



***Bulbine decastroi* (Asphodelaceae subfam. Asphodeloideae), a new peatland species with grass tuft-like rosettes from Mpumalanga, South Africa**

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Abstract

A new species of *Bulbine*, *B. decastroi* (Asphodelaceae subfam. Asphodeloideae), with grass tuft-like leaves, is described from north-central Mpumalanga province, South Africa. *Bulbine decastroi* is a substrate (peatland) specialist. The species is illustrated and compared to *B. capitata*.

Keywords: Steenkampsberge

Introduction

The genus *Bulbine* Wolf (1776: 84) (Asphodelaceae subfam. Asphodeloideae) is well represented in southern Africa (Smith *et al.* 1997: 35–36, Meyer *et al.* 1997: 123), with *ca.* 70 species known from the subcontinent. However, apart from two recent synoptic treatments of the genus (Van Jaarsveld & Forster 2001, 2020), the last comprehensive overview of *Bulbine* dates back over 45 years (Bajjnath 1977), and the genus requires renewed taxonomic attention (Victor *et al.* 2013: 34–35, 2015: 22–27, Crouch & Smith 2021).

Bulbine has a very broad natural geographical distribution range in southern Africa, i.e., the area covered by the *Flora of Southern Africa* (FSA) project [Namibia, Botswana, Eswatini, Lesotho, South Africa], with the genus occurring widely in both winter- and summer-rainfall regions. Manning & Goldblatt (2012: 71–73) recorded 21 species of *Bulbine* for the Core Cape Flora, while Snijman (2013: 49–53) listed 37 species for the Extra Cape Flora. [Note that some species included in Snijman (2013) also occur in the area covered by Manning & Goldblatt (2012)]. However, further northwest and northeast in the FSA region, the number of *Bulbine* species decreases significantly, with Klopper & Smith (2017: 860) listing eight species for South Africa's central Free State province and Retief & Herman (1997: 96) recording nine species as present in the combined northern provinces [virtually the entire North West, Limpopo, Mpumalanga, and Gauteng provinces in their current delimitations] of South Africa.

A new species of *Bulbine* that has its leaves arranged in grass tuft-like rosettes is here described as *B. decastroi* Gideon F.Sm. (Fig. 1); the species is restricted to north-central Mpumalanga in South Africa. We discuss and compare the new species to *B. capitata* Von Poellnitz (1944: 37) (Table 1) (Fig. 2), which occurs sympatrically with *B. decastroi* in central northern South Africa. *Bulbine decastroi* is illustrated and discussed. Discussions are provided of the specialised peatland habitat (Fig. 1A–B) and conservation status of the new species.

Material and methods

The description of *B. decastroi* is based on material from north-central Mpumalanga. Measurements were taken by hand using a ruler, except for floral measurements below 4 mm, which were taken using hand-held magnifying equipment. Habitat characteristics were recorded in situ.

Unless more up-to-date information is available, author attribution of scientific plant names cited follows IPNI (2022+) albeit in the notation required by *Phytotaxa*, i.e., by citing the protologues of the names as full bibliographic references.

Herbarium codes follow Thiers (2022 [continuously updated]).

Nomenclatural issues accord with the Shenzhen *Code* (Turland *et al.* 2018).

Results

Like *B. decastroi* (Fig. 1C–D), *B. capitata* also has its leaves arranged in a grass tuft-like rosette (Fig. 2A–B). Both species are caespitose, but in the case of *B. capitata*, plants very often grow as solitary specimens, or in clusters of six or fewer rosettes. In contrast, *B. decastroi* can develop into dense clusters of up to 40 plants (Fig. 1D). *Bulbine capitata* can be additionally distinguished from *B. decastroi* by its graminoid leaves generally being considerably more robust, with the leaf diameter in cross-section being up to 3 mm (Fig. 2B), rather than only up to 1.5 mm in the case of *B. decastroi*. The leaves of *B. capitata* can reach a length of 400 mm, while, at maximum, those of *B. decastroi* reach less than half that length.

As is the case with many species of *Bulbine*, the flowers of both *B. decastroi* and *B. capitata* deviate little from a basic stellate architecture of six, yellow tepals that are arranged in two, often rather obscure, whorls (Figs 1E and 2C). However, the inflorescences of *B. decastroi* are often fewer-flowered than those of *B. capitata*.

Most importantly, *B. decastroi* is an obligate peatland species that does not occur beyond the margin of the peat that it grows in. *Bulbine capitata*, with its much wider natural geographical distribution range, often occurs in very dry, stony and rocky places and has yet to be observed from what are virtually permanently water-logged habitats. An adaptation found in *B. decastroi* is that it has contractile roots that, when its peat habitat loses moisture, assist with drawing the generally narrow rosettes deeper into the substrate (Fig. 1C).

We considered the possibility that the name *B. lydenburgensis* Von Poellnitz (1944: 44), which is widely included in the synonymy of *B. capitata* (see Baijnath 1977: 363), is the one to apply to what is here described as *B. decastroi*. However, the type of the name *B. lydenburgensis*, *F. Wilms 1535* (Herb. B, see <https://herbarium.bgbm.org/object/B100166839>), is of more robust material that coincides closely with *B. capitata* (Curators Herbarium 2000+).

Based on a combination of the vegetative and reproductive morphological differences between *B. decastroi* and *B. capitata* (Table 1), and taking into account their significantly different habitat preferences, we regard the rank of species as appropriate for the new taxon.

TABLE 1. Habitat and morphological differences between *Bulbine decastroi* and *B. capitata*.

#	Character	<i>Bulbine decastroi</i>	<i>Bulbine capitata</i>
1.	Habitat preference	Peatlands	Mesic habitats typically in grassland or at least grassy patches, often in rocky outcrops
A.	Vegetative characters		
2.	Clustering habit of plant	Up to 40 rosettes	Up to six rosettes
3.	Roots	Contractile	Non-contractile
4.	Leaf clustering	Diverging from the base	Arranged in a cylindrical column
5.	Leaf colour	Mid- to dark green with a glaucous sheen	Light to mid-green
6.	Leaf length (mm)	To 180	To 400
B.	Reproductive characters		
7.	Number of flowers in raceme	8–20	25 to numerous
8.	Pedicel length (mm)	12–16, elongating post-anthesis to 25–40	15–35

Nomenclature and taxonomy of *Bulbine decastroi*

Bulbine decastroi Gideon F.Sm., *sp. nov.*

Type: SOUTH AFRICA. Mpumalanga province. North-central region of the province. Steenkampsberge. 14 October 2022, *G.F. Smith 1202* (holotype PRU).

Diagnosis:—*Bulbine decastroi* differs from *B. capitata* in being somewhat smaller and daintier in most vegetative respects. The glaucous leaves of *B. decastroi* are relatively short and narrow (120–180 × 1.0–1.5 mm), while those of *B. capitata* are light to mid-green and usually more robust (400 × 3 mm). *Bulbine decastroi* has contractile roots, an adaptation to its peatland habitat, while the roots of *B. capitata* are not contractile. *Bulbine decastroi* often grows in dense clusters of up to 40 plants, while up to six plants of *B. capitata* can be clustered together, but they are usually well spaced. The inflorescences of *B. decastroi* are fewer-flowered than those of *B. capitata*, and the pedicels of *B. decastroi* are generally shorter than those of *B. capitata*.

Description:—Perennial, acaulescent, small, rosulate leaf succulent up to 0.18 m tall in vegetative phase, at first solitary, with age dividing basally to form clusters with up to 40 rosettes, each with short pseudo-stem (5–)10–12 mm long. *Pseudo-stem* generally devoid of persistent, basal leaf material. *Roots* wiry to somewhat succulent, up to 1.5 mm in diameter, contractile, white to pinkish yellow. *Leaves* 120–180 × 1.0–1.5 mm, distinctly graminoid, soft-textured, flexuous, numerous, erect to erectly spreading, old leaves eventually shed; *blade* mid- to dark green with a glaucous sheen, senescing pinkish brown, narrowly linear, attenuate, at 15 mm from base broadening gradually downwards to width of ± 10 mm, gradually and narrowly tapering towards apex; *adaxial surface* flat to concave, longitudinally grooved; *abaxial surface* convex, lacking striations; *margins* entire; *apex* acute, hardly drying from tip. *Inflorescence* a cylindrical raceme, appearing subcapitate when few flowers open simultaneously, usually 1 arising from a rosette, few- to subdensely-flowered (8–20), 0.1–0.4 m tall, ascending to slightly spreading, elongating somewhat as flowering proceeds upwards; *peduncle* 3–4 mm in diameter, round in cross-section, slightly tapering upwards, glabrous, not sterile bracteate, drying pinkish brown. *Flowers* rather densely borne in upper 1/3 to 1/2 of inflorescence, 13–15 mm in diameter, 5–7 mm apart, 3–6(–8) open simultaneously, diurnal, open from ± 08:00–17:00, closing in inclement weather; *floral bracts* deltoid-acuminate, 5–6 mm long, 2–3 mm broad at base, membranous, clasping peduncle and higher up the pedicel, light brown with dark brown central vein, margins lacerate, base auriculate, auricles creamy white; *pedicels* slender, 12–16 mm long in bud and at early anthesis, sometimes elongating to 25–40 mm long in fruit, erectly spreading in both flower and fruit, persistent when dry, rarely slightly recurved when barren; *perianth* a stellate perigone; *tepals* in two whorls, bright, glistening yellow, margins somewhat rolled under, 1-nerved, vein light green, raised below; *outer tepals* elliptic, 6–8 × 3.0–3.5 mm, apices blunt-tipped, sometimes slightly notched, variously flat to up- or down-curved in apical 1/2; *inner tepals* ovate to round, 5–7 × 3.0–3.5 mm, apices blunt-tipped. *Stamens* distinctly spreading at 30° from vertical, up to 2–3 mm long; *filaments* yellow, slender, hairy in lower 1/2; *anthers* light brown, oblong, dorsifixed. *Ovary* globose, 1.0–1.5 mm in diameter; *style* erect, terete, up to 2 mm long; *stigma* apical, minutely capitate, whitish yellow. *Fruit* a globose, loculicidal capsule, up to 4.5 mm in diameter, light green, at maturity, at first enveloped in dark brownish black remains of perigone. *Seed* 0.75(–1.00) × 1.0(–1.5) mm, black, ± D-shaped, angled, few per capsule. *Chromosome number*: unknown.

Flowering time:—*Bulbine decastroi* flowers from spring to mid-summer (September to December) in the southern hemisphere.

Natural geographical distribution range:—*Bulbine decastroi* is currently only known from three localities that are in close proximity in the Steenkampsberge in north-central Mpumalanga in South Africa.

Except for the most general, no locality data from specimens or field observations are given. This deviation from widely followed taxonomic practice is justified by the fact that poaching of succulent plants from the wild in South Africa is a severe and escalating problem, and it was decided not to provide any information regarding the exact whereabouts of this new species that could cause known populations to be targeted for destructive collecting (Smith *et al.* 2023).

Habitat:—*Bulbine decastroi* is a habitat specialist that occurs on true peat substrates with a dead soil organic matter content of over 30% (dry mass) (Joosten & Clark 2002, Grobler 2022) in high-altitude mire peatlands in valley-bottom and seep settings (Ollis *et al.* 2013), and is absent from hydromorphic mineral soils situated directly adjacent to these mires. The three known localities where *B. decastroi* occurs on the quartzitic plateau of the Steenkampsberge are at elevations ranging from *ca.* 2100 to 2245 metres above sea level. The mire wetlands that comprise the habitat of *B. decastroi* are embedded within grassland vegetation representative of the Steenkampsberg Montane Grassland vegetation type (Dayaram *et al.* 2017).

Bulbine decastroi is an obligate hygrophyte (*sensu* Retief & Herman 1997) that occurs in near-pristine mires vegetated by dense herbaceous plant communities comprised entirely of hygrophytes.

Conservation status:—*Bulbine decastroi* is currently known from three localities, each representing a distinct subpopulation, within a very small Extent of Occurrence (*sensu* IUCN 2022) of *ca.* 20 km². All known localities are located in South Africa's Mpumalanga province within two formally protected areas and there are currently no known significant threats to this species or its habitat. It is therefore considered to be unlikely that *B. decastroi* currently

meets the IUCN thresholds for categorisation as threatened (CR [Critically Endangered], EN [Endangered], or VU [Vulnerable]) or Near Threatened (NT) (IUCN 2012). However, *B. decastroii* is regarded as ‘Rare’ in accordance with the South African conservation status categories used by Raimondo *et al.* (2009).

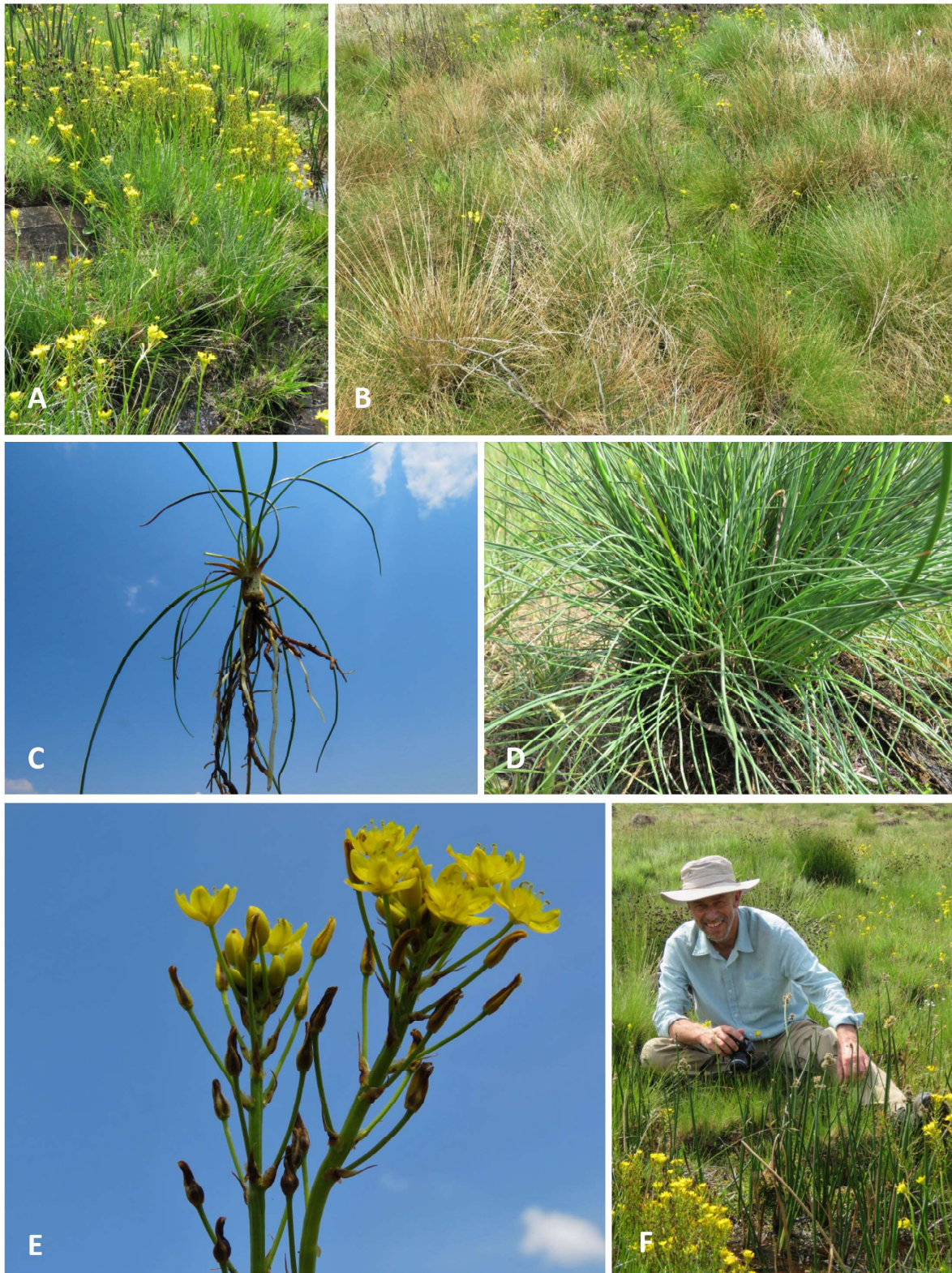


FIGURE 1. *Bulbine decastroii*. **A.** In its natural peatland habitat. The peatland burned a few months before the photograph was taken. Note the high water table in the bottom right of the image. **B.** This section of the peatland did not burn. The vegetation is very dense. **C.** Contractile roots. **D.** A dense cluster of 40 rosettes. Note the glaucous sheen to the leaves. **E.** Close-up of racemes and flowers. **F.** Tony de Castro (1970–) after whom *B. decastroii* is named. *Bulbine decastroii* grows in the foreground. All photographs: Gideon F. Smith.



FIGURE 2. *Bulbine capitata*. **A.** Growing in a recently burned grassland. Note the arid substrate. **B.** The leaves are most often much broader than those of *B. decastroi*. **C.** Close-up of a raceme and flowers. Note the long pedicels. All photographs: Neil R. Crouch.

Eponymy:—*Bulbine decastroii* is named for Antonio (‘Tony’) D’Azevêdo Pinto de Castro (Lourenço Marques [present-day Maputo], Mozambique, 17 January 1970–) (Fig. 1F). He matriculated from King Edward VII High School in Johannesburg in 1987, after which he attended the Rand Afrikaans University (currently the University of Johannesburg), graduating with a B.Sc. (Hons) degree in Botany in 1994. In 1997 Tony entered his current occupation as a professional consultant in the fields of botany and ecology, and in 1999 he founded De Castro & Brits c.c. an ecological consulting firm of which he is at present the Managing Member. He is a registered member of the South African Council for Natural Scientific Professions and conducts specialist work in, inter alia, terrestrial, wetland, and riparian ecosystems of the Savanna and Grassland Biomes of southern Africa. Tony has worked in 13 African countries, and as part of his field surveys has authored several scientific papers and over 570 specialist reports pertaining to biodiversity management, impact assessment, and the sustainable utilisation of natural resources.

Acknowledgements

Prof. Neil R. Crouch, Biodiversity Research and Monitoring Directorate, South African National Biodiversity Institute, Durban, South Africa, is thanked for granting permission to use his photographs of *B. capitata*, which, in composite, is here reproduced as Figure 2.

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