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A new species and a revised record in Namibian *Barleria* (Acanthaceae)

Iain Darbyshire¹, Erin A. Tripp² & Kyle G. Dexter³

Summary. *Barleria grootbergensis* I. Darbysh. & E. A. Tripp is described from the Grootberg Pass in Kunene Region, Namibia. Its affinities within *Barleria* sect. *Somalia* are discussed. A second taxon, named as *Barleria galpinii* C. B. Clarke in the *Prodromus einer Flora von SüdwestAfrika*, is reassessed and found to be referable to *B. pseudosomalia* I. Darbysh., a species previously known only from central Tanzania. A revised checklist to the *Barleria* of Namibia is presented.

Key Words. Africa, checklist, conservation, Grootberg, section *Fissimura*, section *Somalia*, taxonomy.

Introduction

The genus *Barleria* L. (Acanthaceae: Acanthoideae: Barlerieae *sensu* McDade *et al.* 2008) comprises 250 – 300 species. It is largely palaeotropical in distribution, with centres of diversity in the dry woodlands, wooded grasslands and rocky terrain of eastern and southern Africa (Balkwill & Balkwill 1997, 1998; Darbyshire 2010). In Namibia, the genus was most recently treated by Meyer (1968) for the *Prodromus einer Flora von SüdwestAfrika*, where 22 species were recorded. Craven (1999), in her checklist of Namibian plants, added three further species: *B. ameliae* A. Meeuse, *B. megalosiphon* Mildbr. (= *B. capitata* Klotzsch) and *B. papillosa* T. Anderson. The former two were omitted from Meyer's account as they are restricted in Namibia to the Caprivi Strip and so fall outside the remit of the *Prodromus*. The latter is a rare species only recently recorded in Namibia (e.g. Kolberg & Tholkes HK1742, 22 Oct. 2005, Karasburg District; K!, WIND). Of these 25 species, 10 (40%) are either endemic or near-endemic to Namibia (Appendix 1). Such a high rate of endemism is not unusual for the genus in Africa, where many species are highly restricted in range and often rare (Balkwill & Balkwill 1998). Indeed, neighbouring Angola records over 50% endemism in *Barleria*.

Whilst conducting fieldwork in Namibia in March 2009, specifically targeting Acanthaceae, two of the authors (E. A. T. & K. G. D.) came across a distinctive *Barleria* in flower on scree near the Grootberg Pass. The specimen did not key out in Meyer's (1968) account and a thorough search across the genus

confirmed that it did not match any currently described species of *Barleria*. It was subsequently collected in fruit in August 2011 by E. A. T and K. G. D., together with H. Hasheela and L. Lanyeni of the National Botanical Research Institute of Namibia (NBRI). This species is formally described in the first section of this paper as *Barleria grootbergensis* I. Darbysh. & E. A. Tripp.

The second section of the paper corrects an identification error in Meyer's account of the Namibian *Barleria*. A disjunct population of the rare *B. pseudosomalia* I. Darbysh., previously thought endemic to Tanzania, is recorded in Namibia for the first time. A revised and annotated checklist to *Barleria* is presented in Appendix 1. The present research contributes to our ongoing revision of Acanthaceae in Namibia, in collaboration with E. Kwembeya at NBRI.

Materials & Methods

Herbarium specimens and, where available, photographs of living plants were studied using standard herbarium practices. As only a few mature flowers were available for *Barleria grootbergensis*, the measurements of corolla lobes, staminal filaments and staminoles are based on a single dissection. Prior to dissection, flowers were soaked in Aerosol OT 5% solution; all other measurements were made on dry material. Pollen and leaf material of the new taxon were studied using scanning electron microscopy (SEM). Structures were sputter coated with gold using

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a PELCO SC-7 Auto Sputter Coater and then examined using an International Scientific Instruments DS-130 / WB-6 SEM.

Terminology in the description largely follows that applied to *Barleria* in Balkwill & Balkwill (1997). The species conservation assessments follow the Categories and Criteria of IUCN (2001).

1. A new species in *Barleria* sect. *Somalia*

Barleria grootbergensis I. Darbysh. & E. A. Tripp sp. nov. resembling *B. lancifolia* T. Anderson but differing in the more congested, spiciform yellow-green inflorescences with the calyces largely hidden within the suberect bracts during anthesis; the longer bracteoles and the longer glandular inflorescence indumentum that is more dense on the bracts. Type: Namibia, W of Grootberg Pass, Tripp & Dexter 828 (holotype RSA; isotypes K!, NY!, WIND!).

<http://www.ipni.org/urn:lsid:ipni.org:names:77120498-1>

Shrub to 100 cm tall. *Mature stems* densely white-velutinous, the trichomes minute, declinate, interspersed with occasional longer appressed trichomes; uppermost internodes patent glandular-pubescent. *Leaves* ovate or lanceolate, 3.8 – 5.3 × 1.4 – 2 cm, base cuneate, apex acute or attenuate, lateral veins 4 pairs; leaf buds densely white-strigulose but mature leaves soon glabrescent except for sparse strigose trichomes along the margin, midrib and lateral veins beneath, some trichomes ‘anvil-shaped’ (i.e. biramous with one long arm and one short arm), uppermost leaf pairs also glandular-pubescent; cystoliths conspicuous on both surfaces without magnification, sessile glands visible on upper surfaces with magnification; petiole to 6 mm long. *Inflorescences* short dense terminal spikes 3.5 – 5 cm long, of a series of subsessile single-flowered opposite cymules; bracts, bracteoles and calyces pale yellow-green, densely glandular-pubescent throughout; bracts caducous in fruit, elliptic (excluding larger basal leaf-like pair), 18 – 22 × 5.5 – 8 mm, apex acute or subattenuate; bracteoles narrowly elliptic or oblanceolate-elliptic, 15.5 – 20 × 2.5 – 5 mm, held erect and ± equalling the calyx, apex acute. *Calyx* 4-lobed; abaxial lobe elliptic, 17 – 18.5 × 7 – 8 mm, base cuneate, apex shallowly notched for up to 2.5 mm, surface with 5 – 7 prominent subparallel veins; posticous lobe elliptic, 17.5 – 20 × 6.5 – 7 mm, apex acute or shortly attenuate; lateral lobes lanceolate, ± 11 × 2 mm, margin hyaline. *Corolla* pale purple with whitish throat and tube, 48 – 52 mm long, with sparse mixed glandular and eglandular trichomes on the lateral lobes externally; tube 25 – 28 mm long, unexpanded basal portion of the tube ± 3 – 4 mm in diam., gradually expanded above attachment point of

stamens to ± 6 – 6.5 mm in diam. at the mouth; lobes in ‘4 + 1’ arrangement, abaxial lobe offset by 9 mm from the remaining lobes, broadly obovate, 17.5 × 14.5 mm; lateral lobes elliptic-obovate, 17 × 13 mm; adaxial lobes elliptic-obovate, 18.5 × 9.5 mm. *Stamens* attached 7 mm from base of corolla tube; filaments 31 mm long, minutely pubescent at the base; anthers 4 mm long; lateral staminodes to 1.5 mm long, flattened and triangular, minutely pubescent, antherodes absent; adaxial staminode minute. *Pollen* trizonocolporate, globose in equatorial view, 3-lobed in polar view, with coarse deep reticulation of the interapertural and polar exine. *Ovary* 4 mm long, distal portion densely mixed glandular- and eglandular-puberulous; style 35 – 43 mm long, glabrous; stigma linear, 2.5 – 2.8 mm long, curved. *Capsule* 13 – 16 × 6 – 7 mm, including prominent beak 4 – 6 mm long, beaked portion covered with short glandular and/or eglandular trichomes, fertile portion glabrous; seeds c. 5 – 6 × 4 – 5 [very few seen], covered in non-mucilaginous, crisped hygroscopic trichomes. Figs 1 – 3.

DISTRIBUTION. NW Namibia; known only from the type locality.

SPECIMENS EXAMINED. NAMIBIA. Kunene Region (Kaokoland): just W of Grootberg Pass on [road] C40, 19°50'20.2"S, 14°07'12.5"W, fl. 22 March 2010, Tripp & Dexter 828 (holotype RSA; isotypes K, NY, WIND); same location, fr. 18 Aug. 2011, Tripp & Dexter (with Hasheela & Lanyeni) 1963 (CAS, K, MO, NY, RSA, US, WIND).

HABITAT. Growing on rocky slopes including loose scree close to the road; 1400 m alt.

CONSERVATION STATUS. This species is currently known from a single locality, where it is very localised. Less than 15 plants were seen in the vicinity; however we should note that population size was not assessed in an exhaustive manner. Based on current data, it is apparently highly restricted in its range, having not been collected previously despite being found along one of the main roads between the popular Skeleton Coast and Etosha Pan. However, much of the mountainous region to the north and south of the road over the Grootberg Pass is inaccessible by vehicle and has probably never been botanised. Satellite imagery available on Google Earth (http://www.google.co.uk/intl/en_uk/earth/index.html) suggests that there are extensive areas of potentially suitable habitat for *Barleria grootbergensis* in this region. Furthermore, there appears to be little threat to the only known population given that the area is generally not heavily travelled. The only habitation in the immediate vicinity is that of a small eco-lodge, which is owned and operated by the Grootberg Conservancy and thus unlikely to significantly impact the population in a negative manner. Whilst this species must currently be considered Data Defi-



Fig. 1. *Barleria grootbergensis* A habit; B mature stem indumentum, including fine detail; C inflorescence; D bract, with detail of indumentum; E bracteoles (positioned outer left and outer right) and dissected calyx with posticous lobe to the left; F dissected corolla with androecium; G anther; H pistil. From Tripp & Dexter 828. DRAWN BY JULIET WILLIAMSON.



Fig. 2. *Barleria grootbergensis* in the field: A, B flowering plants; C fruiting spike; D detail of fruits. PHOTOS BY E. TRIPP.

cient (DD) (IUCN 2001) pending further survey work, it may ultimately prove to be unthreatened.

NOTES. The minute white-velutinous indumentum on the mature stems, the densely glandular inflorescence indumentum and the general facies of the flowers place this species close to *Barleria lancifolia* T. Anderson, a species that is widespread and common in Namibia. *B. grootbergensis* is, however, easily separable from *B. lancifolia* by its dense terminal spikes with the calyces

largely hidden within the \pm erect yellow-green bracts and bracteoles, the latter subequal in length to the calyces. In *B. lancifolia*, the cymules are more distantly spaced along the axis, at least in the lower portion of the inflorescence where the bracts are foliaceous. The bracts in the upper portion of the inflorescence in *B. lancifolia* are greatly reduced and proportionally narrowed (though remaining green) and are more spreading than in *B. grootbergensis*. The

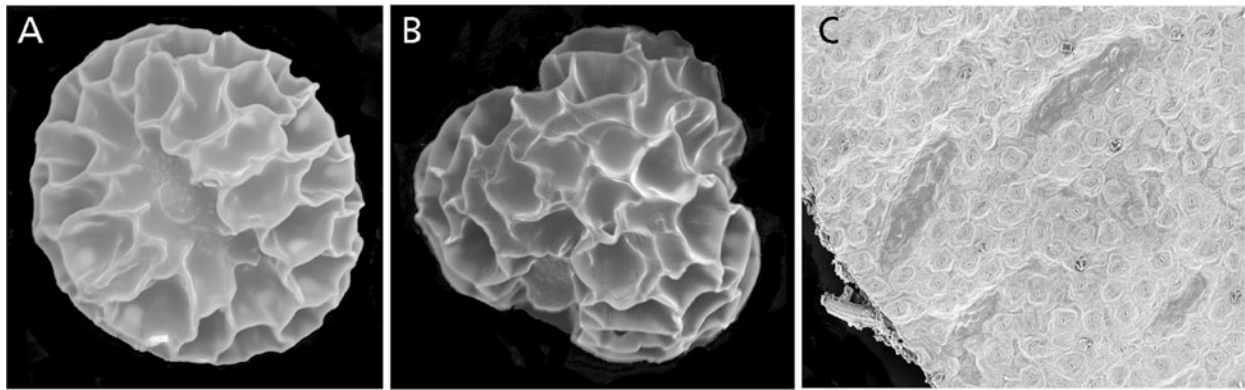


Fig. 3. SEM images of *Barleria grootbergensis*: **A** pollen, apertural view (taken at $\times 770$); **B** pollen, polar view (taken at $\times 770$); **C** adaxial leaf surface showing linear, subepidermal cystoliths, stomata, and sessile, patelliform glands (taken at $\times 100$). IMAGES BY E. TRIPP.

calyces of *B. lancifolia* are also always clearly exposed (see Fig. 4). The bracteoles in *B. lancifolia* are generally shorter than the calyx and ≤ 15 mm in length

in single-flowered cymules (the lower cymules of the inflorescence are often 3-flowered). Finally, the glandular trichomes of the inflorescence in *B. grootbergensis* are



Fig. 4. *Barleria lancifolia*, showing inflorescence form for comparison with *B. grootbergensis*: **A** Kombat, between Otavi and Grootfontein, Namibia; **B** Hwale River, Zimbabwe; **C** 108 km S of Opuwo en route to Sesfontein on C43, Namibia. **A** collected as Tripp & Dexter 781, **C** collected as Tripp & Dexter 857. PHOTOS **A**, **C**, BY E. TRIPP, **B** BY B. WURSTEN.

somewhat longer and more dense (particularly on the bracts) than those of *B. lancifolia*.

The combination of prominently beaked, two-seeded capsules (Fig. 2D), three staminodes lacking antherodes, linear stigmas, absence of spines and non-stellate indumenta place *Barleria grootbergensis* within section *Somalia* of *Barleria* with confidence (Balkwill & Balkwill 1997; Darbyshire 2009).

2. A revised record in Namibian *Barleria*

Meyer (1968) recorded *Barleria galpinii* C. B. Clarke in NE Namibia from dense bushland at Andara Mission Station on the Okavango River, based upon *de Winter & Wiss* 4250. This species is otherwise restricted to rocky hillslopes in NE South Africa and SE Botswana. Meyer did, however, note some differences in leaf and calyx shape compared to typical *B. galpinii*. Mandy-Jane Balkwill later re-

determined the K duplicate of this specimen as the more widespread *B. mackenii* Hook. f. However, on re-examining this collection whilst working on the treatment of *B. mackenii* for *Flora Zambesiaca*, one of us (I. D.) noted that the stigma in this specimen is capitate. This not only immediately rules out both *B. galpinii* and *B. mackenii*, but also places the collection in a different section of the genus. Both *B. galpinii* and *B. mackenii* have linear stigmas, as do all other species in sect. *Somalia*. Further investigation found that in vegetative, calyx and gross floral morphology, the *de Winter & Wiss* specimen is inseparable from *B. pseudosomalia* I. Darbysh. of sect. *Fissimura*. This species was only recently described as new and endemic to the dry foothills of the Eastern Arc Mountains in central Tanzania (Darbyshire 2010). Only one well-preserved corolla is available on the *de Winter & Wiss* specimen (WIND sheet), and no dissection was made. As such, it is possible that there are minor

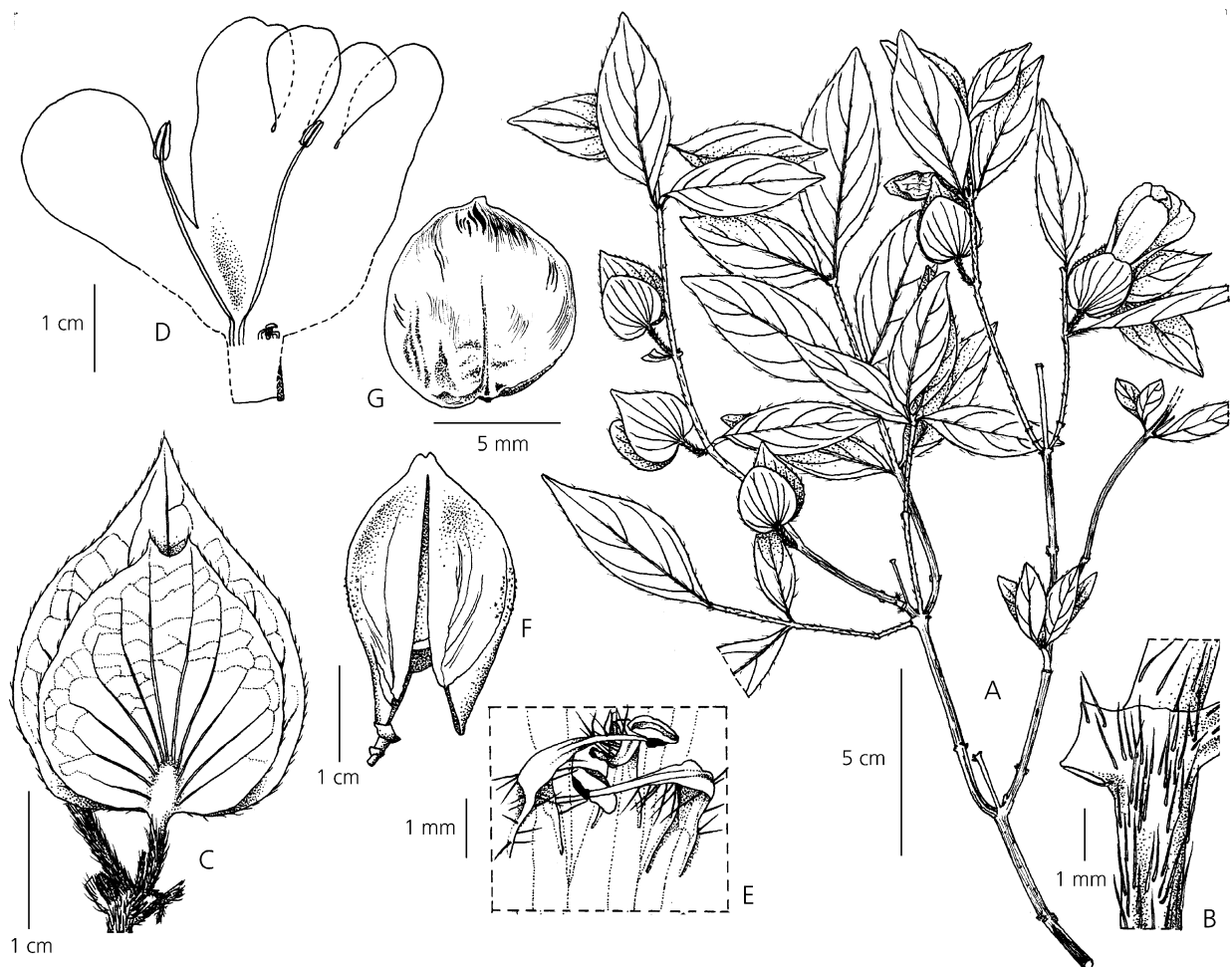


Fig. 5. *Barleria pseudosomalia*: A habit; B detail of young stem indumentum at leaf node; C calyx, anterior view, with subtending bracteoles; D dissected corolla with androecium; E staminodes; F dehiscent capsule; G seed. A drawn from a combination of *Bidgood et al.* 1001 and *Lovett & Congdon* 2476; B, F & G from *Bidgood et al.* 1001, C from *Congdon* 193, D & E from *Lovett & Congdon* 2476. DRAWN BY ANDREW BROWN.

differences in, for example, anther size and staminode length. However, despite this possibility, and despite the disjunction in distribution, we have little doubt that the Namibian and Tanzanian plants are conspecific.

A number of disjunctions in plant distributions between East and South Africa, both at the specific and generic level, are well documented (see e.g. Verdcourt 1969; de Winter 1971; Thulin 1994). Most of these are between the arid zones of the Horn of Africa and Southwest Africa, at the extremities of the putative Pleistocene 'arid corridor(s)'. The disjunct distribution of *Barleria pseudosomalia* is less extreme, but could still be climate-driven. The habitats of the two populations of *B. pseudosomalia* differ to some degree, with the Tanzanian plants being recorded from dry *Brachystegia microphylla* woodland and scrub, whilst the Namibian collection is from 'moist dense bushland'. However, annual rainfall is similar in the two areas (c. 400 – 600 mm p.a.). Much of the intervening region, in SW Tanzania and Zambia, is dominated by wetter miombo woodland assemblages with higher annual rainfall. Thus, the intervening habitat may not be suitable for *B. pseudosomalia* under current climatic conditions.

A full description of *Barleria pseudosomalia* can be found in the protologue (Darbyshire 2010: 377) and is not repeated here, but the species is illustrated for the first time in Fig. 5.

***Barleria pseudosomalia* I. Darbysh.** (Darbyshire 2010: 377). Type: Tanzania, Mpwapwa Distr., Bidgood *et al.* 1001 (holotype K! sheet 1; isotypes C, CAS, DSM!, EA!, K! sheet 2).

Barleria galpinii sensu Meyer (1968: 14), non C. B. Clarke.

DISTRIBUTION. Central Tanzania, NE Namibia.

SPECIMENS EXAMINED. TANZANIA. Mpwapwa Distr.: 2 – 3 miles on Kibakwe to Motta track, fr. 10 April 1988, Bidgood *et al.* 1001 (holotype K sheet 1; isotypes DSM, EA, K sheet 2); Rubeho Mts, Ikuyu to [Mang'aliza] Mangalisa road, Mangalisa Mt, fl. & fr. 10 April 1988, Congdon 193 (K); between Ikuyu and Mangalisa, fl. & fr. 10 April 1988, Lovett & Congdon 3192 (MO). Iringa Distr.: Iringa to Dodoma road N of Isimani, fl. 31 Jan. 1988, Lovett & Congdon 2976 (DSM, K, MO).

NAMIBIA. Okavango Native Territory, Andara Mission Station, fl. 14 Jan. 1956, de Winter & Wiss 4250 (K, PRE, WIND).

HABITAT. In Tanzania, recorded from dry woodland and scrub with *Brachystegia microphylla*; 1200 – 1250 m alt. In Namibia, in shade of moist dense bushland on sandy soil; altitude unrecorded.

CONSERVATION STATUS. Assessed by Darbyshire (2010) as IUCN (2001) category Data Deficient (DD); the discovery of a Namibian population greatly extends the Extent of Occurrence but this species

remains poorly known and is still clearly scarce. As threats remain unknown, the assessment of DD is upheld here.

Acknowledgements

Fieldwork in Namibia was supported by a U.S. National Science Foundation grant to E. Tripp and L. McDade (DEB-0919594). We thank Juliet Williamson and Andrew Brown respectively for the excellent illustrations of *Barleria grootbergensis* and *B. pseudosomalia*, and Bart Wursten for permitting use of his photograph of *Barleria lancifolia* from Zimbabwe. At the National Botanical Research Institute, Windhoek (WIND), we thank Ezekeil Kwembeya and Esmeralda Klaassen for facilitating the fieldwork, Hendrina Hasheela and Leevi Lanyeni for field assistance during the second collecting trip, and Hendrina Hasheela for kindly checking and scanning herbarium specimens of *Barleria*. We thank the Ministry of Environment and Tourism for granting our research permits. Finally, two anonymous reviewers are thanked for their useful comments on an earlier draft of the manuscript.

Appendix 1: revised and annotated checklist of *Barleria* in Namibia

We here present an update of Craven's (1999) list of Namibian *Barleria*. Synonymy is provided only where the accepted name differs from Craven's list and/or from the earlier revision by Meyer (1968). Endemic species are marked (E); near-endemics (NE).

Sect. *Barleria*

(1) ***Barleria capitata* Klotzsch**

Barleria megalosiphon Mildbr. **synon. nov.**

(2) ***Barleria cyanea* S. Moore**

(3) ***Barleria damarensis* T. Anderson (E)**

Note. The records from Angola listed by Clarke (1899) under the synonym *B. marlothii* Engl. and repeated by Makholela (2008) are erroneous and refer to a taxon more closely allied to *B. cyanea* S. Moore.

(4) ***Barleria elegans* S. Moore**

(5) ***Barleria jubata* S. Moore (E)**

(6) ***Barleria lanceolata* (Schinz) Oberm. (E)**

(7) ***Barleria lichtensteiniana* Nees**

(8) ***Barleria macrostegia* Nees**

(9) ***Barleria meeuseana* P. G. Mey. (E)**

(10) ***Barleria merxmulleri* P. G. Mey. (E)**

(11) ***Barleria papillosa* T. Anderson (NE)**

Note. This rare species is also recorded from near the Namibian border in South Africa.

(12) ***Barleria rigida* Nees**

Note. This species and its allies are currently under revision by F. Nyirenda and K. Balkwill (J). It is likely that more than one taxon will be recognised in Namibia since there is considerable morphological variation.

(13) **Barleria solitaria** P. G. Meyer. (E)

Sect. Fissimura

(14) **Barleria pseudosomalia** I. Darbysh.

Barleria galpinii sensu Meyer (1968: 14), non C. B. Clarke

Sect. Prionitis

(15) **Barleria ameliae** A. Meeuse

Barleria prionitis L. subsp. *ameliae* (A. Meeuse) Brummitt & J. R. I. Wood

Note. Craven (1999) listed this taxon both as a good species and as a subspecies of *B. prionitis*; for a discussion on the appropriate taxonomic rank see Darbyshire (2010: 415).

(16) **Barleria kaloxytonea** Lindau (E)

(17) **Barleria dinteri** Oberm. (NE)

Note. there are very few records of this species from South Africa. However, it is questionable as to whether it is distinct from *B. coriacea* Oberm. of Botswana and NE South Africa; the two might be better treated as geographic subspecies.

(18) **Barleria prionitoides** Engl.

Barleria prionitis L. subsp. *prionitoides* (Engl.) Brummitt & J. R. I. Wood

Note. Craven (1999) listed this taxon as endemic, however it is also frequent in Angola.

(19) **Barleria senensis** Klotzsch

Sect. Somalia

(20) **Barleria grootbergensis** I. Darbysh. & E. A. Tripp (E)

(21) **Barleria lancifolia** T. Anderson

(22) **Barleria lugardii** C. B. Clarke

(23) **Barleria mackonii** Hook. f.

Barleria galpinii sensu Craven (1999: 152) quoad *Burgoyne* 3273, non C. B. Clarke

(24) **Barleria matopensis** S. Moore

Barleria albi-pilosa Hainz **synon. nov.**

Note. *Barleria albi-pilosa* was accepted as an endemic species by both Meyer (1968) and Craven (1999) but this taxon is here considered to fall within the variation of the widespread *B. matopensis*.

(25) **Barleria violacea** Hainz (E)

Note. The status of this taxon, and in particular its relationship to *Barleria matopensis*, has not been fully assessed at the present time. The type specimen of *B. violacea* could be merely a depauperate form of *B. matopensis*.

Sect. Stellatohirta

(26) **Barleria taitensis** S. Moore var. **occidentalis** S. Moore

Barleria rogersii sensu Meyer (1968: 17) & sensu Craven (1999: 152).

Note. Varietal status seems inappropriate for this geographically as well as morphologically discrete variant of *Barleria taitensis* (see Darbyshire 2010: 381 for further discussion); however, the *B. taitensis* - *B.*

rogersii complex is currently under revision by one of us (I. D.). As such, we here refrain from making any taxonomic changes until that revision is complete.

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