

## *Barleria superata* (Acanthaceae): a new suffruticose herb endemic to Burundi

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**Background** – A new species of *Barleria* (Acanthaceae) from Burundi is described as a part of on-going taxonomic research on the tropical African members of this large genus of c. 250–300 species.

**Methods** – Standard herbarium practices were applied.

**Key results** – *Barleria superata* I.Darbysh., a new species within section *Somalia* endemic to the fire-prone woodlands of Burundi, is described and illustrated. This species falls within a group of closely allied Tanzanian species: *B. diplotricha* I.Darbysh. & Ndang., *B. mpandensis* I.Darbysh. and *B. limnogeton* S.Moore; it is most closely related to the foremost from which it differs in lacking a tomentellous indumentum throughout and in the leaves being proportionately narrower. This species is provisionally assessed as Vulnerable (VU D2) using IUCN criteria.

**Key words** – *Barleria superata*, Burundi, *Barleria diplotricha*, *Barleria limongeton*, *Barleria mpandensis*, fire-prone woodlands, section *Somalia*, suffrutex.

### INTRODUCTION

The genus *Barleria* L. (Acanthaceae: Acanthoideae: Barlerieae *sensu* McDade et al. 2008) comprises c. 250–300 species and is largely palaeotropical in distribution but with a single neotropical species. It is readily identified by having the combination of a 4-lobed calyx, usually with the anticus and posticus lobes considerably larger than the lateral lobes, often large and showy corollas with quincuncial aestivation, the limb variously arranged but not strongly 2-lipped, an androecium comprising two stamens and two or three staminodes, and a 2- or 4-seeded capsule lacking a basal stipe, the seeds usually clothed in hygroscopic hairs. It is most diverse in the woodlands and wooded grasslands of eastern and southern Africa, with many species in those regions highly restricted in range. *Barleria* was subdivided into two subgenera and seven sections by Balkwill & Balkwill (1997), all of which are recorded in tropical Africa. Recent taxonomic research on the genus in preparation for the treatments in the *Flora of Tropical East Africa* and *Flora Zambesiaca* has revealed many previously undescribed species (Darbyshire 2008, 2009, 2010, Darbyshire & Ndangalasi 2009).

When describing *Barleria diplotricha* I.Darbysh. & Ndang. and *B. mpandensis* I.Darbysh. from western Tanzania, Darbyshire & Ndangalasi (2009) noted a further closely allied and apparently undescribed taxon from Burundi, at that time known only to the authors from a single collection, *Reekmans* 10313. A subsequent research visit to BR revealed

two further collections of this species (*Michel & Reed* 528 & 1532) and with sufficient flowering and fruiting material now available, this species is described here as *Barleria superata* I.Darbysh.

These species all fall within a subgroup of *Barleria* sect. *Somalia* ('group D' of Darbyshire & Ndangalasi 2009), restricted to the fire-prone woodlands in the vicinity of Lake Tanganyika (fig. 1). This group is recognised by having the combination of an indumentum of simple and glandular hairs, a subregular corolla limb and a densely hairy ovary. The earliest member of this group to be described was *Barleria limnogeton* S.Moore (Moore 1876); the current paper extends this group to four species. The principal diagnostic characters separating these four species are presented in table 1.

Despite its small size (c. 27,800 km<sup>2</sup>) Burundi has a rather rich and varied flora, due largely to the fact that the country falls at the meeting point of three major African phytochoria (centres of plant endemism): the Guineo-Congolian from the west, the Zambesian from the south and the Afromontane at higher altitudes (White 1983). The high human population has led to the loss of much of the natural vegetation outside of protected areas, particularly in the central regions (Lewalle 1968). However, in the south, sizable areas of natural wooded grassland and grassland can still be found. These represent the northernmost extent of the Zambesian phytochorion, the "wetter Zambesian miombo woodland" of White (1983). This habitat is much more widespread in western Tanzania, southeastern D.R.Congo and Zambia. Rainfall is moderate

**Table 1 – A comparison of the key characters for *Barleria superata* and its allies.**

Note: the distribution of each species is plotted in figure 2.

Character	<i>Barleria superata</i>	<i>Barleria diplotricha</i>	<i>Barleria mpandensis</i>	<i>Barleria limnogeton</i>
Length of largest leaves	3–4.3 cm	3.3–4 cm	4.5–12.5 cm	7–13 cm
Leaf length : width ratio	2.3–5	1.3–1.8	2–5.4	2.5–5.2
Leaf indumentum, lower surface	glabrous except for long ascending hairs along margin and midrib	ascending hairs numerous on main veins and margin, elsewhere densely tomentellous	ascending hairs numerous particularly on main veins and margin; all leaves (subsp. <i>tomentella</i> ) or only uppermost leaves (subsp. <i>mpandensis</i> ) also tomentellous	sericeous and (sparsely to) densely tomentellous
Inflorescence type	axillary and well-spaced or congested in upper portion of stems, but then overtopped by sterile leafy nodes	axillary, well-spaced, single-flowered cymes	compounded into a dense terminal synflorescence, subcapitate, conical, subcylindrical or thyriform	compounded into a dense terminal synflorescence, strobilate
Bract shape and characteristics	narrowly elliptic, as leaves but reduced	elliptic, as leaves	ovate to obovate, similar to leaves but much-reduced	broadly ovate to obovate and imbricate, much-modified in shape from leaves
Bract indumentum: tomentellous component	absent	dense beneath, hairs buff-coloured	dense outside, hairs buff- or buff-golden coloured	dense outside, hairs silvery
Anticous calyx lobe length and length of bifid lobes	9.5–17 mm long; apex bifid for 4–6.5 mm	11.5–14 mm long; apex bifid for 5–6.5 mm	9.5–16.5 mm long; apex bifid for 4–9 mm	7–10 mm long; apex bifid for 2–4.5 mm

but highly seasonal and dry-season fires play an important role in maintaining this habitat. Indeed, *Barleria superata* displays the annual growth from a woody rootstock which is a typical adaptation to regular burning. Whilst many species in this area of Burundi are widespread in the Zambesian phytocorion, *B. superata* is not unique in being a local endemic or near-endemic (most localised species also occur over the border in Tanzania and it is quite possible that *B. superata* does so too). As an example, in the recent account of the Acanthaceae for the *Flora of Tropical East Africa* (Vollesen 2008), the newly described *Thunbergia verdcourtii* Vollesen is restricted to the miombo woodlands of Burundi and NW Tanzania.

#### MATERIAL AND METHODS

Herbarium material of *Barleria superata* was studied at BR, EA and K. Flowers were dissected and measured under a Leica MZ6 binocular microscope following soaking in Aerosol OT 5% solution; all other measurements were made on dry material.

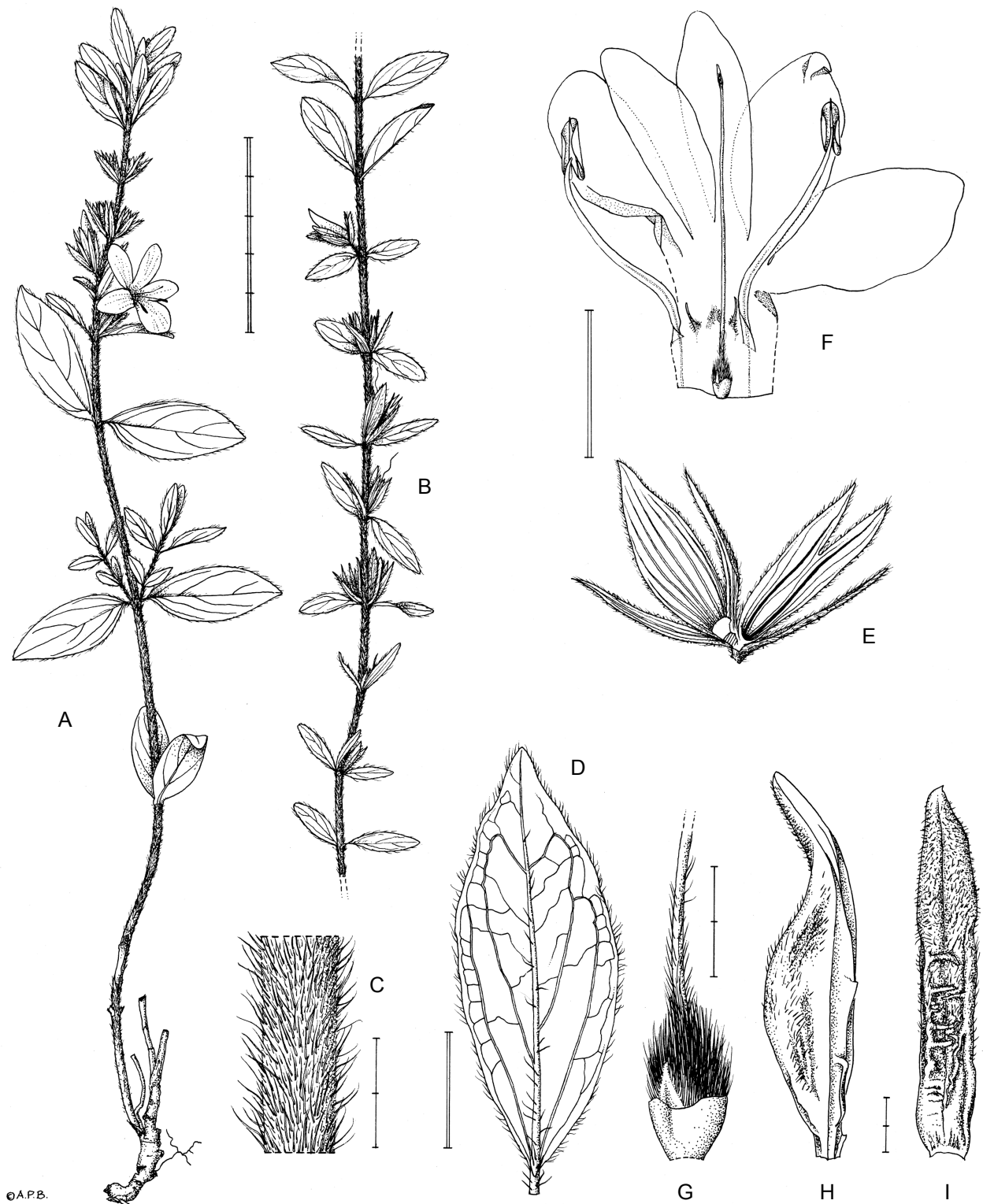
The terminology in the description largely follows that applied to the infrageneric classification of *Barleria* by Balkwill & Balkwill (1997).

#### SPECIES DESCRIPTION & DISCUSSION

##### *Barleria superata* I.Darbysh., sp. nov.

*Barleriae diplotrichae* I.Darbysh. & Ndong. similis sed foliis subtus glabris (non dense tomentellis) praeter ad marginem costamque (non praecipue ad venas principales) pilis longis rectis instructis, foliis in proportione angustioribus (2.3–5 : 1 vs. 1.3–1.8 : 1) et bracteis calycibusque pilis tomentellis carentibus differt. – Type: Burundi, Prov. Bururi, Gisikara, escarpement de Rutana, *Reekmans* 10313 (holo-: BR; iso-: EA, K (2 sheets), MO n.v.).

**Suffrutex** with several stems 20–40 cm tall from a woody rootstock. **Stems** reddish, surface entirely covered at least when young by a dense buff or buff-golden indumentum of short spreading or ascending hairs to 0.2 mm long and interspersed longer ascending hairs 0.5–0.8 mm long. **Leaves** elliptic or narrowly so, 3–4.3 × 0.7–1.6 cm, length / width ratio 2.3–5 : 1 (except lowermost pairs which can be proportionately broader), base cuneate or obtuse, apex acute or lowermost pairs obtuse, glabrous except for course hairs along the margin and often also the midrib, blade glandular-punctate beneath; lateral veins 3–4 pairs; petiole to 2 mm long. **Inflorescences** axillary but sometimes congested towards the stem apex, then usually overtopped by 2–several sterile nodes with normal leaves; fertile axils single-flowered, sessile or peduncle to 3.5 mm long; bracts foliaceous but often reduced,

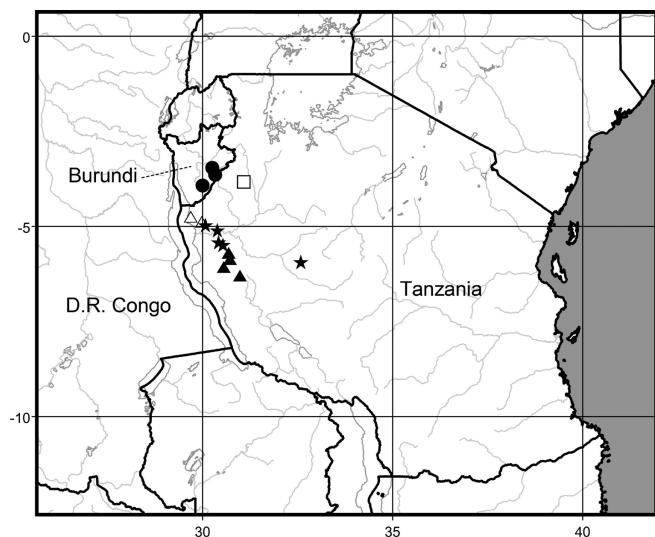


**Figure 1** – *Barleria superata*: A, habit, flowering branch; B, flowering branch, variant with clearly spaced axillary flowers; C, detail of stem indumentum; D, lower leaf surface showing indumentum; E, dissected calyx with single bracteole, inner surface; F, dissected corolla with stamens and pistil; G, detail of ovary; H, capsule valve, face view; I, capsule valve, lateral view. A, C, D, F & G from *Reekmans* 10313 (BR & K); B, E, H & I from *Michel & Reed* 1532 (BR). Scale bars: graduated single bar = 2 mm; double bar = 1 cm; graduated double bar = 5 cm. Drawn by Andrew P. Brown.

narrowly elliptic, 9–30 × 1.5–8 mm, indumentum as leaves but often also shortly pubescent towards the base and with or without scattered patent glandular hairs; bracteoles lanceolate or subulate, 9–15 × 1–1.5 (–2) mm. Calyx anticous lobe narrowly oblong(-lanceolate), 9.5–17 × 2.7–4.7 mm, apex deeply bifid with narrow segments 4–6.5 mm long, surface pubescent and with few to numerous glandular hairs, margin and often main veins with conspicuous longer course ascending hairs; veins parallel, at least the two main veins prominent in flower, up to 8 veins prominent in fruit; posticous lobe as anticous but lanceolate, 12–17 × 4–5.5 mm, apex acute (but malformed and often notched in *Reekmans* 10313), up to 9 parallel veins prominent in fruit. Corolla mauve or violet, 25–31 mm long; tube cylindrical, 8–9 × 3–3.5 mm, glabrous; limb subregular, lateral lobes outside with sparse short glandular hairs and sometimes shortly pubescent; lobes oblong-elliptic, 16–19.5 mm long, abaxial lobe somewhat shorter and 6.5–9 mm wide; lateral pair 5.5–8 mm wide; adaxial pair 4–5 mm wide, fused for 2–3 mm at base. Stamens attached 3.5–4 mm from base of corolla tube; filaments 13.5–15 mm long, glandular towards base; anthers (3.5–) 4–4.7 mm long; lateral pair of staminodes linear, 1.3–2.3 mm long, antherodes absent; adaxial staminode minute. Ovary densely buff-golden hairy; style 15–19 mm long, hairy at base; stigma linear, ± 1 mm long. Capsule ± 15 mm long with a prominent beak 5 mm long, pubescent. Seeds discoid, ± 6.5 × 5 mm, with wavy cream-coloured hygroscopic hairs. Fig. 1.

**Distribution** – endemic to south Burundi (fig. 2: ●).

**Additional specimens examined** – **Burundi**: Mosso, Ruyigi, 10 Sep. 1951, *Michel & Reed* 528, fl (BR); Mosso, Kininya, 10 Oct. 1951, *Michel & Reed* 1532, fl & fr (BR).



**Figure 2** – Distribution map for *Barleria superata* (●), *B. diplotricha* (□), *B. limnogeton* (★), *B. mpandensis* subsp. *mpandensis* (▲) and *B. mpandensis* subsp. *tomentella* (△). Note: Darbyshire & Ndangalasi (2009) recorded this group as also occurring in eastern D.R. Congo but this was due to the mistaken belief that the type of *B. limnogeton* (*Carson* s.n.) was collected from the west shore of Lake Tanganyika, when in fact it was collected from south of Kawele in west Tanzania.

**Habitat and ecology** – Reekmans recorded this species from recently burnt *Hymenocardia* wooded grassland at 1550 m alt. Michel & Reed collected it from lightly wooded grassland over heavily eroded soils and areas of exposed doloritic rock. Fire almost certainly plays an important role in this species’ ecology.

**Etymology** – The epithet ‘*superata*’ (‘overtopped’) refers to the fact that the fertile nodes are usually overtopped by several sterile leafy nodes towards the apex of the stems in this species (see fig. 1A).

**Conservation assessment** – This species is clearly scarce, being known from only three collections from a very small area of occupancy, estimated at 12 km<sup>2</sup> (using the recommended cell size of the IUCN Standards and Petitions Working Group 2008: 34). Whilst no current information on abundance or direct threats is available, the highly restricted range together with the inferred threat from high human population growth in the region and resultant high pressure upon the natural environment mean that this species is assessed as Vulnerable (VU D2) using IUCN (2001) criteria. This assessment may, however, be downgraded if this species is subsequently found to be more widespread in southern Burundi and/or the under-botanised regions of northwest Tanzania.

**Notes** – (1) The four species within sect. *Somalia* ‘group D’ sensu Darbyshire & Ndangalasi (2009) are readily separated by the key presented in that earlier work. *Barleria superata* is most easily identified by the glabrous leaf surface beyond the margin and midrib and the lack of tomentellous hairs on the inflorescence; the other three species are much more hairy throughout and have tomentellous bracts and calyces. Additional diagnostic characters are presented in table 1.

(2) Material at BR has previously been identified as *Barleria hirta* Oberm., a suffruticose species with a patchy distribution from Tanzania to Zimbabwe and Mozambique. Although superficially similar, it is easily separated from *B. superata* by having, amongst other differences, a ‘4+1’ corolla limb arrangement with the abaxial lobe offset from the remaining four lobes by 2.5–5 mm, a (sub-)glabrous ovary, a pilose lower leaf surface and entire or at most shortly notched anticous calyx lobes.

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