

Short communication

A new species of *Polemanniopsis* (Apiaceae) from Namibia

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Abstract

A new species of woody Apiaceae, *Polemanniopsis namibensis* B-E. Van Wyk, A. Burke & C. Mannheimer, is described. The species is allied to *Polemanniopsis marlothii* but differs in the much smaller habit of (up to 0.6 m vs 1.5–4 m in *Polemanniopsis marlothii*), the white or greyish colour of the twigs (brown in *Polemanniopsis marlothii*), the 3-foliolate leaves (predominantly 5-foliolate in *Polemanniopsis marlothii*), the smaller inflorescences with persistent involucre bracts (caducous in *Polemanniopsis marlothii*) and anatomical details of the leaves. The species is endemic to Namibia and is known only from a localised area in the southern Namib desert near Lüderitz, where it is relatively common.

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1. Introduction

Polemanniopsis B.L.Burt (1989) was erected to accommodate the single species *Polemanna marlothii* H. Wolff but which differed from other members of the genus in its regularly toothed leaves lacking an intramarginal vein and in its distinctive fruits. *Polemanniopsis marlothii* (H. Wolff) B.L.Burt is unusual in being a large woody shrub, up to 4 m high, with hysteranthous, five-digitate leaves and heteromericarpic, winged fruits with large cavities in the wings. It is endemic to the South African winter–rainfall region, where it has a disjunct distribution in the Cedarberg and mountainous Richtersveld (Burt, 1989). The full significance of its unusual character states only became apparent when molecular systematic studies by Downie and Katz-Downie (1999) and Downie et al. (2001) showed that *Polemanniopsis* is sister group to another woody African genus *Steganotaenia* Hochst. Van Wyk (2001) and Liu et al. (2003) pointed out the morphological similarities between *Polemanniopsis* and *Steganotaenia* and the similarities in the ontogenetic development of the fruit (Liu et al., 2004). The isolated position of the two genera was emphasised by Calviño et al. (2006) and by Calviño and

Downie (2007), who described a new tribe, the Steganotaeniae, to accommodate them. The new tribe is associated with the subfamily Saniculoideae (Calviño and Downie, 2007) and with several other basally divergent lineages, recently referred to as “protoapioids” (Magee et al., in prep.).

The new species described here has been known since 1977, when it was first collected by Prof H. Merxmüller (University of München) and Mr J.W.H. Giess (Windhoek Herbarium), and cultivated in the Botanic Garden at Munich in Germany (under the number *Merxmüller 32623*). The plant is not mentioned in the Flora of Namibia (Schreiber, 1967) but Burt (1991) listed it as “*Polemanniopsis* sp.?” in his review of southern African Apiaceae, including a photograph taken in the Munich Botanic Garden. None of the flowers on the plant were fertile and fruits remained unknown, so that the correct generic position of the plant could not be established but Burt (1991) proposed that “some affinity with *Polemanniopsis* seems possible”.

Recent botanical collecting in the restricted Diamond Area of southern Namibia (the so-called Sperrgebiet) revealed the presence of large numbers of plants of the species in two main populations. In 2007, special efforts were made to collect fertile material, which confirmed the true identity of the species as a second member of the genus *Polemanniopsis*. Three decades after the plant was first discovered, we are now able to report on the salient morphological and anatomical features of the new species.

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2. Species treatment

Polemanniopsis namibensis B.-E. Van Wyk, A. Burke & C. Mannheimer, sp. nov., *Polemanniopsis marlothii* similis sed habitu minori usque ad 0.6 m (non supra 1.5 m), cortice alba (in *Polemanniopsis marlothii* rubrobrunnea) et foliis trifoliolatis (in *Polemanniopsis marlothii* plerumque 5-foliolatis) differt.

Type.—Namibia, Karas district, Sperrgebiet, ±20 km south of Rotkop gate [2615CD], 6 April 2007, *Burke 7002* (WIND, holo.).

Multi-stemmed, woody, summer-deciduous shrublet, 0.3 (–0.6)m high, glabrous. Roots thick and fleshy, several metres long. *Branches* thick, smooth, greyish white to white, sparsely leafy with short internodes. *Leaves* crowded at branch ends, hysteranthous, digitately (1) 3 (5)-foliolate; petiole up to 40 mm long, somewhat fleshy, sheathing at base; leaflets sessile, obovate-cuneate to semi-orbicular, up to 30×25 mm, base cuneate, apex rounded to irregularly lobed, margin serrate to crenate, each tooth minutely mucronate but not aristate. *Umbels*

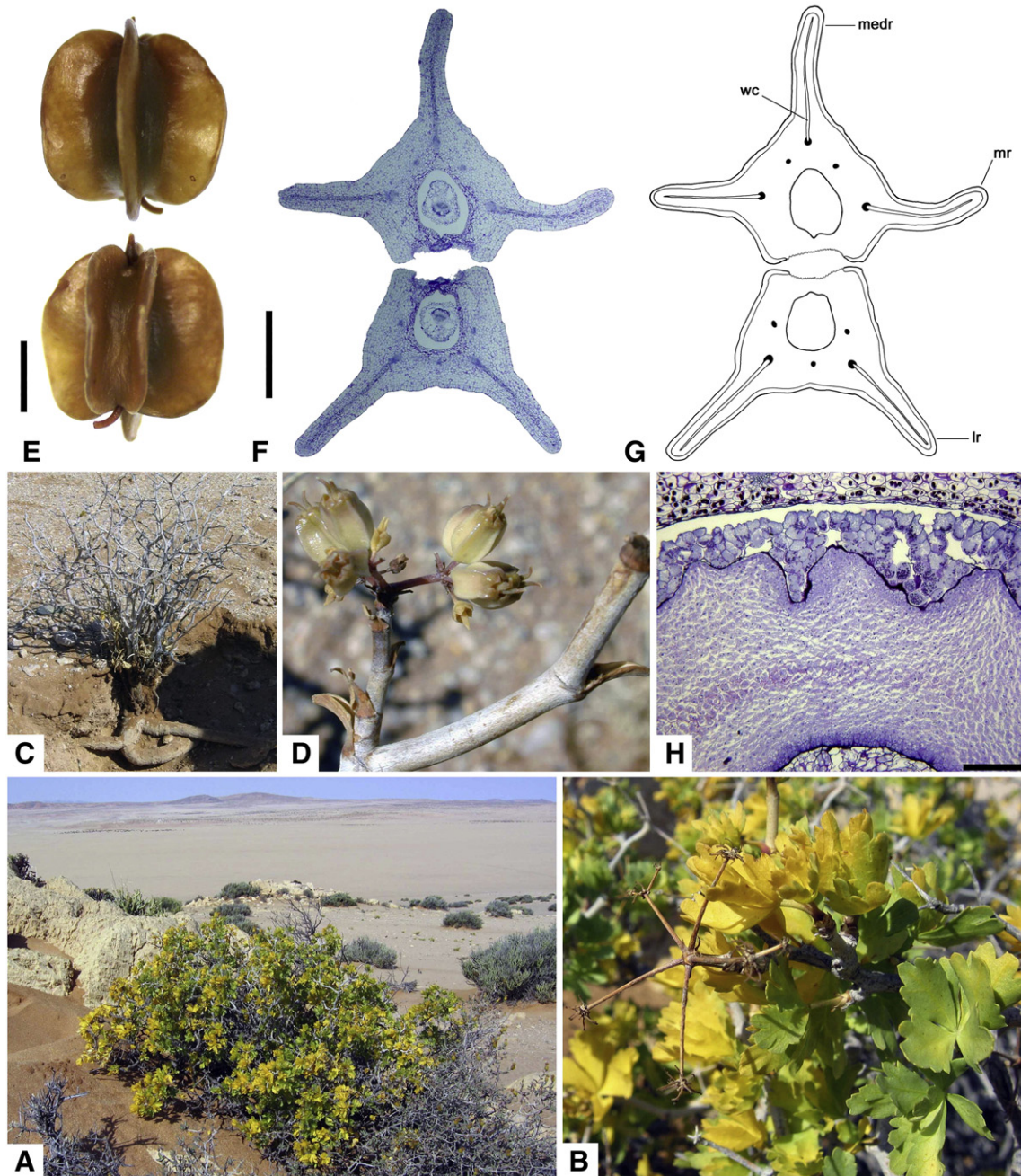


Fig. 1. Morphology of *P. namibensis*. (A) habit (note the habitat); (B) leaves and old inflorescence; (C) habit, showing much-branched stems and thick roots; (D) stem with young fruits (note the smooth white bark and persistent bracts); (E) fruit surfaces in dorsal view, to show both the 3-winged (upper) and two-winged (lower) mericarps (F) transverse section of a young fruit; the 3-winged mericarp has the median (medr) and marginal (mr) ribs prominently winged while the 2-winged mericarp has only the lateral (lr) ribs winged; note the large cavities or slits (wc) in the wings. Scale bars: (E) 5 mm; (F) 1 mm. Voucher specimens: (D–H) A. Burke 7002 (WIND). (Photographs: A, B and C taken by C. Mannheimer; D by A. Burke; E, F and H by A.R. Magee.

compound, usually solitary and terminal, relatively small, ± 70 mm diam., peduncle often very short; rays few, 3–5, short, divergent; pedicels very short, ± 3 mm long. *Bracts* persistent; those on peduncle broad, triangular, sheathing; involucral bracts narrowly lanceolate; involucel bracts similar but smaller. *Flowers* few, bisexual or some male, ± 2 mm diam. *Calyx lobes* persistent, triangular, acute, small. *Petals* yellow flushed with red, obovate, petal apex only slightly narrowed, tip truncate, inflexed. *Stamens* 5, unequal in length. *Fruits* orbicular to shortly oblong, ± 10 mm long, 5-winged, glabrous, aromatic; mericarps heteromorphic, the one 2-winged, the other 3-winged; commissure very narrow. *Carpophore* bifid. *Ribs* very prominent, broadly winged, wings 3 mm wide, hollow. *Rib oil ducts* absent but represented by large hollows (slits), solitary in each wing. *Seeds* apparently not heteromorphic, rugose, grooved on commissural surface, endosperm ruminant. *Vittae* absent. (Fig. 1).

3. Diagnostic characters

The new species can be distinguished from *Polemanniopsis marlothii* by the much smaller habit (Fig. 1A, C), usually ± 0.3 m high but up to 0.6 m (more than 1.5 m and up to 4 m in *Polemanniopsis marlothii*) and also by the white bark on the twigs

(Fig. 1D) (reddish brown in *Polemanniopsis marlothii*). The leaves (Fig. 1B) are mostly 3-foliolate (rarely 5-foliolate) and strictly digitate, with mucronulate marginal teeth. The leaves in *Polemanniopsis marlothii* are predominantly 5-foliolate, and either digitate or inconspicuously pinnate (i.e., with a very short leaf rachis), and the marginal teeth are aristate. Another obvious difference is the smaller size of the compound umbels, with only about four to five short rays vs the nine to 20 or more rays that is typical for *Polemanniopsis marlothii*, and both the rays and pedicels are much longer. Involucral bracts and bracteoles are strongly caducous in *Polemanniopsis marlothii* (Burt, 1989) but are persistent in *P. namibensis*. The fruits (Fig. 1E–G) are very similar to those of *Polemanniopsis marlothii* although they appear to be a little smaller. They have the characteristic heteromorphic mericarps with hollow wings, typical of the genus: the one 3-winged, the other 2-winged (Burt, 1989). In *Polemanniopsis marlothii*, the smaller 2-winged mericarps often produce a much smaller seed than the 3-winged mericarps but in *P. namibensis* the two seeds appear to be equal in size from the small number of fruits available. Burt (1989) reported the presence of ruminant seeds in *Polemanniopsis*, apparently a first record for Apiaceae (but a common feature in Araliaceae) and this is confirmed in *P. namibensis* (Fig. 1H).

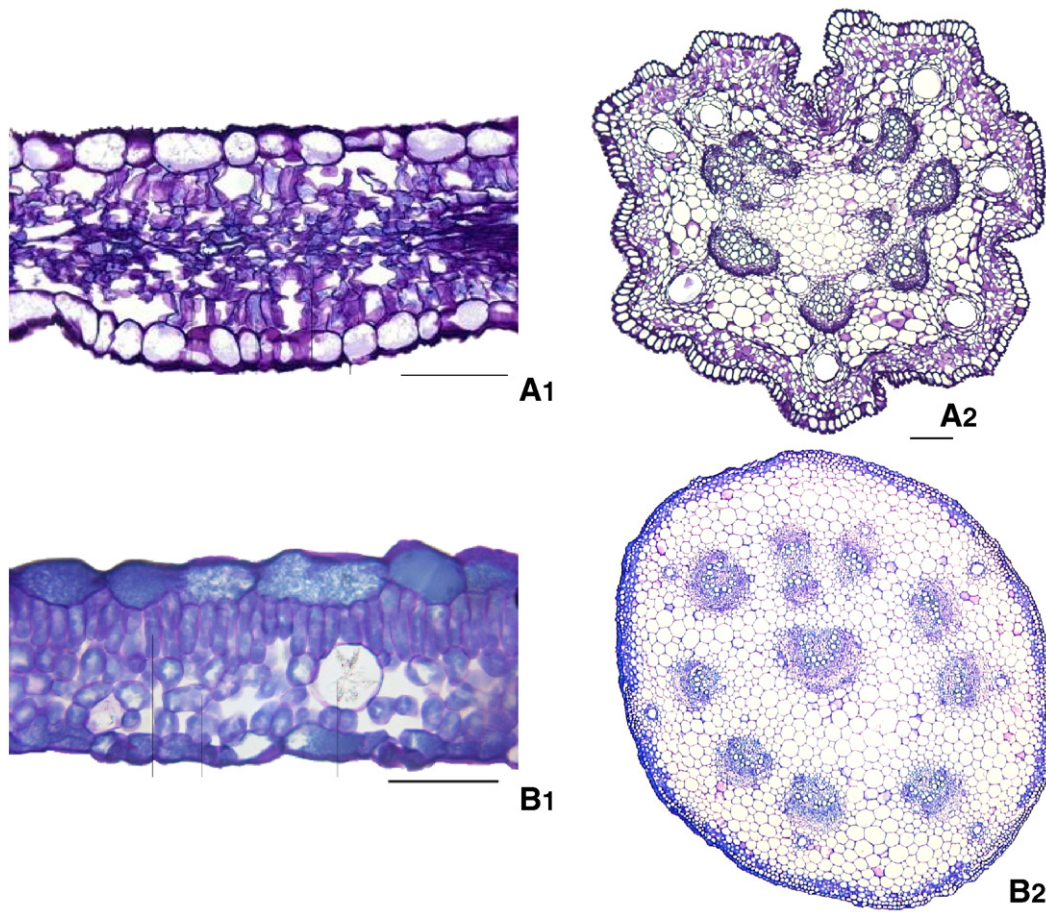


Fig. 2. Leaf anatomy in transverse section of *P. namibensis* (A) and *Polemanniopsis marlothii* (B). (A1) leaflet lamina of *P. namibensis*; (A2) petiole of *Polemanniopsis namibensis*; (B1) leaflet lamina of *Polemanniopsis marlothii*; (B2) petiole of *Polemanniopsis marlothii*. Scale bars: (A1, A2) 0.1 mm; (B1) 0.1 mm; (B2) 0.7 mm. Voucher specimens: (A1, A2) C. Mannheimer 2769 (WIND); (B1, B2) P.J.D. Winter 84 (JRAU).

There are additional differences between the two species in leaf anatomy (Fig. 2). The epidermal surface is minutely striate in *P. namibensis* (Fig. 2A) while it is smooth in *Polemanniopsis marlothii* (Fig. 2B). The epidermal cells are very small and isodiametric to periclinally elongated in *Polemanniopsis marlothii* but larger and isodiametric to periclinally or anticlinally elongated in *P. namibensis*. Tanniferous deposits are present in the epidermal cells of *Polemanniopsis marlothii* (Fig. 2B) but not *P. namibensis* (Fig. 2A). The leaves are dorsiventral (Fig. 2B1), with the mesophyll usually distinctly differentiated into palisade above and spongy parenchyma below (Rossouw, 2007), while in *Polemanniopsis marlothii*, the leaves are isobilateral (Fig. 2A1), with bifacial palisade parenchyma. The petioles differ markedly in the size of the epidermal cells and the secretory canals relative to the diameter of the petiole (relatively larger in *P. namibensis*) (Fig. 2A2, B2).

4. Distribution and habitat

P. namibensis is endemic to south-western Namibia, where it is known only from the Lüderitz district (Fig. 3). *Polemanniopsis marlothii* is restricted to South Africa, where it has a disjunct distribution in the Richtersveld in Northern Cape Province (not on the Namibian side of the border) and then

much further south in the Clanwilliam district of the Western Cape Province of South Africa (Fig. 3).

The new species grows in two distinct localities in the northern Sperrgebiet. One population occurs in the south-eastern part of a large, shallow drainage area associated with the ancient Kaukausib River (associated localities: 26° 57.9' S 15° 38.4' E, 26° 56.05' S 15° 36.2' E, 27° 00.16' S 15° 39.2' E). The habitat here is gravel plains, intersected by shallow drainage lines. The vegetation of the Kaukausib drainage area has been classified as dwarf shrubland, although perennial plant cover in this area is usually extremely scarce (Burke, 2006). However, after the exceptional rains of 2006 large parts of the Kaukausib area were covered with the grass *Stipagrostis ciliata*, which was also dominant at the locality of *Polemanniopsis*.

The second locality is further west on a gently undulating area of gneiss ridges (associated localities: 26° 50.95' S 15° 22.25' E, 26° 51.78' S 15° 22.3' E, 26° 50.12' S 15° 21.88' E). The plants grow on foot-slopes and plains surrounding these ridges as well as on south- to east-facing aspects of gentle slopes. The vegetation is classified as Bushman candle plain dwarf shrubland and *Salsola* dwarf shrubland (Burke, 2006). *Monsonia patersonii* (Geraniaceae), *Salsola* species (Amaranthaceae) and *Stipagrostis ciliata* (Poaceae) are the dominant plants at this locality.

The soils at both localities are poorly developed eutric regosols.

5. Flowering time and phenology

During 2006 the northern Sperrgebiet received more than five times the long-term average rainfall per annum which is approximately 17 mm at Lüderitz. Over the period January–September 2006, 95 mm were recorded in a rain gauge at Grillental, some 20 km south of one of the populations of the plant (T. Cooper, pers. comm. to A. Burke). Although the two populations of *P. namibensis* are positioned in a transitional area between winter and summer rainfall in southern Africa, most plants respond to winter rains and are active during the cold months of the year (June–October). This is also the case for *Polemanniopsis marlothii*, which produces leaves and grows vegetatively during winter. However, reproductive growth seems to be restricted to the late summer months of March and April. Because of the plant's bi-seasonal habit, reproductive material to describe the species was hence only obtained recently. To establish whether reproduction was triggered by the exceptionally good rains in this area and is thus a rare event, or whether reproduction had not been observed previously, requires longer-term observations. However, even in response to the exceptional season of 2006, only about 20% of the plants showed signs of reproductive growth (13 of 62 plants counted in the western population). *Polemanniopsis marlothii* also has a markedly bi-seasonal phenology, with vegetative growth during the rainy season in winter (May–November), and flowering and fruiting during the dry summer and autumn months. Flowering starts in December and the fruits ripen during January or February.

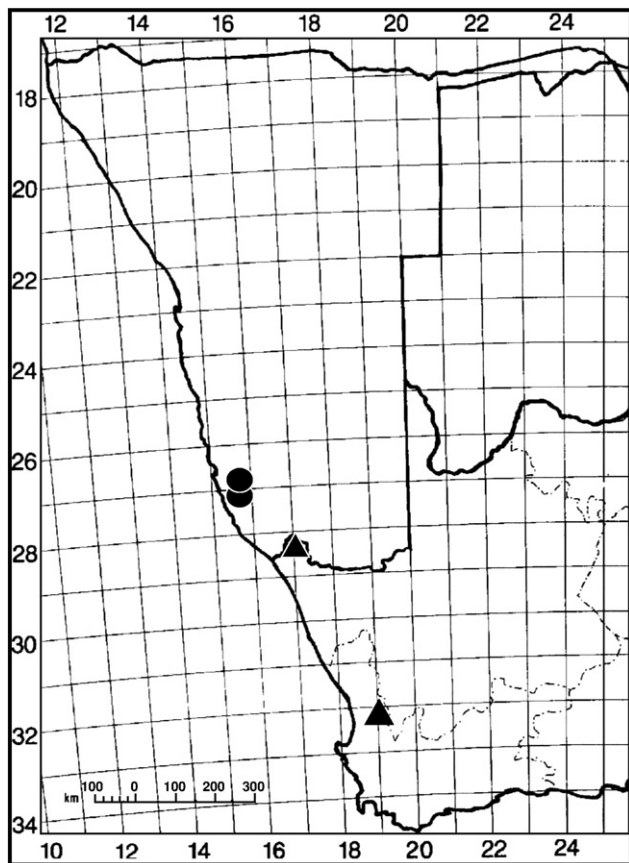


Fig. 3. The known geographical distributions of *P. namibensis* (circles) and *Polemanniopsis marlothii* (triangles).

5.1. Additional specimens examined

- 2615 (Luderitz): Diamond Area No. 1, Sperrgebiet, south of Rotkuppe gate (–CD), 2 August 2001, Mannheimer 1391 (WIND); Road to Grillental from Kaukausib, Blue ridge (–DC), 5 September 2002, Mannheimer 2200 (WIND).
- 2715 (Bogenfels): Diamond Area 1: 9,5 km south of Grillental (–AB), Merxmüller & Giess 32010 (WIND); Diamond Area No. 1, en route from Tsabiams to Grillental (–BA), 5 September 2002, Bartsch, Loots & Mannheimer 1028 (WIND); Approach to Kaukausib Plain to south (–BA), 5 September 2002, Mannheimer 2195 (WIND); Sandy-gravel plain east of Kaukausib Fountain (–BA), 12 September 2005, Mannheimer 2769 (WIND, JRAU); Karas district, Sperrgebiet, Kaukausib Drainage (–BA), 3 March 2007, A. Burke 7001 (PRE).

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