Phytotaxa 734 (1): 009–019
https://www.mapress.com/pt/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

https://doi.org/10.11646/phytotaxa.734.1.2

Petalidium engoense (Acanthaceae), a new species from Angola and Namibia, with notes on phenotypic plasticity in the genus

WESSEL SWANEPOEL[1,2,3,5,6]*, ROLF W. BECKER[3,7] & ABRAHAM E. VAN WYK[2,4,8]

[1]*Independent Researcher, P.O. Box 21168, Windhoek, Namibia*
[2]*H.G.W.J. Schweickerdt Herbarium, Department of Plant and Soil Sciences, University of Pretoria, Pretoria, 0002 South Africa*
[3]*Ongava Research Centre, Private Bag 12041, Windhoek, Namibia*
[4]*South African National Biodiversity Institute, Private Bag X101, Pretoria, 0001 South Africa*
[5]*Biodiversity Research Centre, Department of Agriculture and Natural Resources Sciences, Namibia University of Science and Technology, Private Bag 13388, Windhoek, Namibia*
[6] *wessel@kaokosafari.com; https://orcid.org/0000-0002-0181-3543*
[7] *rb@orc.eco; https://orcid.org/0000-0001-8034-6463*
[8] *braamvanwyk@gmail.com; https://orcid.org/0000-0002-0437-3272*
**Author for correspondence*

Abstract

Petalidium engoense, first collected in May 2025, is here described as a new species. It is a range-restricted species, only known from the western edge of the escarpment zone (Great Escarpment of southern Africa), in the hilly area bordering the Engo Valley (northwestern Namibia), and to the north of Espinheira (southwestern Angola), in the Kaokoveld Centre of Endemism. It grows amongst boulders on arid hillsides, and along an ephemeral riverbed. Diagnostic characters for *P. engoense* include the pale greyish green appearance of the plants, ashy-grey to white fissured bark on older stems, vegetative parts with a dense white indumentum of very small stellate (stellulate) and dendritic trichomes appearing tomentose, semi-succulent leaves, burgundy flowers borne in short few-flowered dichasia with inflorescence axis becoming spiny with age, and narrowly ovate, attenuate to acute, prominently reticulate bracteoles. The flowers of *P. engoense* are distinctive in having all lobes coloured burgundy, and the anterior lobe with two yellow ensiform nectar guides. A comparison of key morphological features distinguishing *P. engoense* from *P. namibense*, its closest relative in appearance, is provided. Based on IUCN Red List criteria, a provisional conservation assessment of Critically Endangered (CR) is recommended for the new species. The paper also summarises current knowledge of phenotypic plasticity within *Petalidium* in response to environmental variation. This contribution forms part of ongoing taxonomic studies on the genus.

Key words: endemism, Engo River, Engo Valley, flora, Hartmann Valley, Iona National Park, Kaokoveld Centre of Endemism, Kunene Region, Namib Desert, Namibe Province, Ruellieae, taxonomy, variation

Introduction

Currently, 46 described species of *Petalidium* Nees von Esenbeck (1832: 75) are recognised in Africa. The primary centre of diversity for this genus is located in northwestern Namibia and neighbouring southwestern Angola. Namibia is home to 36 species, while 13 species are recorded in Angola, six in South Africa, and 38 species are noted in the *Flora of southern Africa region*, which includes South Africa, Namibia, Botswana, Eswatini, and Lesotho (Germishuizen & Meyer 2003, Figueiredo & Smith 2008, Swanepoel 2020, Swanepoel & Manzitto-Tripp 2022, Swanepoel *et al.* 2022, 2023, 2024, 2025, Dexter *et al.* 2023, Swanepoel & Van Wyk 2023a, b, 2024, 2025a, b). In the present contribution a new species of *Petalidium* is described. According to available distribution records, this new entity is restricted to the Kaokoveld Centre of Endemism, a biogeographical region rich in range-restricted plant species in northwestern Namibia and adjacent southwestern Angola (Van Wyk & Smith 2001).

In May 2025, during a botanical expedition to the remote northwestern corner of the Namibian Kaokoveld, south of the Hartmann Valley, one of us (WS) discovered an unfamiliar *Petalidium.* This plant was distinguished by its shrubby habit, stout stem on older specimens, whitish rough and fissured bark, indumentum of very small bifurcate, trifurcate, stellulate and dendritic trichomes, pale green or grey-green semi-succulent leaves, and burgundy flowers

Accepted by Ronell R. Klopper: 3 Dec. 2025; published: 16 Dec. 2025

with yellow nectar guides on the anterior corolla lobe. In June 2025, WS collected similar plants in southwestern Angola, near Espinheira in the Iona National Park. The plants were in flower and fruit, enabling the taxon to be identified as an undescribed species. The new species can be confused with several other members of *Petalidium* in northwestern Namibia and southwestern Angola with which it shares morphological similarities, especially in features of the indumentum, leaves, and flowers. Its closest relative in appearance is *P. namibense* Swanepoel & Van Wyk (2024: 129). A study of the *Petalidium* holdings in the Herbs PRE, PRU, and WIND revealed no earlier collections of the new species.

The Kaokoveld Centre is a pronounced 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). The Centre is botanically still underexplored, hence the identification of yet another new species in this region is not unexpected.

This paper forms part of a long-term project, led by one of us (WS), aimed at conducting extensive fieldwork on *Petalidium* in botanically underexplored regions, particularly in Namibia and Angola. The aim is to discover and document any remaining undescribed species of the genus. The ultimate goal is a comprehensive monograph of *Petalidium*, a major undertaking expected to take considerable time. Given the effort, cost, and duration of the fieldwork, new taxa are being formally described as they are discovered to substantiate the continued investment in exploration.

Methods

Morphological descriptions and ecological information presented here are based primarily on field observations and material collected following extensive field work in Namibia. Diagnostic features for the new species and *P. namibense* were determined through examination of fresh material (also for all other species mentioned in the text), the type material in Herb. WIND, as well as high-resolution images of type material of previously described species of *Petalidium* available on JSTOR Global Plants (https://plants.jstor.org/). This was supplemented by the study of the protologues and available herbarium collections in the National Botanical Research Institute in Namibia (WIND), the South African National Biodiversity Institute, Pretoria (PRE), and the University of Pretoria (PRU) (herbarium codes follow Thiers 2025). A 6.5–45.0× magnification stereo microscope was used for studying morphological features. Descriptive terminology follows Beentje (2016), Hewson (2019), and Manktelow (2000). Locality information for specimens cited also provides 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. A preliminary conservation assessment was conducted using the standard procedures based on IUCN (2012) recommendations.

Taxonomic treatment

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

Diagnosis:—A woody dwarf shrub up to 1.2 m tall, morphologically most similar to *Petalidium namibense,* differing by having the indumentum on vegetative parts matted, consisting of very small subsessile or short-stalked bifurcate, trifurcate, stellulate, and bottlebrush-like dendritic trichomes, all with relative short tapering branches (*vs*. appearing lanate, trichomes short-stalked glandular and dendritic, dendritic ones sparsely branched or bottlebrush-like, branches longer, acerose, leaves with bifurcate trichomes in addition); leaf lamina ovate or elliptic, usually conduplicate or sub-conduplicate [over entire length], recurved, semi-succulent (*vs.* ovate, elliptic, suborbicular or orbicular, flat or often sub-conduplicate [only towards apex], not recurved, not succulent); corolla lobes abaxially strigose-puberulous, burgundy, all similarly coloured, yellow nectar guides on anterior lobe ensiform (*vs*. glabrous, upper lobes vermillion, lateral lobes vermillion or carmine, anterior lobe magenta with nectar guides narrowly triangular).

Type:—NAMIBIA. Kunene Region: Engo Valley, hills 4.5 km east of Skeleton Coast National Park boundary, 1712CC, 578 m a.s.l., 5 May 2025, *Swanepoel 662* (holotype WIND!; isotypes PRE!, PRU!).

Rounded woody dwarf shrub up to 1.2 m tall with strong tendency to branch; all vegetative parts with a dense white matted indumentum, consisting of very small subsessile or short-stalked bifurcate, trifurcate, stellulate, and bottlebrush-like dendritic trichomes, with relatively short tapering branches. *Stems* single or multi-stemmed from just below or

above ground level from thick rootstock or up to 160 mm in diam., bark on main stem(s), rough and fissured, ashy grey or white; older distal stems cylindrical, bark smooth, often longitudinally fissured peeling in longitudinal strips or irregular flakes, cream-white, cream-brown or grey; young stems and branches quadrangular, sometimes zig-zag, pale green, becoming cream-white with age, glabrescent, cystoliths not visible. *Leaves* opposite and decussate on new shoots, fascicled on older stems; petiole up to 7 mm long; lamina ovate or elliptic, usually conduplicate or sub-conduplicate, recurved, semi-succulent, brittle, up to 18 × 12 mm when flattened, pale green to grey-green, apices rounded, obtuse or acute, bases rounded, cuneate or truncate, attenuate onto petiole, margins entire, midrib slightly prominently raised both sides, cystoliths not visible. *Inflorescences* short few-flowered axillary dichasia; axis up to 40 mm long, becoming spiny with age, indumentum similar to vegetative parts; bracts foliaceous, linear-oblanceolate or oblanceolate, sessile, 2.0–7.0 × 0.8–1.3 mm, indumentum similar to vegetative parts; pedicels (below bracteoles; "peduncle" of some authors) up to 1.5 mm long; bracteoles narrowly ovate or oblong, asymmetrical, midrib curved, deeply concave, coriaceous, 9–11 × 3–4 mm, connate proximally for up to 2.7 mm, apex attenuate to acute, pale green, cream-brown when dry, venation reticulate, prominent, dark green or maroon, indumentum adaxially sparsely strigose with scattered very small subsessile or short-stalked glandular trichomes, abaxially similar to vegetative parts but scattered, trichomes larger, ca. 2–3 times as large, with very few dendritic trichomes or dendritic ones absent, scattered very small subsessile or short-stalked glandular trichomes in addition, margin lanate towards apex, cystoliths visible adaxially, linear to oblong. *Calyx* ca. 8.5 mm long including basal tube of ca. 2 mm deep, lobes 4, regular, narrowly triangular, lanceolate when flattened, acute, unequal, 5.7–6.5 mm long, anticous lobe distinctly bifid, notch 1.3 mm deep; strigose both sides, scattered short-stalked glandular trichomes in addition abaxially, margin with irregular simple trichomes towards apex. *Corolla* with narrow unexpanded portion of tube cylindrical, laterally slightly flattened, ca. 14 mm long with lobes straightened, narrow portion ca. 7 mm long, ca. 2.8 mm diam., expanded portion at a slight angle to anterior side of narrow portion, ca. 2.6 mm long, corolla exserted part (from bracteole pair) outside burgundy-white, strigose-puberulous, included part white, glabrous, corolla anticous part inside towards mouth puberulous and with few patent long stiff white simple trichomes, inside otherwise glabrous, anterior lobe obovate or elliptic, ca. 5.8 × 4.2 mm, patent to recurved, lateral lobes oblong or narrowly obovate, ca. 5.7 × 2.6 mm, patent to recurved, upper lobes oblong or narrowly elliptic, ca. 5.3 × 2.1 mm, in plane of tube axis or sub-erect, connate for ca. 40% of their length, usually slightly overlapping, all lobes with margins entire, apices widely retuse, lobes discolorous, adaxially burgundy, abaxially paler or tawny-burgundy, anterior lobe adaxially with two ensiform yellow nectar guides, lobes glabrous adaxially except for few long stiff white simple trichomes towards bases, abaxially strigose-puberulous; palate slightly prominently transversely 3-ribbed, yellow. *Stamens* didynamous, inserted dorsally in throat, fused portion ca. 1.1 mm long, puberulous, free parts slightly tapering towards apex, with small, stalked glandular trichomes, long filaments ca. 3.7 mm long, short filaments ca. 2.1 mm long, outer filament with basal ridge from point of insertion on corolla ("trace") decurrent to ca. 4.4 mm from base of tube, puberulous; filament curtain reduced (*sensu* terminology of Manktelow 2000); anthers 2-thecous, thecae oblong, equal, ca. 1.9 mm long excluding short basal spur, burgundy with scattered small stalked glandular trichomes and a few simple ones. *Gynoecium* ca. 10.3 mm long; ovary ovoid, laterally compressed, ca. 1.7 × 1.6 mm, inserted in fleshy disc, glabrous; style filiform, ca. 8.6 mm long with widely spaced small simple trichomes, stigma lobes linear, unequal, longer lobe ca.1.1 mm long, shorter lobe ca. 0.4 mm long; ovules ovoid, ca. 0.8 mm long. *Capsule* flattened ellipsoid, ca. 5 × 4 mm, tawny, glossy, glabrous; seeds cordate, ca. 3.7 × 2.9 mm, densely covered with white hygroscopic trichomes.

Phenology:—Flowers and fruit have been recorded in May and June.

Distribution and habitat:—At present, *Petalidium engoense* is only known from the western edge of the Great Escarpment zone (Fig. 4). In Namibia it is recorded from the hilly area on the southern side of the Engo Valley, a paleao-glacial valley near the eastern boundary of the Skeleton Coast National Park in northwestern Namibia. The valley is traversed by the ephemeral Engo River (alternative names Ondusengo, Ensengo, Ondondudjengo), a shallow, indistinct drainage line that disappears well before reaching the coast (Coetzee 2021). In Angola it is recorded from the Iona National Park, near Espinheira.

Petalidium engoense occurs at the base of boulders on arid hillsides and along a drainage line at elevations of 430–590 m a.s.l., 38–64 km inland from the Atlantic Ocean. Average annual rainfall in the area is less than 100 mm and falls mainly in summer (Atlas of Namibia Team 2022, Mendelsohn & Huntley 2023). In certain parts of the Namib Desert, fog from the Atlantic Ocean is a regular and vital source of moisture, particularly for smaller animals (Mitchell *et al.* 2020). Although the area in the distribution range of *P. engoense* experiences fog about 5–10% of the year (Atlas of Namibia Team 2022), the fact that several dead plants were observed suggests that they may not benefit significantly from this moisture source. Despite this, the live plants appeared healthy.

FIGURE 1. *Petalidium engoense*. Habitat and habit. **A.** Several plants growing among rocks along a seasonal drainage line in the Engo Valley, Kunene Region, Namibia. **B.** A mature plant (ca. 800 mm tall) displaying a densely branched structure with greyish green foliage. Photographs by W. Swanepoel.

FIGURE 2. *Petalidium engoense*. Habit, vegetative and reproductive features. **A.** Woody stem with fissured bark at the base of a mature plant. **B.** Flowering shoot with semi-succulent leaves, which are covered in matted, greyish white indumentum and typically ca. folded upward along the midrib for their full length. **C.** Portion of a plant showing an open flower along with several old inflorescences; the inflorescence axes usually persist and have become spiny with age. Photographs by W. Swanepoel.

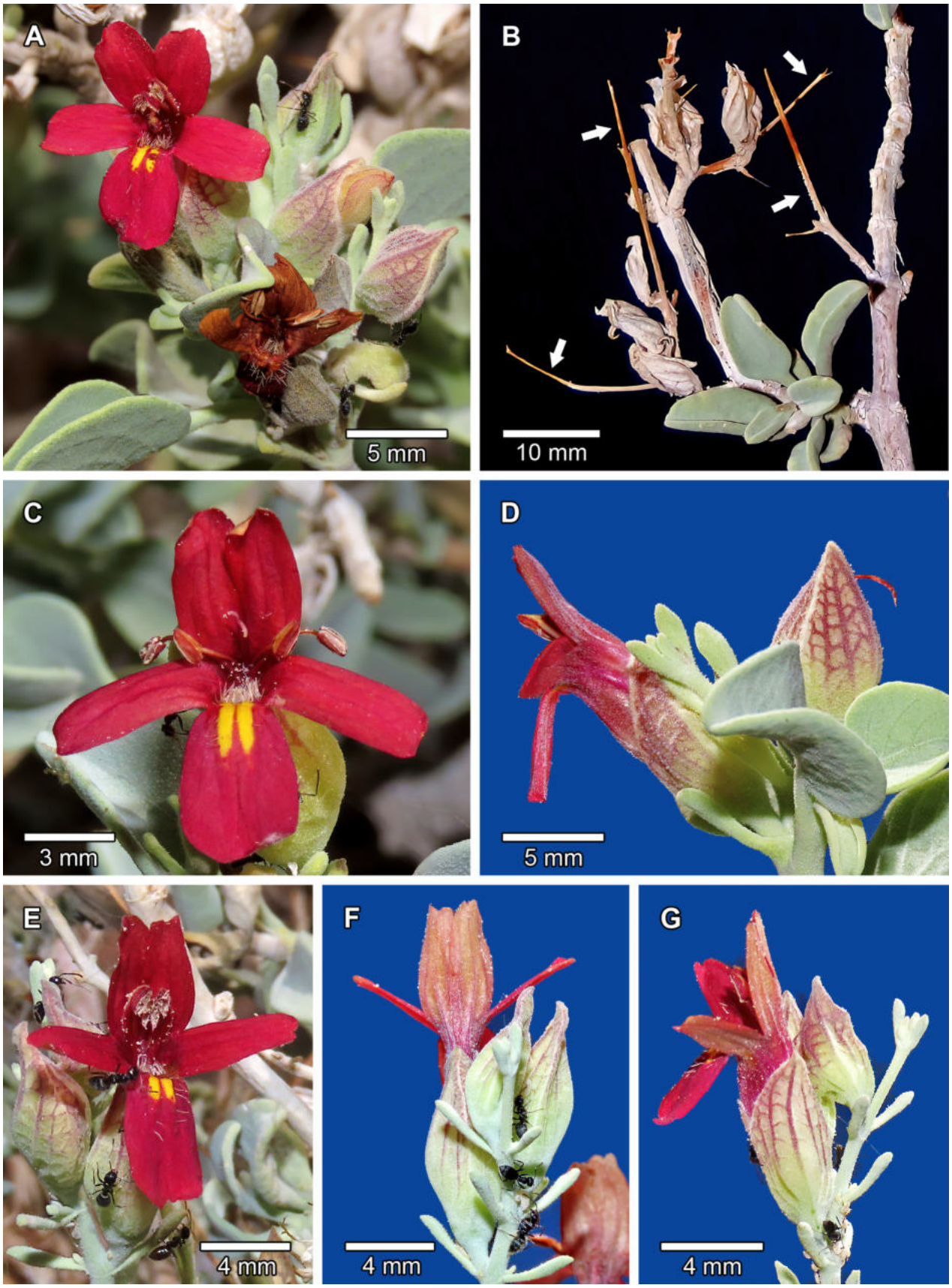

FIGURE 3. *Petalidium engoense*. Morphology of inflorescences and flowers. **A.** Distal part of a shoot showing both an open flower and a faded, brownish one, along with several bracteoles. **B**. Old inflorescences with dried, shriveled bracteoles and persistent axes that have become spiny (indicated by arrows). **C, E.** Frontal view of a flower showing uniformly coloured corolla lobes; the anterior lobe with two yellow, ensiform nectar guides. Visiting ants were feeding on scale insect larvae. **D, G.** Flower and bracteoles in lateral view. **F.** Flower with bracteoles, viewed from above. Photographs by W. Swanepoel.

Conservation status:—*Petalidium engoense* has been recorded at only two localities where it is locally common. About 90 plants were counted of which several seem to have recently died presumably due to the prolonged drought in the area. Although a brief search at various other localities with seemingly suitable habitat did not reveal any plants, it is probably more widespread than currently known. *Petalidium engoense* is here provisionally ranked as Critically Endangered (CR) B2ab(v) (IUCN 2012).

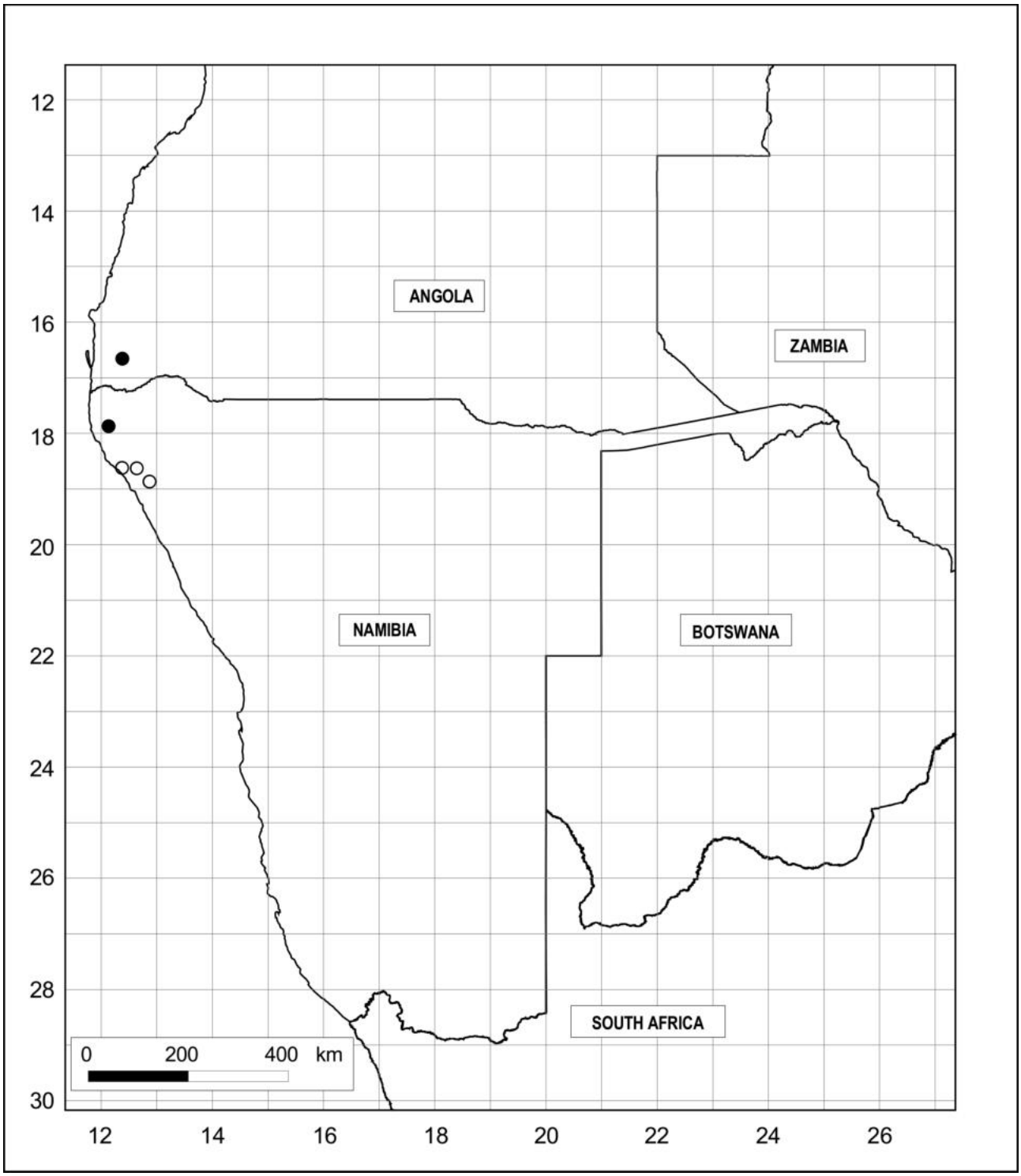

FIGURE 4. Known distribution of *Petalidium engoense* (black dots) and *P. namibense* (open circles). Based on herbarium specimens in Herbs. LUBA, PRE, PRU, and WIND, and as cited by Swanepoel & Van Wyk (2024).

Etymology:—The specific epithet refers to the Engo Valley in the Namib Desert, which is the type locality. The Namib Desert in its broadest definition, stretches along the Atlantic Ocean from Saõ Nicolau (Bentiaba) in Angola through Namibia to the Olifants River in South Africa (Seely 2004, Goudie & Viles 2015).

Notes:—*Petalidium engoense* is morphologically most similar to *P. namibense* (for distribution see Fig. 4), perhaps its closest relative. Hence these two species were compared in the diagnoses above. Some of the morphological features to distinguish between *P. engoense* and *P. namibense* are provided in Table 1.

TABLE 1. Morphological differences between *Petalidium engoense* and *P. namibense*.

Character	*P. engoense*	*P. namibense*
Bark on older stems	Not corky	Corky
Indumentum (vegetative parts)	Appearing matted, consisting of very small subsessile or short-stalked bifurcate, trifurcate, stellulate and bottlebrush-like dendritic trichomes, all with relatively short tapering branches	Appearing lanate, trichomes short-stalked glandular and dendritic, dendritic ones sparsely branched or bottlebrush-like, branches longer, acerose, leaves with bifurcate trichomes in addition
Leaves (shape)	Ovate or elliptic, usually conduplicate or sub-conduplicate [over entire length], recurved	Ovate, elliptic, suborbicular or orbicular, flat or often sub-conduplicate [only towards apex], not recurved
Leaves (succulence)	Semi-succulent	Not succulent
Leaves (size) (mm)	Up to 18 × 12	Up to 42 × 26
Inflorescence (axis)	Becoming spiny with age	Not spiny
Bracteoles (indumentum, abaxially)	Similar to vegetative parts, but trichomes scattered, larger (ca. 2–3 times), bottlebrush-like dendritic trichomes widely spaced or absent, with scattered very small subsessile or short-stalked glandular trichomes in addition	Similar to vegetative parts, appearing lanate, but trichomes longer and more robust
Calyx (length) (mm)	Ca. 8.5	5.9–6.5
Corolla upper lobes (shape, orientation, fusion, and size) (mm)	Oblong or narrowly elliptic, in plane of tube axis or sub-erect, connate for ca. 40% of their length, ca. 5.3 × 2.1	Rectangular (obovate when flattened), patent, connate for 25–40% of their length, 4.9–5.2 × 2.9–3.2
Corolla lateral lobes (shape, orientation, and size) (mm)	Oblong or narrowly obovate, patent to recurved, ca. 5.7 × 2.6	Rectangular, patent, 4.0–4.9 × 2.6–3.5
Corolla anterior lobe (shape, orientation, and size) (mm)	Obovate or elliptic, patent to recurved, ca. 5.8 × 4.2	Obovate, patent, 5.0–5.7 × 4.7–5.5
Corolla lobes (colour, adaxially)	Burgundy	Anterior magenta; upper vermillion; laterals vermillion or distally magenta, grading to vermillion towards throat
Corolla nectar guides (anterior lobe) (shape)	Ensiform	Narrowly triangular
Corolla nectar guides (upper and lateral lobes)	Absent	Present
Corolla (indumentum, outside)	Exserted part (from bracteole pair) strigose-puberulous including lobes abaxially	Glabrous, including lobes abaxially, sometimes exserted part (from bracteole pair) sparingly puberulous on posterior side
Distribution	Namibia: Engo Valley, east of the Skeleton Coast National Park Angola: Iona National Park near Espinheira	Northwest, west and southwest of Puros to the Skeleton Coast National Park including the lower Hoanib River

The new species is unlikely to be confused with other species of *Petalidium* from the wider area of distribution that have dense indumentum and similar inflorescences. These include *P. hoarusibense* Swanepoel & Van Wyk (2025a: 2), *P. kaokoense* Swanepoel (2020: 237), *P. ohopohense* Meyer (1973: 108), *P. physaloides* Moore (1880: 225), *P.*

rossmannianum Meyer (1961: 68), and *P. welwitschii* Moore (1880: 227), as the new species differs in having a very fine indumentum and semi-succulent, conduplicate, recurved leaves. All the mentioned taxa are from the group composed of plants with irregular, four-parted calyces (Obermeijer 1936, Tripp *et al*. 2017).

The corollas of *P. engoense* and a number of other species are morphological similar; however *P. engoense* can be differentiated from *P. hoarusibense* by the small (not visible to the naked eye) scattered trichomes abaxially on the bracteoles (*vs*. indumentum on bracteoles relatively long, up to 2.5 mm [visible to the naked eye], appearing cobwebby) and the ensiform yellow nectar guides on the anterior lobe (*vs*. nectar guides narrowly triangular); from *P. kaokoense* by the very small sessile or short-stalked bifurcate, trifurcate, stellulate, and bottlebrush-like dendritic trichomes on younger distal stems (*vs*. trichomes robust, consisting of multicellular dendritic and stalked glandular trichomes), the semi-succulent leaves (*vs*. leaves not succulent), and the indumentum abaxially on the bracteoles consisting of small scattered trichomes (trichomes similar to those on younger distal stems but larger, with in addition densely scattered very small subsessile or short-stalked glandular ones, bottlebrush-like dendritic trichomes often absent) (*vs*. indumentum matted, trichomes longer, up to 0.5 mm, with in addition more robust, longer, up to 2 mm, multi-cellular dendritic trichomes [visible to the naked eye]); from *P. physaloides* by the bark on older distal stems peeling longitudinally in narrow strips (*vs*. bark not peeling), the relatively short inflorescence axis (up to 40 mm long) (*vs*. axis relatively long [up to 310 mm]), the bracteoles connate proximally for 25%–30% their length (*vs*. connate for ca. 50%), and the ensiform nectar guides on the anterior lobe (*vs*. nectar guides narrowly triangular).

An anonymous reviewer of an earlier draft raised pertinent questions about whether ecophysiological stress might account for morphological variation within *Petalidium*. Given the close floral resemblance between *P. engoense* and *P. kaokoense*, the reviewer asked whether *P. engoense* might represent a population of stunted *P. kaokoense* plants from a more arid environment. We considered this possibility, but based on current knowledge of phenotypic plasticity in these and related species, we conclude that the observed differences between *P. engoense* and *P. kaokoense* (or any of the other species with similar flowers) are not environmentally induced. It is therefore appropriate to summarise what is known about phenotypic plasticity in *Petalidium* in response to environmental variation.

Extensive field observations by one of us (WS) have shown that *Petalidium* species flower primarily on new growth. During drought, when no new shoots develop, flowering ceases. In some cases, plants may flower again in the next season if good rainfall was received in the previous one, but this secondary flowering tends to be limited. Consequently, flowering material collected from different plants is generally comparable, as all would have developed under favourable moisture conditions.

Leaf size tends to increase somewhat in unusually wet years, whereas the density of the indumentum becomes higher during relatively dry periods (see Swanepoel & Van Wyk 2025b). Leaf texture or succulence, however, shows no phenotypic plasticity; thus, the semi-succulent leaves of *P. engoense* cannot be attributed to environmental influence.

Flower size varies among individuals of the same species, and even within a single plant, but this variation appears unrelated to moisture or other obvious environmental factors. Similarly, plant age has little influence on morphology, except that inflorescences may elongate over time as additional flowers are produced, or the axis may become spiny with age—features that are diagnostic in certain species.

Traits that show apparent genetic variation within populations include flower colour, corolla lobe shape, trichome type and density. Nevertheless, despite some infraspecific variation, trichome complement (and its infraspecific variation patterns) on vegetative parts and bracteoles remains consistent and is diagnostic at the species level. Likewise, corolla tube form (straight or curved) is stable. Reliable diagnostic features include the size, shape, texture, and indumentum of the bracteoles, as well as the size and shape of the distinctive yellow nectar guides on the front corolla lobes. Habit is also generally constant within species, although some exhibit both prostrate and erect forms.

Additional specimen examined (paratype):—ANGOLA, Namibe Province: Iona National Park, rocky outcrop, 5.5 km from Espinheira along track to Pediva, 1612CB, 439 m, 20 June 2025, *Swanepoel 686* (LUBA!, PRU!).

Acknowledgements

We would like to thank Dr Hester Steyn, SANBI, for preparing the distribution map. The curator and staff of the National Herbarium of Namibia (WIND), National Herbarium of South Africa (PRE), and H.G.W.J. Schweickerdt Herbarium (PRU) are thanked for their assistance during visits to the herbarium. The constructive comments of two anonymous reviewers are greatly appreciated. The first author is especially grateful to his wife, Hannelie, for assistance and support during field trips. He also acknowledges the financial support received from the Ongava Research Centre

through the project *Endemism, conservation priorities, and banking of genetic material in the highlands of Namibia*. We further thank the University of Pretoria for financial assistance and the use of its facilities.

References

Atlas of Namibia Team. (2022) *Atlas of Namibia: its land, water and life*. Namibia Nature Foundation, Windhoek, 390 pp.

Beentje, H. (2016) *The Kew plant glossary: an illustrated dictionary of plant terms*, 2nd ed. Kew Publishing, Kew, 184 pp.

Coetzee, M.E. (2021) *Geomorphological features of the Skeleton Coast National Park*. Report prepared for the SCIONA Project, Windhoek, 76 pp.

Craven, P. (2009) *Phytogeographic study of the Kaokoveld Centre of Endemism*. Ph.D. Thesis. University of Stellenbosch, Stellenbosch, 234 pp. [https://hdl.handle.net/10019.1/1325]

Darbyshire, I., Kiel, C.A., Astroth, C.M., Dexter, K.G., Chase, F.M. & Tripp, E.A. (2020) Phylogenomic study of *Monechma* reveals two divergent plant lineages of ecological importance in the African savanna and succulent biomes. *Diversity* 12 (6): a237. [25 pp.] https://doi.org/10.3390/d12060237

Dexter, K.G., Swanepoel, W., Loiseau, O., Darbyshire, I., Nanyeni, L., Gonçalves, F.M., Chase, F. & Manzitto-Tripp, E.A. (2023) High endemism of the genus *Petalidium* (Acanthaceae) in the highlands and escarpments of Angola and Namibia. *Namibian Journal of Environment* 8: 135–147. https://doi.org/10.64640/dr0jnh96

Edwards, D. & Leistner, O.A. (1971) A degree reference system for citing biological records in southern Africa. *Mitteilungen der Botanischen Staatssammlung München* 10: 501–509. [https://www.biodiversitylibrary.org/page/15185301#page/509/mode/1up]

Figueiredo, E. & Smith, G.F. (2008) *Plants of Angola/Plantas de Angola*. Strelitzia 22. South African National Biodiversity Institute, Pretoria, 279 pp. [https://www.sanbi.org/documents/plants-of-angola-strelitzia-22/]

Germishuizen, G. & Meyer, N.L. (Eds.) (2003) *Plants of southern Africa: an annotated checklist*. Strelitzia 14. National Botanical Institute, Pretoria, 1231 pp.

Goudie, A. & Viles, H. (2015) *Landscapes and land forms of Namibia*. Springer, Dordrecht, 173 pp. https://doi.org/10.1007/978-94-017-8020-9

Hewson, H.J. (2019) *Plant indumentum: a handbook of terminology*, revised ed. Australian Biological Resources Study, Commonwealth Department of the Environment and Energy, Australia, 47 pp.

IUCN. (2012) *IUCN red list categories and criteria*: Version 3.1. 2nd ed. Gland, Switzerland and Cambridge U.K., iv + 32 pp.

Loiseau, O., Manzitto-Tripp, E.A., Swanepoel, W. & Dexter, K.G. (2023) Net diversification rates of the woody plant genus *Petalidium* (Acanthaceae) are highest in the ancient and arid Namib Desert. *Frontiers in Ecology and Evolution* 11: 1–10. https://doi.org/10.3389/fevo.2023.1193728

Manktelow, M. (2000) The filament curtain: a structure important to systematics and pollination biology in the Acanthaceae. *Botanical Journal of the Linnean Society* 133 (2): 129–160. https://doi.org/10.1006/bojl.1999.0309

Mendelsohn, J.M. & Huntley, B.J. (2023) Introducing the highlands and escarpments of Angola and Namibia. *Namibian Journal of Environment* 8: 7–22. https://doi.org/10.64640/espy7q72

Meyer, P.G. (1961) Beiträge zur kenntnis der Acanthaceen Südwestafrikas (III). *Mitteilungen der Botanischen Staatssammlung München* 4: 59–72. [https://www.biodiversitylibrary.org/item/52384#page/747/mode/1up]

Meyer, P.G. (1973) Neue und enig bekannte Acanthaceen aus dem Kaokoveld (Südwestafrika). *Mitteilungen der Botanischen Staatssammlung München* 11: 101–113. [https://www.biodiversitylibrary.org/item/51768#page/111/mode/1up]

Mitchell, D., Henschel, J.R., Hetem, R.S., Wassenaar, T.D., Strauss, W.M., Hanrahan, S.A. & Seely, M.K. (2020) Fog and fauna of the Namib Desert: past and future. *Ecosphere* 11 (1): e02996. [40 pp.] https://doi.org/10.1002/ecs2.2996

Moore, S. (1880) Enumeratio Acanthacearum Herbarii Welwitschiani Angolensis. *Journal of Botany, British and Foreign* 18: 225–233. [https://www.biodiversitylibrary.org/item/108761#page/236/mode/1up]

Nees von Esenbeck, C.G. (1832) Acanthaceae India Orientalis. *In*: Wallich, N. (Ed.) *Plantae Asiaticae rariores: or descriptions and figures of a select number of unpublished East Indian plants,* Vol. 3. Treuttel & Würtz, London, pp. 70–117. [https://www.biodiversitylibrary.org/item/9716#page/172/mode/1up]

Obermeijer, A.A. (1936) The South African species of *Petalidium. Annals of the Transvaal Museum* 18: 151–162.

Seely, M. (2004) *The Namib: natural history of an ancient desert*. Desert Research Foundation of Namibia, Windhoek, 110 pp.

Swanepoel, W. (2020) *Petalidium kaokoense* (Acanthaceae), a new species from Namibia. *Phytotaxa* 468 (3): 236–242. https://doi.org/10.11646/phytotaxa.468.3.1

Swanepoel, W., Dexter, K.G., Adamo, M., Manzitto-Tripp, E.A. & Van Wyk, A.E. (2025) *Petalidium saxatile* (Acanthaceae), a new species from Namibia. *Phytotaxa* 716 (3): 161–174. https://doi.org/10.11646/phytotaxa.716.3.1

Swanepoel, W., Dexter, K.G., Loiseau, O. & Van Wyk, A.E. (2023) Reinstatement of the name *Petalidium ovatum* (Acanthaceae), with an amplified description of the species. *Phytotaxa* 626 (3): 159–169. https://doi.org/10.11646/phytotaxa.626.3.2

Swanepoel, W. & Manzitto-Tripp, E. (2022) *Petalidium sesfonteinense* (Acanthaceae), a new species from the Kaokoveld, Namibia. *Phytotaxa* 549 (2): 127–135. https://doi.org/10.11646/phytotaxa.549.2.1

Swanepoel, W., Manzitto-Tripp, E.A., Dexter, K.G. & Van Wyk, A.E. (2024) *Petalidium etendekaense* (Acanthaceae), a new species from Namibia, with notes on the taxonomic identity of *P. glutinosum. Phytotaxa* 636 (1): 35–47. https://doi.org/10.11646/phytotaxa.636.1.3

Swanepoel, W., Nanyeni, L. & Van Wyk, A.E. (2022) *Petalidium mannheimerae* (Acanthaceae), a new species from Namibia and South Africa, with notes on the taxonomic identity of *P. parvifolium. Phytotaxa* 561 (1): 1–13. https://doi.org/10.11646/phytotaxa.561.1.1

Swanepoel, W. & Van Wyk, A.E. (2023a) *Petalidium konkiepense* (Acanthaceae), a new species from Namibia. *Phytotaxa* 585 (1): 29–38. https://doi.org/10.11646/phytotaxa.585.1.3

Swanepoel, W. & Van Wyk, A.E. (2023b) *Petalidium karasbergense* (Acanthaceae), a new species from Namibia. *Phytotaxa* 609 (1): 1–9. https://doi.org/10.11646/phytotaxa.609.1.1

Swanepoel, W. & Van Wyk, A.E. (2024) *Petalidium namibense* (Acanthaceae), a new species from Namibia. *Phytotaxa* 671 (2): 128–138. https://doi.org/10.11646/phytotaxa.671.2.2

Swanepoel, W. & Van Wyk, A.E. (2025a) *Petalidium hoarusibense* (Acanthaceae), a new species from Namibia. *Phytotaxa* 681 (1): 1–10. https://doi.org/10.11646/phytotaxa.681.1.1

Swanepoel, W. & Van Wyk, A.E. (2025b) *Petalidium sebrabergense* (Acanthaceae), a new species from Namibia. *Phytotaxa* 728 (1): 17–30. https://doi.org/10.11646/phytotaxa.728.1.2

Thiers, B. (2025) *Index Herbariorum: A global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium. Available from http://sweetgum.nybg.org/ih/ (accessed May 2025)

Tripp, E.A. & Dexter, K.G. (2012) Taxonomic novelties in Namibian *Ruellia* (Acanthaceae). *Systematic Botany* 37 (4): 1023–1030. https://doi.org/10.1600/036364412X656509

Tripp, E.A., Tsai, Y.E., Zhuang, Y. & Dexter, K.G. (2017) RADseq dataset with 90% missing data fully resolves recent radiation of *Petalidium* (Acanthaceae) in the ultra-arid deserts of Namibia. *Ecology and Evolution* 7 (19): 1–17. https://doi.org/10.1002/ece3.3274

Van Wyk, A.E. & Smith, G.F. (2001) *Regions of floristic endemism in southern Africa: a review with emphasis on succulents*. Umdaus Press, Hatfield, Pretoria, 199 pp.