

Albuca annulata sp. nov. (Hyacinthaceae) from the Albany Centre of Endemism, South Africa

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Within the context of a revision of *Albuca*, a new species, here described as *Albuca annulata* Mart.-Azorín & M. B. Crespo sp. nov., was found in three populations in the Albany Centre of Endemism, Eastern Cape, South Africa. This new species is closely related to *Albuca bakeri* Mart.-Azorín & M. B. Crespo and *A. caudata* Jacq., but it can be clearly differentiated by floral and vegetative characters. Data on morphology, ecology and distribution are reported for this new species. Affinities and divergences with other close allies are also discussed.

The genus *Albuca* L., that belongs to the family Hyacinthaceae, includes about 60 species in recent treatments (cf. Speta 1998, Manning et al. 2002, Martínez-Azorín et al. 2011), although up to 131 when considered in a wider sense (Phillips 1951). Recent molecular works have however recircumscribed it in quite different ways. On the one hand, Manning et al. (2009) merged in *Albuca* taxa belonging to other genera, such as *Battandiera* Maire, *Coilonox* Raf., *Stellarioides* Medik. and *Trimelopter* Raf. This resulted in a total of about 110–180 species and made *Albuca* s.l. very variable in morphology. On the other hand, Martínez-Azorín et al. (2011a) showed that *Albuca* is monophyletic as traditionally circumscribed and hence it remains more homogeneous morphologically when treated in a more restrictive way.

Taxa of *Albuca* s.s. are distributed mainly in southern and eastern Africa, with only a few species extending north to Ethiopia, Saudi Arabia and north of Chad and Nigeria (cf. Martínez-Azorín et al. 2011). The only comprehensive revision of *Albuca* is that of Baker (1897, 1898), who focused on South African and tropical African taxa. Recent accounts (cf. Müller-Doblies 1994, 1995, 2006, Manning and Goldblatt 2009) have much enlarged the knowledge of groups with nodding flowers, namely *A.* subg. *Albuca* and *A.* subg. *Falconera* (Salisb.) Baker. However, data on groups with erect flowers, e.g. *A.* subg. *Mitrotepalum* U. Müll. Doblies (= *A.* sect. *Branciona* (Salisb.) J. C. Manning and Goldblatt), have remained almost unchanged from the late 19th century, and is the focus of our current research.

Recent work on the aggregate of *A. caudata* Jacq. (cf. Martínez-Azorín et al. 2011b) has shown that the current concept of that species is very wide and includes different biological entities that can be accepted as autonomous taxa. One of those taxa has been described as *A. bakeri*

Mart.-Azorín & M. B. Crespo, which is characterised by remarkable zebra-banded cataphylls covering the bulb neck.

That feature is also present in other populations of *Albuca* found in the Albany Centre of Endemism. However, they can be clearly differentiated by floral and vegetative characters that allow for the description of a new species, viz. *Albuca annulata*.

Material and methods

Herbarium specimens from the following herbaria were studied: BOL, BNRH, GRA, J, K, KEI, KMG, NBG, NH, NU, PEU, PUC, UFH, WIND (acronyms according Thiers 2011). Moreover, a detailed morphological study of *Albuca annulata* was undertaken based on plants from natural populations. Authors of the cited taxa follow IPNI (2011).

Albuca annulata Mart.-Azorín & M. B. Crespo sp. nov. (Fig. 1)

Species insignis ex Albuca subg. Mitrotepalo (=A. sect. Branciona) prima facie ad Albucam bakeri accedit, sed valde differt et facile distinguitur collo bulbi angustiore cataphyllis zebrinis grosse transversaliter fusco-striatis, striis subhorizontalibus rectisque ornatis; folio solitario cylindrico; scapo ab solo generaliter plus minusve oblique disposito; floribus tepalis luteis banda media viridi, et staminibus interioribus sterilibus antheras destitutis vel rarissime eis rudimentariis.

Etymology

Named after the very characteristic prominent thick transversal banding of the bulb neck, giving the appearance

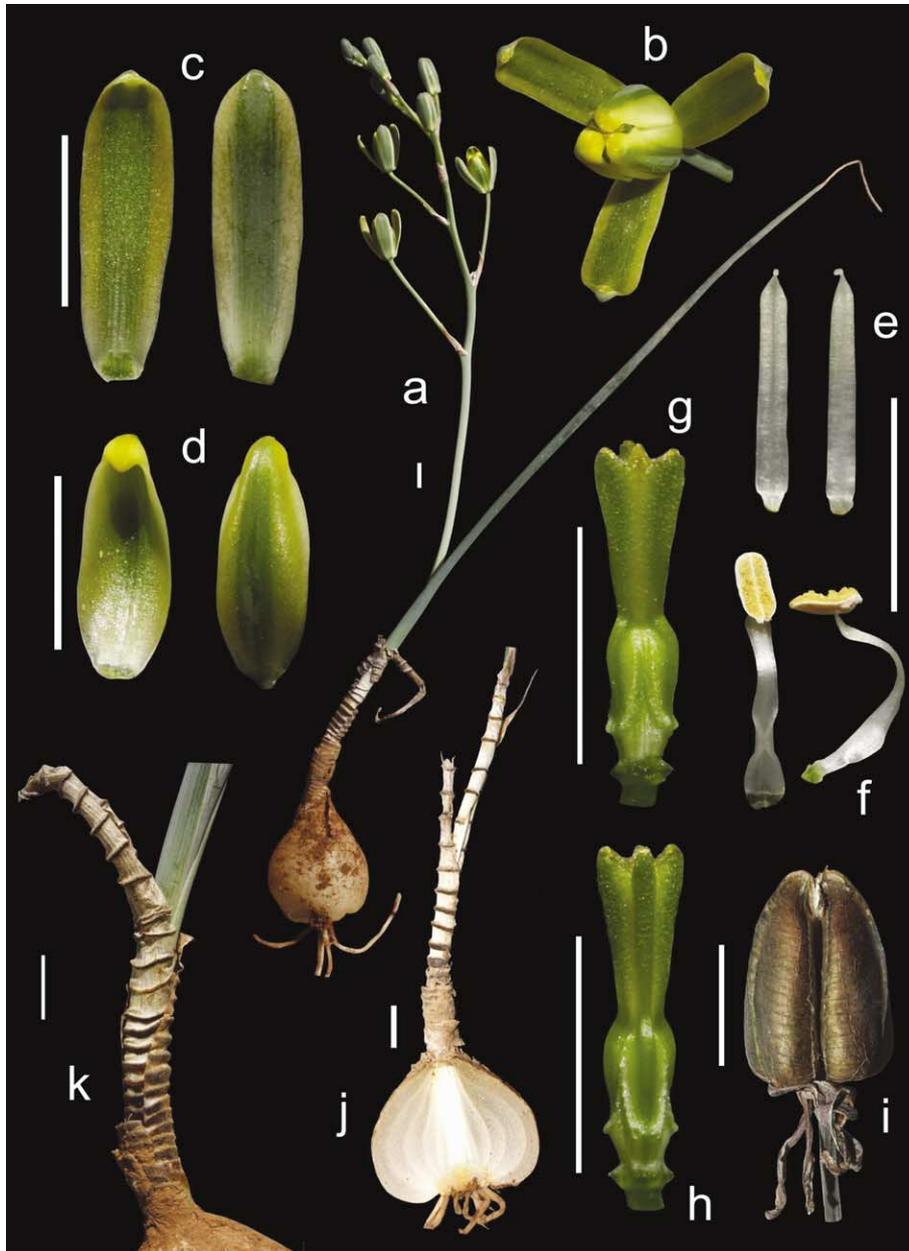


Figure 1. *Albuca annulata* Mart.-Azorín & M. B. Crespo sp. nov. Southwest of Grahamstown, Thomas Baines Nature Reserve. (a) general view, (b) flower, frontal view, (c) outer tepals, (d) inner tepals, (e) outer stamen, (f) inner stamen, (g)–(h) ovary, lateral views, (i) mature capsule, (j) bulb, longitudinal section, (k) bulb neck with membranous dark-banded cataphylls. Scales = 1 cm. Holotype: M. Martínez-Azorín and M. B. Crespo 241, GRA.

of parallel rings (*Annulatus*, *-a*, *-um* = bearing or having rings).

Holotype: South Africa, Eastern Cape, southwest of Grahamstown, Thomas Baines Nature Reserve, picnic area, 306 m a.s.l., 22 Sep 2010, 33°24'35''S, 26°30'11''E, M. Martínez-Azorín and M. B. Crespo 241 (holotype: GRA, isotypes: ABH, K, NBG, PRE).

Deciduous bulbous plants up to 38 cm tall. Bulb solitary, hypogaeal, ovoid to spherical, 3–4 × 2.2–4.2 cm, with soft outer tunics that are pale and fleshy, ending into a long epigeal

narrow neck, 4.3–7.2 × 0.5–0.9 cm, covered by whitish open and sheathing membranous cataphylls up to 11 cm long, bearing thick, prominent transversal dark ridges, giving a horizontal zebra banding pattern; tunics fleshy, whitish, all reaching the top of the bulb, concentrically arranged. Roots fleshy, narrow, white, numerous, up to 50 × 2 mm. Leaf solitary, or occasionally two in cultivation, linear, terete, canaliculate at base, 22–45 × 0.4–0.6 cm, firm, erect and disposed at a 40–45° angle to the ground, persistent or usually starting to wither in the apex when the flowers are present, glaucous, glabrous, finely longitudinally striate, usually with sparse minute papillae on nerves. Inflorescence an erect

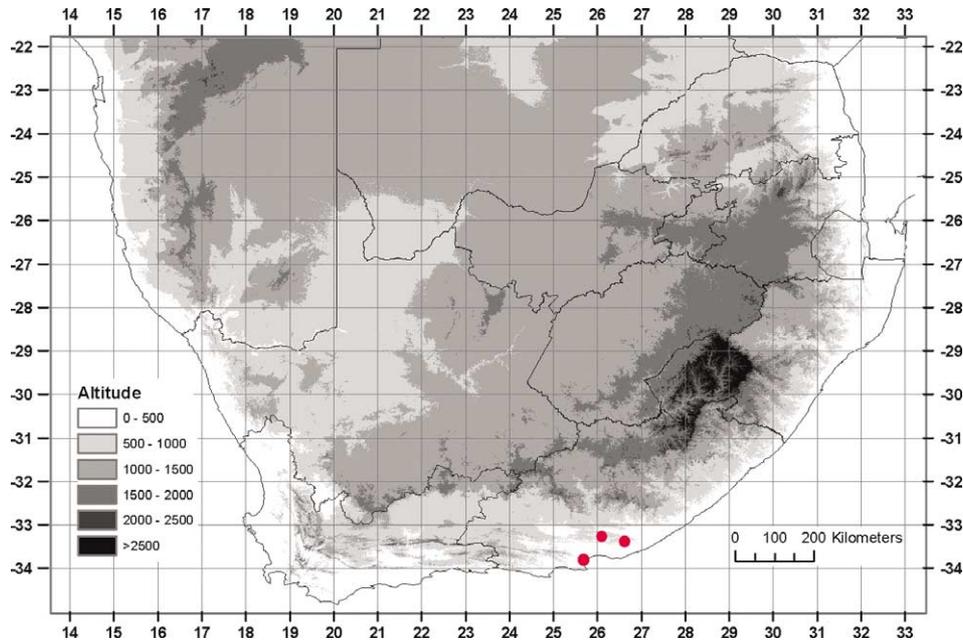


Figure 2. Known distribution of *Albuca annulata* Mart. Azorín & M. B. Crespo sp. nov.

raceme with (5)7–10 flowers, 9–16 cm long; lowermost pedicels 4–5 cm long, erect-patent, shortening from the base to the apex, finally with 0.5–1.0 cm long; peduncle 9–22 cm long, usually obliquely disposed; bracts ovate-lanceolate to triangular, acuminate, 8–20 × 7–8 mm, green with white membranous margins, withering soon and becoming papery white with brownish nerves, much shorter than pedicels at least in the lower part of the inflorescence. Flowers erect; tepals yellow with a green median stripe 2–3 mm wide; outer tepals oblong, 18–20 × 4.5–6.0 mm, with apex very slightly cucullate; inner tepals ovate, 15–16 × 5–6 mm, with apex narrow, acute and strongly cucullate. Stamen dimorphic; outer anthers absent or very small and sterile, up to 1 mm long; inner anthers bigger and fertile, 2.5–3.0 mm long; outer filaments narrowly oblong, 10.5–11.5 × 1.3–1.7 mm, slightly canaliculated, not pinched down; inner filaments linear oblong, 10–13 × 2.0–2.5 mm, wider and pinched in the lower half. Ovary oblong to obovate, green, up to 5.5–6.0 × 3.0–3.5 mm, stipitate, with prominent paraseptal crests that are divergent in the lower part and form three prominent ridges, sometimes white coloured; style subobpyramidal or clavate, trigonous, 6.5–7.5 × 3.5–4.0 mm, stigma yellow-green. Capsule ovate to oblong-ovate, 17–18 × 11–12 mm, trigonous to subspherical in section, pale brown when mature; valves splitting in the upper quarter. Seeds flat, ca 4–5 × 3 mm, dark brown to black, flattened and

semidiscoidal, biseriate and horizontally stacked in each locule.

Flowering time

September to October; fruits appear from late October to December, and seeds are released towards the end of November–December.

Habitat and distribution

Albuca annulata is found growing singly in sandy soils at low altitude in the Albany Thicket Biome, from near sea level up to ca 300 m a.s.l. Only three populations of this species are known from Aloes Reserve (east of Port Elizabeth), Thomas Baines Reserve (southwest of Grahamstown) and Alicedale (Fig. 2). The species is therefore endemic to the Albany Centre of Floristic Endemism.

Conservation status

Albuca annulata is known only from three populations, comprising a single plant in Alicedale, 6 plants in Aloes Reserve and about 40 plants in its type locality in Thomas Baines Reserve. Apparently, *A. annulata* has not been collected before, as no material matching its morphology was found in the revised herbaria. Therefore, we consider

Table 1. Main diagnostic characters between *Albuca annulata* sp. nov. and *A. bakeri*.

	<i>A. annulata</i>	<i>A. bakeri</i>
Bulb	neck up to 9 mm in diameter, covered by cataphylls with dark prominent thick horizontal rings	neck up to 20 mm in diameter, covered by cataphylls with slightly wavy, thin and dark brown transversal banding
Leaves	solitary and mostly terete	two or more and canaliculate
Inflorescence	Erect disposed on an oblique stem	Stem and inflorescence completely erect
Tepals	yellow and green	white and green
Outer stamen	anthers absent or very small and sterile, up to 1 mm long	anthers present and fertile, 1.5–3.0 mm long

this species as rare based on its very localized distribution and the less than 50 individuals found. Further studies are needed to confirm the red list status of this taxon.

Similar species

Albuca annulata is easily identified by its solitary hypogean fleshy bulb ending in an epigeal narrow neck, covered by whitish membranous cataphylls, with dark prominent thick horizontal rings; the solitary, terete leaf; the erect and helicoidal raceme disposed on an oblique stem; the erect flowers with yellow and green tepals and the sterile outer stamens (Fig. 1). No other *Albuca* with erect yellow flowers is described with the characteristic thin and long zebra-banded bulb neck of *A. annulata*. This species is closely related to *A. bakeri*, but it can be easily identified by the characters mentioned above (Table 1). *Albuca caudata* differs from *A. annulata* by many morphological characters, such as the roots tuberose; leaves canaliculate and numerous; inflorescence inclined and unilateral; tepals white and green (cf. Martínez-Azorín et al. 2011b).

Notes on the evolution of zebriine cataphylls

The evident zebra-banded cataphylls of *A. annulata* are also known in its close relative *A. bakeri*, this being a shared character that is very rare in that genus. Nonetheless, zebriine cataphylls are present in several members of all subfamilies of Hyacinthaceae (cf. Müller-Doblies and Müller-Doblies 1981), a character that is occasional in plants growing in semiarid areas from Namibia to Swaziland. In Ornithogaloideae, zebriine cataphylls have evolved independently in at least five different lineages (*Albuca*, *Battandiera*, *Coilonox*, *Nicipe* Raf. and *Stellarioides*), probably by convergent evolution in dry climates of southern Africa (cf. Martínez-Azorín et al. in press).

Additional material examined (paratypes)

Eastern Cape, east of Port Elizabeth, Aloes Reserve, near the cliffs overlooking Swartkops river, 30 m a.s.l., 26 Oct 2010, 33°51'08''S, 25°36'56''E, M. Martínez-Azorín and A. P. Dold 462 (GRA); Eastern Cape, Alicedale, east of village near the railway crossing to Burchell Game Reserve, 287 m a.s.l., 13 Dec 2009, 33°18'50''S, 26°05'58''E, M. Martínez-Azorín, A. P. Dold and A. Martínez-Soler 92 (GRA);

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