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Premna sebrabergensis (Lamiaceae, Premnoideae), a new species from Angola and Namibia

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Abstract

Premna sebrabergensis, hitherto misidentified in herbaria as *Volkameria glabra* (= *Clerodendrum glabrum*), is here described as a new species. It is a range-restricted species, only known from the Zebra Mountains in the Kaokoveld Centre of Endemism, in northwestern Namibia and southwestern Angola. It grows primarily in soils derived from anorthosite and gabbro of the Kunene Igneous Complex. Diagnostic characters for *P. sebrabergensis* include the pale green or yellow-green appearance of the plants, vegetative parts with an indumentum of simple antrorse-directed white trichomes and yellow glandular peltate scales, leaves usually ovate, often with elongated acuminate apex and flowers in paniculately arranged cymes. Based on IUCN Red List criteria, a provisional conservation assessment of Endangered (EN) is recommended for the new species.

Key words: anorthosite, Cunene Province, endemism, flora, Kaokoveld Centre of Endemism, Kunene Region, taxonomy, ultramafic rocks, Zebra Mountains

Introduction

Currently, ca. 130 described species of *Premna* Linnaeus (1771: 154) are recognised worldwide (Christenhusz *et al*. 2017, POWO 2025) with four in Angola and two in the *Flora of southern Africa* region, the latter which includes South Africa, Namibia, Botswana, Eswatini, and Lesotho (Germishuizen & Meyer 2003, Figueiredo & Smith 2008). In the present contribution a new species of *Premna* is described. This new entity is restricted to the Zebra Mountains in 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). The Zebra Mountains are notable for being one of the largest known outcrops of anorthosite, with associated mafic-ultramafic rock types, on Earth (Maier *et al.* 2013). Soils derived from mafic-ultramafic rocks are typically rich in heavy metals, which are often linked to high levels of plant endemism (Siebert *et al.* 2001, Van Wyk & Smith 2001, Adhikari *et al.* 2022). A further important centre of endemism, especially for Lamiaceae, is the Mediterranean Basin (Ben Mahmoud *et al.* 2024, Perrino *et al.* 2024).

During a botanical expedition to the northwestern Namibian part of the Zebra Mountains in May 2012, two of us (EvJ and WS) encountered a single-stemmed small tree with pale green or yellow-green leaves and cream- or green-white flowers in paniculately arranged cymes. The plants were in flower and fruit enabling material to be collected and the plants to be identified as a member of *Premna*. During subsequent expeditions to the Zebra Mountains in both Angola and Namibia more plants at different localities in both countries were found. The new species may be mistaken for *Premna senensis* Klotzsch (1861: 263), the only other member of the genus occurring in Namibia, as well as for

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P. sulphurea Gürke (1903: 292) from Angola. It shares several morphological features with these species, particularly in its habit, indumentum, leaves, and flowers. A study of the Lamiaceae holdings in the Herbs PRE, PRU and WIND revealed one earlier collection (*Hoffman LH875* in WIND) of the new species, filed under *Clerodendrum glabrum* Meyer (1838: 273), a species alternatively known as *Volkameria glabra* (E.Mey.) Mabb. & Y.W.Yuan in Yuan *et al.* (2010: 132).

In recent years, the Zebra Mountains have been recognised as a distinct subcentre of plant endemism within the Kaokoveld Centre. Over the past nine years, at least three new endemic woody species have been described from this mountain complex: *Maerua sebrabergensis* Swanepoel (2015: 123), *Ocimum sebrabergensis* Swanepoel & Van Jaarsveld (2019: 204), and *Carissa sebrabergensis* Van Jaarsveld *et al*. (2021: 150).

Methods

Morphological descriptions and ecological information presented here are based primarily on field observations and material collected following extensive field work in southern Africa, including Namibia and Angola. Diagnostic features of the new species were determined from the examination of fresh material, while those of *P. angolensis* Gürke (1893: 165)*, P. congolensis* Moldenke (1953: 180)*, P. polita* Hiern (1900: 832)*, P. sulphurea*, and *P. senensis* were established through the study of high-resolution images of type specimens 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), the University of Pretoria (PRU), and the Instituto Superior de Ciências de Educação da Huíla, Angola (LUBA) (herbarium codes follow Thiers 2025). A 6.5–45.0× magnification stereo microscope was used for studying morphological features. Descriptive terminology follows Beentje (2016) and Hewson (2019). 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 guidelines (IUCN 2012, IUCN Standards and Petitions Committee 2024), and the online GeoCAT tool (Bachman *et al.* 2011).

Taxonomic treatment

Premna sebrabergensis Swanepoel, Van Jaarsv. & A.E.van Wyk, *sp. nov.* (Figs 1–4)

Diagnosis:—A woody shrub or tree, morphologically resembling *Premna senensis* and *P. sulphurea*. It differs from *P. senensis* in being smaller, up to 3 m tall (*vs*. up to 6 m); indumentum on vegetative parts consisting of scattered simple trichomes, curved, antrorse, and minute yellow glandular scales (*vs*. spreading pilose, trichomes simple or multicellular, scales absent); leaves opposite (*vs*. opposite or 3-whorled), lamina ovate, rarely elliptic, attenuate to acuminate or acute towards apex (*vs*. ovate, oblong or obovate to suborbicular, rounded or acuminate); inflorescences paniculately arranged cymes (*vs*. open corymbs), indumentum similar to vegetative parts with straight simple trichomes in addition (*vs*. pubescent, lacking scales); calyx distinctly 5-lobed (*vs*. distinctly to obsoletely 4-lobed); corolla tube shorter than calyx [two thirds the length] (*vs*. longer [ca. twice as long]), corolla lobes puberulous abaxially (*vs*. glabrous); stamens not exceeding corolla lobes (*vs*. exceeding), filaments 1.1–1.3 mm long (*vs*. longer, ca. 3.5 mm). It differs from *P. sulphurea* in having the indumentum on vegetative parts consisting of white antrorsely-directed, simple trichomes, and minute, yellow, glandular scales (*vs.* tawny stellate tomentose trichomes); lamina narrowly to broadly ovate, rarely elliptic (*vs*. oblong or obovate-oblong), shorter, 10–78 mm long (*vs.* 75–150 mm); calyx lobes acute (*vs*. rounded or obtuse); corolla cream-white or green-white (*vs*. sulphur-yellow or whitish violet); stamens inserted near throat of corolla tube (*vs*. below the middle).

Type:—NAMIBIA. Kunene Region: Zebra Mountains, ca. 2.5 km from Etemba along track to Enyandi, amongst boulders, 1713BA, 740 m a.s.l., 27 April 2025, *Swanepoel 661* (holotype WIND!; isotypes LUBA!, PRE!, PRU!).

Woody shrub or small tree up to 3 m tall; all vegetative parts with scattered to dense, white, curved, antrorsely-directed, simple trichomes, and minute, yellow, glandular scales; crushed leaves with no distinctive scent. *Stems* single or multi-stemmed from just below or above ground level, cylindrical; bark longitudinally ridged, fissured on older stems, grey-brown; branches furrowed, sometimes peeling in filiform strips; older branches dark brown with tawny lenticels; young branches green, becoming light brown. *Leaves* thin, soft, opposite and decussate; petiole slender,

terete, slightly grooved, 4–25 mm long; lamina narrowly to broadly ovate, rarely elliptic, usually attenuate to acuminate towards apex, apex obtuse or acute, base cuneate, flat to conduplicate, (10–)30–40(–78) × (4–)15–20(–37) mm, green to yellow-green (due to yellow scales), slightly discolorous, margins entire, often undulate, or especially on long shoots coarsely dentate or crenate-dentate, midrib and 3–7 principal lateral veins each side prominently raised abaxially, simple trichomes rarely almost absent adaxially. *Inflorescences* terminal with flowers in cymes paniculately arranged, up to 50 mm long; bracts and bracteoles narrowly triangular, bracts up to 2.5 mm long, bracteoles up to 1 mm long, indumentum similar to vegetative parts but with straight simple trichomes usually in addition. *Flowers* hermaphrodite; pedicels up to 3 mm long. *Calyx* with indumentum abaxially similar to vegetative parts, adaxially glabrous; tube cupuliform, 2-lipped, 2.1–2.3 mm long, ca. 1.4 mm diam., fruiting calyx somewhat enlarged, cupuliform, prominently reticulately nerved; lobes 5, distinct, narrowly triangular to triangular, 0.5– 0.9 mm long, the 2 lobes on anterior side slightly longer than the 3 lobes on posterior side. *Corolla* cream-white or green-white, 2-lipped, not-aromatic when crushed; tube cylindric, ca. 2.1 mm long, 1.3 mm diam., glabrous, villous inside near throat, trichomes white, sub-moniliform (visible in fresh material), shorter than stamens; lips puberulous towards apex abaxially, margins entire or irregularly crenulate, posterior lip emarginate, ovate or suborbicular, ca. 1.8 × 1.5 mm, ciliate, sub-cucullate, erect, forming a hood over anthers; anterior lip 3-lobed, lobes on specific flower all similar or polymorphic, oblong, ovate, elliptic or triangular, spreading, 1.3–1.6 × 0.8–1.0 mm, median one largest. *Stamens* didynamous, inserted near throat of corolla tube, exserted ca. 1 mm; filaments tapering, short filament ca. 1.1 mm long, long filament ca. 1.3 mm long; anthers dorsifixed, reniform, ca. 0.3 × 0.5 mm, pale to dark brown or orange, thecae elliptic, divergent. *Gynoecium* ca. 4 mm long; ovary ovoid or globose, 0.9–1.1 × 0.8–1.0 mm diam., with dense globose glands towards apex and subtended by a brownish tissue (nectary/disc?) at the base (Figs 4F & 4G), 4-locular with 1 ovule per loculus; ovules narrowly ovoid, ca. 0.5 mm long; style filiform, ca. 3 mm long, equal to or slightly exceeding stamens, stigma shortly 2-fid with minute papillae. *Fruit* drupaceous, obovoid or globose when mature, ca. 5 mm diam., mesocarp including exocarp thin, fleshy, black, endocarp broadly obovoid, saccate-like (*sensu* Satthaphorn *et al.* 2025).

Phenology:—Flowers and fruit have been recorded from April to June (late summer to winter).

Distribution and habitat:—Currently, *Premna sebrabergensis* is only known from four localities in the Kaokoveld Centre of Endemism, southwestern Angola and northwestern Namibia, specifically in the Zebra Mountains of Namibia and its continuation in Angola (Fig. 5). It typically inhabits plains and hillsides, primarily thriving in clay soils derived from the Kunene Igneous Complex, which includes dark leucotroctolite, olivine-bearing anorthosite, dunite, gabbro and norite (Miller *et al.* 1980, Maier *et al.* 2013). The species is found at elevations ranging from 870 to 925 m a.s.l., ca. 165–225 km inland from the Atlantic Ocean. The region receives an average annual rainfall of 250 to 350 mm, mainly during the summer months (Atlas of Namibia Team 2022). However, it is possible that the species has a wider distribution within the Zebra Mountains, as many areas remain difficult to access.

Conservation status:—*Premna sebrabergensis* has been recorded at only four localities where it is rare to locally common. 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 (see under 'Distribution and habitat' above). The extent of occurrence (EOO) has been calculated as 1012 km² and the area of occupancy (AOO) as 20 km², based on a cell width of 2 km as recommended by the IUCN Standards and Petitions Committee (2024). Due to its limited geographical range (AOO <500 km²), with only four known localities and habitat under pressure from prolonged drought conditions, *Premna sebrabergensis* is here provisionally assessed as Endangered EN B2a,b(iii) (IUCN 2012).

Etymology:—The specific epithet refers to the Zebra Mountains, known as *Sebraberge* in Afrikaans, located in northwestern Namibia and southwestern Angola, where *Premna sebrabergensis* is exclusively found.

Notes:—*Premna sebrabergensis* has been confused with *Volkameria glabra* in the herbarium. However, apart from being from a different genus, it can be differentiated from the latter by the indumentum (presence of yellow scales, the latter retaining their colour in herbarium specimens [*vs*. scales whitish, but turning blackish upon drying to give the leaves a punctate appearance]), leaves opposite (*vs*. usually 3-whorled, occasionally opposite), lamina usually attenuate to acuminate towards apex (*vs*. acute or obtuse), corolla tube ca. as long as the calyx tube, ca. 2.2 mm (*vs*. 2–4 times as long, 4–8 mm), corolla lobes much shorter, posterior lobe (lip) erect, forming a hood over stamens, 1.3–1.8 mm long (*vs*. lobes spreading i.e. not hood-forming, 3–4 mm long), stamens pale green, barely exserted from corolla tube, ca. 1 mm long (*vs*. mauve or lilac, long exserted, 5–7 mm) and the fruit which is black when mature, smaller, ca. 5 mm diam. (*vs*. cream, 6–10 mm diam).

It is unlikely that the new species will be confused with any of the other species of *Premna* in Angola: *Premna angolensis* has the leaves ternate, quaternate or opposite (*vs*. opposite), the calyx truncate or scarcely lobed (*vs*. distinctly triangular lobed); indumentum on vegetative parts of *P. congolensis* lacks scales (*vs*. scales present), the inflorescence is corymbiform (*vs*. flowers in cymes paniculately arranged), the corolla tube is ca. double the size (ca. 4 mm long) (*vs*.

ca. 2.1 mm); *P. polita* has the inflorescence umbellate-corymbose (*vs.* flowers in cymes paniculately arranged) and the fruit glandular-puberulous all over (*vs.* with sparsely scattered minute globose glands towards apex).

FIGURE 1. *Premna sebrabergensis*, habitat and habit. **A.** Multi-stemmed shrub (ca. 2.5 m high) with yellowish green foliage, growing in clay soil next to a leucotroctolite outcrop of the Kunene Igneous Complex. **B.** Sprawling shrub (rising ca. 1.5 m above the rock surface), rooted in a fissure among leucotroctolite rocks in the Zebra Mountains, Namibia. Photographs by W. Swanepoel.

FIGURE 2. *Premna sebrabergensis*, habit and morphology of stems and bark. **A.** Young stem with dense indumentum of curved, antrorsely-directed simple trichomes. **B.** Relatively thin stem showing bark with alternating dark and pale, ca. longitudinal ridges. **C.** Bark pattern on a mature stem ca. 150 mm in diameter. **D.** Multi-stemmed base of a mature plant growing among boulders. Photographs by W. Swanepoel.

Additional specimens examined (paratypes):—ANGOLA, Cunene Province:—1613: Serra Cuio, 25 km southeast of Oncocua along track to Chitado, 870 m, (–DC), 3 May 2015, *Swanepoel 659* (LUBA!, PRU!); Serra Uanguembela, 32 km east-southeast of Oncocua along track to Chitado, 917 m, (–DD), 25 April 2016, *Swanepoel 660* (LUBA!, PRU!).

NAMIBIA, Kunene Region:—1713: On rocky outcrop near baobab, 925 m, (–AD), 10 March 2003, *Hoffman LH875* (WIND!); Zebra Mountains, valley ca. 6 km south of Ombuku, 880 m, (–AD), 27 May 2012, *Swanepoel & Van Jaarsveld 657* (WIND!); Zebra Mountains, valley ca. 7 km south of Ombuku, 890 m, (–AD), 6 May 2013, *Swanepoel 658* (WIND!).

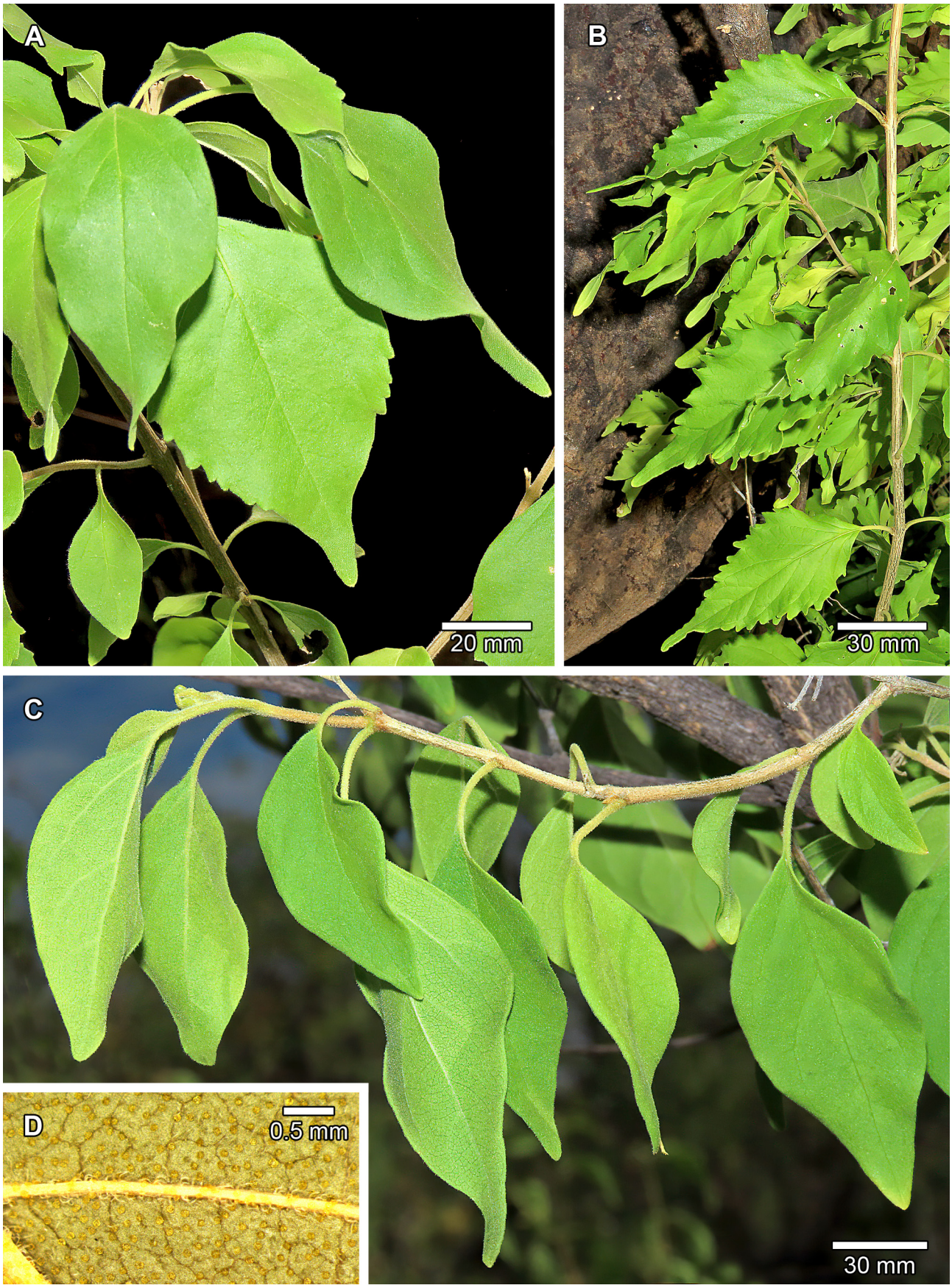

FIGURE 3. *Premna sebrabergensis*, morphology of leaves. **A.** Shoot bearing leaves with a mix of entire and dentate margins. **B.** Shoot with leaves that are mostly dentate. **C.** Shoot with all leaves having entire margins. **D.** Enlarged adaxial leaf surface of dried leaf, showing numerous yellowish glands (scales). Photographs by W. Swanepoel (A, B & C) and A.E. van Wyk (D).

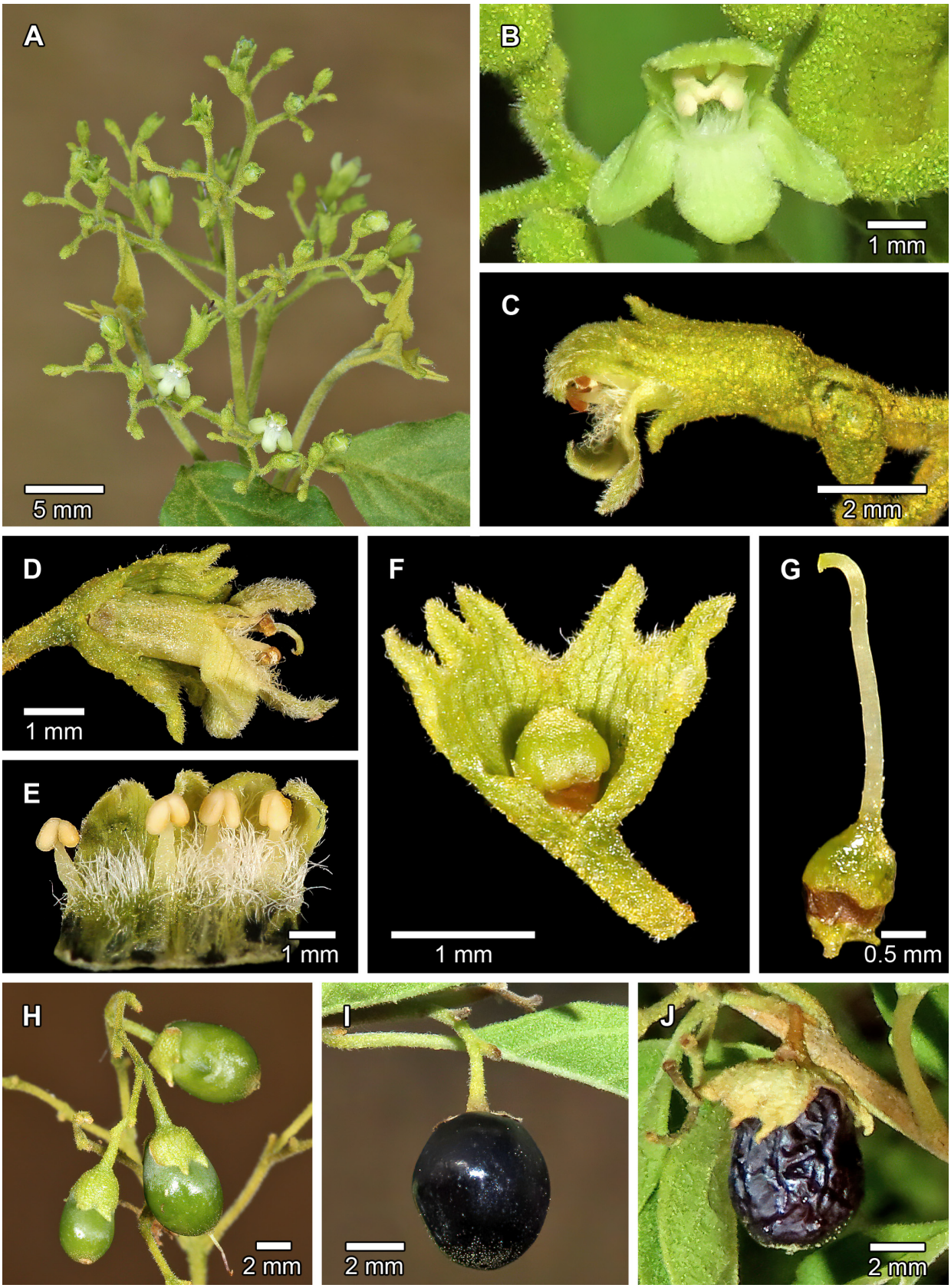

FIGURE 4. *Premna sebrabergensis*, morphology of inflorescences and flowers. **A.** Inflorescence. **B.** Flower viewed from the front. **C.** Flower viewed from the side. **D.** Side view of flower with the front portion of the calyx removed to reveal the corolla tube. **E.** Corolla opened out to display the stamens. **F.** Calyx opened out to expose the ovary subtended by a zone of brownish tissue (nectary/disc?); corolla and style removed. Note the dense, globular glands near the apex. **G.** Gynoecium; note brownish zone at base (nectary/disc?). **H.** Developing fruit. **I.** Mature, drupaceous fruit. **J.** Old, partly shriveled mature fruit; note the persistent calyx. Photographs by W. Swanepoel.

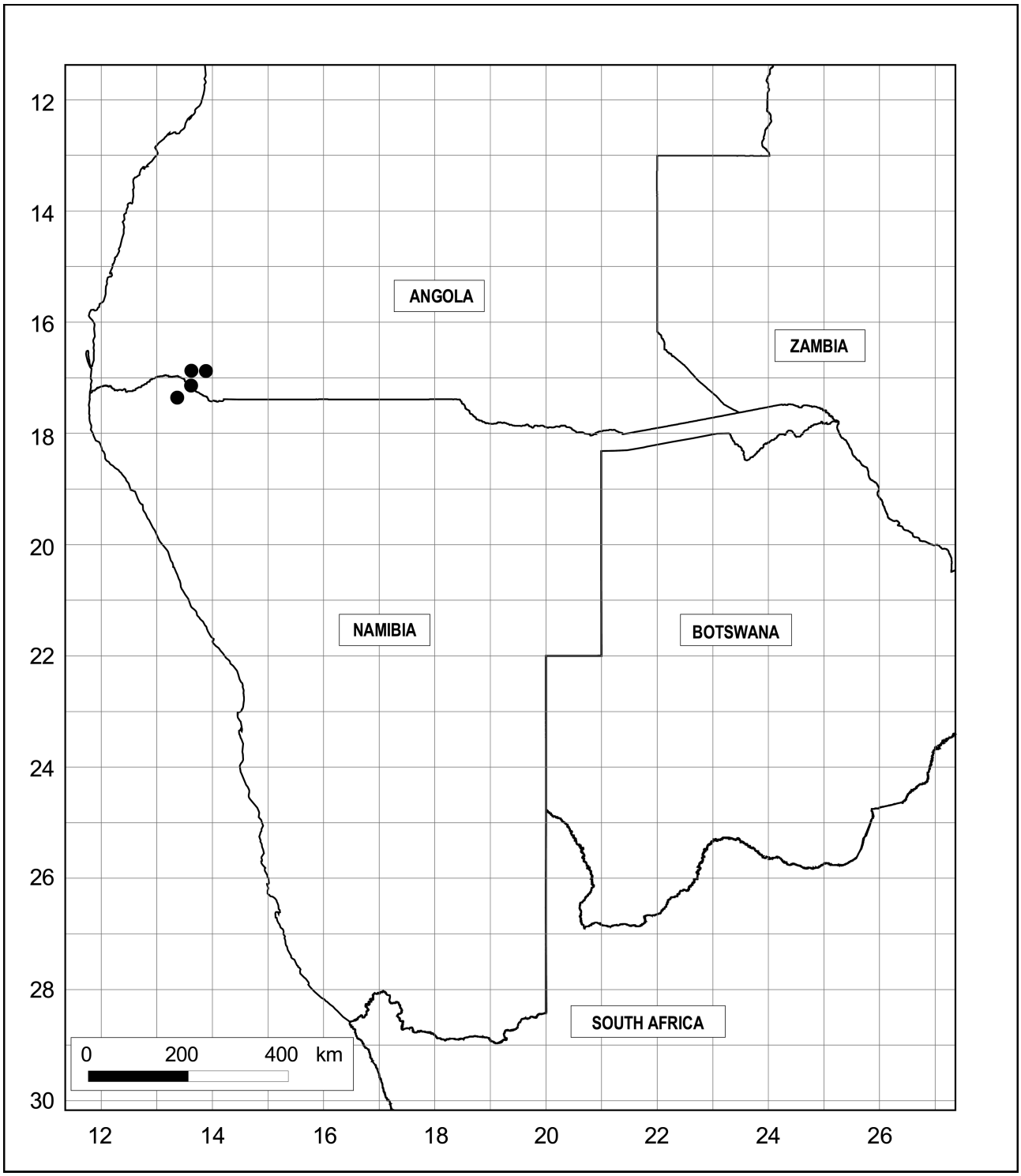

FIGURE 5. Known distribution of *Premna sebrabergensis* (black dots). Based on herbarium specimens in Herbs LUBA, PRE, PRU, and WIND.

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