

***BELLEVALIA PELAGICA (HYACINTHACEAE),
A NEW SPECIES FROM THE ISLET OF LAMPIONE
(PELAGIAN ARCHIPELAGO, SICILY)***

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A new species, *Bellevalia pelagica* C.Brullo, Brullo & Pasta (*Hyacinthaceae*), growing in the limestone rocks of the Islet of Lampione in the Pelagian Archipelago (Sicily), is described and illustrated. It is a tetraploid with $2n = 16$. It belongs to the *Bellevalia romana* group and shows a close relationship with *B. dolichophylla* and *B. galitensis*, both rare endemics from Tunisia.

Keywords. *Bellevalia*, *Hyacinthaceae*, new species, Pelagian Archipelago, Sicily.

INTRODUCTION

According to the literature, the genus *Bellevalia* Lapeyr. (*Hyacinthaceae*) is represented in Sicily by *B. romana* (L.) Sweet and *B. dubia* (Guss.) Rchb. subsp. *dubia* (Borzatti de Loewenstern & Garbari, 2003), which are rather common on the island (Pignatti, 1982). Recently, a small population represented by few individuals was found on Lampione, a small island of the Pelagian Archipelago in the Sicilian Channel. This geophyte was previously collected by Di Martino (1958, 1961) and erroneously identified as *Muscari comosum* L., while Kohlmeyer (1960) correctly referred it to the genus *Bellevalia* without indicating the species. Bulbs of this population cultivated in the Botanical Garden of Catania flowered from February to March, usually producing three stems. This plant is well differentiated from the other species of the genus occurring in Sicily by its large inflorescence and flowers and its very long leaves. It rather shows closer relationships with some species recently described from Tunisia. They are *Bellevalia dolichophylla* Brullo & Minissale from Cap Bon and *B. galitensis* Bocchieri & Mossa, endemic to the island of La Galite. However, a number of vegetative and reproductive characters distinguish the Lampione population from both species (see below). It is described as a species new to science and named *Bellevalia pelagica* C.Brullo, Brullo & Pasta.

MATERIALS AND METHODS

The morphological investigation was made on living material collected from the island of Lampione and cultivated in the Botanical Garden of Catania. For the

karyological study, mitotic plates were obtained from the root tips of cultivated bulbs. The root tips were pretreated with 0.3% colchicine water solution for 3 hours, fixed in ethanol-acetic acid (3:1) for 6 hours and stained according to the Feulgen method (Brullo *et al.*, 2008). The chromosome classification follows the nomenclature of Levan *et al.* (1964).

DESCRIPTION

***Bellevalia pelagica* C.Brullo, Brullo & Pasta, sp. nov. Figs 1–3.**

Bellevalia dolichophylla affinis, bulbo hemisphaerico, 2.5–3 × 3–3.5 cm, foliis 6–8, 50–70 cm longis, exterioribus 15–25 mm latis, scapis 3 (raro 2), racemis 52–60 floribus, in verticillis quaternis dispositis, bracteis 2–6 mm longis, perigonio 12–15 mm longo, lobis 6–7 mm longis, 4.5–5.5 mm latis, antheris 2.6–3.2 mm longis, filamentis staminorum late triangularibus, 2.5–3.5 mm longis, ovario 2.5–3 mm lato, stylo 5–5.5 mm longo, capsula subglobosa ab ea diversa. – Type: Sicily, Arcipelago delle Pelagie, Lampione, 16 iii 2006, cultivated specimen, *Lo Cascio & Sferlazzo* s.n. (holo CAT; iso CAT, FI).

Bulb hemispherical, 2.5–3 × 3–3.5 cm, with outer tunics coriaceous, dark brown in colour. *Leaves* 6–8 in number, green, long linear-lanceolate, subequal, 50–70 cm long, longer than scape, strongly canaliculate, the outer ones 15–25 mm wide at the base, the inner ones narrower, 1–14 mm wide, with hyaline margin glabrous and smooth, cucullate at the apex. *Stems* 3, rarely 2, 28–35 cm long, greenish, tinged with violet in the upper part. *Raceme* cylindrical, with 52–60 flowers generally arranged in a whorl of 4. *Bracts* minute, green-violet, 2–6 mm long. *Pedicels* erect-patent, 6–11 mm long, shorter than perigone. *Flower buds* white with greenish-violet tinge. *Perigone* white tinged with purple-violet in the upper part and tinged with blue-violet at the base, turning pale yellow when dry, cylindrical-campanulate, 12–15 mm long, 5–7 mm in diameter; lobes 6–7 mm long, 4.5–5.5 mm wide, elliptic-ovate, rounded to obtuse at the apex. *Stamens* subequal or shorter than the perigone; anthers dark purple-violet to blue-violet, 2.6–3.2 mm long; filaments white, widely triangular, 2.5–3.5 mm long, decurrent along the perigone tube. *Ovary* ovoid, purple-violet, whitish-blue in the keels, 3.8–4 × 2.5–3 mm; style whitish to white-azure, 5–5.5 mm long; stigma capitate, white, papillose. *Fruiting raceme* cylindrical with patent pedicels. *Capsule* trigonous, subglobose, 13–15 mm in diameter and valves elliptical, with prominent veining, rounded at the base. *Seeds* subglobose, black-pruinose, 2.8–3.2 mm in diameter.

Phenology. Flowering: February–March; fruiting: March–April.

Distribution. *Bellevalia pelagica* is endemic to Lampione, a small islet 17.5 km west of Lampedusa in the Pelagian Archipelago (Fig. 4). The perimeter of the islet is c.750 m with a maximum altitude of 36 m a.s.l. Lampione is characterised by Eocene limestones and therefore is geologically well differentiated from the neighbouring

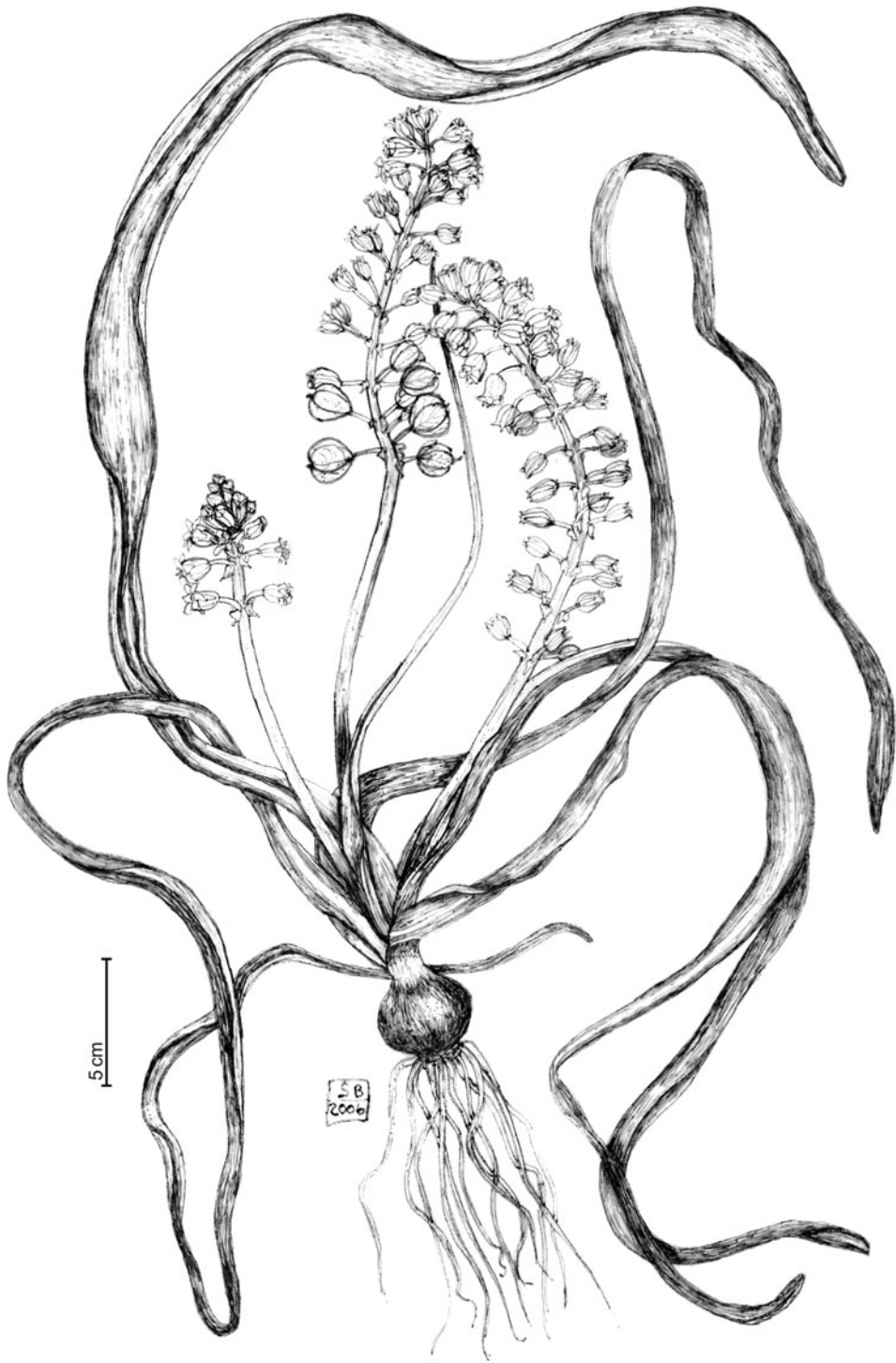


FIG. 1. Habit of *Bellevalia pelagica* C.Brullo, Brullo & Pasta.

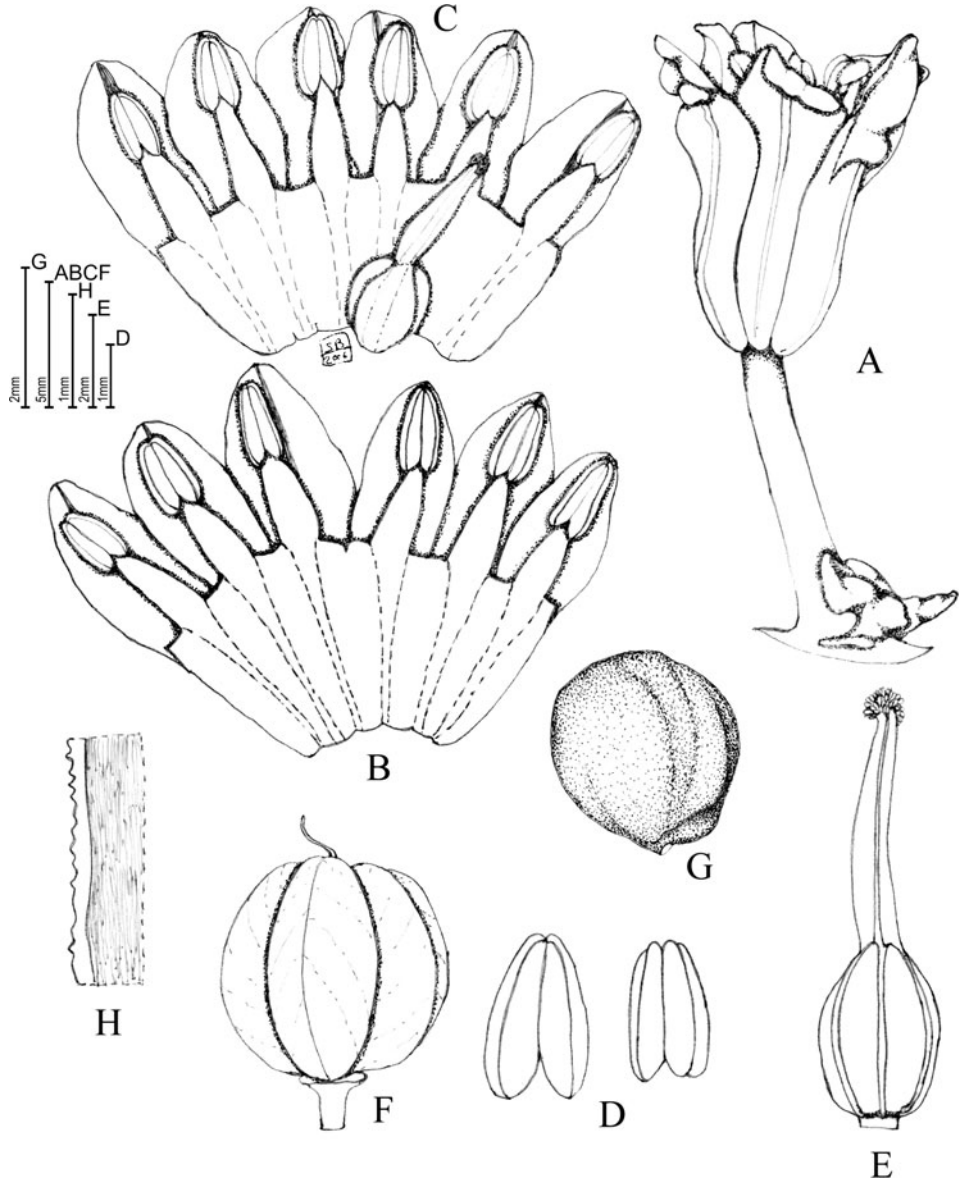


FIG. 2. Morphological characters of *Bellevalia pelagica*: A, flower; B, open perigone; C, open perigone with pistil; D, stamens; E, pistil; F, capsule; G, seed; H, leaf margin.

Lampedusa which is primarily characterised by Miocene rocks. This makes Lampedusa much older than Lampedusa (Bonnesfus & Bismuth, 1982; Grasso *et al.*, 1985).

Habitat and ecology. This species grows in sunny flat places and slight inclines at the top of the islet where it colonises the crevices of the calcareous rocks. It is a member



FIG. 3. Raceme of *Bellevalia pelagica* from cultivated plant.

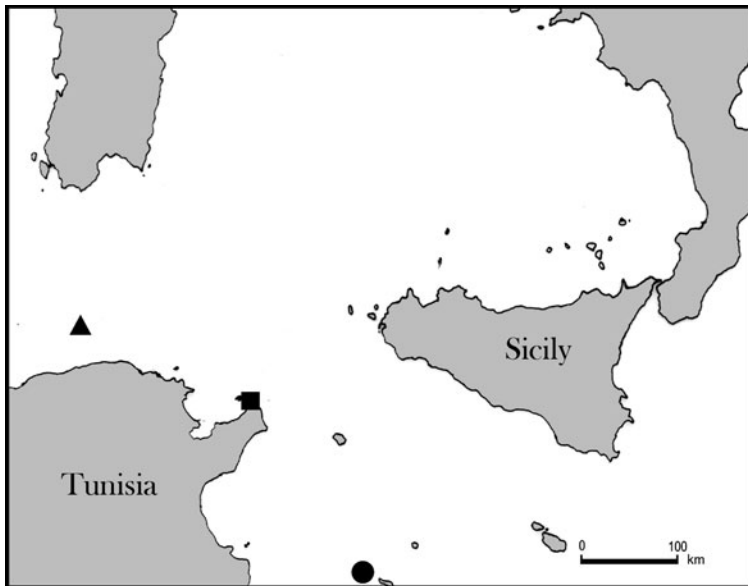


FIG. 4. Geographical distribution of *Bellevalia pelagica* (circle), *B. dolichophylla* (square) and *B. galitensis* (triangle).

of a halo-nitrophilous community characterised by *Atriplex halimus* L., a shrub currently very scattered due to disturbance by huge seagull colonies. In this vegetation some ornithocoprophilous species are present, among them *Malva veneta* (Mill.) Soldano, Banfi & Galasso (Corti *et al.*, 2002, sub *Lavatera arborea* L.).

Conservation status. The population of *Bellevalia pelagica* is quite small and consists of c.60 individuals (Pasta, 2002; Sferlazzo, 2003). Therefore, following IUCN (2001, 2003) methodology the following risk category is proposed: CR B2ab (ii,v); C2a (ii).

Karyology. A karyological investigation found that *Bellevalia pelagica* is a tetraploid species with $2n = 16$ (Fig. 5). This number is very common in the genus *Bellevalia*, as emphasised by Bothmer & Wendelbo (1981). Its chromosome complement is characterised by 4 metacentric pairs (2 of which have microsatellites), 2 submetacentric pairs and 2 subtelocentric pairs. The chromosome formula is: $z = 2n = 4x = 16: 4m + 4m^s + 4sm + 4st$. On the whole, this species shows a very uniform karyogram, with a diploid arrangement (Fig. 6). Our hypothesis is that *Bellevalia pelagica* has an allotetraploid origin from the hybridisation of two ancestors no longer present on the islet.

DISCUSSION

In the taxonomic infrageneric arrangement proposed by Feinbrun (1940) and modified by Feinbrun-Dothan (1986), *Bellevalia pelagica* can be ascribed to *Bellevalia* sect. *Bellevalia* subsect. *Romana* Feinbrun. This section is characterised by a cylindrical fructiferous and flowering raceme, leaves longer than the stem, pedicels erect-patent and shorter than the flowers, bracts often well developed, capsule persistent with valves spherical to ellipsoid and rounded at the base, dehiscing at the apex. Within this subsection *Bellevalia pelagica* seems to be closely related to *B. dolichophylla*, a species described by Brullo & Minissale (1997) from Cap Bon (NE Tunisia), where it is very rare and localised in cliff crevices near the sea. In particular, these two species both have numerous and very long leaves which are glabrous at the margin and cucullate at the apex, the stems are well developed and are tinged with violet above, the racemes are lax with big flowers which are whitish tinged with blue-violet, the pedicels are erect-patent, the stamens are dark violet, the capsules are 13–15 mm wide, the seeds are subglobose and black-pruinose, and the chromosome complements are tetraploid ($2n = 16$). However, they are easily distinguished morphologically (Table 1). In particular, *Bellevalia dolichophylla* differs from *B. pelagica* in having an ovoid bulb, leaves which are less numerous but longer and wider, the stem is solitary, the raceme has fewer flowers, the perigone is shorter, and the capsule is obovoid. *Bellevalia dolichophylla* has 3 pairs of metacentric and 3 pairs of submetacentric chromosomes. Another species showing some affinities with *Bellevalia pelagica* is *B. galitensis*, which was described by Bocchieri & Mossa (1991) from the islet of La Galite (N Tunisia) where it grows in the arid rocky meadows.

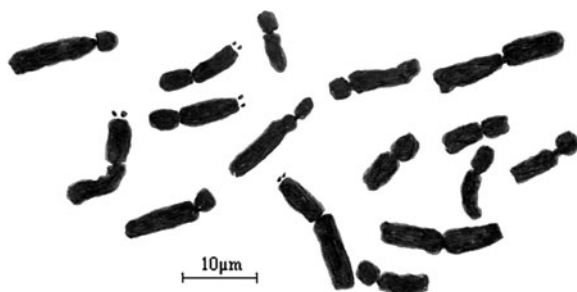


FIG. 5. Somatic metaphase plate of *Bellevalia pelagica*.

They are similar in the well-developed scapes, the numerous and very wide leaves, and the shape of the perigone, but *Bellevalia galitensis* has much shorter leaves, there are only 1–2 racemes which are few flowered, the perigone and anthers are shorter, the style is very long, and the capsule is shorter and obovoid (Table 1). All three species are clearly related to *Bellevalia romana* and *B. mauritanica* Pomel, both belonging to *Bellevalia* subsect. *Romana*. *Bellevalia romana* is widespread in the northern Mediterranean from S France to Greece (Heywood & Regueiro, 1980; Pignatti, 1982), and *B. mauritanica* in N Africa, from Algeria to Egypt (Cuenod, 1954; Maire, 1958). Table 1 gives the differences between *Bellevalia romana*, *B. mauritanica*



FIG. 6. Idiogram of haploid chromosome complement of *Bellevalia pelagica*.

TABLE 1. Comparison of characters distinguishing species in the *Bellevalia romana* group

Character	<i>B. pelagica</i> (1)	<i>B. dolichophylla</i> (2)	<i>B. galitensis</i> (3)	<i>B. romana</i> (4)	<i>B. mauritanica</i> (5)
Bulb shape	Hemispheric	Ovoid	Subspheric or ovoid	Ovoid	Subglobose or ovoid
Bulb size (cm)	2.5–3 × 3–3.5	3 × 2.5	3–3.4 × 3.8–4	2.5–3 × 3–3.5	4 × 3.5–4
Leaf number	6–8	4–5	6–8	3–6	3–4
Leaf length (cm)	50–70	80–100	25–30	15–30	30–40
Leaf width (mm)	15–25	25–35	25–30	5–15	20–30
Leaf margin	Denticulate	Smooth	Ciliolate	Smooth	Ciliate
Stem number	3	1	1(2)	1–2	1
Stem length (cm)	28–35	30–40	20–35	20–25	30–40
Raceme flowers	52–60	24–30	15–25	20–35	30–40
Bract length (mm)	2–6	1–3	2–5	–	2–2.5
Pedicle length (mm)	6–11	8–11	8–10	10–15	8–12
Pedicle/perigone	Shorter	Shorter or subequal	Subequal	Subequal or longer	Shorter or subequal
Perigone length (mm)	12–15	11–12	10–12	8–10	9–12
Perigone lobe length (mm)	6–7	5.5–6	5–6	6–6.5	4.5–6
Perigone lobe width (mm)	4.5–5.5	3–3.6	4–4.5	3–3.5	–
Stamen filament length (mm)	2.5–3.5	2.5	2.5–3	3–4	2.5–2.8
Anther length (mm)	2.6–3.2	2.5	1.5	2	3
Ovary size (mm)	3.8–4 × 2.5–3	3.5–4 × 2.5	3–3.5 × 2.5–2.7	3.5–4 × 2.8–3	–
Style length (mm)	5–5.5	5	6–6.5	3.5–4.5	–
Capsule shape	Subglobose	Obovoid	Obovoid	Obovoid	Obovoid
Capsule size (mm)	13–15 × 13–15	13–15 × 12–15	8–10 × 10–12	10–13 × 7–9	10–12 × 10–12
Seed diameter (mm)	2.8–3.2	3	–	3	3–3.2
Chromosome complement (2 <i>n</i>)	16	16	16	8	16

(1) Based on living material from locus classicus (Lampione – Sicily).

(2) Based on living material from locus classicus (Cap Bon – Tunisia).

(3) Based on literature data and herbarium specimens from locus classicus (La Galite – Tunisia).

(4) Based on living material from Caltanissetta (Sicily).

(5) Based on literature data and herbarium specimens from several localities in Tunisia.

and the previous three species. They differ mainly in the leaves, which are very narrow and a little longer than the stem, as well as in ecology, since they are linked normally to damp soils or mesophilous prairies.

According to Bothmer & Wendelbo (1981), Garbari (1968), Bocchieri & Mossa (1991), Brullo & Minissale (1997) and Peruzzi (2003), the chromosome complement of *Bellevalia romana* is $2n = 2x = 8$, while those of *B. mauritanica*, *B. dolichophylla* and *B. galitensis* are $2n = 4x = 16$, as we found in *B. pelagica*. From their morphological characters, chromosome numbers, geographical distributions and ecological requirements, it is possible to hypothesise that all these species arose from a common ancestor. *Bellevalia pelagica* is closest to *B. dolichophylla* and rather less similar to *B. galitensis* and *B. mauritanica*. In vegetative and floral characters, as well as by its diploid chromosome complement, *Bellevalia romana* would appear to be taxonomically more isolated and nearest to the common ancestor. *Bellevalia pelagica*, *B. dolichophylla* and *B. galitensis*, characterised by tetraploid somatic numbers and showing isolated distributions, have possibly arisen as a consequence of geographic isolation leading to speciation.

Key to the species of Bellevalia subsect. Romana

- 1a. Leaves 50–100 cm long _____ 2
 1b. Leaves 15–40 cm long _____ 3
- 2a. Leaves 6–8, 50–70 cm long, irregularly dentate at the margin; stems 3, with raceme 52–60-flowered; perigone 12–15 mm long; anther 2.6–3.2 mm long; capsule subglobose _____ *B. pelagica*
 2b. Leaves 4–5, 80–100 cm long, smooth at the margin; stem 1, with raceme 24–30-flowered; perigone 11–12 mm long; anther 2.5 mm long; capsule obovoid _____ *B. dolichophylla*
- 3a. Bulb 2.5–3 cm long; leaves 5–15 mm wide, smooth at the margin; perigone with lobes 6–6.5 mm long _____ *B. romana*
 3b. Bulb 3–4 cm long; leaves 20–30 mm wide, ciliate or ciliolate at the margin; perigone with lobes 4.5–6 mm long _____ 4
- 4a. Leaves 3–4, 30–40 cm long; raceme 30–40-flowered; capsule 10–12 mm long _____ *B. mauritanica*
 4b. Leaves 6–8, 25–30 cm long; raceme 15–25-flowered; capsule 8–10 mm long _____ *B. galitensis*

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