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Ethesia tanquana (Ornithogaloideae, Hyacinthaceae), a new species from the Tanqua Karoo (South Africa), with notes on E. haalenbergensis

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Abstract

Martínez-Azorín, M. & Crespo, M.B. 2012. Ethesia tanquana (Ornithogaloideae, Hyacinthaceae), a new species from the Tanqua Karoo (South Africa), with notes on E. haalenbergensis. Anales Jard. Bot. Madrid 69(2): 201-208.

As a part of a taxonomic revision of Ethesia Raf., a new species, E. tanquana Mart.-Azorín & M.B.Crespo, is described from the Tanqua Karoo in South Africa. This new species is at first sight similar to E. haalenbergensis (U.Müll.-Doblies & D.Müll.-Doblies) Mart.-Azorín, M.B.Crespo & Juan and also E. xanthochlora (Baker) Mart.-Azorín, M.B.Crespo & Juan, but it differs in floral and vegetative characters as well as in its ecology and isolated distribution. A complete description, data on biology, habitat, and distribution of the new species are presented. An identification key for Ethesia and new data on the rare Namibian E. haalenbergensis are also given.

Key words: Ethesia xanthochlora, distribution, ecology, habitat, taxonomy, Tankwa Karoo.

INTRODUCTION

Family Hyacinthaceae includes about 700-900 species of bulbous plants that are mainly distributed throughout Europe, Africa and SW Asia, with a single small genus in South America (Speta, 1998; APG II, 2002). Four monophyletic subfamilies are accepted within Hyacinthaceae: Hyacinthoideae, Ornithogaloideae, Urgineae and Ozoroëoideae (Pflosser & Speta, 1999; Manning & al., 2004). Alternatively, Hyacinthaceae has been treated as subfamily Scilloideae of the Asparagaceae, and the subfamilies above are then treated as tribes Hyacintheae, Ornithogaloideae, Ozoroëeae and Urgineae (e.g. APG III, 2009; Chase & al., 2009).

Ornithogaloideae are distributed through Europe, SW Asia and Africa. In recent decades a number of morphological and phylogenetic studies were made on the group, focusing on circumscriptions of the genera. As a consequence, at least three very different taxonomic arrangements at generic level have been proposed for the Ornithogaloideae by Speta (1998) and Manning & al. (2004, 2009), all based exclusively on plastid DNA regions. The latest comprehensive study of the subfamily, including for the first time nuclear DNA regions, accepts 19 independent genera (Martínez-Azorín & al., 2011). These genera are based on monophyletic clades supported by a clear syndrome of morphological characters and distinct biogeographic patterns (cf. Martínez-Azorín & al., 2011), thus making this treatment highly consistent.

The genus Ethesia Raf. was described by Rafinesque (1837) to include a single species, E. prasina (Ker Gawl.) Raf. It was characterized as follows: ‘649. Ethesia Raf. (Nymph) diff. ad

Resumen

Martínez-Azorín, M. & Crespo, M.B. 2012. Ethesia tanquana (Ornithogaloideae, Hyacinthaceae), una nueva especie de Tanqua Karoo (Sudáfrica), con notas sobre E. haalenbergensis. Anales Jard. Bot. Madrid 69(2): 201-208 (en inglés).

En el marco de la revisión taxonómica de Ethesia Raf., se describe una nueva especie, E. tanquana Mart.-Azorín & M.B.Crespo, del Tanqua Karoo en Sudáfrica. Esta nueva especie se asemeja a primera vista a E. haalenbergensis (U.Müll.-Doblies & D.Müll.-Doblies) Mart.-Azorín, M.B.Crespo & Juan y E. xanthochlora (Baker) Mart.-Azorín, M.B.Crespo & Juan, pero difiere por sus caracteres florales y vegetativos así como por su peculiar ecología y distribución aislada. Además, se presenta una descripción completa para la nueva especie, junto a información sobre su biología, hábitat, y distribución. Finalmente, se presenta una clave de identificación para Ethesia y nuevos datos sobre el raro endemismo namibiano E. haalenbergensis.

Palabras clave: Ethesia xanthochlora, distribución, ecología, hábitat, taxonomía, Tankwa Karoo.
placed O. prasinum Ker Gawl., the type of that genus, in their new Albuca subg. Namibiogalum (U. Müll.-Doblies & D. Müll.-Doblies) J.C. Manning & Goldblatt. As discussed by Martínez-Azorín & al. (2011), the inclusion of O. prasinum in A. subg. Namibiogalum (= Battandiera Maire sensu Martínez-Azorín & al., 2011) is not consistent with the morphological data. Furthermore, other apparently related species, such as O. haalenbergense U. Müll.-Doblies & D. Müll.-Doblies and O. xanthochlorum Baker, were placed in O. sect. Xanthochlora (U. Müll.-Doblies & D. Müll.-Doblies) J.C. Manning & Goldblatt (= Ethesia Raf. sensu Martínez-Azorín & al., 2011) in their phylogenetic analyses by Manning & al. (2009). However, Manning & Goldblatt (2011) subsequently transferred O. prasinum to their widely circumscribed and morphologically heterogeneous Ornithogalum, a solution that implicitly corroborates the previous results by Martínez-Azorín & al. (2011). Manning & Goldblatt’s treatment was supported by the cytological data presented in Goldblatt & Manning (2011). Ethesia has the unique chromosome number 2n = 16 (x = 8), that it shares only with its sister clade Galtonia Decne.

The latest revision of Ornithogalum in southern Africa (cf. Müller-Doblies & Müller-Doblies, 1996) accepted O. xanthochlorum, O. prasinum and O. polyplebium as independent species. These authors also described a new related species, O. haalenbergense that is endemic to a small area in the surroundings of Haalenberg in SW Namibia. This species is closely related to E. prasina, but it differs in the colour of the tepals and the number and morphology of the leaves. It is remarkable that no complete morphological description of this new species was presented, and no holotype or isotypes appear to have been deposited in the herbaria cited in the protologue (‘holotypus: WIND; isotypi: B, BTU, K, PRE’) since its description in 1996. As a consequence, a clear understanding of the taxonomic status of E. haalenbergensis is still lacking.

It is the aim of this paper to enhance our knowledge of the taxonomy of Ethesia. The study of living populations and herbarium collections of Ethesia from southern Africa reveals the existence of clear morphological differences that allow the description of a new species, Ethesia tanquana Mart.-Azorín & M.B. Crespo. This taxon appears to be closely related to E. xanthochlora and E. haalenbergensis from SW Namibia and Namaqualand. Data on morphology, biology, habitat, and distribution of E. tanquana and the rare and poorly known E. haalenbergensis are provided, together with a tentative key for the identification of Ethesia species.

MATERIAL AND METHODS

Morphological studies were mainly undertaken on living material from natural populations, usually within a few hours after collection, as described in detail by Martínez-Azorín & al. (2007, 2010) for other related groups of Ornithogaloideae. These data were complemented with studies of dried material conserved in the herbaria BOL, BNRH, GRA, J, K, KEI, KMG, NBG, NH, NU, PEU, PRE, PUC, UFH, and WIND (acronyms according to Thiers, 2012). Authors of the cited taxa follow the IPNI (2012).

RESULTS AND DISCUSSION

Species of Ethesia are characterized by tepals ovate-oblong, free, all spreading, greenish, with branched outer nerves, sometimes with white margins; staminal filaments showy, pure white, and also spreading; capsule obcordate or widely globose and truncate to retuse at the apex, about equal or wider than long (cf. Martínez-Azorín & al., 2011). From a phylogenetic point of view, Ethesia is monophyletic and considered sister to the Galtonia clade (including O. saundersiae Baker) (cf. Martínez-Azorín & al., 2011). Galtonia is easily differentiated from Ethesia by the large leaves sheathing the stem; racemose inflorescence, with flowers nodding; tepals fused into a campanulate tube for about half of their length; filaments cylindrical, adnate, and included; and capsule oblong-cylindrical and acute, usually longer than wide. Only G. saundersiae (Baker) Mart.-Azorín, M.B. Crespo & Juan shows a disruptive flower structure in the genus, it having the tepals almost free and spreading, and the ovary globose and shining black. Further studies, including molecular data, are needed to elucidate its final taxonomic position. Galtonia and Ethesia show different biogeographic patterns since species of the former genus occur in habitat SW of Garies, South Africa (M. Martínez-Azorín, A. Martínez-Soler & R. McKenzie MMA743 GRA).
in summer-rainfall, high-altitude regions of the Drakensberg, Low Drakensberg, Southern Berg and Natal Midlands (South Africa and Lesotho), whereas *Ethesia* species occur in winter-rainfall, sub-arid regions in western and central South Africa and southern Namibia.

Four species are currently accepted in *Ethesia* (cf. Martínez-Azorín & al., 2011). Among them, *E. xanthochlora* is probably the most well-known species of the genus, perhaps because of its large size and abundance in Namaqualand, NW South Africa (Fig. 1). This species was described in *Ornithogalum* by Baker (1897) based on a Harry Bolus collection from ‘Western region: Little Namaqualand; Kaus Mountain, 2500 ft., Bolus 6598!’ The original description includes the following characters: ‘... raceme dense, 6-8 in. long; pedicels stout, erecto-patent, lower 1-1¼ in. long, ... petals yellowish-green, ½ in. long ...’. In summary, this species is characterized by the long and narrow, dense, inflorescence with short and stout pedicels, and flowers with uniformly yellow-green tepals. A similar concept was followed by Leighton (1945) 'Inflorescence many flowered, dense ... pedicels 2-3 cm long ... flowers green ...'. Later Obermeyer (1966) illustrated this species in *Flowering Plants of Africa*. The description and figure showed plants with a long and cylindrical inflorescence with pedicels short and stout, all of similar length, and greenish flowers. The specimen figured was collected by A. Amelia Obermeyer 'about 21 miles north of Springbok near the road to Steinkopf, not far from the type locality'. She gave interesting distribution data on this species, saying that it 'has been collected fairly often in the Namaqualand area, while a few records come from Calvinia and Ceres'. A few years later, Obermeyer (1978) characterized the same species again as having 'Inflorescence ... with a long, dense, many flowered, cylindrical raceme ... pedicels arcuate, lengthening and hardening in fruit, up to 30 mm long ... Perianth green ...'. She also cited a list of herbarium collections distributed from the Richtersveld in the north to near Ceres in the south.

Müller-Doblies & Müller-Doblies (1996), in their revision of *Ornithogalum* in southern Africa accepted *O. xanthochlorum*, though with no new morphological data, and only citing Obermeyer’s distributional information. Moreover, these authors described a new species *O. baalenbergensis*, here accepted as *E. baalenbergensis*, which was known from a single locality in the surroundings of Haalenberg in SW Namibia. It was considered to be related to *O. prasinum*, but it differs by the tepals green with a white marginal region and the 2-3 narrow-oblong and decumbent leaves. No complete morphological description of *E. baalenbergensis* has been published to date and no types are available in any southern African or European herbaria.

Based on our fieldwork in South Africa and the revision of the main herbaria in that country, we present data supporting the description of a new species, *E. tanquana*, for populations growing in the Tanqua Karoo (also known as Tankwa Karoo), South Africa. It shows clear affinities to both *E. xanthochlora* (with which it has been usually misidentified) and *E. baalenbergensis*, though reproductive and vegetative characters allow easy separation from the latter. Since *E. xanthochlora* is a well-known species for which extensive information is available, complete morphological descriptions as well as data on biological, habitat, and distribution are included (see below) only for *E. tanquana* and the rare and poorly known *E. baalenbergensis*.

### Ethesia tanquana Mart.-Azorín & M.B.Crespo, sp. nov.

(Figs. 2, 3, 4)

Holotype: South Africa, Western Cape, Tanqua Karoo, 6.1 km from main road on turn off to Middelpoort, 452 m, 32º39'06"S, 19º45'25"E, 3-IX-2011, M. Martínez-Azorín, A. Martínez-Soler & R. McKenzie MMA815 (GRA).

*Species ad E. xanthochloram et E. baalenbergensem certe affinitis sed eis facile distinguatur foliis per anthesim plenam pro parte maxima emarciitis, et pedicellis fructiferis longioribus bracteas suas semper superantibus. A priore etiam differt tepalis olivaceis late albo-marginatis, nervis atratis pulchre ornatis; filamenti staminalibus angustioribus (ad 2.5 mm lateris); stylis brevioribus (ad 6 mm longis). A posteriore valde discrepat floris magis numerosis et generaliter majoribus; pedunculo inflorantia gracilliori (ad 0.3 cm lato); bracteis herbaceis, angustioribus, breve albo-marginatis; floribus in omnibus partibus majoribus.*

*Habitat in apricis siccis, solo arenoso parum lapidoso, in regione Tanqua Karoo dicta, ex Africa meridionali.*

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**Fig. 2.** *Ethesia tanquana* Mart.-Azorín & M.B. Crespo: **a,** plant; **b,** leaf; **c,** inflorescence; **d,** flower, frontal view (left) and dorsal view (right); **e,** tepals, outer (left) and inner (right); **f,** stamen, outer (left) and inner (right); **g,** gynoecium, lateral views; **h,** capsule, lateral view; **i,** capsule, apical view; **j,** seed. Scale bars: **a-i =** 1 cm; **j =** 2 mm.
Deciduous bulbous plant. Flowering scapes (10)15-28(37) cm high. Bulb hypogeal, ovoid, 4.9 × 2.5-6 cm, with a flat, small, basal plate, and dark leathery outer tunics. Leaves 5-11, in a basal rosette, not sheathing the stem, completely or mostly withered in full anthesis, lanceolate-oblong, lorate, flat, curved outwards and downwards, (8)11-18(25) × 0.8-4.5 cm, somewhat fleshy, glabrous, green, entire with a narrow hyaline margin. Inflorescence with (7)15-28(35) flowers, in a short, conical raceme, (3.5)5-16 × (2.5)3-6(8) cm, ca. 1-2 times longer than wide; peduncle erect, stout, terete, green, 6-15(20) × 0.7-1.2 cm; flower pedicles erect-patent, (1.8)2.4-4.3(4.8) × 0.2-0.3 cm; fruit pedicels lengthening and hardening, (3)2.2-4.4(5) × 0.2-0.3 cm, ascending, slightly arcuate, forming an obtuse callus above; bracts narrow-triangular, slightly clasping pedicles, 1.8-3.5 × 0.8-1 cm, usually not overtopping the flowers, at least in the basal portion of the inflorescence shorter than fruiting pedicels, greenish-yellow with a membranous translucent margin, persistent, drying out slowly and becoming brown from the tip downwards. Flowers sweet-scented; tepals fleshy, pale grey-green with white margin, with distinct darker green venation, and branched lateral veins; outers ovate, 13-14 × 6-8 mm, with a slightly cucullate, white, papillate apex; inners narrowly ovate-lanceolate, 12-13 × 5-6 mm. Filaments all similar, ovate-lanceolate or narrowly triangular, acuminate, thick, fleshy, white, 8-9.5 × 2-2.5 mm, all spreading not enclosing the ovary; anthers small, 2-2.5 × 1-1.2 mm after dehiscence. Ovary oblong, turbinate, trigonous, 6-6.5 × 3.5-4 mm, green, with sepal nectaries in the apical portion of the carpellary axis, which produce abundant nectar; ovules biseriate; style thickened, white, papillate apex, as long as the ovary, erect or somewhat curved; stigma shortly 3-lobed, somewhat capitate, with conspicuous papillate lobes. Capsule broadly globose-oblong, truncate, retuse at the apex, as wide or wider than long, 13-15 × 15-19 mm, trilobate in section, surrounded by the persistent perianth; seeds flattened, semidiscoid to irregularly discoid, 5-7.5 × 4-6 mm; testa shining black, with a very shallow undulate cell pattern.

Etymology. Named after its confined distribution to the Tanqua Karoo in South Africa (*tanquana* = from Tanqua Karoo).

Chromosome number. 2n = 16 (cf. Goldblatt & Manning, 2011; as *O. xanthochlorum* = Snijman 2227 NBG).

Flowering time. August-October, fruits appear in late September-November.

Habitat. Flats with dry open karroid shrubby vegetation (Succulent Karoo Biome), over clayey soils on shale mudstones or red-brown sandy and slightly stony soils derived from shale arenites.

Distribution and biogeography. It is confined to the Tanqua Karoo in the inland areas of SW South Africa, from south of Calvinia to north of Ceres (Fig. 5). This region comprises the lowlands located south west of the Hantam-Roggeveld Centre (HRC) of plant endemism (Van Wyk & Smith, 2001), and includes the vegetation units Tanqua Karoo and Koedoesberge-Moordenaars Karoo in the Bainshadows Valley Karoo bioregion (Mucina & Rutherford, 2006). Other taxa, such as *Baibiana tanquana* J.C.Manning & Goldblatt, *Moerae tanquana* Goldblatt & J.C.Manning, *Octopoma tanquana* Klak, *Lampranthus tanquanus* H.E.K.Hartmann, *Euphorbia gentilis* subsp. *tanquana* L.C.Leach, or *Tanguana* H.E.K.Hartmann & Liede, are also found in the same geographic area, thus emphasizing the fact that the Tanqua Karoo is a remarkable biogeographical unit in terms of endemism.

Diagnostic characters and relationships. *Ethesia tanquana* is easily identified by the tepals olive-green with a broad white margin and dark nerves, the bracts up to ¼ the length of fruiting pedicels, and the leaves mostly withered at the full anthesis. *Ethesia xanthochlora* can be related to *E. tanquana* on the basis of its robust habit, with stout inflorescence peduncle and flower pedicels, but it differs in its uniformly green-yellowish tepals, the cylindrical narrow inflorescence with bracts longer than pedicels in fruit (Table 1). On the other hand, *E. baadenbergensis* shares with *E. tanquana* the tepals green with a white margin, but differs in its smaller flowers and inflorescence, with only 2-3 leaves per flowering stem, among other characters (Table 1). It is also notable that despite its floral similarities with *E. baadenbergensis*, *E. tanquana* occurs in continental...
areas to the south of the main populations of *E. xanthochlora*, whereas *E. haalenbergensis* is found in coastal regions further north of the *E. xanthochlora* populations (Fig. 5).

**Observations**. Herbarium materials of the new species have usually been misidentified as *O. xanthochlorum* (= *E. xanthochlora*). The first known collections were made by R.H. Compton in Gansfontein, in Tanqua Karoo, in 1935 ([Compton](#)). The most recent flora of the Roggeveld and the Tanqua Karoo ([Van der Merwe & Van Rooyen, 2010](#)) includes a photograph of this species, although again as *O. xanthochlorum*.

**Additional specimens studied**

**SOUTH AFRICA**: **Northern Cape**: (3119DC) Tankwa Karoo, Kalkgat Oos, next to road, 31º51’18"S, 19º34’29"E, 7-IX-2004, 452 m, H. Rösch 239 (KMG, NBG); (3219BB) Tankwa Karoo, along Roodewerf road, 32º00’14"S, 19º52’14"E, 18-IX-2006, 543 m, H. Rösch 564 (KMG, NBG); (3219BC) Wupertal, Elands Vlei, lower Tanqua, Marloth 10465 (cf. Obermeyer, 1978).

**Western Cape**: (3219DA) Tanqua Karoo, farm De Mond, just E of Doorn River, 6-X-2008, D.A. Snijman 2227 (NBG); (3219DA) Tanqua Karoo, farm De Mond, just N of Doorn River, 6-X-2008, D.A. Snijman 2227 (NBG); (3219DA) Calvinia CP, Tanqua Karoo, Gansfontein, 26-VIII-1935, 1500 feet, Compton 5991 (NBG); (3219DA) Tanqua Karoo, 3.8 km from main road on turn off to Middelpo, 32º39’44"S, 19º44’21"E, 3-IX-2011, 469 m, M. Martínez-Azorín, A. Martínez-Soler & R. McKenzie MMA818 (GRA); (3219DD) between Ceres and Sutherland, in the Tanqua Karoo, near Bizansgat, 24-IX-1987, M. Viviers & J. Vlok 338 (NBG); (3219DD) on road to Sutherland, just before turn off to Onder-Wadrif, north of river crossing, 1-X-1974, K. Hiemstra 586 (NBG); (3319BC) Worcester, Karoooporth, Hafström & Acocks 231 (cf. Obermeyer, 1978).

**Ethesia haalenbergensis** (U.Müll.-Doblies & D.Müll.-Doblies) Mart.-Azorín, M.B.Crespo & Juan in *Ann. Bot. (Oxford)* 107(1): 28. 2011. ≡ *Ornithogalum haalenbergense* U.Müll.-Doblies & D.Müll.-Doblies in *Feddes Repert.* 107(5-6): 492. 1996.

Holotype: Namibia (2615DA, Lüderitz): Haalenberg, N of the road, ca. 600 m, 25-VII-1988, Müller-Doblies 88040e (allegedly at WIND). Isotypes: B, BTU, K, PRE.

Ornithogalo prasino affine, sed differt foliis solum 2-3, plantis, humo appressis, anguste oblongis.

Deciduous bulbous plant. Flowering scapes 5-6.5 cm high. Bulb hypogeal, ovoid, 4-7 x 2-3 cm, with a flat, small, basal plate, and brown leathery outer tunic. Leaves 2-3, in a basal rosette, not sheathing the stem, coetaneous with flowers, narrowly-oblong, lorate, flat, curved outwards and downwards, 7-12 x 0.4-1.2 cm, somewhat fleshy, glabrous, glaucous green, entire with a narrow hyaline margin. Inflorescence with (9)11-20(22) flowers, in a short, conical raceme, 2-3.5 x 2.8-3.2 cm, about as long as wide; peduncle erect, terete, green, 2.3-5.2 x 0.2-0.3 cm; flower pedicels erect-patent, 0.6-1.4(1.6) x 0.1 cm; fruit pedicels 0.7-1.7 x 0.1 cm, about as long as fruiting pedicels. Flowers erect-patent; tepals fleshy, pale olive-green with white margin, with distinct darker green venation, and branched lateral veins; others ovate, 7-9 x 4-6 mm, with a slightly cucullate, white, papillose apex; inners narrowly ovate-lanceolate, 7-8 x 3-4 mm. Filaments all similar, ovate-lanceolate or narrowly triangular, acuminate, thick, fleshy, white, 4.5-6.5 x 1.5-2.2 mm, all spreading not enclosing the ovary; anthers small, ca. 2 x 1 mm after dehiscence. Ovary oblong, turbinate, trigonous, ca. 3.5 x 2.5 mm, green, with sepalnectaries in the apical portion of the carpel sutures; ovules biseriate; style white, ca. 3 x 0.5 mm, about as long as the ovary, erect; stigma shortly 3-lobed, somewhat capitate, with conspicuous papillate lobes. Capsule
broadly globose-oblong, truncate, retuse at the apex, as wide or wider than long, 7-10 × 10-14 mm, trilobate in section, surrounded by the persistent perianth; seeds flattened, semidiscoid to irregularly discoid, black, shiny (Fig. 6).

Etymology. Named after the type locality near Haalenberg (haalenbergensis = from Haalenberg) in SW Namibia.

Chromosome number. Unknown.

Flowering time. July-September (January), fruits appear in late September-October.

Habitat. Deep sandy soils on flats and rocky outcrops of the Succulent Karoo Biome.

Distribution. Endemic to the coastal regions of SW Namibia, from Haalenberg near Lüderitz in the north, to Klinghardt Mts. in the south (Fig. 5).

Diagnostic characters and relationships. This species is easily identified by the presence of 2-3 lorate and spreading leaves, the short, subglobose inflorescence, the widely ovate-lanceolate and white-membranous bracts and the tepals olive-green with white margins. It appears to be akin to E. tanquana on the basis of flower morphology, but strongly differs by leaf number, and size of inflorescence, flowers and pedicels (Table 1).

Observations. First collected in the surroundings of Haalenberg by M.K. Dinter in 1929 (Dinter 6612 B, BTU-b; as Albuca diphylla ined.); Haalenberg, quarry 2 km N of the road at 3 km WSW of Haalenberg, deep sand and rocky slopes, ca. 600 m, 31-VII-1988, Müller-Doblies 88047c (BTU, WIND), in bud; 2715BD (Bogenfels): Karas, dune entering outskirts of Klinghardt from the south east, 27º15’47”S, 15º46’45”E, 13-VIII-2011, 644 m, L. Smook 11370 (WIND!).

This species was illustrated as ‘Ornithogalum prasinum’ by Mannheimer & al. (2008), whilst the photographs by C. Mannheimer do indeed correspond to E. haalenbergensis that by T. Greyling shows E. prasina.

No type specimens of E. haalenbergensis have been found in WIND, PRE and K, which together with the very poor description in the protologue, made a priori understanding of this species difficult. However, the photograph in the protologue shows features that undoubtedly match the materials studied here (Fig. 6) from sites south to the type locality, which supports the placement of this species in Ethesia as proposed by Martínez-Azorín & al. (2011). This situation raises a question that should be addressed by botanical nomenclature authorities, with regard to a requirement for a time limitation for the deposition of types after description of new taxa.

Additional specimens studied

NAMIBIA: Lüderitz: (2615CB) Haalenberg, 30-VIII-1929 coll., Dinter 6612 (B, BTU-b; as Albuca diphylla ined.); Haalenberg, quarry 2 km N of the road at 3 km WSW of Haalenberg, deep sand and rocky slopes, ca. 600 m, 31-VII-1988, Müller-Doblies 88047c (BTU, WIND), in bud; 2715BD (Bogenfels): Karas, dune entering outskirts of Klinghardt from the south east, 27º15’47”S, 15º46’45”E, 21-IX-2003, 615 m, C.A. Mannheimer 2443 (WIND!);

Fig. 6. Ethesia haalenbergensis (Mannheimer 2443, WIND). Scales in mm.
Table 1. Main diagnostic characters of *Ethesia xanthochlora*, *E. tanquana* and *E. haalenbergensis*.

| Character                  | *E. xanthochlora* | *E. tanquana* | *E. haalenbergensis* |
|----------------------------|-------------------|---------------|----------------------|
| **Plant**                  | 40-70 cm          | (10)15-28(37) cm | 5-6.5 cm             |
| **Bulb**                   | 7-12 x 4-10 cm    | 4-9 x 2.5-6 cm | 4-7 x 2-3 cm         |
| **Leaves**                 | (7/9)-12(15)      | 5-11          | 2-3                  |
| mostly coetaneous with the flowers | completely or mostly withered in full flower | coetaneous with flowers |
| **Inflorescence**          | (15/20)-37(46) x (1.5/2.4-5(5.6) cm) | (8/11)-18(25) x 0.8-4.5 cm | 7-12 x 0.4-1.2 cm   |
| **Flower pedicles**        | (0.8)1.2-2.8(3) x 0.3-0.4 cm | flower pedicles (1.8)2.4-4.3(4.8) x 0.2-0.3 cm | flower pedicles 0.6-1.4(1.6) x 0.1 cm |
| **Capsule**                | 40-70 cm          | 5-6.5 cm      | 2-3 cm               |
| **Fruit pedicles**         | (1.3)1.5-3(3.5) x 0.4-0.5 cm | fruit pedicles (3)3.2-4.4(5) x 0.2-0.3 cm | fruit pedicles 0.7-1.7 x 0.1 cm |
| **Bracts**                 | (1.8)2.5-5.8(7) x 0.6-1.4 cm | 1.8-3.5 x 0.8-1 cm | 0.8-1.5 x 0.6-0.7 cm |
| **Filaments**              | 8-12 x 2.5-4.2 mm | 8-9.5 x 2.2-2.5 mm | more as than in pedicels in fruit |
| **Ovary**                  | 6-7 x 4-4.5 mm    | 6-6.5 x 3.5-4 mm | ca. 3.5 x 2.5 mm     |
| **Style**                  | 7-8 x 1 mm       | 5.5-6 x 1 mm   | ca. 3 x 0.5 mm       |
| **Capule**                 | 12-15 x 14-15 mm  | 13-15 x 15-19 mm | 7-10 x 10-14 mm      |
| **Seeds**                  | 5-6 x 2-3 mm     | 5-7.5 x 4-6 mm | —                    |
| **Flowering time**         | August-September | August-October | July-September (January) |

2713BD (Bogenfels): along road in sandy-rubble, armoured flats, 1 km due S of spot, 630 m, 21-VII-1986, van Berkel 562 (NBG); 2715BD (Bogenfels): sandy-rubble armoured flats 1 km due S of spot h 703 ca. 2.5 km NE of Schwatzkoppen, 17-VIII-1986, 603 m, van Berkel 569 (NBG).

**KEY TO THE SPECIES OF ETHESIA**

1. Tepals uniformly greenish-yellow ............................................. 2
2. Tepals green with white margins .................................................. 3
3. Plant smaller, up to 30 cm, with thin peduncles and pedicels; inflorescence narrowly triangular, slightly clasping pedicels ............................... 2
4. Plant large, up to 70 cm, with very stout peduncles and pedicels; inflorescence widely racemose or conical; bracts much shorter than pedicels; leaves (15)24-50(56) mm broad .......................................................... 3

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**Additional specimens studied**

**Ethesia xanthochlora**, SOUTH AFRICA. Northern Cape: (2816BD) Head of Hekpoort, Hottentotsandakloof, 28-VIII-1977, 700 m, Thompson & A. Le Roux 149 (NBG); (2816BD) Oranjemund, Richtersveld, Kuboes, Laveran 10842 (cf. Obermeyer, 1978); (2917AC) Namaqualand, near Henties, between Steinkopf and the Orange River, Phillips 1632 (cf. Obermeyer, 1978); (2917CD) Namaqualand, Komaggas, 9-IX-1950, W. F. Barker 6733 (NBG); (2917DA) Namaqualand, Spektral Camp, 9 IX 1950, W. F. Barker 6732 (NBG); (2917DB) Okiep, Kitten sub Marloth 6868 (cf. Obermeyer, 1978); (2917DB) Springbok: foot of Anenos Pass, 29°15’18”S, 17°30’20”E, 11 IX 2000, 525 m, P. Goldblatt, J. C. Manning & V. Savolainen 11491 (NBG); (2917BB) near Henkries, between Steinkopf and the Orange River, Phillips 1632 (cf. Obermeyer, 1978); (2917CD) Namaqualand, Komaggas, 9-IX-1950, W. F. Barker 6733 (NBG); (2917DA) Namaqualand, Spektral Camp, 9 IX 1950, W. F. Barker 6732 (NBG); (2917DB) Okiep, Kitten sub Marloth 6868 (cf. Obermeyer, 1978); (2917DB) Springbok: south of Springbok, on N7, 29°45’08”S, 17°30’40”E, 27 IX 2010, 849 m, M. Martinez-Azorin, M.B. Crespo & A. Martinez-Soler MMA310 (GRA); (2917DB) Springbok: north of Springbok, ca. 5 km east of turn off to Nababazar, 29°36’30”S, 17°51’50”E, 28 IX 2010, 988 m, M. Martinez-Azorin, M.B. Crespo & A. Martinez-Soler MMA310 (GRA); (2917DD) Vogelklip, in collibus, 17 IX 1897, 2600 feet, Schlechter 11311 (B100614882, B100616843, GRA, K000365555) as ‘Albuca bracteata Schrfr. nom. nud.’; (3017BA) Bokdikloof, Kookfontein farm, 10 km NE of Soebatsfontein, 400 m, 02 IX 1986, C. Hiltun-Taylor 1398 (NBG); (3017BA) Namaqualand, near Soebatsfontein, 3 IX 1980, A. Le Roux 2788 (NBG); (3017BA) near Soebatsfontein, Lewis 1422 (cf. Obermeyer, 1978); (3017BA) Namaqualand, 8 m north of Soebatsfontein, 27 VIII 1957, 600 feet, J. P. H. Acocks 19457 (K); (3017BB) Kamieskroon, Thorne sub SAM 48848 (cf. Obermeyer, 1978);
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