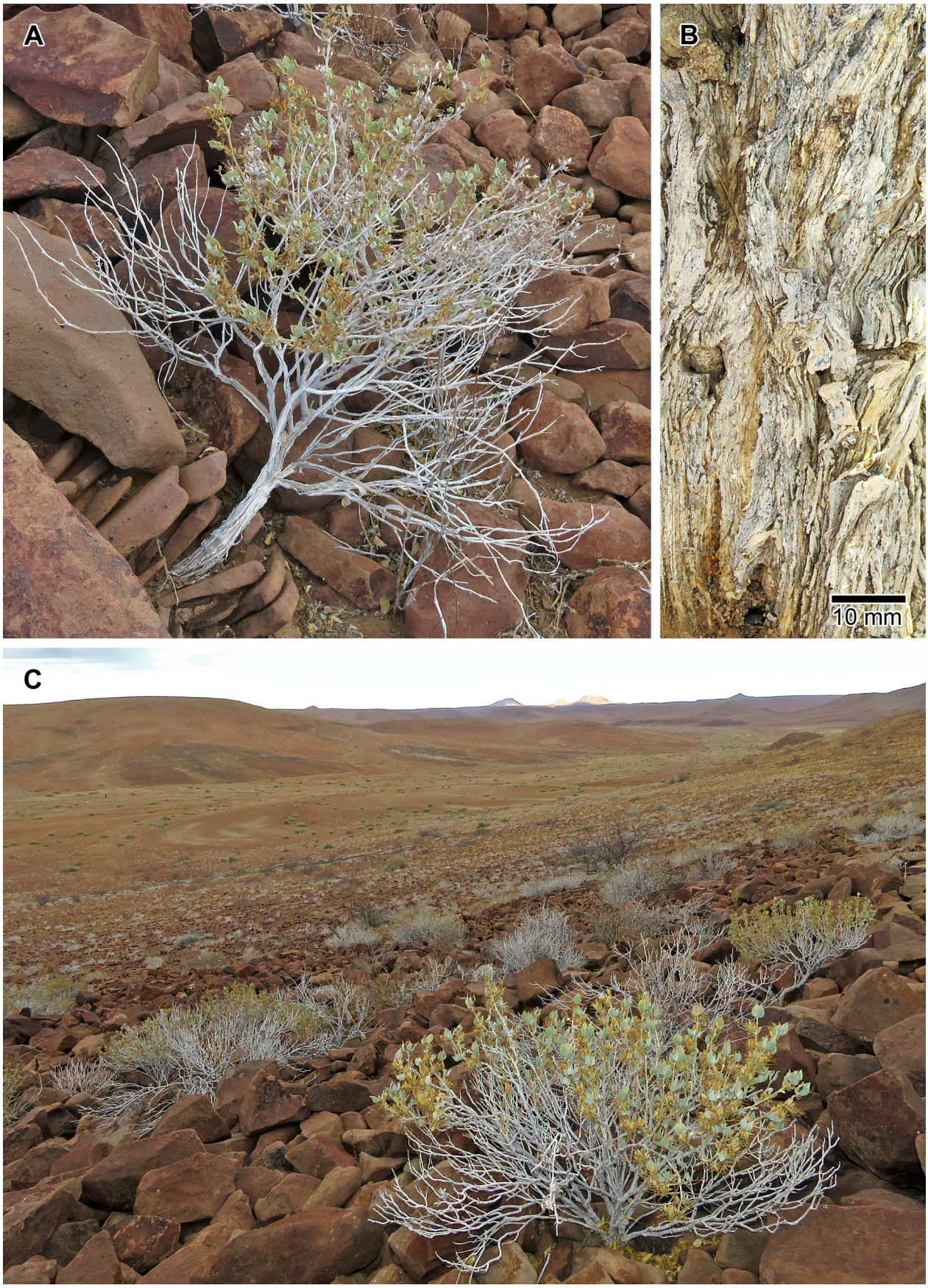

FIGURE 2. *Petalidium etendekaense*. Habitat and habit. **A.** Plant (ca. 350 mm high) with relatively long single main stem, growing among rocks of Etendeka Group basalt. **B.** Part of fissured greyish white bark on woody stem (ca. 60 mm in diam.) at base of mature plant. **C.** Plants growing in abundance (right front and low greyish shrublets in background) among rocks of Etendeka Group basalt on a hill slope. Photographs by W. Swanepoel.

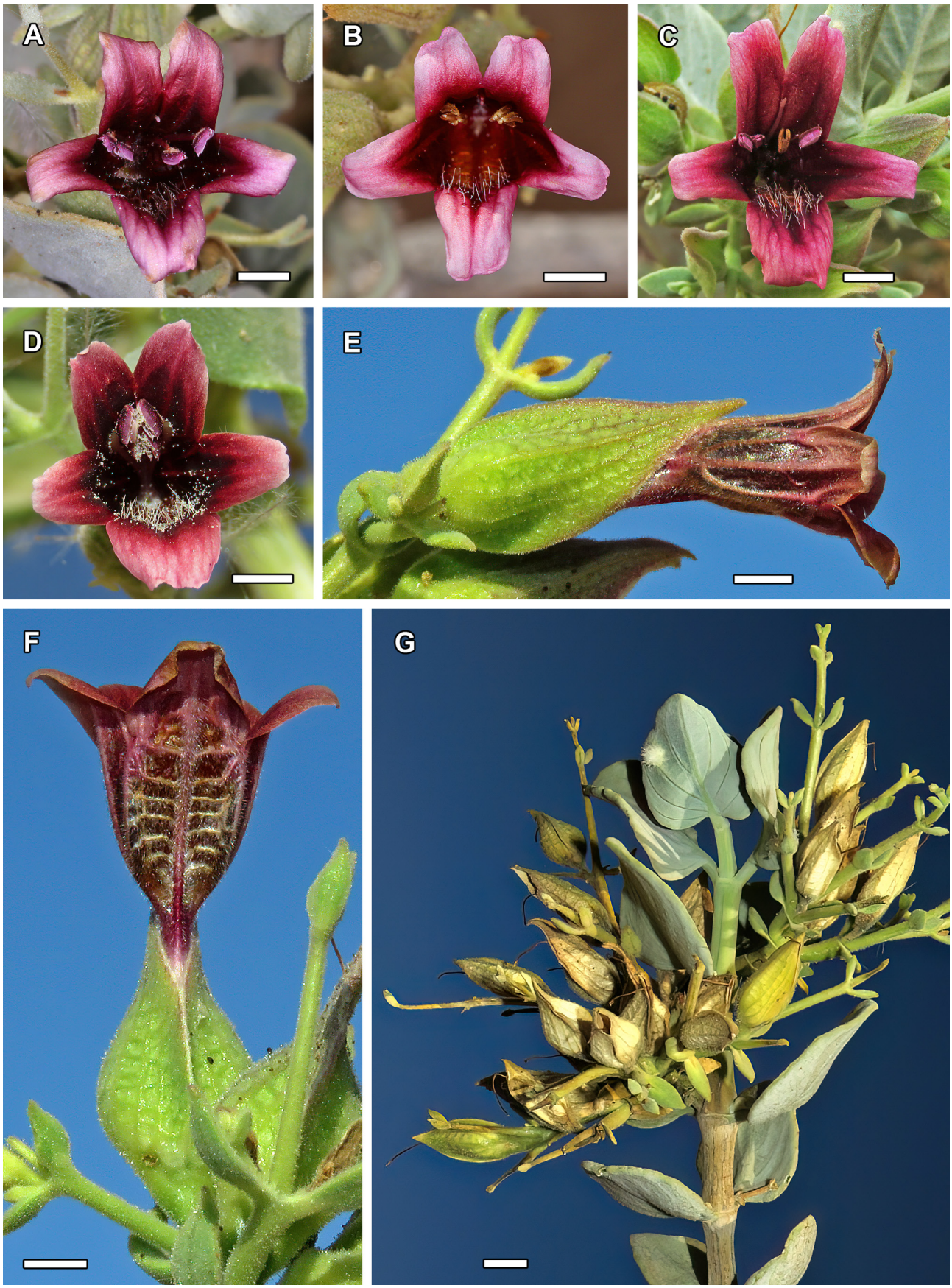

FIGURE 3. *Petalidium etendekaense*. Morphology of flowers and leaves. **A, B, C, D.** Flowers in front view, each from a different plant to show variation; note all corolla lobes of a flower being similarly coloured. **E.** Flower and bracteole in lateral view; note absence of long, simple trichomes on bracteoles. **F.** Flower with bracteoles, viewed from below. **G.** Shoot showing leaves with dense white indumentum and persistent bracteoles of spent flowers, some enclosing developing fruit. Scale bar = 3 mm. Photographs by W. Swanepoel.

Erect woody shrub to 1 m tall. *Stems*: single main stem up to 100 mm long, 80 mm diam. or multi-stemmed from just above ground level, stems up to 30 mm diam., bark fissured, cream-coloured, greyish white or grey-black; bark on distal stems sometimes peeling in long, thin, narrow strips; young stems quadrangular to terete, indumentum as for leaves, glabrescent; green with cystoliths linear, inconspicuous. *Leaves* opposite and decussate; laminae ovate, elliptic, rarely suborbicular, 12–37 × 9–27 mm, apices acute, rounded or retuse, bases cuneate, rounded or truncate, not or slightly decurrent, flat, subconduplicate or often recurved towards apex and margins, margins entire or slightly undulate, midribs and lateral veins prominent especially adaxially, lateral veins 3–5 each side; grey to greyish green or green; cystoliths inconspicuous; indumentum initially of sparse, simple geniculate trichomes, few unevenly bifurcate or dendritic and patent, also with scattered stalked glandular trichomes of variable sizes, more robust ones multi-cellular, eventually with additional, dense, shorter simple geniculate trichomes and appearing tomentose-strigulose; petioles up to 9 mm long or leaves subsessile. *Flowers* in axillary dichasia, inflorescence main axis up to 100 mm long, secondary branches shorter, main axis and secondary branches becoming spiny with age, tapering, apices blunt to sharp; bracts foliaceous, oblanceolate or narrowly elliptic, up to 7.0 × 2.3 mm, apices acute, sessile, indumentum similar to that of leaves; pedicels (below bracteoles) 0.5–4.0 mm long; bracteoles symmetrically ovate or narrowly ovate, narrowly elliptic or lanceolate, coriaceous, forming prominent bulging on bracteole pair from which corolla limb emerges from one side, apices attenuate, pale green, midrib straight, venation reticulate, slightly prominent, inconspicuous, pale green, glutinous, slightly aromatic owing to the latter secretion, 11.8–16.1 × 4.2–8.2 mm, abaxially with scattered stalked glandular trichomes of various sizes, smallest ones subsessile, more robust ones multi-cellular, sometimes in addition sparsely puberulous in places, adaxially with stalked glandular trichomes, strigose towards apex and margins, margins lanate, cystoliths visible adaxially. *Calyces* 8.1–8.4 mm long including basal tube of 1.1–2.3 mm, adaxially strigulose with few small stalked glandular trichomes, abaxially puberulous with scattered stalked glandular trichomes of varying length; lobes 4, narrowly triangular, acute, 5.2–7.3 mm long, anticous lobe indistinctly bifid. *Corollas* 22–26 mm long with lobes straightened, narrow unexpanded portion cylindrical, sometimes slightly curved towards anterior side, slightly flattened laterally, 9.6–11.6 mm long, 2.6–3.5 mm diam., outside and inside cream-white, expanded portion at slight angle to anterior side of narrow portion, 5.4–7.1 mm long; outside dark brown to almost black, anterior side brown, herringbone pattern prominently transversely 6- or 7-ribbed, cream-brown, traces prominent, pink to carmine; inside dark burgundy, anterior side glabrous, yellow, terminating in two narrowly triangular separate markings (nectar guides) on proximal portion of anterior lobe; outside of expanded portion (including lobes) and anterior side of narrow portion puberulous distally, trichomes bulbous, inside puberulous on area immediately above insertion of filaments up to mouth, otherwise glabrous; lobes ascending-spreading, upper lobes ovate, 5.4–7.5 × 3.1–4.0 mm, connate for ca. one-third of their length, not or slightly overlapping, apices emarginate, truncate or rounded, lateral lobes oblong-ovate, 4.4–6.2 × 2.9–3.8 mm, apices truncate, obtuse or retuse, anterior lobe ovate, apex truncate, emarginate or retuse, 5.4–7.6 × 4.9–6.0 mm, all lobe margins entire or denticulate towards apex; lobes adaxially dark burgundy towards bases, carmine to pink towards apices, carmine abaxially; anterior lobe with long, stiff, patent, simple, white, eglandular trichomes towards base, other lobes glabrous or with few widely spaced similar trichomes. *Stamens* didynamous: filaments inserted dorsally in throat, fused portion 1.9–2.6 mm long, free portion tapering towards apex, slightly flattened, with few widely spaced short stalked glandular trichomes, long filaments 4.7–6.1 mm long, short filaments 2.8–3.7 mm long, outer filament decurrent for 4.6–5.8 mm (ca. halfway) towards base of tube, puberulous, trichomes bulbous; filament curtain (*sensu* Manktelow 2000) reduced; anthers 2-thecous, thecae elliptic-oblong with minute spurs at base, 2.2–2.5 mm long, mauve or pink, with scattered short stalked glandular trichomes. *Gynoecium* 17.3–18.4 mm long; ovary ovoid, laterally compressed, 1.5–2.1 × 1.5–1.7 × 1.0–1.2 mm, situated on fleshy disc, 0.8–1.0 mm long, glabrous; style filiform, 13.5–15.5 mm long, with scattered short eglandular trichomes, stigma lobes linear, slightly flattened, subequal, longer lobe 0.5–1.0 mm long, shorter lobe 0.3–0.8 mm long. *Capsule* flattened ellipsoid or ovoid, 7.5–8.8 × 3.6–4.6 × 2.2–2.5 mm, chestnut, glossy, sides slightly rugose or smooth, glabrous. *Seeds* cordate, 4.1–4.3 × 3.0–3.4 mm, surfaces and margins densely covered with white hygroscopic trichomes.

Phenology:—Flowers have been recorded from November to June and fruits from December to July.

Distribution and habitat:—At present, *Petalidium etendekaense* is known from the area to the northwest, west, and southwest of Bergsig, specifically on the farms Rooiplaat, Wêreldsend, Driefontein, and Krone. Plants have also been recorded further west, extending towards the Skeleton Coast National Park, reaching as far north as the Samanab River (Fig. 4). The species is restricted to soils derived from basaltic rocks of the Etendeka Group (Milner *et al.* 1994) and is the dominant woody dwarf shrub found on hillsides, along seasonally dry riverbeds and at the base of rocky outcrops. Its occurrence is documented at elevations of 380–1060 m a.s.l., about 25–85 km inland from the Atlantic Ocean. The average annual rainfall in the area is less than 100 mm (Atlas of Namibia Team 2022).

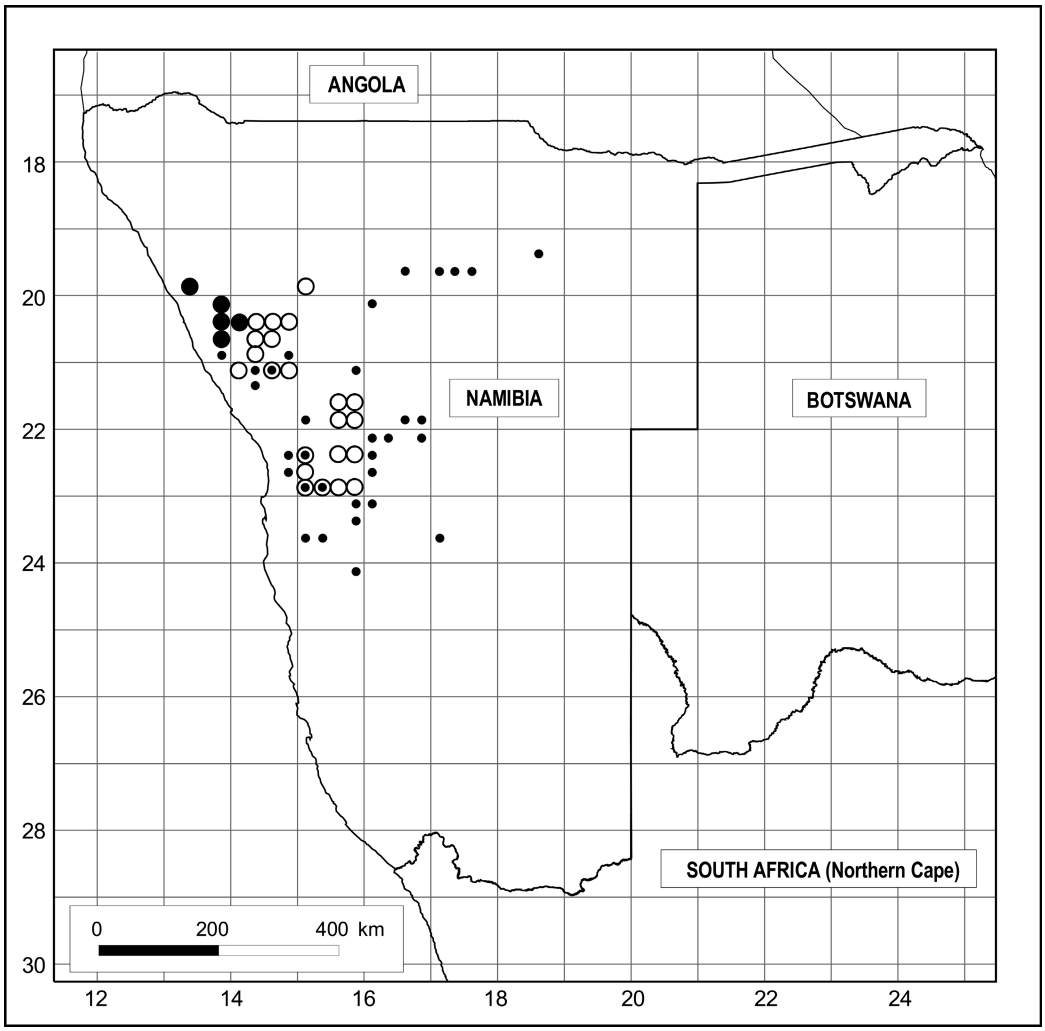

FIGURE 4. Known distribution of *Petalidium etendekaense* (large black dots), *P. variabile* (small black dots), and *P. glutinosum* (open circles): overlap between *P. variabile* and *P. glutinosum* depicted as an open circle with central dot. Based on herbarium specimens in Herbs. PRE and WIND.

Conservation status:—*Petalidium etendekaense* is likely more common and widespread in suitable habitats than currently documented. It is not considered to be in immediate conservation danger, as it is found in sparsely populated or uninhabited areas and does not seem to be utilised by humans. The estimated extent of occurrence is 2000 km², with six subpopulations. Since there is no known decline in population size or numbers, it is classified as Least Concern (LC) according to the IUCN (2012) criteria.

Etymology:—The specific epithet "*etendekaense*" refers to the Etendeka Tableland landscape (or plateau), which was formed by lava flows (basalts of the Etendeka Group) ca. 132 million years ago due to sea floor spreading and the formation of the South Atlantic. This plateau is a component of a significant igneous province, and its counterpart in Brazil is represented by the Paraná basalts (Goudie & Viles 2015). The name "Etendeka" is derived from the Otjiherero word for layered or stacked, in reference to the flat-topped mountains that define the landscape (Detay & Detay 2017, Atlas of Namibia Team 2022). The entire known population of *Petalidium etendekaense* is located in this landscape, growing on soils derived from Etendeka basalt.

Notes:—Unless the indumentum of the bracteoles is investigated, it is difficult to differentiate among *Petalidium etendekaense*, *P. glutinosum*, and *P. variabile* in herbarium material. For example, the specimens *Giess 3861* and *Giess & Barnard 7960*, both representing *P. etendekaense*, were mistakenly cited under *P. variabile* in the *Prodromus einer Flora von Südwestafrika* (Meyer 1968). However, in the field, when in flower, *P. etendekaense* can be easily distinguished from the others by the combination of a dark burgundy corolla throat and proximal part of the lobes, contrasting with the carmine to pink distal part of the lobes (Figs 5 & 6). Additionally, it has an ovate anterior lobe that is longer than wide and the lobes exhibit an ascending-spreading orientation. Table 1 provides some morphological features to differentiate *P. glutinosum* and *P. variabile*.

TABLE 1. Prominent morphological differences among *Petalidium etendekaense*, *P. glutinosum*, and *P. variabile.*

Character	*P. etendekaense*	*P. glutinosum*	*P. variabile*
Indumentum (vegetative parts)	Tomentose-strigulose: usually few trichomes unevenly bifurcate or dendritic; scattered stalked glandular trichomes of various sizes in addition	Densely strigulose; often with scattered short stalked glandular trichomes ca. of uniform size in addition	Densely strigulose; often with scattered short stalked glandular trichomes ca. of uniform size in addition
Lamina (shape)	Ovate or elliptic, rarely suborbicular	Narrowly ovate, ovate or elliptic	Narrowly ovate, elliptic, lanceolate *sensu* Lindley (Beentje 2016: 73), lanceolate, oblanceolate or obovate
Inflorescences	Axis and lateral branches becoming spiny with age; spines tapering, with a sharp or blunt tip	Axis not spiny, or becoming spiny with age; spines needle-like with a blunt tip or spines tapering	Axis not spiny, or becoming spiny with age; spines needle-like with a blunt tip
Bracts (shape)	Oblanceolate or narrowly elliptic	Oblanceolate or lanceolate (*sensu* Lindley)	Oblanceolate or lanceolate (*sensu* Lindley)
Bracteoles (shape & reticulation)	Narrowly ovate or ovate, narrowly elliptic or lanceolate; laterally compressed or not	Narrowly ovate or ovate; laterally compressed or not	Elliptic-oblong (laterally compressed) or narrowly ovate
Bracteoles (indumentum, abaxially)	Scattered stalked glandular trichomes of various sizes; sometimes sparsely puberulous in places	Scattered stalked glandular trichomes of various sizes, usually interspersed with long simple irregular trichomes (appearing villose), sometimes sparsely strigulose	Densely strigulose (similar to leaves); often interspersed with short stalked glandular trichomes of ca. uniform size, rarely with widely spaced long simple trichomes in addition
Corolla (length with lobes straightened) (mm)	22–26	22–26	16–21
Corolla (ratio length of expanded *vs*. narrow portion)	1:1.5–1.8	1:1.0–1.5	1:1.5–2.8
Corolla (lobes orientation)	Ascending spreading	Upper lobes in line with tube to sub-patent or ascending-spreading, other lobes patent	Upper lobes in line with tube to sub-patent or ascending-spreading, other lobes patent
Corolla upper lobes (shape)	Ovate; connate for a third of the length	Oblong-ovate; connate for a third to half the length	Narrowly ovate, to oblong-elliptic; connate for a third to half the length
Corolla lateral lobes (shape)	Oblong-ovate	Oblong-ovate	Obovate or elliptic
Corolla anterior lobe (shape)	Ovate, longer than broad	Broadly obovate, suborbicular or spathulate, broader than long	Broadly obovate or suborbicular, broader than long
Corolla ratio anterior lobe *vs.* lateral lobes (width at base)	1.0–1.5:1	ca. 2:1	ca. 2:1
Corolla (lobes colour, adaxially)	All lobes similarly coloured	Front lobes differently coloured or shaded than others	Front lobes differently coloured or shaded than others
Distribution	Namibia: northwest and west of Bergsig to the Skeleton Coast National Park and the Samanab River. Southwest and south of Bergsig to the northern side of the lower Huab River Valley.	Namibia: from the Bergsig area southwards towards the Swakop River drainage area.	Namibia: from the lower Huab River southwards to west central Namibia and in northern Namibia near Otavi and Grootfontein.

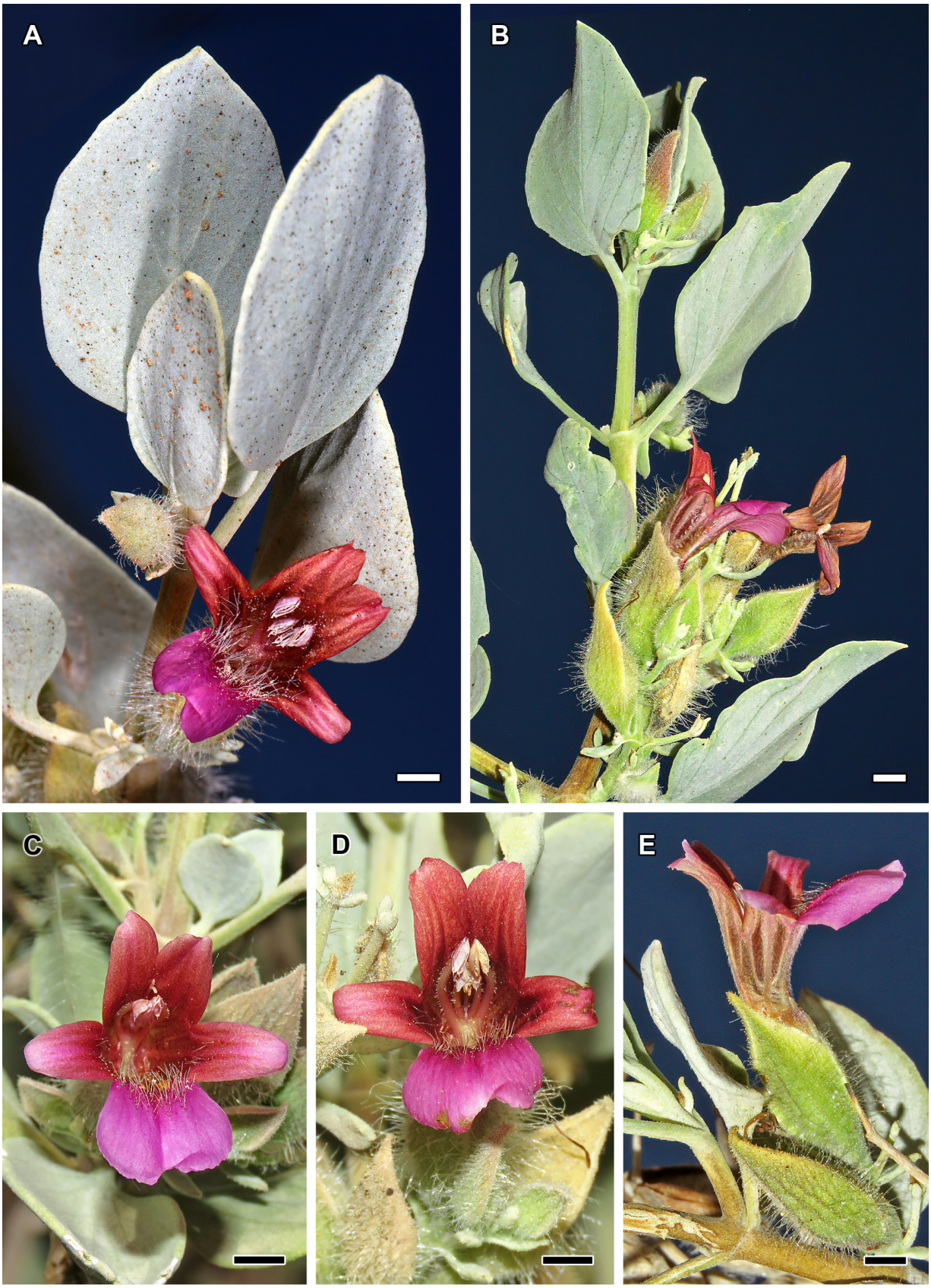

FIGURE 5. *Petalidium glutinosum* (= *P. pilosibracteolatum*), flower and leaf morphology. **A.** Shoot showing leaves with dense white indumentum and a flower in front view. **B.** Leafy shoot showing flowers (one faded) and bracteoles in lateral view; note long, simple trichomes on bracteoles. **C, D.** Flowers from different plants in front view; front corolla lobe being differently coloured than the others. **E.** Flower and bracteoles in lateral view; note long, simple trichomes on bracteoles. Scale bar = 3 mm. Photographs by W. Swanepoel.

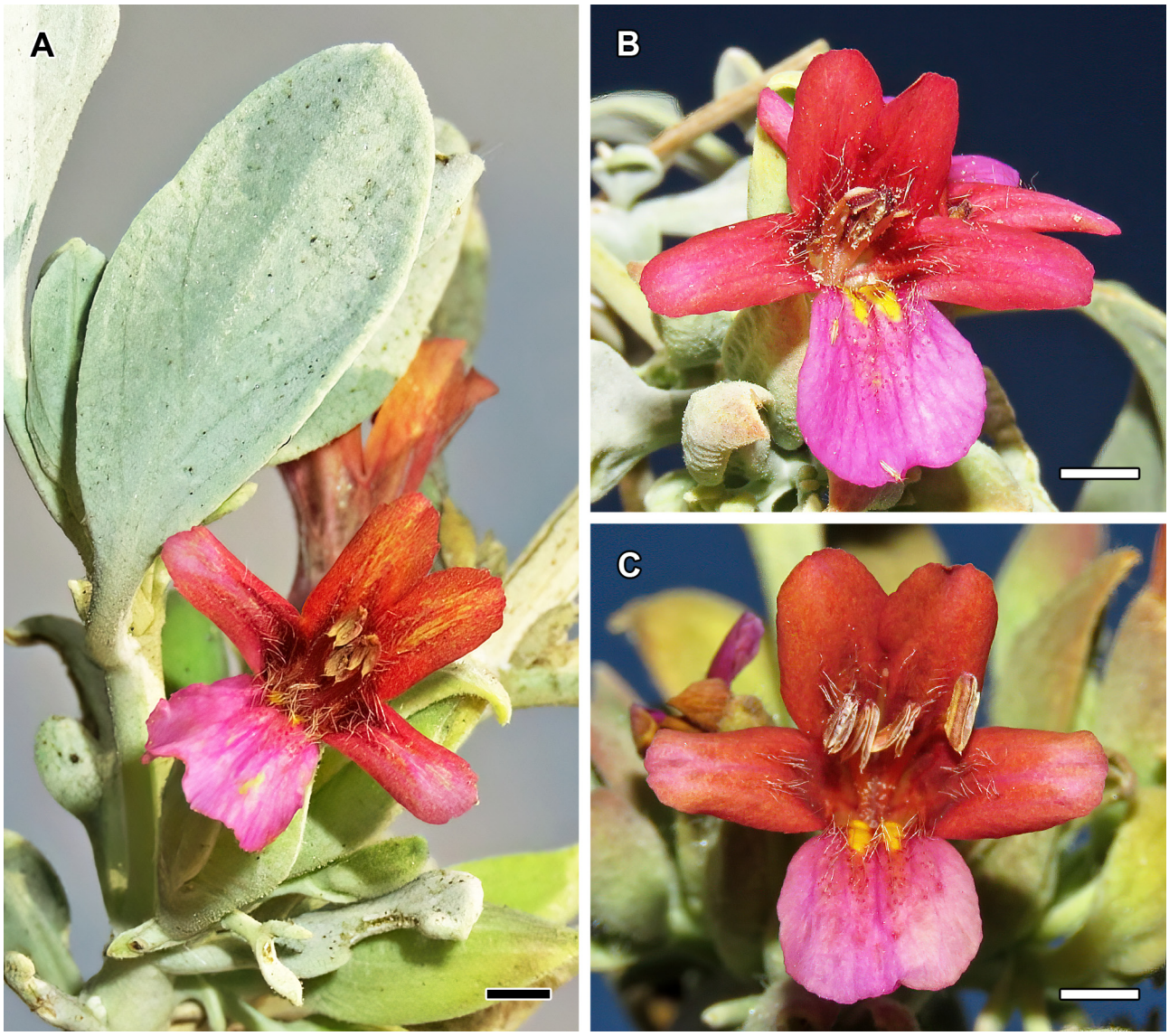

FIGURE 6. *Petalidium variabile*, flower and leaf morphology. **A.** Shoot showing leaf with dense white indumentum and open flower. **B, C.** Flowers of different plants in front view; note front corolla lobe being differently coloured than the others. Scale bar = 3 mm. Photographs by W. Swanepoel.

The distribution range of the new species slightly overlaps with that of *P. glutinosum* in the Springbok River to the west of Bergsig (Fig. 4). Although *P. etendekaense* has been collected within ca. 15 km from *P. glutinosum*, they have not been recorded to occur sympatrically to date. *Petalidium variabile* occurs to the south of *P. etendekaense*, from south of the Huab River and Sorris-Sorris southwards (Fig. 4).

All the mentioned taxa are from the group of plants with irregular, four-parted calyces (Obermeijer 1936, Tripp *et al*. 2017). This is also the clade that shows the highest rates of net species diversification in *Petalidium*, and occupies the most arid areas within the geographic distribution of the entire genus (Loiseau *et al.* 2023).

Additional specimens examined (paratypes):—NAMIBIA, Kunene Region:—1913: Samanab River, 10 km from dune field, (–CD), 385 m, 15 July 2019, *Swanepoel 630* (WIND!).—2013: Farm Wêreldend [Wêreldsend], etwa 1 meile w. des Hauses in kleinen Rivier, (–BB), 12 November 1961, *Giess 3861* (PRE!, WIND!); Farm Rooiplaat OU 710, in Grob Geroellsenke, (–BB), 14 April 1964, *Giess & Barnard 7960* (WIND!); Gui-Tsawisib River, Road C39, opposite Wêreldsend Veterinary Gate, (–BB), 775 m, 4 April 2023, *Swanepoel 626* (WIND!); Tributary to Springbok River along track to Huab River, 2 km south of Wêreldsend Veterinary Gate, (–BD), 766 m, 4 April 2023, *Swanepoel 627* (WIND!); 1 km south of Ugibputs, along track to Huab, River, (–BD), 720 m, 4 April 2023, *Swanepoel 628* (WIND!); 6.4 km south of Ugibputs, along track to Huab River, (–DB), 741 m, 4 April 2023, *Swanepoel 629* (WIND).—2014: Huab drainage, farm Krone 721, NNE old farmhouse, (–AC), 560 m, 28 March 1996, *Ward 13731* (WIND!); 8.6 km west of Bergsig towards Torra Bay on C39, (–AC), 28 March 2010, *Tripp & Dexter 876* (US!); Farm Driefontein 716,

ridge above southern tributary to Springbok River, ca. 5 km southeast of old homestead, (–AC), 963 m, 4 April 2023, *Swanepoel 625* (WIND!).

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