



Eliokarmos humanii (Hyacinthaceae, Ornithogaloideae), a new species from Namaqualand in South Africa and a new combination in the genus

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Abstract

A new species of the southern Africa endemic genus *Eliokarmos*, that includes the well-known chinchinchees, is described from the vicinity of Kotzesrus, Northern Cape Province of South Africa. *Eliokarmos humanii* sp. nov. is unique in the genus based on its single, slightly fleshy, suborbicular, convex leaf with ciliate margin, and the short subspiciform inflorescence with almost sessile flowers. A complete description is presented for this species, and data on morphology, ecology, and distribution are reported. In addition, *Ornithogalum richtersveldensis*, recently described from northwestern South Africa, is transferred to *Eliokarmos* based on its morphology and biogeography, and a new combination is presented for this species in the latter genus.

Keywords: Asparagaceae, new species, southern Africa, taxonomy

Introduction

Hyacinthaceae subfam. Ornithogaloideae (= tribe Ornithogaleae of Asparagaceae sensu Angiosperm Phylogeny Groups 2009, 2016, Chase *et al.* 2009) includes about 300 species of bulbous plants that are mainly distributed through Europe, Africa and southwest Asia. The latest study in Ornithogaloideae (cf. Martínez-Azorín *et al.* 2011), combining phylogenetic and morphological studies, substantiated the existence of 19 monophyletic genera, which are characterized by a clear syndrome of morphological characters and are related to clear biogeographic patterns, a treatment that has increasingly been followed lately.

Among those genera, *Eliokarmos* Rafinesque (1837: 24) was long overlooked by most modern authors until Speta (1998) and Martínez-Azorín *et al.* (2011, 2015) accepted its autonomy. This genus includes about 35 species that were traditionally included in *Ornithogalum* Linnaeus (1753: 306), based on the unspecialised stellate flowers. However, species of *Eliokarmos* are evidently different from those of *Ornithogalum* s.str., especially in fruit and seed morphology, as well as distribution (cf. Martínez-Azorín *et al.* 2010). *Eliokarmos* is endemic to southern and western South Africa and southern Namibia (cf. Martínez-Azorín *et al.* 2011) and includes *Eliokarmos thyrsoides* (Jacquin 1777: 17) Rafinesque (1837: 24), *E. dubius* (Houttuyn 1780: 309) Martínez-Azorín *et al.* (2011: 29) and related species, which are known colloquially as “chinchinchees”. Some of these have great ornamental value and are widely cultivated (Obermeyer 1978, Manning *et al.* 2007). Other species included in *Eliokarmos* are those previously placed in *Ornithogalum* subg. *Aspasia* (Salisbury 1866: 34) Obermeyer (1978: 333) “group Hispidae” (Obermeyer 1978) or *Ornithogalum* sect. *Hispidaspasia* Müller-Doblies & Müller-Doblies (1996: 404), among them *E. pilosus* (Jacquin 1793: t. 416) Martínez-Azorín *et al.* (2011: 29) (= *Ornithogalum hispidum* Hornemann 1813: 331) and related species, that show long sheathing, tubular and ascending leaves, with spreading blades arranged at different levels, among other characters (cf. Obermeyer 1978, Martínez-Azorín *et al.* 2015).

Our field work in August 2017 in Namaqualand, Northern Cape Province of South Africa, resulted in the discovery of an undescribed species of *Eliokarmos* in the surroundings of Kotzesrus. This species is unique in the genus in having a single, slightly fleshy, suborbicular, convex leaf with ciliate margin, and the short inflorescence with small, almost sessile flowers, among other characters. Therefore, based on these unique characters, we here describe *Eliokarmos humanii*, including a complete morphological description and illustration, as well as data on ecology and distribution. A new combination in *Eliokarmos* is also presented based on a recently described species of *Ornithogalum s.l.* from northwestern South Africa (van Jaarsveld 2016).

Materials and methods

Detailed morphological studies were undertaken on cultivated and wild specimens following the terminology used for species of Hyacinthaceae in Martínez-Azorín *et al.* (2007, 2009). Herbarium specimens from the herbaria ABH, BOL, GZU, GRA, NBG, and PRE (acronyms according to Thiers 2020+) were studied. Authors of the cited taxa follow IPNI (2020+). Orthography of geographical names and grid-number system follow Leistner & Morris (1976). Measurements of tepals, stamens and ovaries were performed on fresh material.

Results and discussion

Eliokarmos humanii Mart.-Azorín, M.B.Crespo, M.Á.Alonso & M.Pinter, *sp. nov.* (Fig. 1).

Eliokarmos humanii is unique in the genus based on its single, slightly fleshy, suborbicular, convex leaf with ciliate margin, and the short subspiciform inflorescence with almost sessile flowers, not approaching any known species in the genus.

Type:—SOUTH AFRICA. Northern Cape. Hondeklipbaai (3017): ca. 10 km NE of Kotzesrus on the way to Garies (–DB), elevation 160 m, sandy soil on quartzitic ridge, 13 April 2020 in flower ex hort. at University of Alicante, Spain, *M. Martínez-Azorín, M.B. Crespo, M.Á. Alonso & M. Pinter s.n.* (holotype GRA, isotype ABH).

Deciduous bulbous plants to 7 cm tall. *Bulb* solitary, hypogaeal, ovoid to subglobose, 0.7–1.0 × 0.5–0.8 cm, with soft, whitish outer tunics. *Roots* fleshy, branched, white, to 15 mm long. *Leaf* solitary, aerial portion ovoid to suborbicular when fully developed, 1.5–1.8 × 1.0–1.5 cm, green, glabrous, slightly succulent, appressed to the ground, convex, obtuse, with cilia 0.2–0.3 mm long on margins, convolute at base and clasping the stem, withered at anthesis. *Inflorescence* erect, subspiciform raceme with 2–5 flowers, 1–2 cm long; pedicels very reduced to show apparently sessile flowers and fruits; peduncle 3–5 cm long; bracts deltoid, auriculate, acuminate, ca 2.8 × 2.0 mm, dull reddish with white, membranous margins, glabrous. *Flowers* suberect; tepals white with median stripe ca 0.5 mm wide that is greenish proximally and orange distally, visible on abaxial surface but undefined adaxially, slightly fleshy, with minutely glandulous apex; outer tepals lanceolate-oblong, 4.9–5.2 × 1.4–1.6 mm; inner tepals obovate-lanceolate, 4.9–5.1 × 1.8–2.0 mm. *Stamens* monomorphic, very shortly adnate to tepals at the base; anthers lanceolate, 1.3 × 0.5 mm after dehiscence; filaments white, strap-like, narrowly triangular to lanceolate, gradually tapering to connect anthers, 2.8–3.0 mm long, 0.7–1.0 mm wide at the base. *Ovary* ellipsoid, green with whitish edges, ca 1.8 × 1.2 mm, trigonous in section; style white, columnar, erect, ca 2.0 × 0.4 mm, stigma trigonous, glandulous. *Capsule* elliptical-lanceolate, ca 3.0 × 1.5 mm, trigonous in section, pale-brown when mature, covered by persistent withered perigone. *Seeds* trigonous, comma like, apiculate, irregularly compressed, 0.5–0.9 × 0.3–0.5 mm, black, with minutely papillate-echinate surface.

Eponymy:—Named after Dawie Human (Bloemfontein, South Africa), amateur botanist who informed us of the new species and its type locality, so facilitating its description. His good knowledge on the South African flora, on account on his extensive travels in South Africa together with the late Charles Craib, has resulted in the discovery of various bulb species new to science.

Phenology:—*Eliokarmos humanii* produces leaves during June–July (mid-winter) in the wild. In cultivation in the northern hemisphere it produces flowers during April.

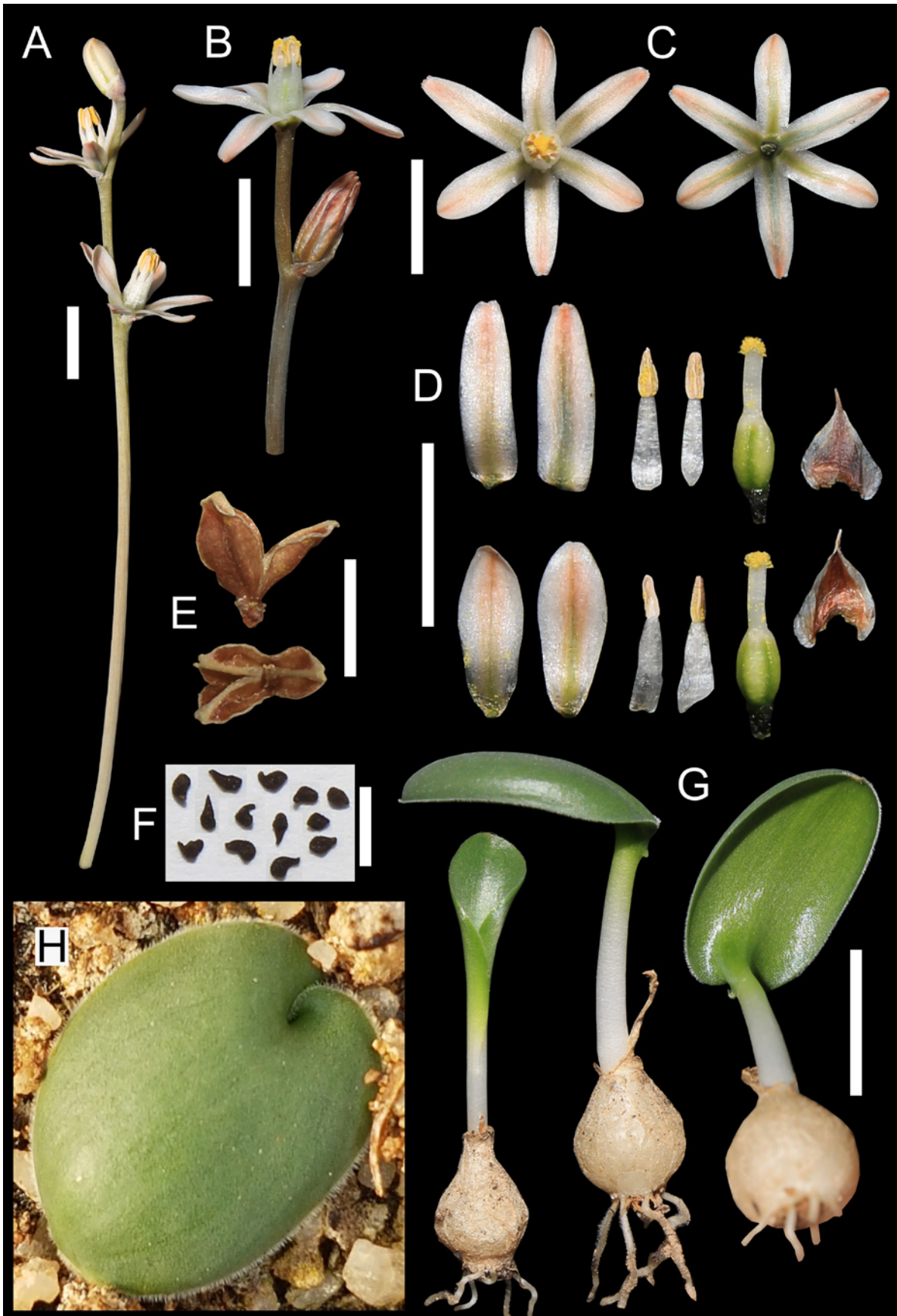


FIGURE 1. *Eliokarmos humanii* from the type locality, near Kotzesrus, Northern Cape Province in South Africa (from cultivated material). **A.** Inflorescence. **B.** Detail of inflorescence. **C.** Flowers in frontal and dorsal views. **D.** Dissected flower (outer tepals and stamens above and inners below) and bracts. **E.** Dehiscent capsule in lateral and apical view. **F.** Seeds. **G.** Bulbs with leaves. **H.** Leaf in cultivation. Scale bars: A–D: 5 mm; E: 3 mm; F: 2 mm; G: 1 cm.

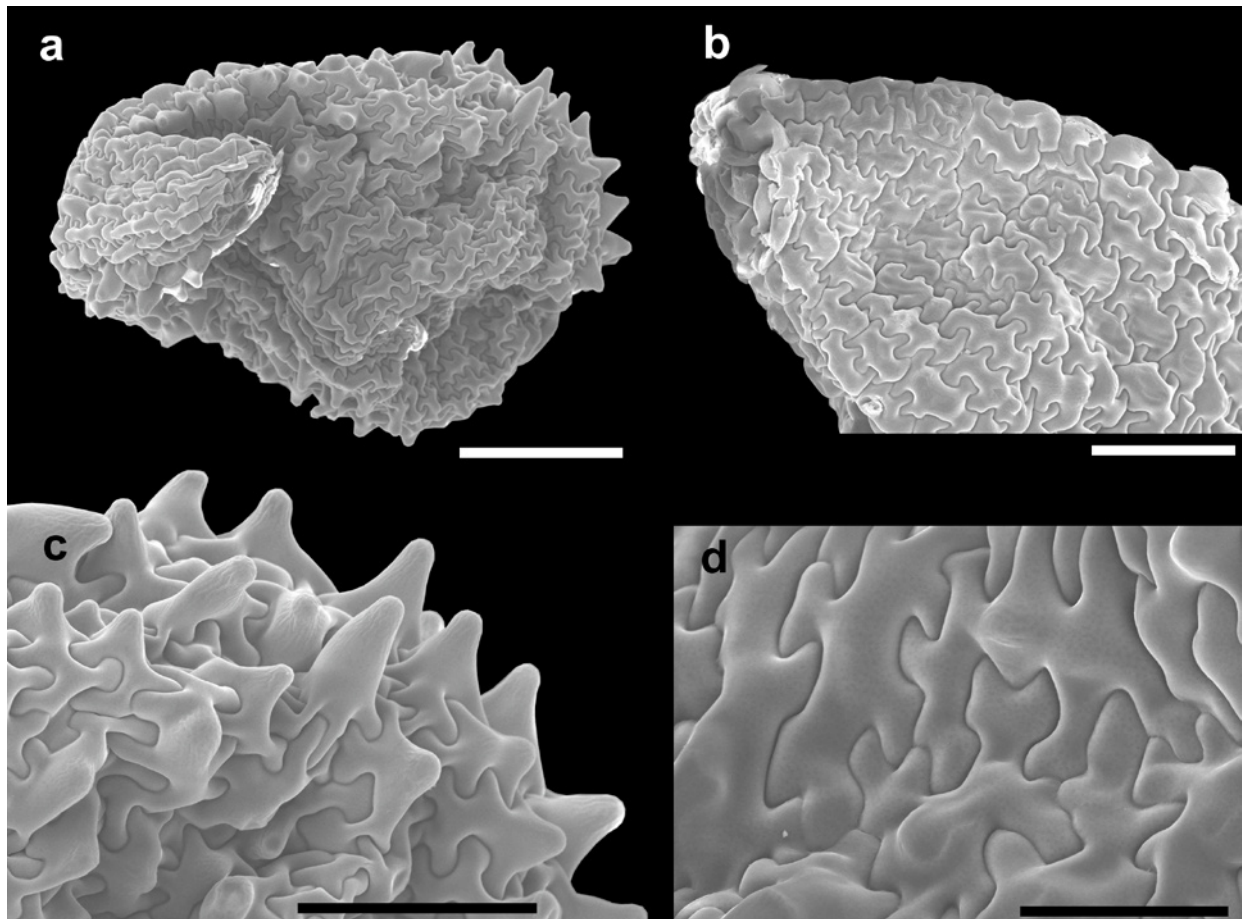


FIGURE 2. A–D. SEM images of the seed morphology and detail of the testa sculpture of *Eliokarmos humanii* from the type collection. Scale bars: A: 200 µm; B–C: 100 µm; D: 50 µm.

Habitat:—This species occurs on a small quartzitic outcrop (*koppie*) with gravelly or stony ground in the Succulent Karoo biome, sharing its type locality and habitat with the recently described *Austronea hispidoplicata* Martínez-Azorín *et al.* (2018: 114). Vegetation is classified as SKn4 Namaqualand Heuweltjieveld, characterised by winter-rainfall climate with irregular rain events occurring mostly from May to August with almost no rain between November and February (Mean annual precipitation: 115 mm), and frequent dew in winter. Mean annual temperature is ca 17°C and frost hardly occurs (Mucina & Rutherford 2006).

Distribution:—*Eliokarmos humanii* is only known from the type locality in the surroundings of Kotzesrus in Namaqualand, Northern Cape Province of South Africa. Further studies are needed to ascertain the real distribution of the species.

Diagnostic characters and taxonomic relationships:—*Eliokarmos humanii* is unique in the genus in having a single, slightly fleshy, suborbicular, convex, ciliate leaf and a short subspiciform inflorescence with almost sessile flowers. The new species shows a combination of morphological characters intermediate between *Ornithogalum* subgenus *Aspasia* “group *Aspasiae*” (Obermeyer 1978) and *Ornithogalum* subg. *Aspasia* sect. *Aspasia* (Müller-Doblies & Müller-Doblies 1996, Manning *et al.* 2007), the “chinchinchees”—with usually wide and ciliate or fimbriate (rarely glabrous) leaves; membranous, ovoid, wide and petaloid bracts; large colourful flowers; white, yellow, orange or reddish tepals, sometimes with basal or apical maculae but lacking a darker longitudinal band; and filaments usually expanded or winged below (cf. Obermeyer 1978, Manning *et al.* 2007)—and *O.* sect. *Hispidaspasia*—with long sheathing, tubular and ascending leaves, with spreading blades arranged at different levels, usually not coinciding with the flowers; bracts narrower and apiculate or aristate; flowers smaller, and tepals usually having a darker longitudinal band only apparent on the abaxial side (cf. Obermeyer 1978). Although *E. humanii* shows the wide, flat, ciliate leaf associated with *O.* sect. *Aspasia*, in having small flowers with tepals showing a darker longitudinal band it also approaches *O.* sect. *Hispidaspasia*. Our phylogenetic analyses (Martínez-Azorín *et al.* in prep.) confirm the inclusion of *E. humanii* in *Eliokarmos*, and support previous phylogenetic findings that show sections *Aspasia* and *Hispidaspasia* to be not monophyletic. Therefore, no infrageneric classification is accepted here. Further genetic studies covering the whole diversity of the genus are necessary.

A new combination in the genus

A recently described species of *Ornithogalum s.l.* from northwestern South Africa (van Jaarsveld 2016) fits with the morphology and distribution of *Eliokarmos*, and we accordingly present its combination in the latter genus:

Eliokarmos richtersveldense (van Jaarsv.) Mart.-Azorín, M.B. Crespo, M.Á. Alonso & M. Pinter **comb. nov.** ≡ *Ornithogalum richtersveldense* van Jaarsveld [2016: 25, in *Aloe* 52(1) as “*richtersveldensis*”], basionym.

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