Trimelopter crispolanatum (Asparagaceae, Scilloideae), a new species from Namaqualand, South Africa

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Hyacinthaceae subfam. Ornithogaloideae (= tribe Ornithogaleae of Asparagaceae sensu APG 2009, 2016, Chase *et al.* 2009) includes about 300 species of bulbous plants mainly distributed throughout Europe, Africa and south-west Asia. The latest comprehensive study in Ornithogaloideae (Martínez-Azorín *et al.* 2011) demonstrates the existence of 19 monophyletic genera which are characterised by a clear syndrome of morphological characters related to biogeographic patterns.

Among those genera, *Trimelopter* Rafinesque (1837: 24) currently includes 11 species related to the generitype *T. unifolium* (Retz. 1781: 17) Martínez-Azorín *et al.* (2011: 26) (= *Ornithogalum unifolium* Retz.), mostly showing 1–2(–3) elliptic to narrowly oblong leaves that are commonly appressed to the ground, although few species show filiform or suberect leaves; the ovary with two usually prominent longitudinal dorsal keels on each carpel, sometimes weakly prominent but always present (apomorphy of the genus); and unequally compressed or semi-discoïd seeds (Dyer 1931, Leighton 1944, Obermeyer 1978, Martínez-Azorín *et al.* 2011, 2013).

Our botanical exploration in August 2017 in Namaqualand, Northern Cape Province of South Africa, has yielded discovery of some populations of an undescribed species of *Trimelopter* with remarkable crisped and densely hairy leaves at that time found in vegetative stage only. We have recently obtained flowering material of this species in cultivation which shows typical inflorescence and flower morphology of *Trimelopter* but differs from the other known species by distinct characters, most notably by crisped, lanate leaves. Based on both field and cultivated specimens, here we describe a new species—*Trimelopter crispolanatum*—and provide a complete description, accompanied by illustrations as well as data on ecology and distribution.

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

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

Trimelopter crispolanatum slightly approaches *T. monarchos* in leaf morphology, but the former species produces crisped, woolly leaves, which are shorter and commonly purplish abaxially, orange tepals, longer and hairy bracts, abruptly contracted filaments along the upper third, longer ovary and shorter style.

Type:—SOUTH AFRICA. Northern Cape. Hondeklipbaai (3017): 5 km N of Klipfontein, near Kersboshoek (–BD), 313 m elevation, sandy soil, 3 April 2020 (in flower ex hort.), M. Martínez-Azorín, M.B. Crespo, M.Á. Alonso & M. Pinter MMA1890b (holotype GRA, isotype ABH).

Deciduous bulbous plants up to 20 cm tall. Bulb solitary, hypogeal, ovoid to subglobose, $2.5\text{--}6 \times 1.5\text{--}4$ cm, with soft pale brown outer tunics, usually with longitudinal darker markings, terminating in a hypogeal neck, 1–3 cm long. Roots fleshy, branched, white, up to 50 mm long. Leaf solitary or 2 per bulb, ovate-lanceolate to oblong, $4\text{--}17 \times 1.5\text{--}3.5$ cm, acute to obtuse, shortly apiculate, green on the adaxial side and commonly purplish abaxially, declinate to decumbent, canaliculate, slightly succulent, with crisped margins, covered with abundant long, sinuous, white, woolly hairs 1–3 mm long, convolute and clasping the stem at base with purple striation, withered at anthesis. Inflorescence an erect raceme with 15–27 flowers, 1.5–5 cm long; lowermost pedicels 4–6 mm long at anthesis, erect-patent, elongating in fruit to 30 mm long; peduncle 10–15 cm long; bracts narrowly linear-lanceolate, acuminate, 15–20 mm long, ca 1.5 mm at base, comose before anthesis and distinctly longer than pedicels at anthesis, green with purplish tinge and white membranous margins, laxly hirsute with long, patent, white hairs on both sides and margin. Flowers suberect to patent; tepals yellow-orange with a grey-green median stripe 1–1.5 mm wide, clearly visible in the abaxial side and undefined in the adaxial side associated to the central nerves, slightly fleshy, with minutely glandulous apex; outer tepals ovate-oblong, $9\text{--}9.3 \times 2.2\text{--}2.4$ mm; inner tepals ovate, $8.5\text{--}9.5 \times 3\text{--}3.2$ mm. Stamens monomorphic; anthers ca 1.5×0.7 mm after dehiscence; filaments strap-like, wide and abruptly contracted along the upper third to connect anthers, 6–6.5 mm long, 1.2–1.5 mm wide at the middle. Ovary ellipsoid, green, $4\text{--}4.2 \times 2.2\text{--}2.5$ mm, with two longitudinal keels on each carpel giving a 6 angled trilobed section; style filiform, erect to slightly declined, $3\text{--}3.2 \times 0.4\text{--}0.6$ mm, stigma slightly capitate, glandulose. Capsule broadly ovate to subglobose, ca 10×8 mm, trilobed in section, pale-brown when mature. Seeds flat, $2\text{--}3 \times 1.5\text{--}2$ mm, black, flattened and hemidiscoid, with slightly winged margins.

Etymology:—Named after the distinctly crisped and hairy leaves, the main diagnostic character of the species (from the Latin words “crispum” [crisped] and “lanatum” [woolly]).

Phenology:—*Trimelopter crispolanatum* produces leaves around July and August in the wild. Under glasshouse conditions at University of Alicante, Spain, the plant produced flowers in April.

Habitat:—This species occurs in deep sandy soil, sometimes associated to quartzitic ridges, of the SKn4 Namaqualand Heuweltjieveld (Succulent Karoo Biome). The locality is characterised by distinctly winter-rainfall climate with irregular rain events mostly from May to August and a dry season with almost no rain from November to February. The mean annual precipitation in the vegetation unit where the new species was found is about 115 mm per year, with dew experienced throughout the winter, and the mean annual temperature around 17.8°C (Mucina & Rutherford 2006).

Distribution:—*Trimelopter crispolanatum* is only known from two populations in the surroundings of Garies in Namaqualand, Northern Cape Province of South Africa.

Diagnostic characters and taxonomic relationships:—*Trimelopter crispolanatum* is easily identified by the solitary or paired leaves which are green adaxially and usually purplish abaxially, distinctly crisped and coated with abundant, elongated, sinuous, white hairs all over, giving a woolly appearance, together with the long comose, hairy bracts—a combination of traits making the species unmistakable in the genus.

The morphologically closest species of *Trimelopter crispolanatum* appears to be *T. monarchos* (Müller-Doblies & Müller-Doblies 1996: 476) Martínez-Azorín *et al.* (2011: 26). The latter species was described by Müller-Doblies & Müller-Doblies (1996) in a very concise manner, with no full morphological description, illustrating only leaf morphology, and types are not yet deposited in the cited herbaria. We were able to collect the latter species on the type locality. After observing this species in cultivation (Martínez-Azorín *et al.* 659 ABH59600!, GRA!), we add here other characters not cited in the protologue, such as the soft, green, leaves 13–33 cm long (the largest in the genus) covered with hairs ca 0.5–1 mm long on both sides and margins; the elongated, lax raceme, with 10–17 flowers; pedicels at anthesis to 25 mm long; bracts glabrous, ca 8 mm long; tepals white with a green band on the abaxial side, 9–11 mm long; filaments tapering and gradually attenuate; ovary subglobose, 3.5–4 mm long, distinctly trilobed and 6-angled in section; and style, 4–5 mm long. *Trimelopter monarchos* is only known from the type locality, 7 km W of Steinkopf, in the Northern Cape Province of South Africa.

The new species also reminds other taxa having hairy leaves, such as *T. craibii* Martínez-Azorín *et al.* (2013: 52), *T. etesiogaripense* Müller-Doblies & Müller-Doblies (1996: 476) subsp. *longipilosum* (Müller-Doblies & Müller-Doblies 1996: 476) Martínez-Azorín *et al.* (2011: 26), and *T. strigosulum* (Müller-Doblies & Müller-Doblies 1996: 480) Martínez-Azorín *et al.* (2011: 26). However, all these species produce a single, much smaller leaf that is appressed to the ground and has different hairs.

Additional material studied (paratypes):—SOUTH AFRICA. Northern Cape. Hondeklipbaai (3017): ca 20 km S of Garies on the way to Kotzesrus (–DB), 160 m elevation, sandy soil on quartzitic ridge, 20 August 2017 (in leaf), M. Martínez-Azorín, M.B. Crespo, M.Á. Alonso & M. Pinter MMA1781 (ABH!); Hondeklipbaai (3017): 5 km N of Klipfontein, near Kersboshhoek (–BD), 313 m elevation, sandy soil, 30 August 2017 (in leaf), M. Martínez-Azorín, M.B. Crespo, M.Á. Alonso & M. Pinter MMA1890 (ABH!); Hondeklipbaai (3017): 2.3 km N of Klipfontein, S of Kersboshhoek (–BD), 309

m elevation, sandy soil, 30 August 2017 (in leaf), M. Martínez-Azorín, M.B. Crespo, M.Á. Alonso & M. Pinter MMA1891 (ABH!).

FIGURE 1. *Trimelopter crispolanatum* Mart.-Azorín *et al.* from the type locality, near Klipfontein in South Africa (bulbs and leaves of wild plants on 30 August 2017 and inflorescence ex hort. on 3 April 2020). **A.** Inflorescence with withered leaf; **B.** Immature inflorescence with long, comose, hairy bracts; **C.** Inflorescence; **D.** Flowers in frontal, dorsal and lateral views; **E.** Dissected flower; **F.** Bulb with leaves; **G.** Leaves; **H.** Detail of leaf indumentum. Scale bars: A, F–G = 1 cm; B–E, H = 5 mm.

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