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A taxonomic revision of the “Quadrispina clade” of *Barleria* sect. *Prionitis*

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Abstract. The recently recognised Quadrispina clade within *Barleria* sect. *Prionitis* Nees (Acanthaceae) represents a taxonomically challenging group endemic to the Horn of Africa biodiversity hotspot. This study presents a comprehensive taxonomic revision of the complex, driven by morphological assessment and morphometric analyses. We recognise seven species in the complex in total, including four new species to science that had previously been included within *B. quadrispina*, namely *B. filtuensis*, *B. mudugensis*, *B. puberulifolia* and *B. sebsebei*. In addition, we recognise four subspecies within *B. quadrispina*, namely subsp. *quadrispina*, subsp. *glaucoabracteata*, subsp. *waggana* and the newly described subsp. *kenyana*. Conservation assessments based on IUCN Red List categories and criteria indicate that *B. filtuensis*, *B. mudugensis*, *B. puberulifolia*, *B. sebsebei* and *B. quadrispina* subsp. *glaucoabracteata* are range-restricted and potentially threatened by habitat degradation, hence they are preliminarily assessed as threatened under criterion B, whilst *B. quadrispina* subsp. *kenyana* remains Data Deficient.

Keywords: Ethiopia, extinction risk, hotspot, Kenya, phytogeography, Somalia, subsection, taxonomy.

INTRODUCTION

Barleria L. is the fourth largest genus of Acanthaceae, comprising approximately 300 species (Ensermu and Darbyshire 2018; Comito et al. 2022). Despite its remarkable diversity in macro- and micro-morphological characters and its high number of range-restricted species, it has only recently been

the focus of concerted taxonomic and systematic research. Section *Prionitis* Nees is one of the most species-rich (and most consistently recognised) clades within *Barleria* with over 50 species. It is particularly rich in the drylands of Africa, with potentially the highest diversity in the Horn of Africa biodiversity hotspot (CEPF 2025). Species within this section are well-adapted to arid and semi-arid environments, often inhabiting open woodlands, thickets, and dry rocky slopes. A recent comprehensive RADseq phylogenetic analysis (Comito et al. 2022) has provided further resolution of relationships within *Barleria*, building on the earlier, predominantly plastid dataset of Darbyshire et al. (2019). Amongst several notable findings, Comito et al. (2022) highlighted the *Quadrispina* clade as a distinct group within sect. *Prionitis*, sister to the Core *Prionitis* clade. This *Quadrispina* clade is unique within sect. *Prionitis* in having corollas in the colour spectrum white to blue or mauve, whilst in the remainder of sect. *Prionitis* the corollas are in the spectrum white to yellow, orange, ochre-coloured or red. Therefore, the *Quadrispina* clade is now in the process of being formally recognised as a distinct subsection, subsect. *Cyanoprionitis* I.Darbysh. & Comito, as part of a global infrageneric reclassification of *Barleria* (Darbyshire and Comito, in press).

Species delimitation within the *Quadrispina* clade is challenging, in particular how to delimit the widespread species *Barleria quadrispina* Lindau and closely allied localised taxa or variants (Ensermu 2006; Hedrén 2006a; Darbyshire et al. 2010). Previous taxonomic efforts have resulted in the recognition of three species within the clade, including *B. ferox* Ensermu & I.Darbysh. and *B. negeleensis* Ensermu & I.Darbysh. as two range-restricted species endemic to Ethiopia (Ensermu and Darbyshire 2018), following their earlier informal recognition as undescribed species in the *Flora of Ethiopia and Eritrea* (Ensermu 2006). Elsewhere, Hedrén (2006b) proposed *B. glaucobracteata* Hedrén as a distinct species from southwest Somalia, although he did not recognise this species to be allied to the *B. quadrispina* complex, instead comparing it to the yellow-flowered *B. linearifolia* Rendle, nor did he note that the same taxon occurs in neighboring regions of Ethiopia and Kenya. Later, *B. glaucobracteata* was synonymised within a broadly circumscribed *B. quadrispina* Lindau by Darbyshire et al. (2010). In addition, other potentially distinct species from Somalia were listed only as ‘notes’ under *B. quadrispina* by Hedrén (2006a), remaining undescribed.

The aims of the current study are therefore to reassess the taxonomy and species delimitation within the *Quadrispina* clade (subsect. *Cyanoprionitis*) and to describe any arising new taxa to science. Morphometric analysis is used to help visualize morphological

variation in the complex and inform species delimitation. Together with the recently described *B. biramosa* Defty & I.Darbysh., *B. compacta* Malombe & I.Darbysh. subsp. *minima* I.Darbysh. & Defty and *B. praetermissa* I.Darbysh. (Defty and Darbyshire 2024; Hanny et al. 2024), the present revision adds to ongoing taxonomic work that highlights the high diversity of *Barleria* sect. *Prionitis* and the rich endemic Acanthaceae flora of the Horn of Africa biodiversity hotspot.

MATERIALS & METHODS

Herbarium specimens of the potential new taxa and morphologically allied species housed at B, C, EA, ETH, FT, K, MO, P, PRE and UPS herbaria were analysed and measured, using standard herbarium practices; herbarium abbreviations follow Thiers (updated continuously). Prior to dissection, flowers were soaked in Aerosol OT 5% solution; all other characters were measured on dry material. All duplicates seen by at least one of the authors are marked with “!”; those only seen as electronic images are marked “*”. Barcodes for duplicates are listed wherever available to facilitate digital access to the specimens.

Morphometric trait data, where possible, were recorded for all examined specimens, including: stem width; stem, leaf and inflorescence indumentum; longest spine ray length; leaf, bract and bracteole shape, size and length: width ratio; and presence of broad sessile glands on the bracts and bracteoles. Measurements were taken using a ruler or Leica S9E microscope with a 0.1 mm scale graticule. Where possible for each quantitative character, an average value per specimen was calculated from up to 10 measurements per specimen. A principal component analysis (PCA) was conducted in R version 4.1.2 (R Core Team 2021) using the *prcomp* function of the built-in *stats* package (version 3.6.2), with the dataset imported as a matrix. Due to the requirement of the PCA for quantitative traits, only the following characters could be used in the final analysis: leaf length: width ratio, bract length: width ratio, bracteole length: width ratio, and maximum corolla length. As such, diagnostic characteristics for some taxa are not included in the PCA.

Description of the range of each species includes reference to the relevant floristic regions from the *Flora of Ethiopia and Eritrea*, the *Flora of Somalia* and the *Flora of Tropical East Africa*. For Ethiopia, we use the two-letter codes that relate to the provinces during the time of Emperor Haile Selassie, namely AF = Afar, BA = Bale, GG = Gamo Gofa, HA = Harerge, SD = Sidamo, SU = Shewa and TU = Tigray (see Hedberg et al. 2009). For Somalia, we use the eight geographic regions of the Flora, three

in the north (N1, N2, N3), two in the central region (C1, C2) and three in the south (S1, S2, S3; see Thulin 1993). For Ethiopia, we use the seven subdivisions of Kenya, the only one of relevance being K1 (see Polhill 1988). The distribution maps for the relevant taxa were produced in ArcGIS Pro v.3.5, using georeferenced herbarium collections. The species conservation (extinction risk) assessment follows the Categories and Criteria of the IUCN Red List (IUCN 2012) and the guidelines for their use (IUCN 2024). Extent of Occurrence (EOO) and Area of Occupancy (AOO) were calculated using the GeoCAT tool (<https://geocat.iucnredlist.org/>; Bachman et al. 2011).

RESULTS

Our detailed morphological investigation of the Quadrispina clade in *Barleria* sect. *Prionitis* is based upon 143 specimens of which 82 were studied directly by the first and last authors and the remaining 61 were studied remotely via digital images or in-person by the other authors. This research reveals that several distinct taxa are readily recognizable based on variation in a suite of characters, with type(s) and density of vegetative and inflorescence indumentum; leaf dimensions and shape; inflorescence form; bract, bracteole and calyx colour and shape; and corolla colour and size all being significant in differentiating the taxa.

A total of seven species are recognised within the Quadrispina clade based on morphological and distributional data. These include four newly described species – *Barleria filtuensis* Defty & I.Darbysh., *B. mudugensis* Defty & I.Darbysh., *B. puberulifolia* Defty & I.Darbysh., and *B. sebsebei* Defty & I.Darbysh. – in addition to the previously described *B. ferox*, *B. negeleensis* and the widespread *B. quadrispina*. The lattermost species is further subdivided into four subspecies, including one newly described taxon – *B. quadrispina* subsp. *kenyana* Defty & I.Darbysh. – and two newly assigned combinations for taxa previously treated as separate species before subsequently being included within *B. quadrispina* s.l. – *B. quadrispina* subsp. *glaucobracteata* (Hedrén) Defty & I.Darbysh. and *B. quadrispina* subsp. *waggana* (Rendle) Defty & I.Darbysh. – to reflect the significant infraspecific morphological and geographical differentiation within *B. quadrispina*.

Principal Component Analysis

The purpose of the PCA was to visualise morphological variation in the Quadrispina clade to help inform species delimitation. The analysis was limited to four

measurable traits and thus captures only a subset of the morphological variation present. Other taxonomically important characters, such as indumentum, flower colour and the presence and density of broad sessile glands on the bracts and bracteoles, could not be included in the PCA due to their qualitative nature. Similarly, only specimens which had measurable aspects for all characteristics could be included within the PCA. Hence, some taxa are only represented by a single specimen within the PCA, often due to the absence of measurable corollas. As such, of the 82 specimens studied directly by the first author in the Quadrispina clade, 64 were used for the PCA analysis (Table S1). The PCA of the vegetative (leaf, bract and bracteole l:w ratio) and floral (maximum corolla length) traits revealed that the first two principal components accounted for approximately 64.1% of the total variance. PC1 was primarily associated with bract and bracteole length: width ratios, which both loaded strongly and positively (0.64 and 0.65), while PC2 was driven largely by corolla length, which loaded negatively (-0.84), and leaf length: width ratio (-0.54). The results of the PCA can be further explored in Figure 1.

The taxon here described as *Barleria filtuensis* shows considerable separation from the other taxa, likely on account of its high leaf length: width ratio. Similarly, *B. negeleensis* appears distinct in its separation from the taxa identified in this account. *Barleria ferox* and *B. sebsebei*, the latter newly described here, form distinct clusters in the PCA, although there is some degree of overlap between them. However, these taxa can be reliably distinguished when characters in the PCA are combined with other morphological traits such as leaf shape, spine length and calyx indumentum. Clustering can also be observed between the different forms of *B. quadrispina* that are here described as subspecies, supporting the taxonomic grouping of these taxa. Overlap between these groupings may be attributed to the absence of traits such as indumentum type and bract/bracteole colour in the PCA – important characteristics in delimiting these subspecies. Notably, *B. quadrispina* subsp. *waggana* differentiates itself from subsp. *quadrispina* with its dense indumentum of bulbous-based hairs. *Barleria quadrispina* subsp. *glaucobracteata* and subsp. *kenyana* are separated from subsp. *quadrispina* and subsp. *waggana* due to their notably larger leaves and higher leaf length: width ratios. However, these two taxa show some clumping because much of their distinction is characterised by indumentum and bract/bracteole colour. It is important to note that *B. mudugensis* and *B. puberulifolia*, both newly described here, were both represented by only one specimen in the analysis. *Barleria mudugensis* is the only taxon with biramous hairs, an unusual characteristic

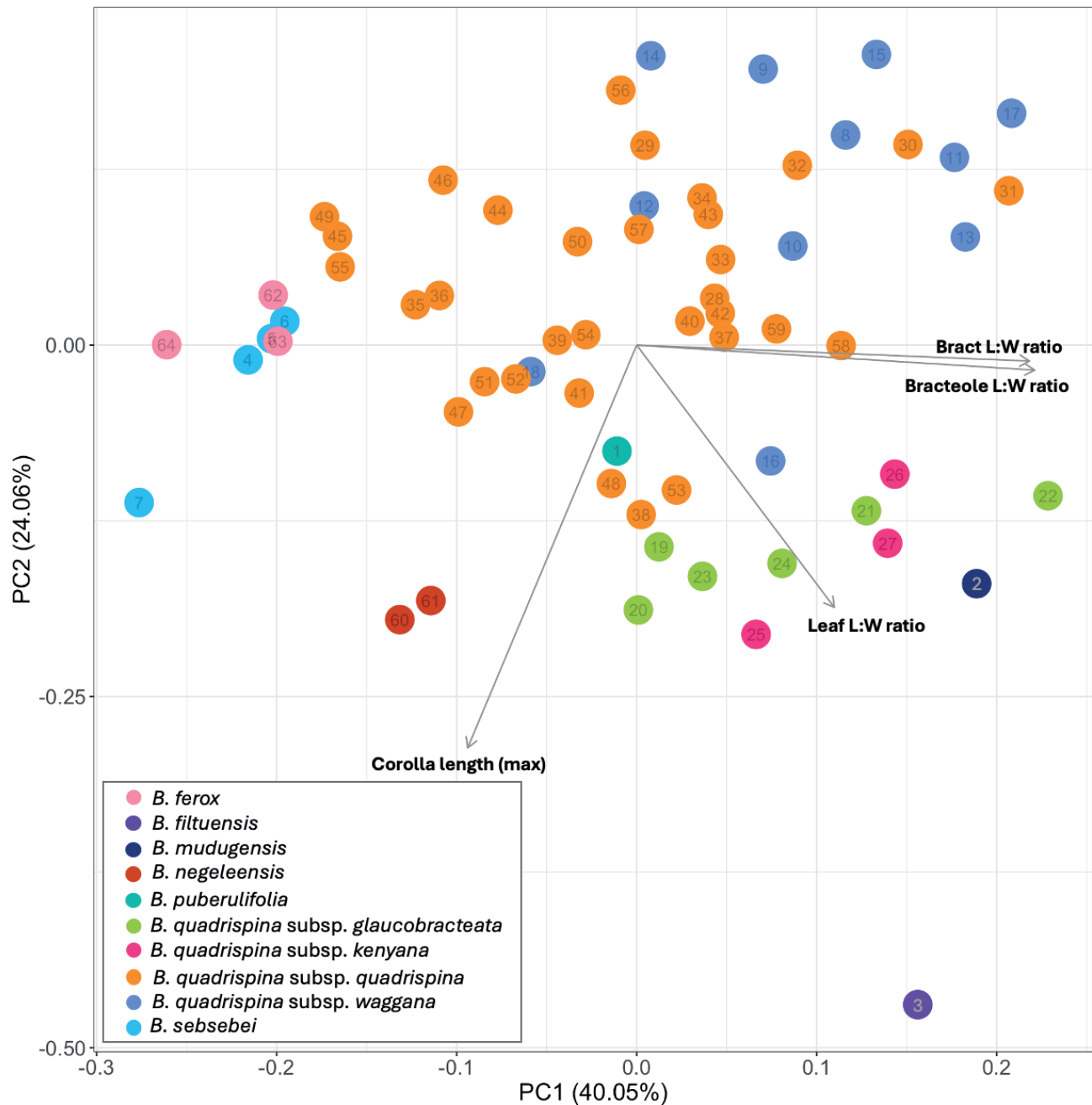


Figure 1. Principal Components Analysis (PCA) of morphological traits across taxa of *Barleria* in the *Quadrispina* clade.

within *Barleria* sect. *Prionitis*. It is also characterised by the dense, broad sessile glands present at the base of the bracts and bracteoles – not captured by this PCA. *Barleria mudugensis* is also geographically disjunct from its closest clustering taxa in the PCA, namely *B. quadrispina* subsp. *glaucobracteata* and subsp. *kenyana*, occurring in the Mudug Region of north-central Somalia. Similarly, despite *B. puberulifolia* clustering within *B. quadrispina*

na, this species separates itself geographically, located in northern Somalia, and is characterised by its leaf, bract, bracteole and calyx indumentum.

Extinction risk

Preliminary conservation assessments suggest that several taxa within the *Quadrispina* clade face elevated

extinction risk and are likely to qualify as threatened on the IUCN Red List due to habitat degradation within their restricted geographic ranges. Specifically, the newly described species *B. filtuensis*, *B. mudugensis*, *B. puberulifolia* and *B. sebsebei* provisionally qualify as threatened alongside *B. quadrispina* subsp. *glaucobracteata*, whilst the newly described *B. quadrispina* subsp. *kenyana* is considered to be Data Deficient. The previously described *B. ferox* and *B. negeleensis* are also currently assessed as Endangered on the Red List (Darbyshire and Roberts 2023; Darbyshire et al. 2023). Within *B. quadrispina*, subsp. *quadrispina* and subsp. *waggana* are considered to be of Least Concern.

TAXONOMIC ACCOUNT

Key to species and subspecies in the *Barleria quadrispina* Clade

1. Cream-coloured biramous hairs present on the stems, leaves and bracts; each unit (axil) of the flowering spike single-flowered..... **1. *B. mudugensis***
 Cream-coloured biramous hairs absent, all hairs unbranched; each unit (axil) of the flowering spike 3–7-flowered, at least when mature (distal axils can be single-flowered) **2**
2. Calyx with a dense mixed indumentum of glandular and eglandular hairs covering the external surface; the entire inflorescence usually densely and conspicuously hairy (can be less so at fruiting) **3**
 Calyx glabrous or sparsely hairy with no or few glandular hairs, or if with a mixed indumentum of glandular and eglandular hairs then less dense, the surface still visible, the inflorescence not so densely and conspicuously hairy (except in *B. quadrispina* subsp. *waggana* where glandular hairs are absent) **5**
3. External surface of corolla puberulous; leaves puberulent with minute (sub-) appressed white hairs, venation inconspicuous, 2 (–3) lateral veins per side, leaf blade lanceolate to obovate or ovate-elliptic, 23–28 × 6.2–11 mm, length: width ratio 2.5–3.7: 1..... **4. *B. puberulifolia***
 External surface of corolla glabrous; leaves pubescent with bristly hairs at least along margin, these sometimes also numerous on the midrib and veins abaxially, with conspicuous venation, 3–5 lateral veins per side, linear-lanceolate to narrowly oblong-elliptic, leaf length >50 mm, length: width ratio 3.7–11: 1..... **4**
4. Leaves linear-lanceolate to -oblanceolate, length: width ratio 8.3–11: 1; bracteoles and calyces with long ascending bristly eglandular hairs 1–1.7 mm long and shorter patent, non-glossy glandular hairs 0.4–0.6 mm long; bracts towards base of spike 24–24.5 × 3–6 mm including spine tip 1.5–4 mm long, bracts becoming linear-lanceolate distally..... **2. *B. filtuensis***
 Leaves narrowly oblong to oblong-elliptic, leaf length: width ratio 3.7–5.2: 1; bracteoles and calyces with ascending bristly eglandular hairs 0.3–0.5 mm long and longer patent, glossy glandular hairs 0.4–1.2 mm long; bracts towards base of spike 22–40 × 8.5–17 mm including prominent grey apical spine 4–8 mm long, bracts becoming oblanceolate distally **3. *B. negeleensis***
5. Broad sessile glands numerous and conspicuous at base of bracts and bracteoles **6**
 Broad sessile glands absent or sparse and inconspicuous on the bracts and bracteoles (5. *B. quadrispina*) **7**
6. Axillary spines rather slender, sessile or stalk to 2 mm long, with ascending rays 17–22 (–29) mm long; leaves broadly elliptic to suborbicular or occasionally ovate, 22–39 mm wide, length: width ratio 1.2–1.7: 1, surfaces pubescent in addition to long bristly hairs along midrib and veins beneath and margins; anterior and posterior calyx lobes lanceolate, more gradually narrowed into long apical seta, ± 8.5–9.5 mm long at flowering including seta. **6. *B. sebsebei***
 Axillary spines very stout, stalked for (4–) 8–16 mm, with widely divergent rays typically 22–32 mm long; leaves oblong-elliptic or -obovate, 13–25 mm wide, length: width ratio 1.9–2.1: 1, sparsely strigulose along midrib adaxially, main veins abaxially and margin; anterior and posterior calyx lobes broadly ovate, abruptly narrowed into short apical seta, 4.2–5.5 mm long at flowering including seta **7. *B. ferox***
7. Bract length: width ratio at midpoint of inflorescence 9.6–10: 1; calyx with long glandular hairs and fine short patent eglandular hairs on external surface..... **5d. *B. quadrispina* subsp. *kenyana***
 Bract length: width ratio at midpoint of inflorescence 3.7–9: 1; calyx glabrous or eglandular hairs present along margins (these sometimes bulbous based) and/or sometimes with few glandular hairs on external surface..... **8**
8. Bracts and bracteoles green, densely and conspicuously hairy, always with bulbous-based hairs numerous along the margins, glandular hairs absent; leaves usually obovate, more rarely oblanceolate, length: width ratio 2–2.7 (–3.7): 1, corollas blue or purple... **5b. *B. quadrispina* subsp. *waggana***
 Bracts and bracteoles if with bulbous-based hairs numerous along the margins, then less densely and conspicuously hairy and glandular hairs also present on the surface; leaves variously oblanceolate, oblong-elliptic or more rarely obovate, length: width ratio 3.2–6.5: 1, corollas white, blue or purple **9**
9. Bracts and bracteoles green or at most slightly glaucous; corolla white, blue or purple, 16–30 mm long **5a. *B. quadrispina* subsp. *quadrispina***

Bracts and bracteoles conspicuously pale glaucous to white; corolla always white, 28–34 mm long.....
5c. *B. quadrispina* subsp. *glaucobracteata*

1. *Barleria mudugensis* Defty & I. Darbysh., **sp. nov.**

Type: Somalia, 23 km S of Jeriban, 07°01'N, 48°52'E, 27 May 1979 (fl.), J. B. Gillett, C. F. Hemming & R. M. Watson 22097 (holotype K! [K001295239]; isotype EA! [EA000043822]). Figure 2.

Diagnosis

Barleria mudugensis has previously been confused with *Barleria quadrispina* but differs in (1) the stem being densely covered in cream-coloured biramous hairs (versus largely glabrous to pubescent with many short spreading white unbranched hairs); (2) the leaf indumentum being strigose with unequally and equally biramous hairs (versus strigose with unbranched hairs); (3) the cymes at each axil of the inflorescence being 1-flowered (versus 3–7-flowered); (4) the bracts strigose with appressed hairs, which are mixed unbranched and biramous (versus appressed to spreading unbranched hairs with or without a bulbous base and surface sometimes with patent glandular hairs); (5) the abaxial bract surface having numerous and conspicuous broad sessile glands (versus broad sessile glands absent or very few abaxially); and (6) the external surface of the calyx having unbranched and biramous strigose hairs, with short glandular hairs occasionally along the margin (versus glabrous to densely eglandular and/or glandular unbranched hairs, with or without coarse bulbous-based hairs along the margin). Table 1.

Description

Harshly spiny compact shrublet, 10–15 cm tall; young stems 4-angular, densely covered in cream-coloured appressed biramous hairs throughout, giving the stems a pale-glaucous appearance; mature stems turning woody, 3–4 mm in diameter, sometimes with numerous scars at the nodes between short internodes. *Axillary spines* numerous, beige-white, subsessile or stalk to 2.5 mm long, 4-rayed, rays of similar length, $\pm$ straight, longest rays 22–26 mm long, eglandular hairs present at base of spines. *Leaves* on short and ill-defined petioles 2–3 mm long, pubescent with short fine hairs; blade (oblong-) obovate, 27–30 $\times$ 9–11 mm (length: width ratio 2.7–3: 1), base attenuate, margin entire, apex acute to obtuse with apical spine 1.2–2.1 mm long, adaxial surface sparsely strigose but more densely strigose along midrib, abaxial surface at first densely strigose, more sparse at maturity

when most dense along midrib, hairs cream-coloured, equally and unequally biramous, 0.3–0.6 mm long, also with few broad sessile glands towards the base abaxially; lateral veins 2–3 per side, strongly ascending, inconspicuous. *Inflorescences* terminal, spiciform, 2–4.5 cm long, each axil single-flowered, flowers sessile; bracts at base of inflorescence green, elliptic-obovate, 12.3–14.5 $\times$ 4.3–4.8 mm, apex tapered into spine tip 2.7–4 mm long, gradually becoming paler grey-green and narrowing up the spike, becoming linear-lanceolate distally where 18–24 $\times$ 1.6–1.8 mm including long-spinose apex; abaxial surface strigose, most dense on midrib, with both unbranched and biramous hairs present, and with numerous, conspicuous broad sessile glands most dense proximally towards midrib, adaxial surface as abaxial, but without broad sessile glands; bracteoles greenish-white, linear-lanceolate, spinose, 16–21 $\times$ 1–1.5 mm, with few appressed unbranched and biramous hairs along midrib towards base abaxially, and with broad sessile glands towards base. *Calyx* pale grey-green, eventually turning white; anterior and posterior lobes subequal, with base broadly elliptic-orbicular and with abrupt long-cuspidate apex, 8–9.8 $\times$ 2–2.8 mm including spine tip 4–4.7 mm long, midrib somewhat prominent, external surface strigose, hairs concentrated proximally, both unbranched and biramous hairs present, also with short glandular hairs present along margin, internal surface shortly pubescent; lateral lobes narrower, $\pm$ 8.8 $\times$ 1.8 mm, apex attenuate. *Corolla* white or white becoming lilac, 30–35 mm long, glabrous externally; tube cylindrical, 14–18 mm long, $\pm$ 2.5 mm diameter; limb in weak “4+1” configuration; abaxial lobe offset by $\pm$ 3.8 mm, obovate, ca. 19 $\times$ 9.5 mm, apex rounded, lateral lobes broadly elliptic to obovate, 16.6–17.4 $\times$ 9.6–9.8 mm, apices obtuse (ratio of abaxial: lateral lobe length $\pm$ 1.1: 1); adaxial lobes oblanceolate, $\pm$ 17.2 $\times$ 7.2 mm, apices obtuse. *Stamens* inserted 5.3–5.5 mm from base of corolla tube; filaments of long stamens 16.5–17 mm long, shortly and sparsely hairy at base, elsewhere glabrous; anthers $\pm$ 2.6 mm long; short lateral stamens with filaments 1.6–1.7 mm long, sparsely pubescent at base, antherodes 0.8–0.9 mm long. *Ovary* glabrous; style $\pm$ 35 mm long, glabrous; stigma linear, 0.5–0.9 mm long. *Cap-sule* and seeds not seen.

Etymology

Barleria mudugensis is named after the Mudug Region of Somalia, to which it is endemic.

Distribution

Occurs only in Hobyo and Jeriban Districts, Mudug Region of north-central Somalia (C1 floristic region). Fig. 3.

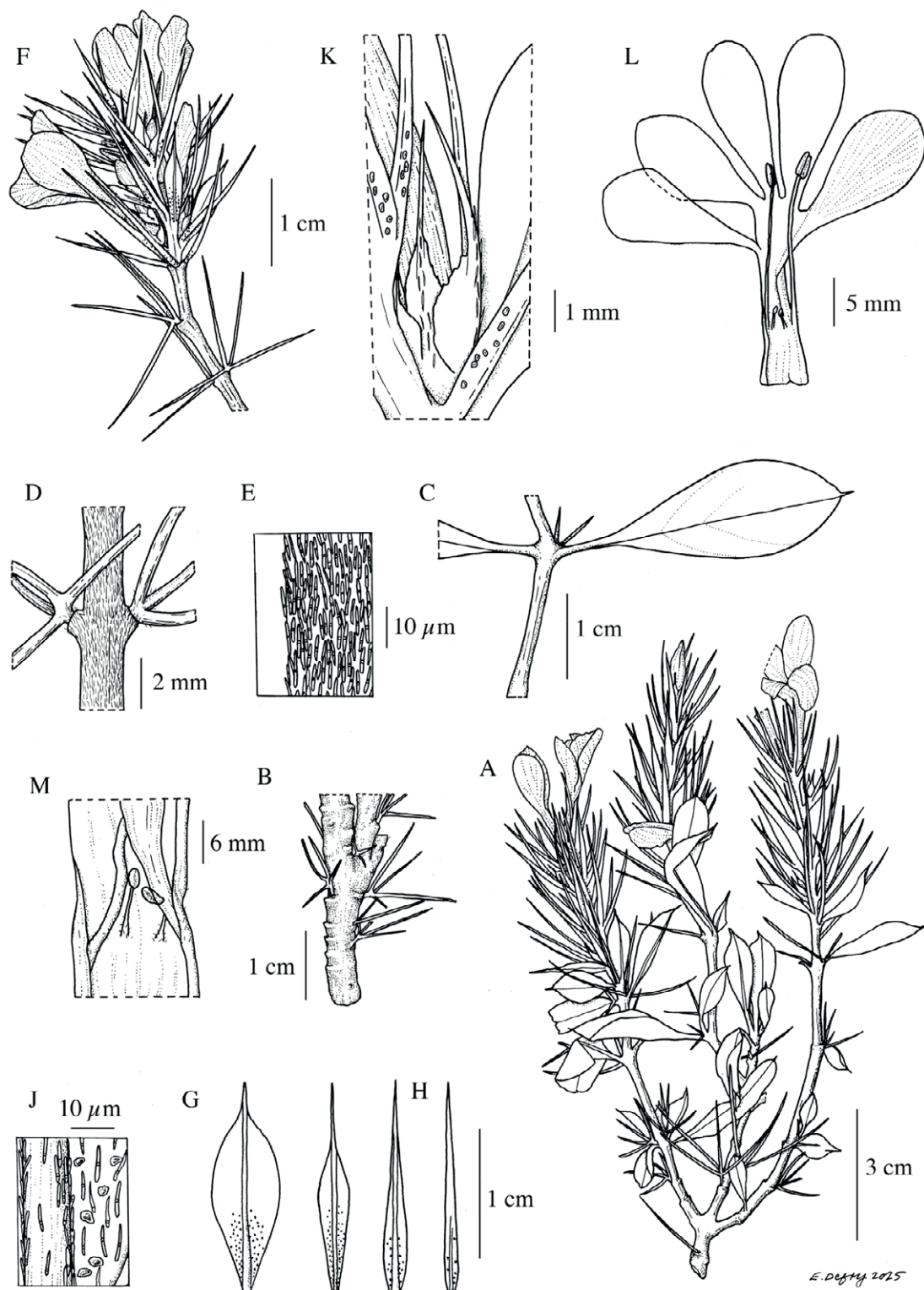


Figure 2. *Barleria mudugensis*. A. Habit, flowering branch. B. Mature stem, with axillary spines. C. Leaf in situ, abaxial surface, with axillary spines. D. Young stem, with indumentum and axillary spines. E. Detail of young stem indumentum. F. Inflorescence, flowering, with axillary spines. G. Bracts, variation in shape from proximal (l) to distal (r) bracts. H. Bracteole. J. Leaf indumentum, with biramous hairs and broad sessile glands. K. Flowering calyx, with base of bracts and bracteoles. L. Dissected corolla with androecium, abaxial corolla lobe to the left. M. Short lateral stamens. A, C–M. from J. B. Gillett et al. 22097 (K, holotype); B. from R. G. Wieland 4567 (K). Drawn by Ellie Defty.

Habitat and Ecology

This species is known to occur at ca. 150 m asl. The vegetation in the area is open deciduous bushland on shallow soil or sand overlying limestone. Examples of other narrow endemics with similar distributions are *Endostemon stenocaulis* (Hedge) Ryding, A.J.Paton & Thulin, *Oxygonum thulinianum* S.Ortiz and *Zygocarpum gillettii* (Thulin) Thulin & Lavin.

Conservation status

With only two known localities and an area of occupancy (AOO) of 8 km², this is a highly range-restricted species, although it was noted to be locally common by J. B. Gillett *et al.* (22097). Whilst specific habitat information is unknown, this species has been collected from the Hobyo grassland and shrubland ecoregion. Although the area is sparsely populated, overgrazing and wood collecting are general threats to the habitat of this region. In addition, the collection by R. G. Wieland (4567) was collected near the roadside, suggesting potential vulnerability to habitat disturbance from road improvement. The two known localities are considered to be separate locations and, with the threats noted above, this species is considered likely to qualify as **Endangered** under criteria B: **EN B2ab(iii)**.

Taxonomic notes

Hedrén (2006a) noted that the type specimen of this species is similar to his *Barleria glaucobracteata* (= *B. quadrispina* subsp. *glaucobracteata* in the current treatment) but that it differs in having shorter leaves, the bracts and bracteoles having few bristle-like hairs and densely dotted with sessile glands on the lower surface towards the base, and broader calyx lobes with a more distinctly delineated spine distally. He had earlier (2004) annotated the specimen as a possible sp. nov. near *B. quadrispina*, differing in having a silvery indumentum of appressed hairs on the stem. Hedrén did not note that these silvery hairs are biramous, this being the only species within the *Barleria quadrispina* to have such an indumentum. This, together with the conspicuous and numerous sessile glands on the bracts, plus the fact that each unit of the spiciform inflorescence is single-flowered, allows this species to be readily separated from *B. quadrispina*.

Additional specimens examined

SOMALIA. Hobyo Region: W of Labawarood, Stand 153, 06°26'30"N, 48°35'12"E, 20 June 1987 (fl.), R. G. Wieland 4567 (K! [K001295252], MO).

Table 1. A comparison of the diagnostic characters for separation of *Barleria mudugensis* and *B. sebsebei* from *B. quadrispina*.

Character	<i>B. mudugensis</i>	<i>B. quadrispina</i>	<i>B. sebsebei</i>
Stem indumentum	Densely covered in cream-coloured appressed biramous hairs	Largely glabrous or with many short spreading white hairs	Sparsely pubescent with short bristly unbranched hairs
Leaf indumentum (abaxial surface)	Strigose, hairs equally and unequally biramous	Strigose at least on the margin, hairs unbranched	Short fine ascending hairs, most dense along veins, hairs unbranched, margins and occasionally midrib strigose
Leaf length: width ratio	2.7–3: 1	2–6.5: 1	1.2–1.7: 1
Leaf width	9–11 mm	8–24 mm	22–39 mm
Cyme at each axil of inflorescence when mature	1-flowered	3–7-flowered	3–7-flowered
Bract indumentum (adaxial surface)	Strigose, unbranched and biramous hairs present	Margin and midrib with coarse appressed to spreading hairs with or without a bulbous base, surface sometimes also with patent glandular hairs, hairs unbranched	Glabrous or sometimes with short fine hairs along midrib and veins, hairs unbranched
Glands on bracts (abaxial surface)	Numerous, conspicuous broad sessile glands	Broad sessile glands occasional or absent	Conspicuous and ± numerous broad sessile glands
Calyx indumentum (external surface)	Both unbranched and biramous hairs present, also with short glandular hairs present along margin	Surface glabrous to eglandular- and/or glandular-pubescent, with or without coarse, ± bulbous-based hairs along margin	Glabrous or with short ascending or appressed eglandular hairs concentrated proximally along midrib
Corolla length	30–35 mm	17–34 mm	30–37 mm

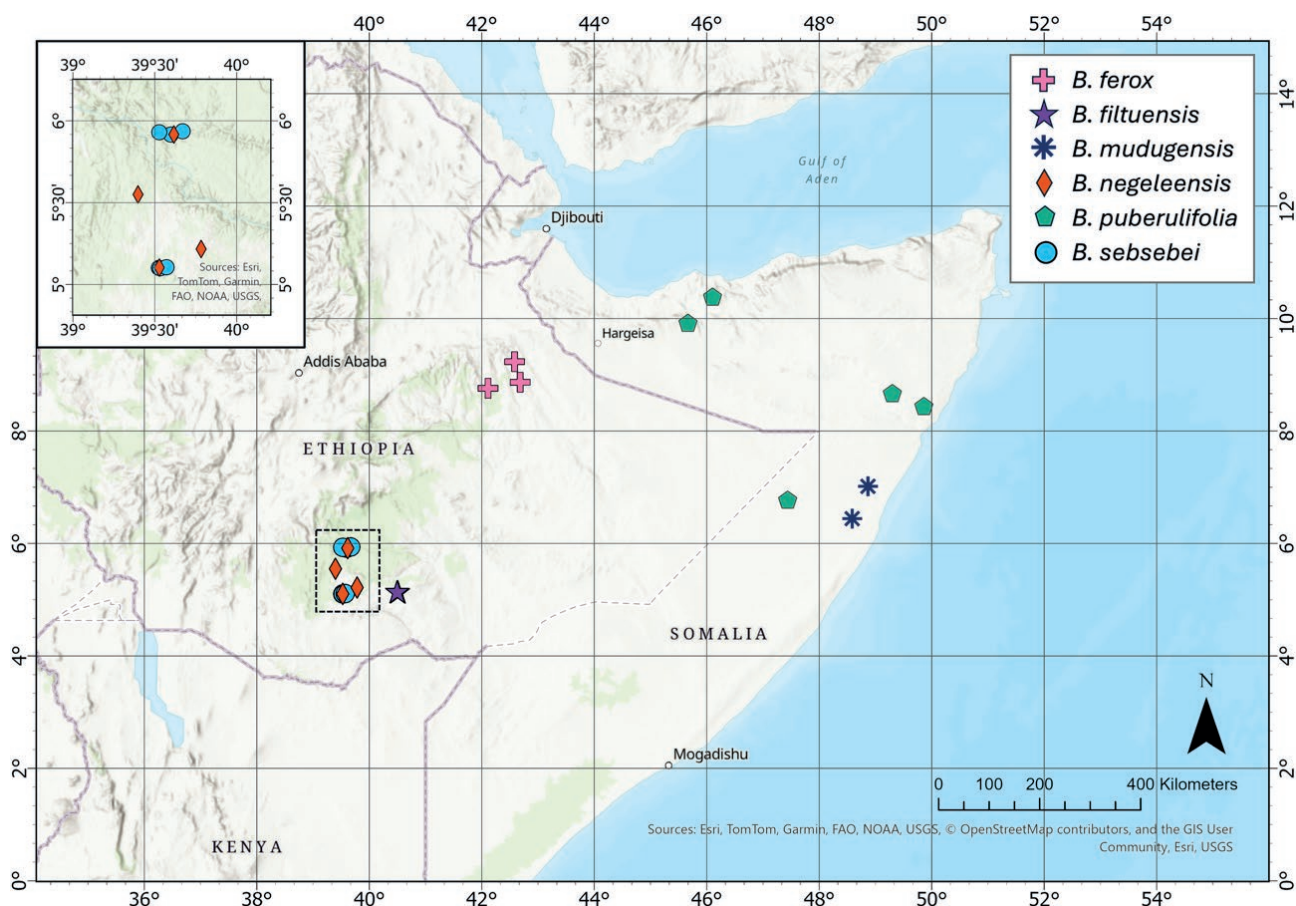


Figure 3. Geographic distribution of four newly described *Barleria* species within the Quadrspina clade, *B. filtuensis*, *B. mudugensis*, *B. puberulifolia* and *B. sebsebei*, and two closely allied species, *B. ferox* and *B. negeleensis*, from northeastern Africa. Zoomed inset (indicated by dashed box) clarifies the overlapping ranges of *B. negeleensis* and *B. sebsebei*.

2. *Barleria filtuensis* Defty & I.Darbysh., sp. nov.

Type: Ethiopia, Sidamo, Filtu to Negelle, 17 km from Filtu, 05°08.5'N, 40°30.5'E, 8 Dec. 2012 (fl.), *I. Friis*, *Sebsebe D.*, *Wege A.* & *Ermias G.* 14839 (holotype K! [K001295211]; isotypes C, ETH); Figure 4.

Diagnosis

Barleria filtuensis is most likely to be confused with *B. negeleensis* but differs in (1) the basal stem width being 1.5–3.6 mm (versus 5–8 mm); (2) the leaf length: width ratio being 8.3–11: 1 (versus 3.7–5.2: 1); (3) the bracteole and calyx indumentum comprising long-ascending bristly, glossy eglandular hairs 1–1.7 mm long and shorter patent, non-glossy glandular hairs 0.4–0.6 mm long (versus densely pubescent with ascending bristly eglandular hairs 0.3–0.5 mm and longer patent, glossy glandular hairs 0.4–1.2 mm); (4) the anterior calyx lobes being $\pm 16.8 \times 3.5$ mm including spine tip 6

mm long, with no visible midrib or lateral veins (versus (11–) 14–17 $\times$ 4–6 mm including spine tip 2.5 mm long, with prominent midrib and lateral veins); (5) the bracts towards the base of the spike (but excluding basal pairs) being lanceolate to linear-lanceolate, 24–24.5 $\times$ 3–6 mm including apical spine 1.5–4 mm (versus bracts towards base of spike ovate to oblong-elliptic, 22–40 $\times$ 8.5–17 mm including prominent grey apical spine 4–8 mm long). Table 2.

Description

Spiny slender shrublet, 8.5–16 cm tall; young stems green, 4-angular, pubescent with long ascending bristly hairs, increasing in density at and immediately below nodes, most dense on two opposite sides; older stems woody, 1.5–3.6 mm in diameter. *Axillary spines* beige-white, stalk 1.5–5.9 mm long, 4-rayed, rays of similar length or 2 longer, straight, longest ray 16–17.5 mm long; occasional 2-rayed spines present in the distal leaf axils

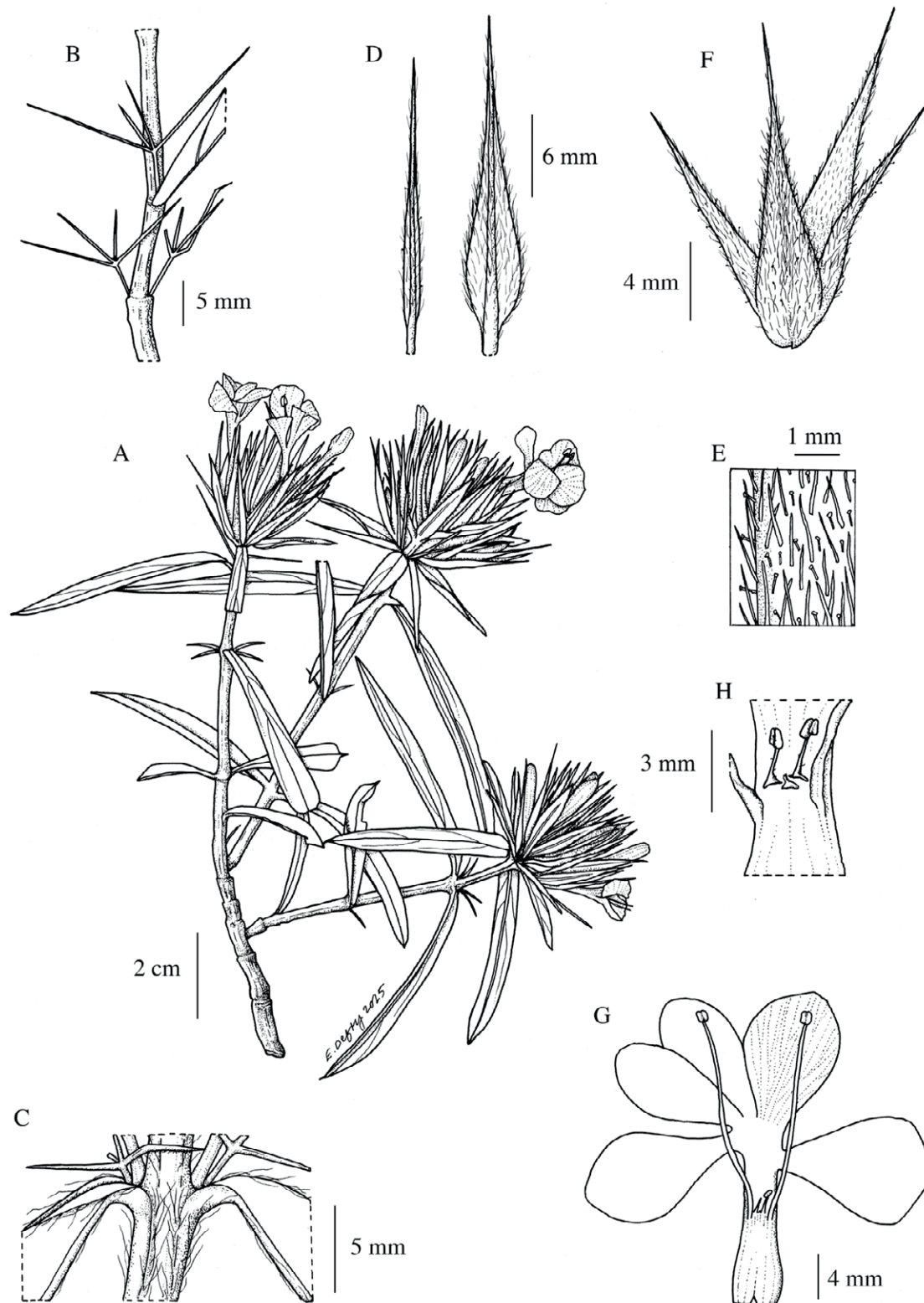


Figure 4. *Barleria filtuensis*. A. Habit, flowering branch. B. Young stem, with indumentum and axillary spines. C. Young stem at node, with indumentum and axillary spines. D. Bracteole (l) and bract (r), abaxial surfaces. E. Detail of bract indumentum. F. Calyx, with indumentum. G. Dissected corolla with androecium, abaxial corolla lobe to the right. H. Short lateral stamens and staminode. A–H. from I. Friis et al. 14839 (K, holotype). Drawn by Ellie Defty.

resembling bracteoles, sessile; occasional compound spines present in the distal axils that are many branched. *Leaves* subsessile; blade linear-lanceolate to -oblanceolate, 55–69 × 5–8 mm (length: width ratio 8.3–11: 1), base cuneate, margin entire, apex acute, sometimes with a minute apical spine 0.5–0.7 mm long, adaxial surface often glabrous, abaxial surface with long somewhat bristly ascending hairs 1.4–2.1 mm long, most dense along midrib and margin, hairs unbranched, 1–2.6 mm long; lateral veins 3–4 per side, strongly ascending, prominent abaxially, midrib prominent abaxially and adaxially. *Inflorescences* terminal, subcapitate or shortly and densely spiciform, 2.5–4 cm long, each axil with a 3–7-flowered dichasial cyme; basal bracts leaf like, bracts towards centre of spike green, lanceolate, 24–24.5 × 3–6 mm including spine tip 1.5–4 mm long, gradually becoming more linear-lanceolate distally, abaxial surface and margin with dense long ascending, bristly eglandular hairs, glabrous adaxially; bracteoles green-white, linear-lanceolate, spinose, 19–20 × 1.1–1.5 mm, with ascending eglandular bristly hairs 1–1.7 mm long and patent glandular hairs 0.4–0.6 mm long on both surfaces and margins; flowers shortly pedicellate, pedicel fused to the subtending bracteole. *Calyx* green; anterior lobe lanceolate, ± 16.8 × 3.5 mm including spine tip (one calyx measured), apex with grey spine 6 mm long; external surface densely eglandular-pubescent with long ascending bristly hairs, and with numerous shorter glandular hairs; internal surface eglandular-strigose; posterior lobe as anterior lobe but ± 18.5 × 3.5 mm including apical spine ± 6.2 mm long; lateral lobes narrower, 13.7–13.9 × 2–2.2 mm, including apical spine 3.7–4.9 mm long. *Corolla* pale bluish-purple, ± 28 mm long (one flower measured), glabrous externally; tube cylindrical, ± 14 mm long, ± 3 mm diameter; limb in weak “4+1” configuration; abaxial lobe offset by ± 3.1 mm, broadly obovate, ± 14.5 × 10.4 mm, apex rounded; lateral lobes obovate, 11–13 × 8.2–8.5 mm, apices obtuse (ratio of abaxial: lateral lobe length ± 1.1–1.3: 1); adaxial lobes elliptic-obovate, 12–13.5 × 6–6.2 mm, apices obtuse. *Stamens* inserted ± 8 mm from base of corolla tube; filaments of long stamens 17–18 mm long, sparsely pubescent at base; anthers ± 2 mm long; short lateral stamens with filaments 1.5–1.7 mm long, with sparse retrorse hairs at base, antherodes ± 0.6 mm long; median staminode ± 0.4 mm long. *Ovary* not seen; style glabrous; stigma linear, 0.45–0.5 mm long. *Capsule* and seeds not seen.

Etymology

Barleria filtuensis is named after the town of Filtu in southern Ethiopia, close to which the three known specimens of this species have been collected.

Distribution

This species is endemic to the Liben Zone, Somali Region of southern Ethiopia (SD floristic region). It has to-date been found along the road from Negele to Filtu. See Fig. 3.

Habitat and Ecology

This species occurs in a mixed open woodland comprising *Senegalia-Vachellia* bushland with *Barbeya oleoides* Schweinf. and some *Terminalia* and *Combretum* spp. on outcrops of limestone, eroding into a whitish grey limestone-rich soil (Friis *et al.* 14839). The ground cover is rich in the local endemic *Wellstedtia filtuensis* D.R.Hunt & Lebrun and other relatively rare, endemic species such as *Jatropha horizontalis* M.G.Gilbert. Other associated species include *Senegalia ogadensis* (Chiov.) Kyal. & Boatwr., *Bauhinia ellenbeckii* Harms, *Convolvulus vollesenii* Sebsebe, *Elaeodendron aquifolium* (Fiori) Chiov., *Endostemon tenuiflorus* (Benth.) M.R.Ashby and *Gladiolus lithicola* Goldblatt (I. Friis, pers. comm. 2024). It occurs at 1350–1450 m elevation.

Conservation status

Barleria filtuensis is a highly range-restricted species, currently only known from three localities in close proximity to one another within the Liben Zone of southeast Ethiopia. It has an area of occupancy (AOO) of 4 km² whilst the extent of occurrence (EOO) based on a minimum convex hull is below 1 km² based on the known collections, and is therefore matched to AOO in accordance with IUCN guidelines. Google Earth imagery indicates intensive agricultural activity to the west of this species' range towards Negele. Dense human settlement can also be observed to the east of this species range which is in close proximity to the small town of Filtu. While the direct impact on *B. filtuensis* is unclear, settlement expansion and agricultural activity may pose a potential threat to this species. Given its extremely small range (treated as a single location) and proximity to anthropogenic pressures, *B. filtuensis* likely qualifies as **Critically Endangered** under criterion B of the IUCN Red List criteria: **CR B1ab(iii)+2ab(iii)**.

Taxonomic notes

Barleria filtuensis is closely allied to another local endemic from close geographic proximity, *B. negeleensis*, but has a very different gestalt and can be readily separated by the distinct morphological characters as outlined in the diagnosis and Table 1. It should be noted that the collection by Ensermu Kelbessa and Aschalew

Table 2. A comparison of the diagnostic characters for separation of *B. filtuensis* and *B. puberulifolia* from *B. negeleensis*.

Character	<i>B. filtuensis</i>	<i>B. negeleensis</i>	<i>B. puberulifolia</i>
Stem indumentum	Young stems sparsely pubescent with long ascending bristly hairs	Young stems pubescent with long ascending bristly hairs or sparsely so	Young stems puberulous
Stem width, basal stems	1.5–3.6 mm	5–8 mm	3–5.2 mm
Longest ray of axillary spines	16–17.5 mm	10–30 mm	27–41 mm
Leaf shape, size and length:width ratio	Linear-lanceolate to -oblanceolate, 55–69 × 5–8 mm (length: width ratio 8.3–11: 1)	Linear-oblong to narrowly oblong-elliptic, 50 – 140 × 10–27 mm (length: width ratio 3.7–5.2: 1)	Lanceolate to obovate or ovate-elliptic, 23–28 × 6.2–11 mm, (leaf length: width ratio 2.5–3.7: 1)
Leaf indumentum	Adaxial surface glabrous; abaxial surface with long somewhat bristly ascending hairs most dense along midrib and margin, hairs 1.4–2.1 mm long	Both surfaces pubescent with bristly ascending hairs at least along margin, sometimes dense on margin, midrib and on main veins beneath, hairs 1.1–2 mm long	Both surfaces puberulent with minute appressed hairs 0.1–0.15 mm long
Veins	3(4) per side, strongly ascending, midrib prominent abaxially and adaxially, lateral veins prominent abaxially	4(5) per side, strongly ascending, midrib and lateral veins prominent abaxially and adaxially	2(3) per side, strongly ascending, inconspicuous
Bract shape and size	Bracts towards base of spike (but excluding basal pairs) lanceolate to linear-lanceolate; 24–24.5 × 3–6 mm including spine tip 1.5–4 mm long; gradually becoming more linear distally, green	Bracts towards base of spike ovate to oblong-elliptic, 22–40 × 8.5–17 mm including prominent grey apical spine 4–8 mm long, becoming oblanceolate distally, pale green tinged purple at the tip	Bracts towards base of spike lanceolate to linear-lanceolate, 21.7–28 × 2.5–6 mm including spine tip 4.2–9 mm long, becoming linear-spinose distally, pale green to brown
Bract indumentum	Long, ascending, bristly eglandular hairs dense on abaxial surface and margin, glabrous adaxially; occasional patent glandular hairs but very infrequent	Densely pubescent with ascending bristly eglandular hairs and long patent glandular hairs adaxially and abaxially	Appressed to patent, white, eglandular hairs both adaxially and abaxially; patent glandular hairs often longer than eglandular hairs but vary in length
Bracteole shape and size	Linear-lanceolate, apex spinose, 19–20 × 1.1–1.5 mm	Variable, those of first flower in dichasium lanceolate to oblanceolate and can resemble the bracts, 15–32 × (2–) 4–7.5 mm, those of lateral flowers in dichasium more linear-lanceolate, (8–) 14–20 × 1– 2.5 mm, apex spinose	Linear, apex spinose, 20–23 × 1.7–2 mm
Bracteole indumentum	Ascending bristly eglandular hairs 1–1.7 mm long and patent, non-glossy glandular hairs 0.4–0.6 mm long	Densely pubescent with ascending bristly eglandular 0.3–0.5 mm and patent, glossy glandular hairs 0.4–1.2 mm long	Patent to retrorse eglandular hairs 0.1–0.2 mm long and patent glandular hairs 0.3–0.8 mm long
Calyx – anterior lobe size and venation	Lanceolate, no visible midrib or lateral veins, ± 16.8 × 3.5 mm including spine tip 6 mm long	Lanceolate, prominent midrib and lateral veins, (11–) 14–17 × 4–6 mm including spine tip 2.5 mm	Lanceolate, prominent midrib and parallel veins, 13.2 × 4 mm including spine tip 3.2 mm
Calyx – anterior lobe indumentum	External surface densely pubescent with ascending eglandular hairs covering surface and shorter glandular hairs concentrated along midrib and distally	External surface densely pubescent with long bristly ascending or appressed eglandular hairs and long patent glossy glandular hairs	External surface with short eglandular hairs and long patent glandular hairs
Corolla indumentum	Glabrous externally	Glabrous externally	Shortly puberulous externally

Getahun (3997) appears to be a mixed collection – the lefthand plant on that specimen is true *B. filtuensis* whilst the righthand pieces tend towards *B. quadrispina* in having a less dense indumentum and narrower bracts; these latter plants may be of hybrid origin.

The newly described *Barleria filtuensis* and *B. sebei*, together with the recently described *B. negeleensis* (see spp. 3 and 6 below) all occur in close proximity within a phytogeographical transition zone between the Ethiopian highlands and the lowlands of Eastern Ethio-

pia and Somalia. Another recently described species in the Quadriscina clade, *Barleria ferox* (sp. 7 below) also occurs in a similar transition zone, although it is found considerably further to the northeast than the first three taxa (Figure 3). This transition zone was first documented by Lovett and Friis (1996), who noted a number of characteristic, range-restricted species such as *Barbeya oleoides* (Barbeyaceae), *Cadia purpurea* (G.Piccioli) Aiton (Fabaceae) and *Pistacia aethiopica* Kokwaro (Anacardiaceae). This transition zone was later described by Friis et al. (2010) as a subtype of the vegetation unit “5. Dry evergreen Afromontane forest and grassland complex (DAF)”, namely “5d. Transition between Afromontane vegetation and *Acacia-Commiphora* bushland on the Eastern escarpment (DAF/TR)”. Friis et al. (2010) noted that this vegetation type is rich in endemic species. The Habitat & Ecology section above notes some of these endemic species associated with *B. filtuensis*. Later, Friis et al. (2022) revised the potential vegetation map of Ethiopia and elevated this transition zone to a stand-alone vegetation unit, namely “Transitional Semi-Evergreen Bushland (TSEB)” (see Figure 4.1 of Friis et al. 2022). The recognition of four species of *Barleria* from the Quadriscina clade within this vegetation unit adds further evidence to its importance for plant endemism.

Additional specimens examined (paratypes)

ETHIOPIA. Sidamo, 107 km from Negelle [Negele] towards Filtu, 05°10'N, 40°32'E, 14 Dec. 1990 (fl.), *Sebsebe D. & Ensermu K.* 2690 (ETH!); Sidamo, Borana Awraja, about 110 km from Negelle [Negele] on the road to Filtu, 05°08'30", 40°29'50"E, 20 Dec. 1998 (fl.), *Ensermu K. & Aschalew G.* 3997 in part (ETH!) - see note.

3. *Barleria negeleensis* Ensermu & I.Darbysh., Kew Bull. 73(1)-1: 16. 2018.

Type: Ethiopia, Sidamo Region, Borana, 31 km from Negele towards Filtu, 05°13'N, 39°47'E, 14 Dec. 1990, *Sebsebe D. & Ensermu K.* 2658 (holotype ETH!; isotype K! [K000963717]).

(=) *Barleria* sp. [= *Sebsebe D. & Ensermu K.* 2658] *sensu* Ensermu in Fl. Ethiopia & Eritrea 6: 416. 2006.

For a full description and illustration, see Ensermu and Darbyshire (2018: 16, Fig. 6).

Distribution

This species is restricted to the southeastern portion of Oromia regional state (BA and SD floristic

regions) of southern Ethiopia, centered on the town of Negele. Fig. 3.

Habitat and Ecology

This species occurs in open grassland and grassy-scrub with scattered *Senegalia*, *Vachellia*, *Combretum*, *Commiphora* and/or *Terminalia* or in denser *Senegalia-Vachellia-Commiphora* woodland with *Barbeya oleoides* Schweinf., in sandy soil overlying granite or on limestone; 1400–1700 m elevation.

Conservation status

This rare and localized species with an EOO of only 2,117 km² is assessed as **Endangered** under criteria B: **EN B1ab(iii)+2ab(iii)** on the IUCN Red List (Darbyshire and Roberts 2023). Threats include habitat loss and degradation from both the expansion of human residential infrastructure and the expansion of agriculture.

Taxonomic notes

The collection from Bale Region, *Friis et al.* 11071, is currently considered to be a depauperate specimen of this species, although the inflorescence is less densely hairy than in other flowering specimens, with shorter bristly eglandular hairs, and the leaves dry a darker green tinged purple, whilst the Sidamo material has yellow-green leaves. Further material from the Bale site is desirable; it may be a distinct regional form or a further species in this complex.

For phylogeographic affinities of this species, see note under *Barleria filtuensis*.

Additional specimens examined

ETHIOPIA. Sidamo Region: near Wadera, 6 Jan. 1959 (fr.), *H. F. Mooney* 7706 (EA!, ETH!, PRE!); Borana Awraja, 42 km SW of Negele Borana, along the road leading to Wellensu [Wolensu] Ranch, 24 Dec. 1981 (fl.), *Mesfin T. & Tewolde B. G. E.* 2636 (ETH!); Bale Region: c. 52 km N of Sidambale Bridge towards Dolo Menna, 5°55'N, 39°37'E, 20 Dec. 2002 (fl.), *I. Friis et al.* 11071 (C!, ETH!, K! [K000963716]).

4. *Barleria puberulifolia* Defty & I.Darbysh., **sp. nov.**

Type: Somalia, N Somalia site A/10, 09°56'N, 45°40'E, 23 June 1981 (fl.), *J. B. Gillett & R. M. Watson* 23592 (holotype K! [K001295248]; isotype EA! [EA000043816]); Figure 5.

Diagnosis

Barleria puberulifolia is most likely to be confused with *B. negeleensis* but differs in (1) the young stems

being puberulous with minute appressed hairs (versus being pubescent with long ascending bristly hairs); (2) the leaves being puberulent with minute appressed hairs 0.1–0.15 mm long (versus pubescent with long ascending bristly hairs 1.1–2 mm long); (3) the leaves having inconspicuous venation with 2 (–3) lateral veins per side (versus having prominent venation with 4 (–5) lateral veins per side); (4) the bracts towards the base of the spike being lanceolate to linear-lanceolate, 21.7–28 × 2.5–6 mm, eventually turning linear-spinose at the apex of the inflorescence (versus the bracts at the base of the spike being ovate to oblong-elliptic, 22–40 × 8.5–17 mm, eventually turning oblanceolate towards the apex of the inflorescence); (5) the corolla being shortly puberulous externally (versus glabrous externally); and (6) the leaves being lanceolate to obovate or ovate-elliptic, 23–28 × 6.2–11 mm, length: width ratio 2.5–3.7: 1 (versus leaves linear-oblong to narrowly oblong-elliptic, 50–140 × 10–27 mm, length: width ratio 3.7–5.2: 1). See Table 2.

Barleria puberulifolia may also be confused with *B. quadrispina*, but it can easily be separated by (1) the leaves being densely puberulous with minute appressed hairs (versus strigose at least on the margin, often also on the veins beneath); (2) the inflorescence being more densely glandular-hairy (versus glandular hairs absent to sparse in the inflorescence except in subsp. *kenyana* where they are more numerous, but not so dense as in *B. puberulifolia*), and (3) the corolla being shortly puberulous externally (versus glabrous externally).

Description

Harshly spiny compact subshrub, 10–30 cm tall; young stems 4-angular, silvery appressed-puberulous, hairs 0.1–0.2 mm long; mature stems woody, up to 3–5.2 mm in diameter. *Axillary spines* numerous, beige-white, stalk 2–14 mm long, 4-rayed, rays of similar length, straight, longest ray 27–41 mm long. *Leaves* on short, ill-defined petioles 1.6–1.7 mm long, these silvery appressed-puberulous; blade lanceolate to obovate, 23–28 × 6.2–11 mm, (length: width ratio 2.5–3.7: 1), base attenuate to obtuse, margin entire, apex acute to slightly attenuate with apical spine 1.1–2.7 mm long, both surfaces densely (sub-) appressed-puberulous, hairs 0.1–0.15 mm long; lateral veins 2 (–3) per side, ascending, inconspicuous. *Inflorescences* terminal, shortly spiciform or subcapitate, 3.5–4.5 cm long, each axil multi-flowered, flowers sessile; bracts towards base of inflorescence lanceolate to linear-lanceolate, 21.5–28 × 2.5–6 mm including spine tip 4–9 mm long, bracts becoming linear-spinose distally, with short appressed to patent white eglandular hairs both adaxially and abaxially and with patent glandular hairs often longer than eglandu-

lar hairs but variable in length, 0.2–1 mm long; bracteoles greenish white, linear, spinose, 20–22 × 1.5–2 mm, including spine tip 5–5.5 mm long, with patent to retrorse eglandular hairs 0.1–0.2 mm long and patent glandular hairs 0.3–0.8 mm long. *Calyx* (one calyx measured) pale green-white; anterior lobe lanceolate, ± 13.2 × 4 mm including purple, bifid spine tip 3.2 mm long, external surface with patent long glandular and short eglandular hairs abaxially, midrib and parallel veins prominent internally, only midrib prominent externally; posterior lobe as anterior lobe but ± 15.5 × 5 mm including spine tip 4.1 mm long; lateral lobes narrower, lanceolate to linear-lanceolate, 11.6–11.9 × 1.5–1.6 with spine tip 3.6–3.8 mm long, apices attenuate. *Corolla* white to deep blue, ± 30 mm long (one corolla measured), with short appressed hairs externally, most dense on the throat; tube cylindrical, ± 20 mm long, ± 4.5 mm diameter; limb in “4+1” configuration; abaxial lobe not sufficiently preserved for measurement in specimens examined; lateral lobes obovate, ± 12 × 7 mm, apices acute; adaxial lobes obovate, 12–13.5 × 5.6–5.7 mm, apices broadly acute. *Stamens* inserted ± 6.5 mm from base of corolla tube; filaments of long stamens ± 14.7 mm long, sparsely pubescent at base; anthers 2.5–2.6 mm long; short lateral stamens with filaments 2.2–3.2 mm long, antherodes ± 1 mm long. *Ovary* not seen; style glabrous, ± 21.5 mm long; stigma linear, 0.8–0.9 mm long. *Capsule* (one capsule measured) ± 11.5 mm long including short beak ± 4 mm, external surface with short white hairs distally, glabrous proximally, 2-seeded; seeds ± 5.6 × 4.9 mm, with dense indumentum of wavy golden hygroscopic hairs.

Etymology

The species epithet “*puberulifolia*” refers to the indumentum of minute (sub) appressed hairs on the foliage of this species, an unusual feature in the *Quadrispina* clade.

Distribution

Barleria puberulifolia is distributed in the Bari, Mudug, Nugal, Sanaag, and Togdheer regions of Somalia (N1, N2, N3 and C1 floristic regions). Fig. 3.

Habitat and Ecology

This species occurs in *Senegalia-Commiphora* bushland and on open rocky areas, including on limestone ridges and slopes, often in cracks in the rock and along drainage lines and small water courses. Associated plants include: *Buxus hildebrandtii* Baill., *Commiphora* spp., *Dodonaea viscosa* Jacq., *Dracaena ombet* Kotschy & Peyr. subsp. *schizantha* (Baker) Bos, *Euryops* sp., *Periploca* sp., *Sideroxylon mascat-*

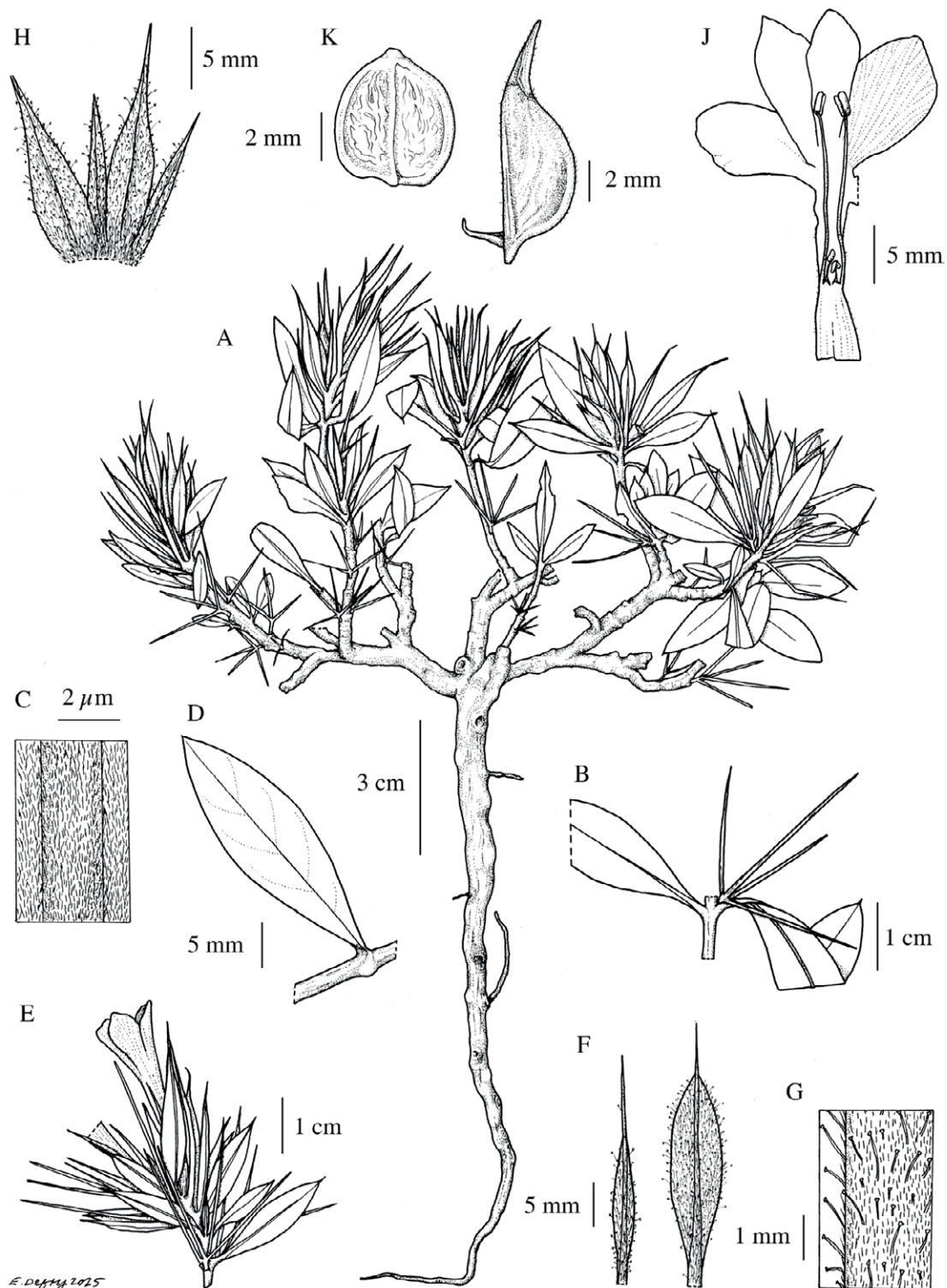


Figure 5. *Barleria puberulifolia*. A. Habit, mature stamens and leafy branches, including broken spines. B. Stem node with leaves, abaxial surfaces, and axillary spine. C. Leaf indumentum, adaxial surface. D. Leaf in situ, adaxial surface, indumentum omitted. E. Inflorescence, flowering, with axillary spine at base. F. Bracteole (l) and bract (r), with indumentum. G. Detail of bract indumentum. H. Dissected calyx, with indumentum. I. Dissected corolla with androecium, abaxial corolla lobe not preserved. K. Seed, with hygroscopic hairs, and capsule valve. A–D, F–H. from J. B. Gillett & R. M. Watson 23592 (K, holotype); E and J. from C. F. Hemming & R. M. Watson 3309 (K); K. from P. R. O. Bally & R. Melville 15466 (K). Drawn by Ellie Defty.

ense (A.DC.) T.D.Penn. and *Tarchonanthus camphoratus* L., as well as succulents including *Aloe* spp., *Euphorbia* spp., *Kalanchoe* spp. and *Pyrenacantha malvifolia* Engl. It occurs at elevations of (200–) 750–1590 m.

Conservation status

This species is widespread but highly scattered in northern Somalia, with an extent of occurrence (EOO) of 80,740 km² but an area of occupancy (AOO) of only 20 km² based on known occurrence data. Despite the relatively large EOO, this species' highly restricted AOO suggests it could be vulnerable to potential threats, although it may also reflect limited botanical exploration in this part of Somalia. The region is affected by low to medium density agropastoralism which can lead to habitat degradation through overgrazing. However, this species' preference for rocky ridges and slopes may afford it some protection from human disturbance. Given its restricted AOO, its estimated 5–6 threat-based locations and the potential threats from agropastoralism, *B. puberulifolia* is likely to qualify as **Vulnerable** under criterion B: **VU B2ab(iii)**.

Taxonomic notes

Hedrén (2006a) noted that this taxon differs from typical *B. quadrispina* in being a low shrub with very short internodes, having greyish-green leaves covered by a dense indumentum of minute appressed hairs and in the bracteoles having a fairly well-developed blade and ± abruptly narrowed into the apical spine and in having patent glandular hairs 0.2–0.3 mm long. He cited the specimens *Lavranos & Carter 24630* (N3), *Hemming & Watson 3309* (N2) and *Gillett et al. 22097* (C1), but we believe this last specimen is cited in error and should have read *Gillett & Watson 23592* (N1). Hedrén (l.c.) maintained these specimens within *B. quadrispina* as he argued that they differ amongst themselves in other characters such as spine length and that they are connected with some forms of *B. quadrispina* and show intermediacy in at least some of these characters. However, we do not find this to be the case and the combination of minute appressed hairs, inconspicuous leaf venation of 2 (–3) veins per side, long glandular hairs and short eglandular hairs on the bracts, bracteoles and calyx and shortly puberulous indumentum on the external surface of the corolla is diagnostic. This new species is also superficially similar to *B. negeleensis* from SE Ethiopia (see above) but the two are readily separated by the characters listed in the diagnosis above.

P. R. O. Bally 9571 (EA! [EA000043817], K! [K001295251]) from 44 miles N of Dusa Mareb in the

C1 region of Somalia is similar to this species but it differs in having a spreading puberulous leaf indumentum when mature, larger leaves with more prominent venation beneath and a prominent purple leaf spine tip. Further, more complete material from this population is required to determine if it belongs here or is a distinct species.

Additional specimens examined

SOMALIA. 95 km E of Sinugif, 40 km NW of Eil airstrip, 1 Jan. 1973 (fl.), *P. R. O. Bally 15466* (K! [K001295253]); L76 140 km WSW of Erigavo, 10°24'N, 46°06'E, 27 Nov. 1980 (fl.), *C. F. Hemming & R. M. Watson 3309* (EA! [EA000043815], K! [K001295249]); 114 km N of Garoe on road to Gardo, 5 km S of Dan Goreyo, 08°41'N, 49°18'E, 12 Nov. 1986 (fl.), *J. Lavranos & S. Carter 24630* (K! [K001295250]); Mudug, Garoe–Belet Huen, bei Galcayo, 200 – 300 m, 15 Dec. 1987 (fl.), *B. Gabriel s.n.* (B* [B101161468]); Nogal/Mudug, Gardo – Garoe, 24 March 1989 (fl.), *B. Gabriel s.n.* (B* [B101161476]).

5. *Barleria quadrispina* Lindau in *Annuario Reale Ist. Bot. Roma* 6: 72. 1896.

Clarke in *Fl. Trop. Afr.* 5: 147. 1899, pro parte, excl. *Donaldson-Smith s.n.* ex Turfa. Milne-Redhead in *Hook. Ic. Pl.* 33: t. 3293. 1935. Ensermu in *Fl. Ethiopia & Eritrea* 6: 416, fig. 166.30. 2006, pro parte. Hedrén in *Fl. Somalia* 3: 438, fig. 292. 2006, pro parte. Darbyshire in *Fl. Trop. East Afr., Acanthaceae* (Part 2): 432. 2010.

Type: Ethiopia, Harar, 1889 (st.), *L. Robbecchi-Bricchetti 10* (lectotype B*, chosen by I. Darbyshire in *Fl. Trop. East Afr., Acanthaceae* (Part 2): 432 [2010], photo. at K!; isolectotype FT! [FT003197]).

Additional syntype, not selected as lectotype: Ethiopia, Vallata di Mil Mil, 9 Jan. 1893 (st.), *D. Riva 1065* (FT! [FT003198]).

(=) *Barleria setigera* Rendle in *J. Bot.* 34: 395. 1896.

Type: Ethiopia, Darar, 15 Sept. 1894 (fl.), *A. Donaldson-Smith s.n.* (holotype BM! [BM000931070]).

(=) *Barleria setigera* Rendle var. *pumila* Rendle in *J. Bot.* 34: 396. 1896.

Type: Ethiopia, Okoto, 8 Sept. 1894 (fl.), *A. Donaldson-Smith s.n.* (holotype BM! [BM000931069]).

Description

Compact spiny subshrub 8–40 cm tall; young stems green to brown, 4-angular, largely glabrous or with many short spreading white hairs, nodes often strigose. *Axillary spines* beige-white, subsessile or stalk to 12 mm long, rays 4 (–6), straight or ascending, longest ray 10–29 mm long. *Leaves* sessile or on petioles to 9 mm long; blade oblanceolate, obovate or narrowly oblong-elliptic, (17–) 20–76 × 8–24 mm (length: width ratio 2–6.5: 1), base cuneate or attenuate, apex acute to rounded, mucronate, strigose at least on the margin, often also on the veins beneath, hairs unbranched; lateral veins 3–6 per side. *Inflorescences* terminal, ± densely spiciform or subcapitate, 2–6.5 (–10) cm long, each axil 3–7 flowered when mature, subsessile or peduncle to 2 (–4.5) mm long; bracts of lower axils foliaceous, becoming smaller upwards where green to whitish, (linear-) oblanceolate, 12–40 × 1.5–7 mm (length: width ratio 3.7–9 (–12.5): 1), apex spinose, margin and midrib with coarse appressed to spreading hairs with or without a bulbous base, external surface sometimes with patent glandular hairs, hairs unbranched, broad sessile glands occasional or absent towards base; bracteoles erect or ascending, linear (–lanceolate) or oblanceolate, 9–32 × 0.5–4 mm, short peduncle of lateral cyme branches fused to subtending bracteoles; flowers subsessile or pedicels 3 mm long. *Calyx* greenish-brown or green to glaucous, anterior lobe 5.5–14.5 mm long, basally ovate or lanceolate where 1.5–3 (–4) mm wide, then abruptly or rarely gradually narrowed into a flexible spine, this sometimes bifid, external surface glabrous to eglandular- and/or glandular-pubescent, with or without coarse, ± bulbous-based hairs along margin, venation inconspicuous; posterior lobe as anterior, but 6.5–17 × 1–3.6 mm; lateral lobes 5–12.5 × 0.8–1.2 mm. *Corolla* white, blue or purple, 17–34 mm long, glabrous externally, tube cylindrical, 11.5–20 mm long; limbs in weak “4+1” configuration or subregular, abaxial lobe offset by 0.5–4 mm, oblanceolate, 10–17 × 4.5–12 mm, apex acute; lateral lobes as abaxial lobe but 4–10.5 mm wide; adaxial lobes narrower, 3–8 mm wide, apices obtuse. *Stamens* inserted 4.5–10 mm from base of corolla tube; filaments of long stamens 16–23 mm long, shortly pubescent at least in proximal half; anthers 1.5–2.5 (–3) mm long; short lateral stamens with filaments 1–2.7 mm long, pubescent, antherodes 0.5–0.9 mm long. *Ovary* and style glabrous; stigma 0.4–0.7 mm long. *Capsule* 9–11 mm long, including beak 3–3.5 mm long, glabrous; seeds 3.7–5 × 2.5–4 mm.

Distribution (for species)

This species is widespread within the African portion of the Horn of Africa biodiversity hotspot, where it is known from eastern and northern Ethiopia (AF, BA,

GG, HA, SD, SU and TU floristic regions), Somalia (N1, N2, C1, C2, S1 and S2 floristic regions) and northeast Kenya (K1 floristic region). Fig. 6.

Taxonomic and nomenclatural notes (for species)

As noted by Darbyshire et al. (2010), there is some uncertainty over the priority of the names *Barleria quadrispina* and *B. setigera*, both of which were published in 1896. The month of publication of *B. setigera* is noted to be September (in Journal of Botany 34: 393, immediately before the paper of Rendle [1896] where *B. setigera* is described). The month of publication of *B. quadrispina* by Lindau (1896) is not recorded, although the manuscript is marked “finito di stampare il 30 Dicembre 1895” (p. 83; “finished printing on 30 December 1895”) and a handwritten note on the Kew copy of this work states “presumably published early 1896”. It is therefore reasonable to consider that the name *B. quadrispina* has priority.

a. *Barleria quadrispina* Lindau, Annuario Reale Ist. Bot. Roma 6 : 72. 1896.

subsp. *quadrispina**Description*

Leaves obovate to oblanceolate or oblong-elliptic, (17–) 20–56 (–76) mm; length: width ratio 2.3–6.2: 1. *Bracts and bracteoles* typically drying green (–brown) or somewhat glaucous, with coarse eglandular hairs, sometimes bulbous-based along margin, midrib and veins and/or short glandular hairs; short eglandular hairs absent; bract length: width ratio 3.7–9: 1 at midpoint. *Calyx* green or somewhat glaucous; eglandular hairs present along margins, sometimes bulbous based, sometimes with glandular hairs on external surface, or glabrous; anterior lobe 5.5–9.9 × 1.5–1.9 mm, posterior lobe 6.5–10.3 × 1.8–2.5 mm. *Corolla* bluish-purple or white, 17–30 mm long.

Distribution

This subspecies is widespread in Ethiopia, mainly to the east of or within the Rift Valley, (AF, BA, GG, HA, SD and SU floristic regions), but also with one record from west of the Rift in Tigray regional state (TU floristic region). There are also some records from the Togdheer and Woqooyi Galbeed Regions of northern Somalia (N1 floristic region). Fig. 6.

Habitat and Ecology

This subspecies occurs primarily in *Senegalia-Vachellia-Commiphora* bushland and dense or open

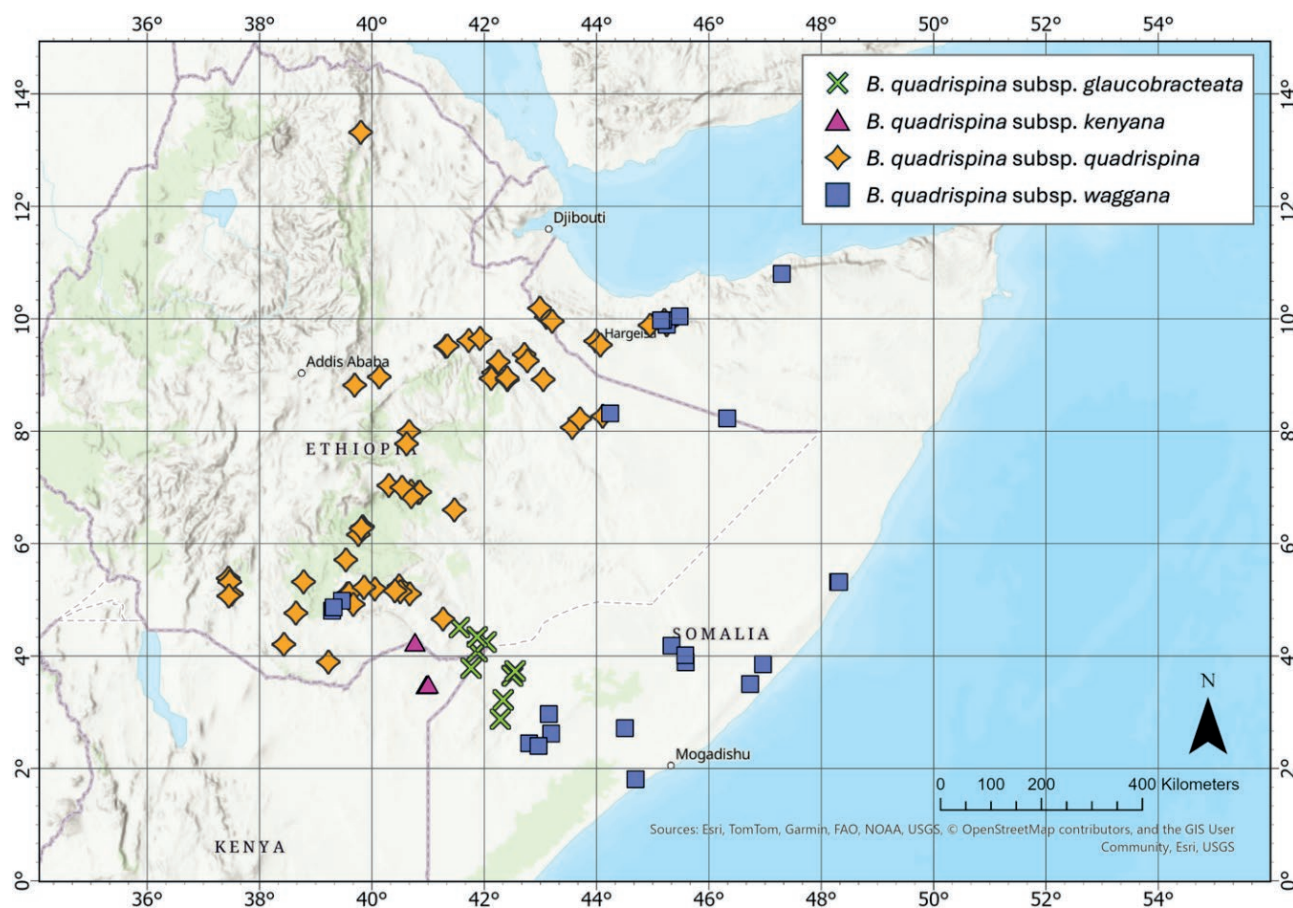


Figure 6. Geographic distribution of the subspecies of *Barleria quadrispina* in northeastern Africa.

thicket, on sandy, gravelly or stony soils including over limestone, at elevations of 250–1780 m.

Conservation notes

This subspecies has an area of occupancy (AOO) of 224 km² and an extent of occurrence (EOO) of 493,576 km². It is locally common in a range of dry bushland habitats and is assessed as **Least Concern (LC)**.

Taxonomic notes

The specimen Friis *et al.* 10719 is the only collection seen from Tigray floristic region and is disjunct from other populations of *Barleria quadrispina*, being the only population known from west of the Rift Valley. This is from an unusual site near Ab'ala with “limestone pavement”, i.e., a flat area with limestone broken up into tile-like sections. This habitat has not been recorded elsewhere in Tigray; the locality is on the eastern escarpment of the Ethiopian highlands, and geological structures that are elsewhere covered by the basalt may be

exposed here (I. Friis, pers. comm., 2024). Therefore, it seems correct that this is an isolated record rather than *B. quadrispina* being under-recorded in Tigray.

It should also be noted that the specimens Puff *et al.* 820913 (Shewa floristic region), Friis *et al.* 12358 (Afar) and Burger 887 (Harar) are also geographically somewhat disjunct, being located in or on the edge of the Ethiopian Rift Valley. These specimens appear slightly different in gestalt, and tend towards *B. waggana* in having rather numerous bulbous-based hairs on the inflorescence but are otherwise closer to subsp. *quadrispina*.

Additional specimens examined

ETHIOPIA. Jijiga road, without date (fl.), *Imp[erial] Coll[ege] Agric[ulture] D-11* (EA!); Harar Province, Erer River area 60 km W of Dire Dawa on highway to Addis Ababa, 09°31'N, 41°25'E, 11 Sept. 1961 (fl.), W. Burger 887 (HUHE, K! [K001295184]); 10–5 km N of Midaga, S of Harar, 08°47'N, 42°10'E, 14 Oct. 1962 (fl.), W. Burger 2200 (K! [K001295180]); S of Midaga, on plateau S of

- Harar, 08°47'N, 42°10'E, 14 Oct. 1962 (fl.), *W. Burger* 2224 (ETH!, K! [K00129578]); Erer valley 22 km SE of Harar on highway to Djidjiga, 09°14'N, 42°15'E, 18 Oct. 1962 (fl.), *W. Burger* 2224 (K! [K00129579]); Haraghie [Harar] Province, 6 km NW of Aware, 69 km SE of Degehabur, 11 June 1973 (fl.), *M. G. Gilbert* 2061 (EA!, ETH!, K! [K001295177]); Harerge [Harar], 68 km from Dire Dawa on road through Afdem to Addis Ababa, 1 km from Gota, 24 Sept. 1980, *Ensermu K. & Tamirat B.* 360a (UPS!); Sidamo, 33 km from Neghelle [Negele], along the road to Filtu, 20 May 1982 (fl.), *I. Friis, Mesfin T. & K. Vollesen* 3156 (ETH!); at the Wells El Siro, 11 km from the turn off from the Neghelle [Negele]–Filtu road, 85 km from Neghelle [Negele], 22 May 1982 (fl.), *I. Friis, Mesfin T. & K. Vollesen* 3193 (ETH!, K! [K001295194]); Yerer & Kereyu Awr., 162 km from Addis Ababa, towards Awash Stn., Caldera (nr. “Garibaldi pass”), 08°51'N, 39°58'E, 13 Sept. 1982 (fl.), *C. Puff, Ensermu K. & J. Dawe* 820913-2/11 (ETH!, K! [K001295188]); Bale, Web valley at Sof Omar, 6°50'N, 40°42'E, 9 Nov. 1982, *M. Hedrén* 668 (UPS!); Bale, Goro, 7°00'N, 40°32'E, 9 Nov. 1982, *M. Hedrén* 670 (UPS!); 65 km from Negele on road to Filtu, 05°11'N, 40°08'E, 16 May 1983 (fl.), *M. G. Gilbert, Ensermu K. & K. Vollesen* 7439 (ETH!, K! [K001295198]); Sidamo, El Siro Water-holes, 101 km from Negele, 11 km N of road to Filtu, 04°53'N, 40°54'E, 22 May 1983 (fl.), *M. G. Gilbert, Ensermu K. & K. Vollesen* 7720 (ETH!, K! [K001295196], UPS!); El Siro Water-holes, 101 km from Negele, 11 km N of road to Filtu, 04°53'N, 40°54'E, 22 May 1983 (fl.), *M. G. Gilbert, Ensermu K. & K. Vollesen* 7722 (ETH!, K! [K001295197], UPS!); Bale, 97 km from Robi on road to Ghinir, 06°55'N, 40°47'E, 27 May 1983 (fl.), *M. G. Gilbert, Ensermu K. & K. Vollesen* 7832 (ETH!, K! [K001295192]); Bale, 2 km before Sof Omar in Web Gorge, 36 km from Ghinir on road to Robi, 06°54'N, 40°50'E, 28 May 1983 (fl.), *M. G. Gilbert, Ensermu K. & K. Vollesen* 7856 (ETH!, K! [K001295189], UPS!); Bale, 14 km E of Goro on road from Ginir & Sof Omar (in Web Gorge) to Robe, 06°55'N, 40°42'E, 1 June 1983 (fl.), *M. G. Gilbert, Ensermu K. & K. Vollesen* 8017 (ETH!, K! [K001295190]); Harerge [Harar] Region, Dire Dawa, Isa and Gurgura Awr., 4 km from Dire Dawa on the road to Harer/Addis Abeba, 18 Sept. 1985 (fl.), *Ensermu K.* 1350 (ETH!); Bale Region, Delo Awraja, ca. 19 km on Dello Mena – Negelle [Negele] Borena road, 06°29'N, 39°44'E, 9 June 1986 (fl.), *Mesfin T.* 4486 (ETH!); Harar, Gursum Awr., 35 km S of Babile on the road to Fik, 21 Jan. 1987 (fl.), *Ensermu K. & Petros E.* 1899A (ETH!); *idem*, *Ensermu K. & Petros E.* 1899B (ETH!); Wabe Awr., road Robe to Ginnir (via Goro, 58 km and S of Omar), km 104 – 106 (Sof Omar area; Weyb gorge), 06°55'N, 40°51'E, 12 May 1987 (fl.), *C. Puff et al.* 870512-4/17 (ETH!); Hararghe [Harar], Harer Zuriya Wr., 58 km from Harer (34 km from Fedis) on the road to Midega, 23 Sept. 1987 (fl.), *Ensermu K. & Petros E.* 1960A (ETH!); *idem*, *Ensermu K. & Petros E.* 1960B (ETH!); Bale, 38 km from Goro towards Sof Omar and Ginir, 07°02'N, 40°18'E, 8 Nov. 1988 (fl.), *I. Friis, A. Michelsen & Sebsebe D.* 5760 (ETH!); Awash National Park, close to Gotu, Park headquarters, 29 Sept. 1989 (fl.), *P. Nystrom* 72 (ETH!); Gama Gofa, 6 km from Konso on road to Arba Minch, 05°23'N, 37°11'E, 8 Oct. 1989 (fl.), *M. G. Gilbert & S. Phillips* 9140 (ETH!, K! [K001295206], UPS!); Sidamo, Welensu cattle Ranch, 68 km S of Negelle [Negele] (42 km off the main Negelle [Negele] – Melka Guba Road after 26 km), 04°55'N, 39°40'E, 19 Dec. 1990 (fl.), *Sebsebe D. & Ensermu K.* 2814 (ETH!); Sidamo, 30 km from Mega towards Negelle [Negele], 04°12'N, 38°20'E, 20 Dec. 1990 (bud), *Sebsebe D. & Ensermu K.* 2864 (ETH!); Eastern Hararghe [Harar] region, Dhurwale, 24 km SW of Kebri Beyah, 8°55'N, 43°03'E, 3 Nov. 1992 (bud), *P. Kuchar & Mahdi M. Kidar* 18120 (ETH!); Eastern Hararghe [Harar] Region, Jijiga, 10 km S on highway from Xadow (Hado), 09°18'N, 42°39'E, 5 Nov. 1992 (fr.), *P. Kuchar & Mahdi M. Kidar* 18203 (ETH!); *idem*, *P. Kuchar & M. Kidar* 18216 (ETH!); Eastern Haraghe [Harar] Region, Jijiga, Ghiba, 11 km SSW of Jijiga, 09°15'N, 42°46'E, 27 Oct. 1993 (fl.), *P. Kuchar & Mahdi M. Kidar* 19894 (ETH!); *idem*, *P. Kuchar & Mahdi M. Kidar* 19895 (ETH!); Eastern Hararghe [Harar] Region, 17 km S of Dhegabor, 08°04'N, 43°34'E, 12 Nov. 1993 (fl.), *P. Kuchar & Mahdi M. Kidar* 20091 (ETH!); Eastern Hararghe [Harar] Region, 16 km on rd from Dhegabor to Falfal, 08°13'N, 43°42'E, 24 Nov. 1993 (fl.), *P. Kuchar & Mahdi M. Kidar* 20313 (ETH!); Bale, 32–33 km from Dalo Manna on the road to Negelle [Negele], 27 May 1994 (fl.), *Ensermu K. & Melaku W.* 2817 (ETH!); Sidamo, Borana, 18 km on the Filtu–Negelle [Negele] road, 12 May 1995 (fl.), *Ensermu K., Z. Gowler & Lemessa K.* 3223 (ETH!); Sidamo, Borana, 68–70 km from Negelle [Negele] around the ?deroofed cattle ranch buildings, 14 May 1995 (fl.), *Ensermu K., Z. Gowler & Lemessa K.* 3242 (ETH!); Sidamo, 1.2 km SE of Filtu on the road to Bokol Mayo, 24 May 1996 (bud), *Ensermu K. & Dessalegn D.* 3656 (ETH!); Sidamo Region, ca. 65 km E of Yavello on the road to Arero, 04°46'N, 38°37'E, 11 Dec. 1997 (fl.), *I. Friis et al.* 8550 (ETH!, K! [K001295201]); Sidamo Region, ca. 50 km N of Moyale along the tract to Wachile and past El Gof, 03°57'N, 39°05'E, 21 Dec. 1997 (bud), *I. Friis et al.* 8770 (ETH!, K! [K001295208]); Sidamo Region, ca. 10 km from Brindi along the new road to Teltele, 05°06'N, 37°30'E, 9 Dec. 1998 (fl.), *I. Friis et al.* 9367 (ETH!, K! [K001295207]); Sidamo, 33–35 km from

Negelle [Negele] on the road to Filtu, 1 June 2001 (fl.), *Ensermu K. & Assefa H.* 4361 (ETH!); ca. 10 km E of Ab'ala on a track leading into the Afar and said ultimately to lead to Afrera (Afdera), 13°19'N, 39°48'E, 17 Oct. 2001 (fl.), *I. Friis et al.* 10719 (K! [K001295183], UPS!); Bale region, ca. 10 km S of Dolo Menna (Masslo) towards Sidambale Bridge, 06°18'N, 39°50'E, 21 Dec. 2002 (fl.), *I. Friis et al.* 11077 (K! [K001295191]); ca. 15 km towards Wolensu from turn off from the road from Negelle [Negele] towards Melka Guba, 05°01'N, 39°46'E, 23 Dec. 2002 (fl.), *I. Friis et al.* 11105 (K! [K001295200]); ca. 15 km towards Wolensu from turn off from the road from Negelle [Negele] towards Melka Guba, 05°01'N, 39°46'E, 23 Dec. 2002 (fl.), *I. Friis et al.* 11106 (K! [K0012952199]); Oromiya Region, Sidamo, 28 km on Melka Guba road from turn off from Filtu road, 05°06'N, 39°34'E, 2 Oct. 2003 (fl.), *S. Bidgood et al.* 4962 (K! [K001295205]); 5 km W of Awash, 08°57.50'N, 40°07.50'E, 5 Oct. 2006 (fl.), *I. Friis, Wege A. & Ermias G.* 12358 (K! [K001295181], UPS!); 10 km NE of Dire Dawa towards Djibouti, 09°38.90'N, 41°55.40'E, 9 Oct. 2006, *I. Friis, Wege A. & Ermias G.* 12392 (K! [K001295182]); Sidamo, 8 km NE of Teltele towards Brindi and Yavello, 05°01'N, 39°46'E, 24 Nov. 2010 (fl.), *I. Friis et al.* 13874 (K! [K001295204]); Sidamo, 80 km E of Agere Mariam on road to Shakiso, 05°19.10'N, 38°46.90'E, 21 Nov. 2011 (fl.), *I. Friis et al.* 14091 (K! [K001295203]); Gamo Gofa, 3.5 km SE of Konso on road to Yavello, 05°19'N, 37°27.60'E, 23 Nov. 2011 (fl.), *I. Friis et al.* 14134 (K! [K001295202]); Sidamo, at Sidambale Bridge, 05°42.50'N, 39°32.10'E, 4 Dec. 2012 (fl.), *I. Friis et al.* 14761 (K! [K001295195]); Bale, Sheik Hussein to Methara, at bridge across the Webi Schebele River, 07°46.28'N, 40°36.90'E, 10 Dec. 2013 (fl.), *I. Friis et al.* 15093 (K! [K001295828]); Harar, Chisi / Shube Mts, north-eastern foothills, 07°58.90'N, 40°39.30'E, 10 Nov. 2015 (fl.), *I. Friis, Wege A. & Ermias G.* 15650 (K! [K001295827]); Bale, road Ginir-Imi, 115 km E of Ginir (just W of Lele Hills), 06°35.90'N, 41°28'E, 17 Nov. 2015 (fl.), *I. Friis, Wege A. & Ermias G.* 15701 (K! [K001295826]). - **SOMALIA.** Hargeisa, 09°34'N, 44°01'E, 23 Sept. 1932 (fl.), *J. B. Gillett* 3994 (K! [K001295219]); Hagare, NW of Borama, 10°12'N, 42°53'E, Aug. 1933 (fl.), *H. C. Godding* 82 (K! [K001295221]); Hargeisa, Locust Survey Camp, 20 Oct. 1949 (fl.), *K. M. Guichard in E.A.H.* 10682 (EA! [EA000043805], K! [K001295223]); 8 miles NW of Borama, 4 Oct. 1954 (fl.), *P. R. O. Bally* 9954 (EA! [EA000043807], K! [K001295226]); Hargeisa, 8 Oct. 1954 (fl.), *P. R. O. Bally* 10007 (K! [K001295224]); Waggar Mt., at foot of southern slope, 26 Oct. 1954 (fl.), *P. R. O. Bally* 10231 (K! [K001295222]); Garabgui (Karskoi) Hill, S of Upper Sheik, 8 Oct. 1957 (fl.), *P. R. O. Bally* 11804 (K!

[K001295225]); Hargeisa (Desert Locust Survey Base), Oct. 1961 (fl.), *C. F. Hemming* 2270 (EA! [EA000043803], K! [K001295220]); Togdheer, Sheikh, Bokh reserve, near water point, 09°53'N, 44°57'E, 20 Nov. 1979 (fl.), *O. J. Hansen, H. Heemstra & Abukar Sheikh* 6467 (EA! [EA000043802], K! [K001295217]); Borama, May 1972 (fl.), *J. R. I. Wood S/72/91* (EA! [EA000043819], K! [K001295218]).

b. *Barleria quadrispina* Lindau subsp. *waggana* (Rendle) Defty & I. Darbysh., **comb. & stat. nov.**

(=) *Barleria waggana* Rendle in J. Bot. 35: 377. 1897. C. B. Clarke in Fl. Trop. Afr. 5: 148. 1899.

Type: Somalia, Wagar [Wagga] Mt, 1897 (fl.), *E. Lort-Phillips s.n.* (holotype BM! [BM000931068]).

Description

Leaves mainly obovate, occasionally oblanceolate, 21–42 (–60) mm long; length: width ratio 2–2.7 (–3.7): 1. *Bracts and bracteoles* green, with bulbous-based eglandular hairs numerous along the margin, surface with long eglandular hairs only, glandular hairs and short eglandular hairs absent; bract length: width ratio 5.7–9 (–11.7): 1 at midpoint. *Calyx* green; marginal eglandular hairs with bulbous base; anterior lobe 12–14 × 1.8–2 mm, posterior lobe 14–16 × 2–2.4 mm. *Corolla* always bluish-purple, 18–23 (–30) mm long.

Distribution

This subspecies is recorded from Aware in eastern Ethiopia and the Malka Guba area of southern Ethiopia (HA and SD floristic regions respectively) and is widespread in Somalia (N1, N2, C1, C2, S1 and S2 floristic regions). Fig 6.

Habitat and Ecology

This subspecies occurs primarily in *Senegalia-Vachellia-Commiphora* dominated open bushland on coarse sandy soil. It is also recorded from granite and limestone slopes growing in shallow, stony or silty soil, at elevations of 80–850 m.

Conservation notes

This species has an area of occupancy (AOO) of 76 km² and an extent of occurrence (EOO) of 551,967 km². It is locally common in a range of dry bushland habitats, and is assessed as **Least Concern (LC)**.

Taxonomic notes

Subsp. *waggana* is usually easily separated from subsp. *quadriscina* in having a more densely and conspicuously hairy inflorescence with long bristly eglandular hairs, those along the margins of the bracts, bracteoles and calyces having a bulbous base; and in having usually short, obovate leaves. The two subspecies are mainly allopatric but they meet in northern Somalia (Somaliland) including at the type locality for subsp. *waggana*, “Wagga Mountain” where P. R. O. Bally has collected both taxa. Further, an isolated population of subsp. *waggana* around Malka Guba in Sidamo floristic region is well within the range of subsp. *quadriscina*, but this population is a close match to other populations of subsp. *waggana*. This subspecies may be more widespread in eastern Ethiopia which is heavily underbotanised at present.

Additional specimens examined

ETHIOPIA. Melca Guba [Malka Guba], at the Dawa Parma River, 16 May 1982 (fl.), *I. Friis, Mesfin T. & K. Vollesen 3002* (ETH!, K! [K001295209]); Eastern Haraghe [Harar] Region, Aware, 12 km from Aware, on road to Rabasso, 08°19'N, 44°14.5'E, 20 June 1993 (fl.), *P. Kuchar & Mahdi M. Kidar 19330* (ETH!); Sidamo, Malka Guba, 93 km from Negelle [Negele] to Wachile and Mega, 30 May 1996 (fl.), *Ensermu K. & Dessalegn D. 3793* (ETH!); Sidamo, 87 km from Negelle [Negele] on the road to Malka Guba, 04°59'N, 39°28'E, 5 June 2001 (fl.), *Ensermu K. & Assefa H. 4481* (ETH!). - **SOMALIA.** Golis range, 1895 (fr), *E. Lort Phillips s.n.* (K! [K001295233]); between Walwal & Sirauw, 27 Nov. 1944 (fl.), *P. E. Glover & H. B. Gilliland 410* (BM!, EA! [EA000043812], K! [K001295229]); Wagga Mt, at foot of S. slope, 26 Oct. 1954 (fl.), *P. R. O. Bally 10231A* (K! [K001295226]); Bohodle [Buuhoodle], S Border Road., 7 Dec. 1959 (fl.), *C. Ashall in E.A. 11927* (EA! [EA000043814], K! [K001295231]); Wogr [Wagga Mountain] near Sheikh, Nov. 1972 (fl.), *J. R. I. Wood S/72/99* (EA! [EA000043806], K! [K001295227]); 4 km N of Buloburte [Buloburde], 23 Dec. 1972 (fl.), *P. R. O. Bally & R. Melville 15292* (K! [K001295238]); site 'b', Janaale area, 3 Jan. 1978, *K. J. Virgo 34* (K! [K001295243]); slopes east of Gawan village, 05°19'N, 48°18'E, 30 May 1979 (fl.), *J. B. Gillett, C. F. Hemming & R. M. Watson 22257* (EA! [EA000043823], K! [K001295237]); Bay region, 2°57'N, 43°05'E, 17 Feb. 1982 (fl.), *J. J. Beckett & R. White 1794* (EA! [EA000043818]); crossroads 84 km NE of Haji Ali, 03°30.5'N, 46°44.5'E, 6 June 1983 (fl.), *J. B. Gillett & C. F. Hemming 24575* (EA! [EA000043820], K! [K001295236]); Hiiraan, Buloburte to Halgan,

June 1984, *P. Kuchar 16233* (EA! [EA000043813], UPS!); Hiiraan Region, Buloburte [Buloburde] District, 17 km NNE of Buqda Caqable [Buq Aqable], 04°11'N, 45°20'E, 4 July 1986, *P. Kuchar 17068* (EA! [EA000043808], FT!, K! [K001295234], UPS!); Mudug, E of Gawen, 29–30 km on road between Hobyo and Wisil, 5°19'N, 48°19'E, 28 May 1989, *M. Thulin & Abdi M. Dahir 6669* (UPS!); Galguduud, 18 km on road from Masagaweyn to Bud Bud, 03°50'N, 46°58'E, 10 May 1990 (fl.), *M. Thulin, M. Hedrén & Abdi M. Dahir 7420* (EA! [EA000043811], FT!, K! [K001295235], UPS!); Bay, 49 km from Buurhakaba [Buurhakaba] on road to Muqdisho [Mogadishu], 02°43'N, 44°30'E, 16 May 1990 (fl.), *M. Thulin, M. Hedrén & Abdi M. Dahir 7471* (EA! [EA000043809], FT!, K! [K001295241], UPS!); Bay, 80 km on road from Baydhabo [Baidoa] to Diinsoor [Dinsoor], 02°40'N, 43°14'E, 19 May 1990 (fl.), *M. Thulin, M. Hedrén & Abdi M. Dahir 7589* (EA! [EA000043810], FT!, K! [K001295240], UPS!); Bay, Buur Diinsoor, ca. 3 km SW of Diinsoor, 2°24'N, 42°58'E, 20 May 1990, *M. Thulin, M. Hedrén & Abdi M. Dahir 7638* (UPS!); Bay, ca. 20 km NW of Diinsoor [Dinsoor], area around Kurman village, 02°28'N, 42°48'E, 21 May 1990 (fl.), *M. Thulin, M. Hedrén & Abdi M. Dahir 7691* (K! [K001295242], UPS!); Bay, 39 km from Awdiinle to Qansaxdheere, 2°58'N, 43°09'E, 23 May 1990, *M. Thulin, M. Hedrén & Abdi M. Dahir 7759* (UPS!).

c. *Barleria quadriscina* Lindau subsp. *glaucobracteata* (Hedrén) Defty & I. Darbysh., comb. & stat. nov.

(=) *Barleria glaucobracteata* Hedrén in Willdenowia 36: 758. 2006. Hedrén in Fl. Somalia 3: 441. 2006.

Type: Somalia, Gedo Region, 7–8 km S of Luuq, 03°44'N, 42°33'E, 26 May 1988 (fl.), *Somali Medicinal Plant Project SMP 210* (holotype UPS!; isotype K! [K000430890]).

Description

Leaves oblanceolate or sometimes narrowly oblong-elliptic, (37–) 45–60 mm long; length: width ratio 3.2–3.8 (–4.6): 1. *Bracts and bracteoles* glaucous to whitish in dry state, with bulbous-based eglandular hairs along the margin, surface with short glandular hairs and with or without short eglandular hairs; length: width ratio 5.3–9 (–12.5): 1. *Calyx* glaucous to white; glabrous or occasionally very few glandular hairs on external surface; anterior lobe 11.8–13 × 1.8–2.2 mm, posterior lobe 13.7–17 × 1.8–2.4 mm. *Corolla* white, 28–34 mm long.

Distribution

This subspecies extends along the Jubba River catchment and is known from the southern Somali regional state of southern Ethiopia (SD floristic region), Gedo Region in Somalia (S1 floristic region), and Mandera District in Kenya (K1 floristic region), all in close proximity to the international borders between the three countries. Fig 6.

Habitat and Ecology

This subspecies is recorded from *Senegalia-Commiphora*, *Commiphora-Boswellia-Euphorbia* and other forms of bushland (e.g., with *Anisotes*, *Combretum*, *Cordia*, *Grewia*, *Jatropha*, *Lannea*, *Sesamothamnus* and *Ziziphus* spp.), typically on stony (-sandy) to gravelly soils over limestone or gypsum, at 150–500 m elevation. It has also been recorded in close proximity to riverine areas.

Conservation status

This subspecies has an area of occupancy (AOO) of 40 km² and an extent of occurrence (EOO) of 8,382 km². As such, it falls within the range threshold for Vulnerable (VU) under criterion B1 or Endangered (EN) under criteria B2 on the IUCN Red List. Overgrazing and collecting of wood for charcoal, firewood and house building pose a threat to its dry bushland habitats and have led to habitat degradation. This has been periodically enhanced by the migration of refugees and erection of refugee camps in the border areas between Somalia, Ethiopia and Kenya. We estimate 8–9 threat-based locations for this subspecies and, with a continuing decline in extent and quality of habitat, we therefore assess this subspecies as **Vulnerable** under criterion B: **VU B1ab(iii)+2ab(iii)**.

Taxonomic notes

As noted by Darbyshire et al. (2010), this form from the Ethiopia-Kenya-Somalia border region is distinctive in its strikingly pale bracts, bracteoles and calyces. It is also always a low-growing dwarf shrublet with dense foliage of oblanceolate to narrowly oblong-elliptic leaves and has white flowers that are at the larger end of the size range for *B. quadrispina*. This combination of characters is diagnostic as a distinct regional subspecies.

Additional specimens examined

ETHIOPIA. Sidamo, 24 km SW of Dolo on track to Suftu, 04°04'N, 39°32'E, 19 May 1983 (fl.), *M. G. Gilbert*, *Ensermu K. & K. Vollesen* 7590 (ETH!, K! [K001295210]); Sidamo, 1.5 km from Bokol Mayo towards Dolo Odo, 15 Dec. 1990 (fl.), *Sebsebe D. & Ensermu K.* 2705 (ETH!);

Sidamo, 13 km from Dolo Odo to Dolo Bay (2 km off the main road), 04°13'N, 42°09'E, 16 Dec. 1990 (fl.), *Sebsebe D. & Ensermu K.* 2744A (ETH!); Sidamo, 30.5 km NW of Dolo along the road to Bokol Mayo, 25 May 1996 (fl.), *Ensermu K. & Dessalegn D.* 3709 (ETH!); 27.7 km NW of Bokol Mayo along the road to Filtu, 109.3 km before Filtu, 27 May 1996 (fl.), *Ensermu K. & Dessalegn D.* 3732 (ETH!). - **KENYA.** 18 km SW of Mandera, 13 Dec. 1971 (fl.), *P. R. O. Bally & A. R. Smith* B14586 (EA!, K! [K004590691]). - **SOMALIA.** 54 km S of Garba Harre [Garbahare] on Bardera rd., 02°53'N, 42°17'E, 14/15 June 1983 (fl.), *J. B. Gillett & C. F. Hemming* 24772 (EA! [EA000043821], K! [K001295212]); JESS Site 61 east of R. Jubba, 17 km from Luuq bridge on 195°, 03°40'N, 42°30'E, 5 July 1987 (fl.), *C. F. Hemming & I. Deshmukh.* JESS 270 (EA! [EA000043800], K! [K001295254]); JESS Site 68, E of R. Jubba, 16.5 km from Luuq bridge on 200°, 03°40'N, 42°30'E, 9 July 1987 (fl.), *C. F. Hemming & I. Deshmukh.* JESS 323 (EA! [EA000043801], K! [K001295246]); Gedo, 20 km on road between Garbahare and Qansaxdheere [Qansahdhere], 5 June 1989 (fl.), *M. Thulin & Bashir A. Mohamed* 6918 (K! [K001295244], UPS!).

d. *Barleria quadrispina* Lindau subsp. *kenyana* Defty & I. Darbysh., subsp. nov.

Type: Kenya, 55 km SSW of Rhamu, 14 Dec. 1971 (fl.), *P. R. O. Bally & A. R. Smith* B14596 (holotype K! [K004590692]; isotypes BR! [BR0000019231198], EA!).

Description [Diagnosis]

Leaves lanceolate to narrowly oblong-elliptic, 60–107 mm long; length: width ratio 4–5: 1. *Bracts and bracteoles* green (-brown) to somewhat glaucous in dry state, with long glandular hairs and short eglandular hairs on surface; bract length: width ratio 9.6–10: 1 at midpoint. *Calyx* greenish-brown or turning whitish, with long glandular hairs and fine short eglandular hairs on external surface; anterior lobe 11.2–13 × 2.6–3 mm, occasionally bifid, posterior lobe (11.8–) 15–15.7 × 3–3.6 mm. *Corolla* bluish-purple or white, 26–32 mm long.

Distribution

This subspecies is currently only known from Mandera County in northeastern Kenya (K1 floristic region). Fig. 6.

Habitat and Ecology

This subspecies is recorded from dry *Senegalia-Vachellia-Commiphora* and mixed bushland and on

rocky ground, at ca. 600–800 m elevation. It potentially occurs on limestone; *Gilbert & Thulin 1628* is recorded from a site where the foot of the hills supports bushland on limestone with *Ipomoea donaldsonii* Rendle, *Euphorbia cuneata* Vahl and various *Senegalia*, *Vachellia* and *Commiphora* with scattered trees of *Delonix elata* (L.) Gamble and *Terminalia* sp.; the collection of this *Barleria* was recorded from the “lower slopes” at this site.

Conservation status

Based upon currently known observation data, this subspecies has an area of occupancy (AOO) of 12 km² and an extent of occurrence (EOO) of 162 km² and is known from only three collecting localities in Mandera District, Kenya, which are treated as separate locations. Satellite imagery shows little habitat degradation within the range of this subspecies, with agricultural activity and urban development observed in close proximity to only one of the locations. However, further botanical exploration is needed for this subspecies as data is limited and botanical exploration has been restricted to date. We therefore currently assess this subspecies as **Data Deficient (DD)**.

Taxonomic notes

This subspecies is separated from the other subspecies of *Barleria quadrispina* by the combination of its narrow leaves and rather numerous glandular hairs on the inflorescence. It warrants further collection to determine whether *kenyana* truly belongs as a subspecies to *B. quadrispina* or if it is a distinct species. It should be noted that the collection *Kirrika 118* is unusual in being a robust, large-leaved plant with a rather laxly branched inflorescence with pale axes and calyces, not observed in the two other specimens of this subspecies; it is possible that these inflorescences are somewhat malformed.

Additional specimens examined

KENYA. Dawa River, Murri, 30 June 1951 (fl.), *E. P. Kirrika 118* (EA!, K! [K004590694], PRE!); Mandera District, 48 km on the Ramu [Rhamu] – El Wak road, 03°31'N, 41°00'E, 9/10 May 1978 (fl.), *M. G. Gilbert & M. Thulin 1628* (EA!, K! [K004590693], UPS!).

6. *Barleria sebsebei* Defty & I. Darbysh., **sp. nov.**

Type: Ethiopia, Sidamo, Curre Liban, 28 km from junction of roads from Filtu & Wachile to Negele, 05°06'N, 39°32'E, 16 June 1986 (fl.), *M. G. Gilbert, Sebsebe D. & K. Vollesen 8257* (holotype K! [K001295213]; isotypes ETH!, UPS!); Figure 7.

Diagnosis

Barleria sebsebei is most likely to be confused with *B. quadrispina*, more specifically, subsp. *quadrispina* but differs in (1) the leaves being broadly elliptic to orbicular or occasionally ovate, 22–39 mm wide with a length: width ratio of 1.2–1.7: 1 (versus leaves narrower, 4–16 mm wide with length: width ratio 2.3–6.2: 1); (2) always having many and conspicuous broad sessile glands at the base of the bracts and bracteoles (versus sessile glands absent or rarely few present and inconspicuous); and (3) having a corolla length of 30–37 mm (versus 17–30 mm); see Table 1. Also similar to *Barleria ferox* but differing in (1) the axillary spines being less stout, sessile or stalked for up to 2 mm, with the longest rays being 11–22 (–29) mm long (versus axillary spines very stout, stalked for (4–) 8–16 mm, longest rays typically 22–32 mm long); (2) the leaves being broadly elliptic to suborbicular or occasionally ovate, 22–39 mm wide, length: width ratio 1.2–1.7: 1, with a minute apical spine up to 1 mm long (versus leaves oblong-elliptic or -obovate, 13–25 mm wide, length: width ratio 1.9–2.1: 1, apical spine 2–3 mm long); and (3) the anterior and posterior calyx lobes being lanceolate, being more gradually narrowed into the long apical seta, ± 8.5–11 mm long at flowering, external surface glabrous or with short ascending to appressed eglandular hairs concentrated proximally along midrib (versus anterior and posterior calyx lobes broadly ovate and abruptly narrowed into short apical seta, 4.2–5.5 mm long at flowering, external surface with scattered broad sessile glands).

Description

Spiny shrub, stems variously prostrate, spreading, erect or scandent, (0.4–) 1–2 m tall; young stems green to brown, 4-angular, sparsely pubescent with short bristly unbranched hairs, increasing in density at and immediately below nodes, most dense on two opposite sides, can be slightly retrorse, strigose at nodes; older stems woody, up to 7 mm in diameter. *Axillary spines* beige-white, sessile or stalk to 2 mm long, 4-rayed, rays of similar length or 2 longer, straight, longest ray 11–22 (–29) mm long. *Leaves* on petioles 0.7–1.4 cm long; blade broadly elliptic to suborbicular or occasionally ovate, 29–56 × 22–39 mm (length: width ratio 1.2–1.7: 1), base cuneate to obtuse, margin entire, apex acute to rounded, sometimes with a minute apical spine 0.5–1 mm long, adaxial surface often glabrous, sometimes with short fine hairs along midrib and veins, abaxial surface with short fine ascending hairs, most dense along veins, hairs unbranched, margins and occasionally midrib strigose; lateral veins 3–4 per side, strongly ascending, these and midrib prominent abaxially and adaxially. *Inflorescences* terminal, subcapi-

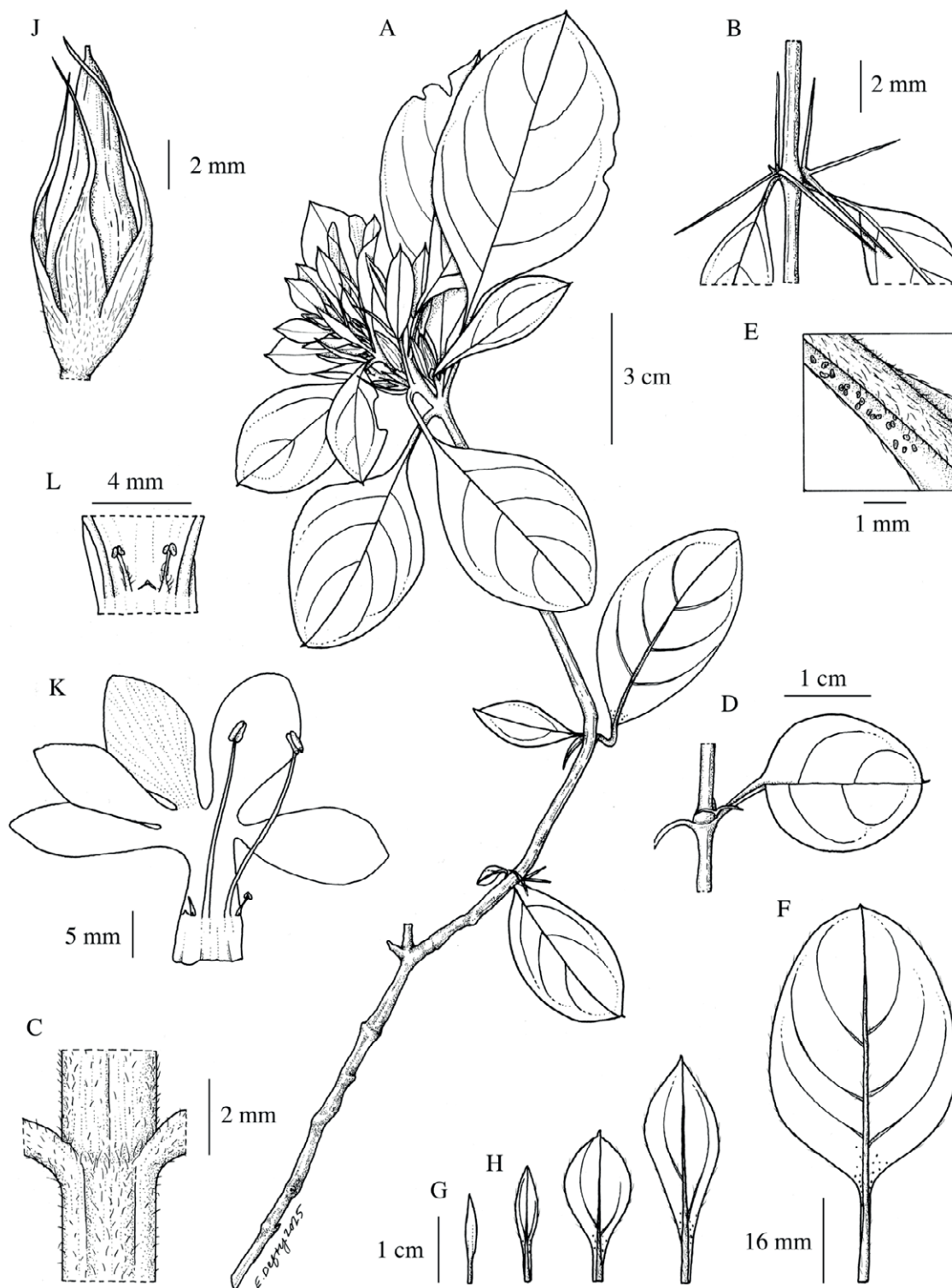


Figure 7. *Barleria sebsebei*. **A.** Habit, flowering branch. **B.** Stem node with proximal portions of leaves and with axillary spines. **C.** Young stem indumentum, at node. **D.** Leaf in situ, adaxial surface, with axillary spine. **E.** Leaf indumentum, base of abaxial surface with broad sessile glands. **F.** Proximal-most bract, abaxial surface. **G.** Bracteole. **H.** Bracts, variation in shape moving distally (l) to proximally (r), abaxial surfaces. **J.** Fruiting calyx with immature capsule. **K.** Dissected corolla with androecium, abaxial corolla lobe second from the right. **L.** Short lateral stamens and staminode. **A, C, E–H, K–L.** drawn from *M. G. Gilbert et al.* 8257 (K); **B** drawn from *I. Friis et al.* 14746 (K), **D.** drawn from *M. G. Gilbert & Sebsebe* D. 8628 (K); **J.** drawn from *I. Friis et al.* 10949 (K). Drawn by Ellie Defty.

tate to shortly spiciform, 2.1–4.3 cm long, each axil with a 3–7-flowered dichasial cyme when mature (distalmost axils can be 1-flowered); basal bracts leaf like, up to 8.2×4.4 mm, distal bracts green, lanceolate to obovate, $17\text{--}20 \times 4.5\text{--}11$ mm including spine tip $0.9\text{--}1.1$ mm long; indumentum as on leaves but also with occasional short glandular hairs on abaxial surface or glabrous, and with conspicuous and $\pm$ numerous broad sessile glands proximally on abaxial surface; bracteoles green, linear-lanceolate, $14\text{--}26 \times 1.5\text{--}2$ mm, strigose along margin and with short fine hairs along midrib, conspicuous broad sessile glands numerous proximally; flowers shortly pedicellate, pedicel fused to the subtending bracteole. *Calyx* green to dark green in flower, turning pale green-white in fruit; anterior lobe lanceolate, $\pm 9.5 \times 2$ mm in flower including spine tip 3.2 mm long, apical spine can be bifid, extending to $\pm 13 \times 2.9$ mm in fruit including spine tip 5.5 mm long, external surface glabrous or with short ascending or appressed eglandular hairs concentrated proximally along midrib, internal surface glabrous; posterior lobe as anterior lobe but $\pm 10.3 \times 2.7$ mm in flower including apical spine ± 5 mm long, extending to $\pm 13.5 \times 2.9$ mm in fruit including apical spine ± 6.5 mm long; lateral lobes narrower, $9.2\text{--}10 \times 1\text{--}1.2$ mm in flower including apical spine $3.2\text{--}4.8$ mm long, extending to $11.8\text{--}12 \times 2$ mm in fruit including apical spine $5\text{--}5.5$ mm; midrib and parallel veins prominent abaxially and adaxially on all lobes when in fruit; anterior lobe lanceolate. *Corolla* bluish-purple, $30\text{--}37$ mm long, glabrous externally; tube cylindrical, ± 13 mm long, ± 5.9 mm diameter at base, ± 4 mm at narrowest point; limb in weak “4+1” configuration; abaxial lobe offset by ± 1.5 mm, broadly obovate, $\pm 17.3 \times 10$ mm, apex rounded; lateral lobes oblanceolate, $17.5\text{--}17.8 \times 8\text{--}10$ mm, apices acute (ratio of abaxial: lateral lobe length $\pm 0.97\text{--}1$: 1); adaxial lobes elliptic to obovate, $18\text{--}18.5 \times 6.6\text{--}6.7$ mm, apices acute. *Stamens* inserted $6.3\text{--}6.5$ mm from base of corolla tube; filaments of long stamens $18\text{--}18.5$ mm long; anthers ± 3.1 mm long; short lateral stamens with filaments ± 1.8 mm long, with flimsy subulate hairs, antherodes $0.5\text{--}0.7$ mm long. *Ovary* not seen; style glabrous; stigma linear, $0.45\text{--}0.5$ mm long. *Capsule* only seen in immature state, glabrous; seeds not seen.

Etymology

This species is named in honour of Professor Sebsebe Demissew, for his exceptional contributions to our knowledge of the Ethiopian and wider African flora and its conservation.

Distribution

This species is known from two small areas of the southeastern portion of Oromia regional state in south-

ern Ethiopia (BA and SD floristic regions), specifically in the vicinity of Bidrē and to the south of Negele towards Melca Guba. Fig. 3.

Habitat and Ecology

This species occurs in mixed vegetation comprising *Senegalia-Commiphora* woodland often with *Combretum* and *Terminalia* spp. on rocky limestone escarpments and areas with clay-covered or red sandy soils. It is also associated with various *Euphorbia* spp. and *Kirkia* sp. These habitats can range from short, overgrazed grassland to dense thickets that include *Cadia*, *Carissa*, *Fagaropsis*, *Pistacia aethiopica* Kokwaro and *Psydrax* sp. Other associated woody plants include *Euclea*, *Grewia* and *Lananea* spp. This species has also been noted in areas with creeks and drainage lines, where vegetation is particularly rich. It occurs at elevations of $1250\text{--}1650$ m.

Conservation status

This species has an area of occupancy (AOO) of 20 km² and an extent of occurrence (EOO) of 968 km². Despite its relatively large EOO, it is only known from six collecting localities in two small areas, the first in the vicinity of Bidrē and the second to the south of Negele towards Melca Guba. These are deemed to represent 2–3 threat-defined locations. The pastoral and agricultural activities that are widespread in this region, particularly at lower elevations, present a potential threat, with Google Earth imagery showing intense farming activity throughout its range. The collecting localities in the north of the range may also be impacted by settlement expansion and human activity from nearby Bidrē. Half of the collected specimens were found on foot slopes or plateaux, where the rocky ground may provide this species with some degree of protection from agricultural encroachment, but it appears that much of its habitat is nevertheless disturbed to some degree. The species is also likely to be experiencing some levels of habitat loss due to overgrazing, but further surveys are needed to assess the true extent of this threat. Given the combination of its restricted AOO and EOO, its few locations and ongoing agricultural pressures, this species is given a preliminary assessment of **Endangered** under criterion B: **EN B1ab(iii)+2ab(iii)**.

Taxonomic notes

Barleria sebsebei has previously been treated as a form of *B. quadrispina*, e.g., by Ensermu (2006) who did not comment on these distinctive plants, although in herbarium collections it has been provisionally identified as distinct from that species. It is a conspicuously more robust and usually considerably taller species

(often ≥ 1 m) than *B. quadrispina* and the broad leaves, the bracts with numerous and conspicuous broad sessile glands towards the base and the relatively large corollas are together diagnostic. The robust stature of *Barleria sebsebei* and the presence of broad sessile glands on the abaxial surface of the bracts are similar to *B. ferox* from Harar region of northeast Ethiopia and, indeed, these two species cluster together in the PCA analysis (Figure 1) but they are easily separated by the spine, leaf and calyx characters listed in the Diagnosis above.

The range of *Barleria sebsebei* is closely similar to that of *B. negeleensis*, but the two species are very different morphologically in a range of characters, for example *B. negeleensis* is a short, stout perennial ≤ 40 cm tall with narrowly oblong or oblong-elliptic leaves with conspicuously spinose apices, ovate to oblong-elliptic bracts in the proximal portion of the inflorescence, and a $\pm$ densely glandular and eglandular calyx indumentum. These two species are unlikely to be confused.

For phytogeographic affinities of this species, see note under *Barleria filtuensis*.

Additional specimens examined

ETHIOPIA. Bale, edge of escarpment 6 km from Biddre [Bidrē] on road to Dello Mena [Delo Menna] (Maslo), 05°51'N, 39°36'E, 2 June 1988 (fl.), *M. G. Gilbert & Sebsebe D. 8628* (ETH!, K! [K001295216], UPS!); Bale, 32 km from Genale river bridge along the track from Bitata to Vidre [Bidrē] and Dalo Manna [Delo Menna] (83 km from Negelle [Negele]), 29 May 1996 (fl.), *Ensermu K. & Dessalegn D. 3778* (ETH!); Sidamo, 42 km from Negelle [Negele] along the road to Malka Guba [Melka Guba], 30 May 1996 (fl.), *Ensermu K. & Dessalegn D. 3787* (ETH!); ca. 48 km from Negelle [Negele], along the road towards Melka Guba [Melka Guba], Hudat, Wachile and Arero, 05°06'N, 39°32'E, 13 Dec. 2002 (fl.), *I. Friis et al. 10949* (K! [K001295215]); Oromya [Oromia] Region, Sidamo, 28 km on Melka Guba Road from turn off from Filtu road, 05°06'N, 39°34'E, 2 Oct. 2003 (fl.), *S. Bidgood et al. 4961* (ETH, K! [K001295241]); Biddre [Bidrē] to Sidambale Bridge, 6 km from Biddre [Bidrē], 05°55'N, 39°35.50'E, 3 Dec. 2012 (fl.), *I. Friis et al. 14746* (K! [K001295212]).

7. *Barleria ferox* Ensermu & I. Darbysh. in Kew Bull. 73(1)-1: 13. 2018.

Type: Ethiopia, Harar Region, near Galacia, 10 Nov. 1963 (fl., fr.), *W. Burger 3349* (holotype ETH!; isotypes FT, K! [K001290016]).

(=) *Barleria* sp. [= *Amare G. D-10*] sensu Ensermu in Fl. Ethiopia & Eritrea 6: 415. 2006.

For a full description and illustration, see Ensermu and Darbyshire (2018: 13, Fig. 5).

Distribution

This species is restricted to Oromia regional state (HA floristic region) in eastern Ethiopia. Fig. 3.

Habitat and Ecology

Only very limited information is available on the ecology of this species; on the type specimen it was recorded from open limestone slopes with shrubs and no trees, whilst *Amare Getahun (D-10)* recorded it from a “dry area”; ca. 1400–1600 m elevation.

Conservation status

This highly range-restricted species, with an EOO of only 1,348 km² based on current evidence, is assessed as **Endangered** under criterion B on the IUCN Red List: **EN B1ab(iii)** (Darbyshire et al. 2023). It is threatened by habitat loss and degradation due to the expansion of human residential infrastructure and the expansion of agriculture in parts of its range.

Taxonomic notes

See notes to *Barleria sebsebei* on how these two allopatric species differ. For phytogeographic affinities of this species, see note under *Barleria filtuensis*.

Additional specimens examined

ETHIOPIA. Harar region, Jijiga Road, 15 Sept. 1958 (fl.), *Amare G. D-10* (EA!, K! [K001290014]); 90 km S of Harar on road S of Midaga, 14 Oct. 1962 (fl., fr.), *W. Burger 2190* (ETH!, FT!, K! [K001290015]).

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STATEMENT OF INTERESTS

The authors declare no conflicts of interest or competing interests.

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