

Ledebouria caesiomontana A.J.Hankey & N.Hahn (Hyacinthaceae: Hyacinthoideae): A new species from the Blouberg centre of endemism, Limpopo, South Africa

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Background: *Ledebouria* Roth (Hyacinthaceae: Hyacinthoideae) is a largely African genus with, more or less, 40 species occurring in South Africa. The species was first collected in December 1990 by R. Archer [*Archer, R.H. 503* (PRE)] and remained un-identified. Subsequently, N. Hahn also collected the species in 1992 [*N. Hahn 444* (ZPB)] and, upon failing to resolve the identity of the specimen, he approached A. Hankey who initiated further collaborative research.

Objective: To describe the new species of *Ledebouria* from Blouberg mountain massif in Limpopo Province, South Africa.

Method: Relevant existing specimens in herbaria were examined and morphological characters and states noted. The type specimen was collected during an expedition under the guidance of Prof. Dirk Bellstedt accompanied by Mr Adam Harrower.

Results: *Ledebouria caesiomontana* A.J.Hankey & N.Hahn sp. nov. was described and illustrated. The new species was distinguished from its closest relative, *Ledebouria papillata* S.Venter, by the ovary which lacks basal lobes, as well the absence of cataphylls and the irregular papillate ridges present only on the upper leaf surfaces.

Conclusion: *Ledebouria caesiomontana* is a new species restricted to the Blouberg mountain massif in Limpopo Province, South Africa. Initial estimates deem the species to be vulnerable (VU D2) as a result of especially anthropogenic-induced disturbances on the Blouberg.

Introduction

The genus *Ledebouria* Roth (Hyacinthaceae: Hyacinthoideae) was first erected by Roth (1821) when he described *Ledebouria hyacinthina* Roth from India. Baker (1870) subsequently placed the genus under *Scilla* L. where it typified section *Ledebouria*. Jessop (1970) resurrected the genus and recognised 15 South African species, characterised by the possession of bulbs with deciduous leaves and erect to mostly somewhat flaccid inflorescences with basal ovules paired in each locule, together with a stipitate ovary. The most recent revision of *Ledebouria* by Venter (1993) was followed by a synopsis of the genus by the same author (Venter 2008), wherein he recognises 39 South African species and makes reference to more than 60 species occurring in sub-Saharan Africa, with one or two each in India and Madagascar. Despite the large number of species currently recognised in *Ledebouria*, no formal infra-generic classification exists to date.

This study was initiated by N. Hahn, who collected the species from Blouberg mountain massif in Limpopo Province, South Africa, in 1992 [*N. Hahn 444* (ZPB)] and, upon failing to resolve the identity of the specimen, approached the first author for assistance. Subsequently, an examination of existing herbarium specimens revealed un-identified specimens that belonged to the same entity. Recollections by some of the authors, coupled with an analysis of characters and states based on herbarium specimens, fieldwork and living material, led to the conclusion that a new species was in hand. In this article, we describe the new species of *Ledebouria*.

Research method and design

Relevant specimens in the South African National Herbarium (PRE) and the Herbarium Soutpansbergensis (ZPB) formed the bulk of the material available for study. In addition, a collection of living plants housed at the Walter Sisulu National Botanical Garden, Roodepoort, Gauteng Province, provided material for illustrative and research purposes. The unknown entity was compared on a macromorphological and micromorphological basis with similar looking species. Measurement of plant parts was performed by hand using a combination of rulers and callipers.

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Taxonomic treatment

Ledebouria caesiomontana A.J.Hankey & N.Hahn sp. nov.

Type: SOUTH AFRICA. **Limpopo:** 2329 (Blouberg): Beuley, 23.08467 °S, 29.00076 °E, 1658 m.a.s.l. cliff ledges in forest, (–AA), 24 Mar. 2007, Hankey, A.J. 2129 (PRE, holo; NBG, iso).

Description

Plants mostly solitary to weakly gregarious by sobolifery (proliferating from the base of the bulb). *Bulbs:* hypogaeal 20 mm – 25 mm × 10 mm – 15 mm, ovoid, dead bulb scales membranous, pale brown, live bulb scales tightly arranged, whitish, fleshy, truncate apically, with threads when torn. *Leaves:* (3–)4(–5), dull green, linear-oblongate, 70 mm – 100 mm × 10 mm – 15 mm, synanthous, apex acute, base canaliculate, with threads when torn, spreading, green, with irregular longitudinal papillate ridges, maculate with dark green to purple spots and blotches adaxially, glabrous, wholly purple-red, or green suffused with purple-red abaxially, margin entire, minutely papillate. *Inflorescence:* one per bulb, erect, 65 mm – 120 mm long, raceme 30 mm – 40 mm long, conical, with 12–20 loosely arranged flowers, scape terete, glabrous, 50 mm – 80 mm long, reddish-green. *Bracts:* present, 1.0 mm × 0.5 mm, deltoid, fleshy, reddish-green, prophylls absent. *Pedicels:* 5 mm – 7 mm long, pink. *Perianth:* campanulate; tepals oblong, cucullate apically, reflexed, 5.0 mm – 6.0 mm × 1.8 mm, pink with greenish-brown vitta. *Stamens:* epitepalous, erect, filaments 6 mm long, filiform, violet; anthers yellow, 0.5 mm long, dorsifixed. *Ovary:* six lobed, greenish, depressed ovoid, 1 mm × 2 mm, stipitate, stipe 0.5 mm × 0.5 mm, basal lobes absent, style 5 mm long, violet. *Flowering time:* October to December (Figure 1).

Distribution and ecology

Ledebouria caesiomontana occurs in Northern Mistbelt Forest vegetation (Mucina & Rutherford 2006) on the Blouberg massif. Specifically, it has been recorded from low deciduous forest and forest margins in shallow, moss-covered lithosols and rock crevices under the shade of woody vegetation. The species is cryptic and easily overlooked in its habitat because the bulbs are often tightly wedged in narrow rock crevices. This species is thus far only known from the Blouberg massif, where it has only been recorded from five collections (Figure 2).

The description of this new species brings the total of Blouberg endemic plant species to four (Hahn 2006), with the following endemic species previously known being: *Berkheya radyeri* Roessler, *Cineraria cyanomontana* Cron (Asteraceae) and *Streptocarpus longiflorus* (Hilliard & B.L.Burt) T.J.Edwards (Gesneriaceae). The new species has thus far not been found in the Soutpansberg, an area known to share 13 near endemic taxa with the Blouberg (Hahn 2006).

Etymology

The specific epithet *caesiomontana* alludes to the Blouberg (meaning Blue Mountain) in the Limpopo Province of South Africa, from which the new species was collected.

Conservation status

Owing to *L. caesiomontana*'s cryptic nature, it may easily be overlooked in the field and this may explain the low numbers of collections. *Ledebouria caesiomontana* is uncommon in its known distribution range but more extensive fieldwork may reveal additional populations.

The forests on the Blouberg are systematically being eradicated as a result of slash and burn practices. To date, no official study has been undertaken on the Blouberg to ascertain the extent these activities could potentially have on the conservation of *L. caesiomontana* or the Blouberg as a whole. An urgent study needs to be conducted on the Blouberg to assess the impact and inform the conservation measures required to halt the rapid loss of forests in the area. In the light of the preceding factors, we expect that the species would be best ascribed as VU D2 in terms of the International Union for Conservation of Nature's (IUCN) Red List status (IUCN 2012).

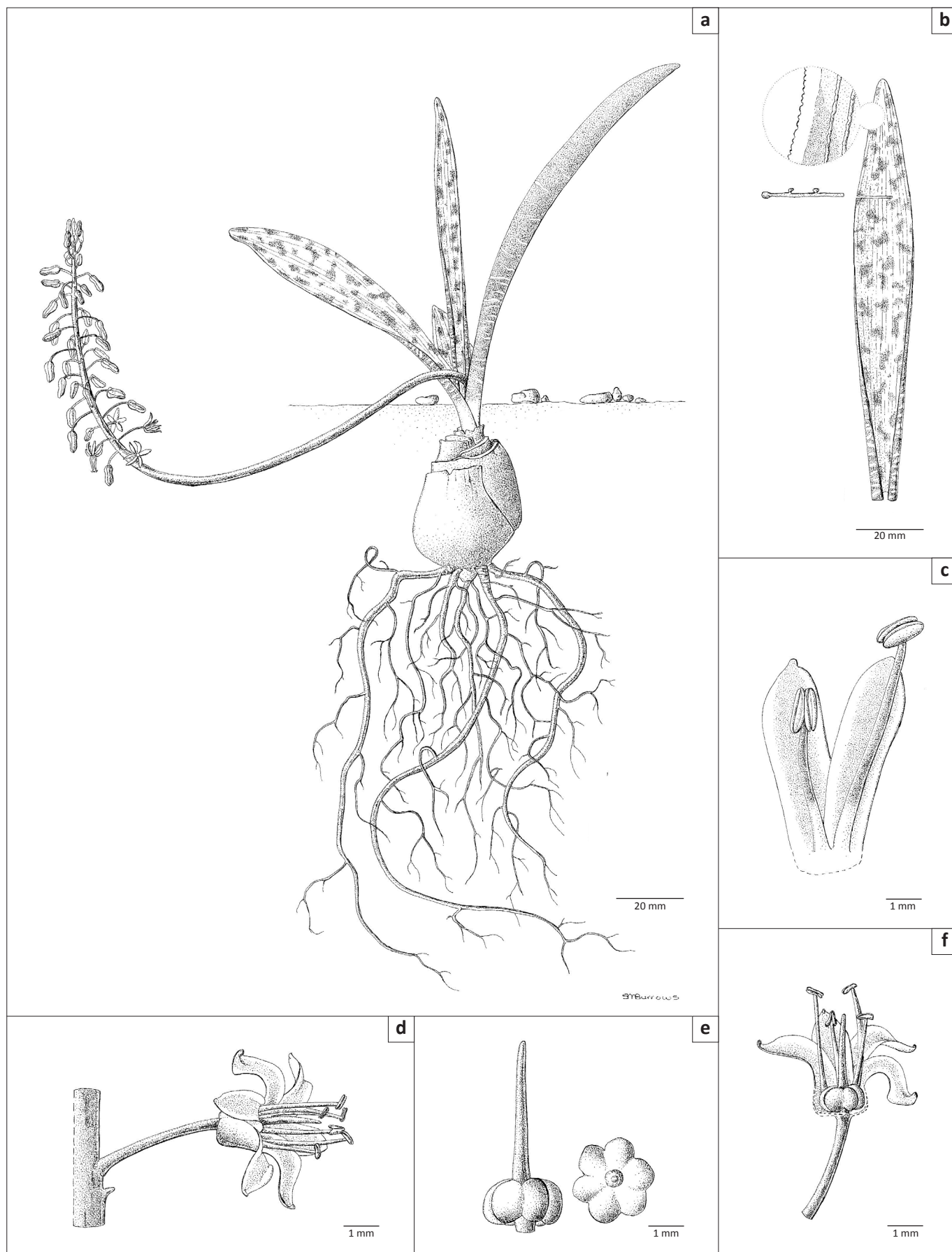
Diagnosis

Ledebouria caesiomontana is most similar to *Ledebouria papillata*, from which it is distinguished by several characters (Table 1). The new species lacks the characteristic basal ovary lobes of *L. papillata* – not illustrated by Venter (1993, 2008) but clearly noted in the descriptions. Furthermore, *L. caesiomontana* differs in the absence of regular longitudinal rows of papillae on the scape and leaves, instead having irregular papillate ridges only on the adaxial surface of the leaf and not on the scape or the abaxial leaf surface. This species also lacks the two basal cataphylls noted by Venter (2008) as diagnostic for *L. papillata*.

Ledebouria asperifolia (Van der Merwe) S.Venter (Venter2008) also possesses longitudinal rows of papillae on the lower leaf surface (and occasionally on the upper leaf surfaces) and may be superficially similar to *L. caesiomontana*. However, *L. asperifolia* is larger in all respects, and has purplish-brown dead bulb scales persistent on the bulb. The distribution of these two species is furthermore, distinct (Figure 2).

Additional specimens examined

SOUTH AFRICA. **Limpopo:** 2329 (Blouberg): Blouberg, Blouberg Nature Reserve, 13 Dec. 1990, Venter, S. 13507 (PRE); Blouberg NR, Farm Dantsig 3, 05 Dec. 1990, Archer, R.H. 503 (PRE); Blouberg, Beuley, 23.0776 °S, 28.99324 °E, 1692 m.a.s.l., cliff ledges in forest, 24 Mar. 2007, Hankey, A.J. 2130 (PRE) (–AA). 2328 (Tolwe): Blouberg, Beuley, 23°4'40.14" S, 28°59'38.50" E, 1710 m.a.s.l., in flower, 09 Dec. 1992, N. Hahn 444, (ZPB) (–BB).



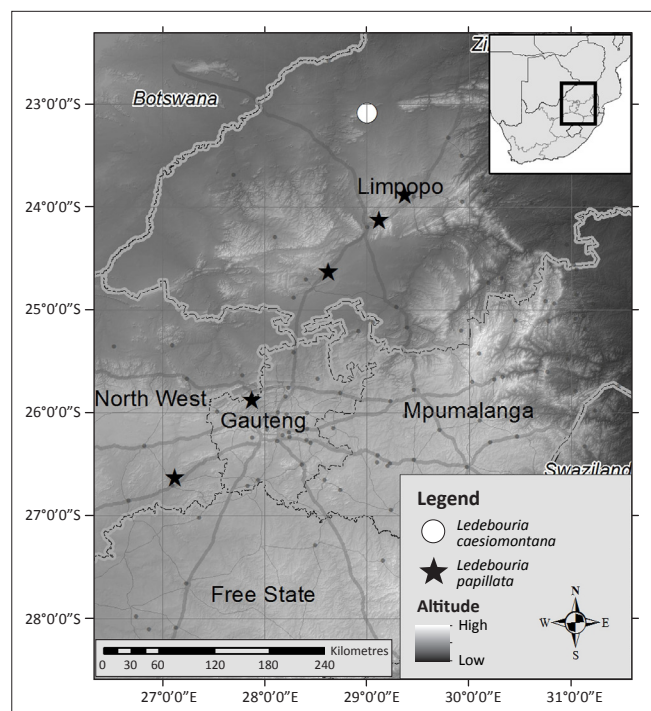
Source: Illustrations by S. Burrows; specimen voucher: Hankey, A.J. 2129

FIGURE 1: Illustrations of *Ledebouria caesiomontana* depicting, (a) flowering plant, (b) adaxial leaf surface showing ridges and ornamentation detail, (c) inner and outer tepal section showing stamens, (d) flower, pedicel and floral bract, (e) ovary lateral and dorsal view and (f) flower, section showing ovary and stamens.

TABLE 1: Differences between *Ledebouria papillata* and *Ledebouria caesiomontana*.

Category	<i>Ledebouria papillata</i> (Venter 2008)	<i>Ledebouria caesiomontana</i>
Distribution	Pietersburg plateau, Gauteng and Eastern Cape Provinces	Endemic to the Blouberg, Limpopo Province
Bulb	With prominent neck and 2 basal cataphylls reaching ground level – not shown in illustration by Venter (2008)	Without prominent neck, cataphylls absent
Leaves	2–4, glossy dark green, with venation prominent	3–5, dull mid-green, with venation obscure
Leaf base	Sub-petiolate with vertical purple stripes	Clasping, canaliculate without vertical stripes
Epidermal ornamentation	Longitudinal rows of papillae on adaxial and abaxial leaf surfaces and scape	Irregular longitudinal ridges on the adaxial leaf surface only; Abaxial leaf surface and scape glabrous
Inflorescence	Erect	Spreading, becoming flaccid
Perianth	2.0 mm – 3.5 mm long	5.0 mm – 6.0 mm long
Ovary	Basal lobes present – not shown in illustration by Venter (2008)	Basal lobes absent

Source: *Ledebouria papillata* data taken from Venter, S., 2008, 'Synopsis of the genus *Ledebouria* Roth (Hyacinthaceae) in South Africa', *Herbertia* 62, 85–155



Source: Map drawn by M. Lötter

FIGURE 2: Known distribution of *Ledebouria caesiomontana* and *Ledebouria papillata*.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

A.J.H. (Walter Sisulu National Botanical Garden) was responsible for the morphological study and wrote the description, whilst N.H. (Herbarium Soutpansbergensis) provided the conservation, ecological and phytogeographic notes. M.H.B. (New Zealand Forest Research Institute) undertook a supervisory and advisory role, providing taxonomic guidance and editing.

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