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A new *Galium* species from NW Portugal

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Abstract

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A new species of the genus *Galium* is described, *G. belizianum* Ortega-Olivencia, Devesa & Rodr. Riaño, endemic to NW Portugal. It belongs to *Galium* sect. *Leiogalium*. The species is glabrous and pruinose, with corolla rotate and yellow. *Galium belizianum* shares some diagnostic characters with another species that is endemic to the Balearic Islands – *G. friedrichii* N. Torres, L. Sáez, Mus & Rosselló.

Key words: Flora Iberica, *Galium*, karyology, *Leiogalium*, Portugal, taxonomy.

Introduction

According to Mabberley (1997) the genus *Galium* consists of some 300 species distributed worldwide, but mainly centred in temperate regions. It has historically been seen as a taxonomically problematic genus (Jordan 1846), both in its delimitation with respect to neighbouring genera (e.g., *Asperula*, *Cruciata*) and within the genus itself (Manen et al. 1994; Natali et al. 1995; Natali and Jeanmonod 2000). Many of its species have been given a multitude of names, doubtless reflecting these problems of taxonomy, but it has also sometimes been the case that two different but related species have been grouped together within a single species. Our revision of the genus *Galium* in preparing volume XV of the *Flora Iberica* has brought to light the existence of species that can not be assigned to any previously known species. Two of them have recently been published (Ortega-Olivencia and Devesa 2003), and a third is the object of the present work. With these, there are now ca. 21 endemic species of the genus in the ambit of our flora (ca. 33%), with the number rising to 63 for all the species and subspecies in the flora of the Iberian Peninsula and the Balearic Islands.

Material and Methods

Numerous specimens were studied of the genus *Galium* conserved in the herbaria BC, COI, GDAC, JAEN, MA, MAF, MGC, SEV, and UNEX (abbreviations according

to Holmgren et al. 1990). During summer 2002 some natural populations were visited for their morphological and ecological study *in situ*, and some plants were collected for *ex situ* cultivation.

The collected plants were cultured in pots until the production of roots. They were then pre-treated with 0.002 M 8-hydroxyquinoline (Tjio and Levan 1950) for 4–4½ h at below 4°C, fixed in absolute alcohol/acetic acid (3:1) for 3 h at the same temperature, and stained with carmine acetic alcohol (Snow 1963) for 6–8 days. The material was covered with a few drops of 45% glacial acetic acid, squash-mounted for light microscopy observation and the chromosome number was determined.

Results and Discussion

Several herbarium sheets, initially determined as *Galium verum* or *Galium* sp. by Portuguese botanists, contained plants that could not be assigned to any of the previously known *Galium* species. These are markedly glaucous-pruinose plants, especially *in vivo*, both on the vegetative organs and in the floriferous zone. They also present a rotate corolla of a lemon-yellow colour, which, unlike white, is in the minority amongst the species with rotate corolla represented in the Iberian Peninsula and Balearic Islands (*G. arenarium*, *G. crespianum*, *G. tunetanum*, *G. valentinum*, *G. verum* subsp. *verum* and the annual *G. viscosum*).

G. belizianum Ortega-Olivencia, Devesa & Rodr. Riaño, **sp. nova** (Fig. 1)

G. verum sensu auct. lusit., non L. (1753)

Herbaceum, perenne, stoloniferum, glabrum, pruinose. Folia in verticillis 6–8, linearia vel anguste oblanceolata, acuta, apiculata, plana vel margine aliquantulum revoluta insuperque laevia aut antrorse scabridula, uninervata, discoloria. Inflorescentia paniculata pyramidalisque, laxa, floribus in cymas compositas distributis quorum pedunculi aut minores quam bracteae sunt aut eas ± aequant. Pedicelli fructiferi divaricati. Corolla rotata, glabra, citrina, lobulis quam tubo longioribus, acutis vel apiculatis. Mericarpiia subreniformia, nigricantia, glabra, laevia aut rugosula.

Perennial herb, stoloniferous, ascending or erecto-ascending, glabrous, pruinose, in general not blackened on desiccation. Stems 40–61 cm, generally with 1–2 ramifications per node, erecto-patent; internodes subequal or up to 2.5 times greater than the leaves, glabrous. Leaves in whorls of 6–8, 12–27 × (0.5)1–2(2.3) mm, from patent to erecto-patent, the lower reflexed, generally straight, linear or narrowly-oblanceolate, acute, with apiculum 0.15–0.4 mm, flat or narrowly revolute margin, single-veined, discoloured, pruinose, green on the adaxial and lighter on the abaxial surfaces, with margin smooth or with 1–3 rows antrorse-scabridulous; those of the lateral branches 5–6(7) per node, patent or erect, narrower and occasionally completely revolute. Inflorescence 3.5–16 cm, on a pyramidal panicle, lax, with branches opposite, erect or erecto-patent, formed by compound and multifloral cymes, with peduncles smaller than or subequal to the bracts, glabrous; those of last order, cymose with 2–3 flowers. Bracts of first order in whorls of 4–6 or 2 at the upper nodes, 2.2–12(17) × 0.4–1(1.3) mm, patent or erecto-patent, conform with the leaves. Bracteoles absent or one per node, 1.2–2.3 × 0.3–0.6 mm, smaller than or equal to the pedicels, erect or patent, linear-lanceolate or linear-

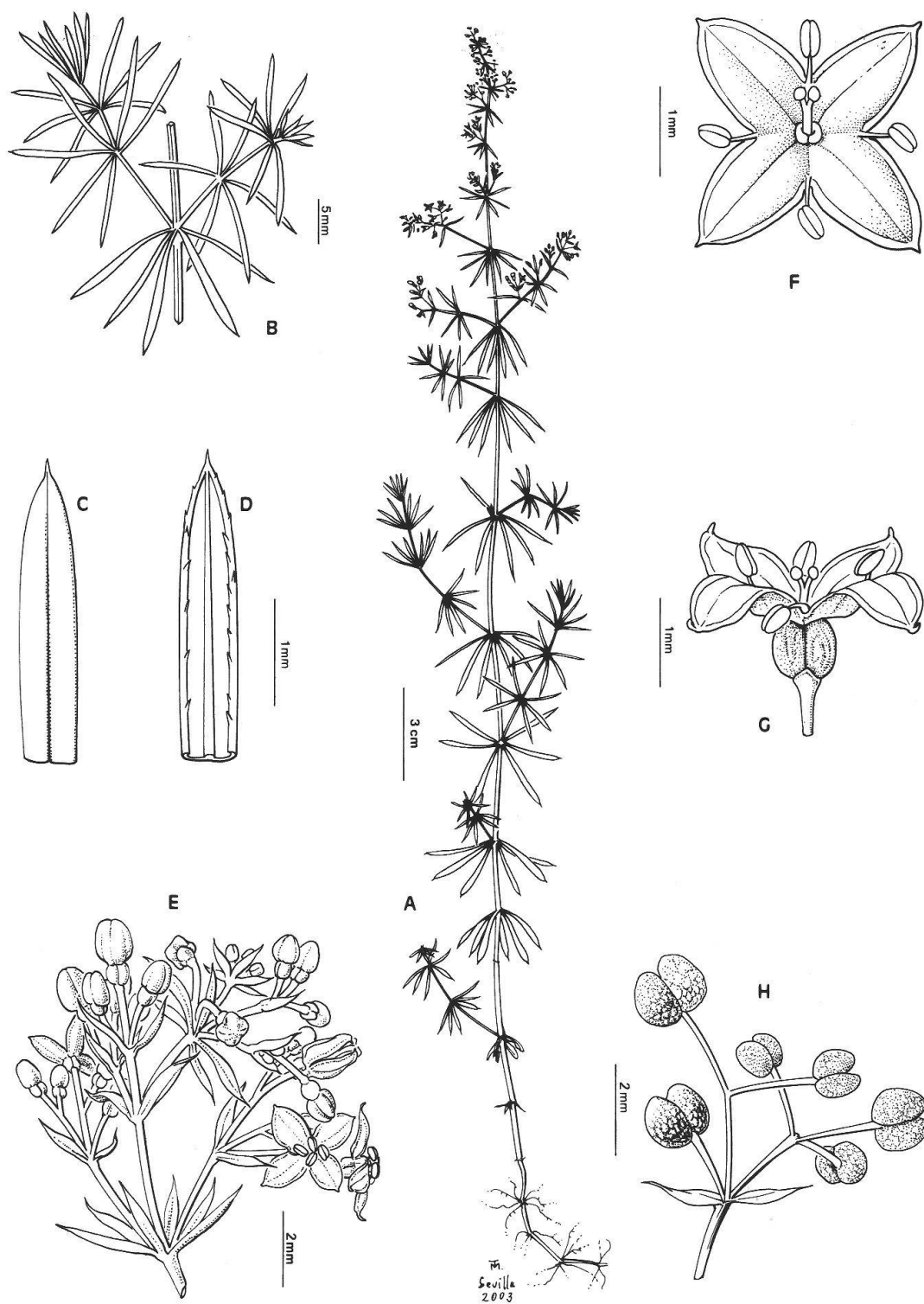


Fig. 1. *G. belizianum* Ortega-Olivencia, Devesa & Rodr. Riaño. A: habit. B: node with leaves and two branches. C: leaf seen from above. D: leaf seen from below. E: detail of an inflorescence (thyrsus). F and G: flower. H: detail of cyme with nearly mature fruits (mericarps).

elliptical, acute and flat. Flowers hermaphrodite, pedicellate. Pedicels (0.6)1.3–2.3(3.3) mm, smaller than or subequal to the corolla diameter; the fructiferous pedicels 1.4–2.3 mm, subequal to or larger than the fruit, 0.15–0.2 mm thick, somewhat wider towards the apex, divaricate, glabrous, pruinose. Corolla 3–4(4.5) mm in diameter, rotate, glabrous, lemon-yellow; tube 0.4–0.6 mm and lobules 1.2–1.6 mm, larger than the tube, ovate-lanceolate, acute or with apiculum of up to 0.2 mm. Stamens with anthers 0.4–0.6 mm, oblongoid and yellow; filaments 0.5–1 mm, generally longer than the anthers. Ovary oblongoid, glabrous, smooth and pruinose, with style of up to 1 mm and globose stigmas. Mericarps c. 1–1.3 mm, subreniform, dull, blackish, glabrous, with a smooth or slightly rough surface.

Etymology: Belizianum, latinized name of the Portuguese botanist José Vicente Malato Beliz (1920–1993), in recognition of his contributions to the flora of Portugal.

Holotypus (designated here): Miño: Serra do Gerês, carretera de Caldas do Gerês a Portela do Homen, margen granítico de camino junto al río, 10.VII.2002, A. Ortega-Olivencia & T. Rodríguez Riaño (UNEX 30821).

Phenology: Flowering from July to August.

Ecology: Riverbeds and tracks next to riverbanks, generally on a granitic substrate at elevations of 600 to 800 m.

Distribution: Endemic to Portugal, in NW mountains: Serra do Gêres, Serra do Soajo, Serra da Freita and Serra de Montemuro.

Karyology: $2n = 66$, i.e. hexaploid condition. Asterisk (*, see below) indicates population studied karyologically.

Studied material

Beira Alta: from Castro Daire to Lamego, near bridge over river Balsemão, 9.VII.1966, J. Matos & A. Dinis (COI 9741). **Douro Litoral**: Serra da Freita, towards Arouca, 8.VII.1966, J. Matos & A. Dinis (COI 9691). **Miño**: Gerês, VIII.1871, J. H. (COI w.n.); ibidem, Gerês, near frontier area, 1.VII.1964, J. Mesquita & A. Dinis (COI 9179); Serra do Gerês, river Homen near Albergaira, 2.VII.1948, R. Fernandes & Sousa (COI 2376); ibidem, Bouça, river Homen, 15.VII.1958, M. Beliz, A. Raimundo & J. A. Guerra (MA 180399, MA 299575, MAF 92475); ibidem, river Homen, 13.VII.1958, M. Beliz et al. (MA 299574); ibidem, *road from Caldas do Gerês to Portela do Homen, 10.VII.2002, A. Ortega Olivencia & T. Rodríguez Riaño (UNEX 30821); Serra do Soajo, near Senhora da Peneda, VII.1890, A. Moller (COI w.n.); ibidem, A. Moller, Fl. Lus. Exsicc. n° 907 (COI w.n.).

Galium belizianum is a species which fits perfectly into the section *Leiogalium* (DC.) Ledeb. (Ehrendorfer et al. 1976). This section includes species that are mostly herbaceous and perennial, generally stoloniferous, with internodes always deprived of retrorse prickles and nodes with (4)6–10(12) leaves, single-veined, margin antrorse-scabrous, with prickles almost parallel to the margin, on rare occasions smooth. In this section, the flowers are pedicellate with a corolla that is rotate, subrotate, crateriform, or campanulate, with acute lobules, generally shortly apiculate, and an ovary surface smooth, finely papillose, or diminutively granular.

Galium belizianum shares some diagnostic characters with *G. friedrichii* (section *Leiogalium*), a tetraploid species ($2n = 44$) which is endemic to Ibiza and Formentera (Balearic Islands; Torres et al. 2001). In both cases, the plants are glabrous or glabrescent and glaucous, the greater part of their surface is pruinose and the leaves are dis-

coloured. They have a clearly rotate corolla (white in *G. friedrichii* and lemon yellow in the new species) with non-capillary pedicels, divaricate after anthesis and inflorescence on a pyramidal panicle (sometime oblongoid panicle in *G. friedrichii*).

G. belizianum and also *G. friedrichii* do not seem to fit well into any of the three series described in section *Leiogalium* (Ehrendorfer et al. 1976). Future studies with more data might shed some light on the resolution of the group phylogeny and the grouping of taxa, including *G. belizianum* and *G. friedrichii* into section *Leiogalium*.

A karyological study of one of the *G. belizianum* populations showed a hexaploid condition ($2n=66$; see * in "Studied material"). The same chromosome number was found in the literature for *G. verum* (Natali and Jeanmonod 2000) although this species is usually known as tetraploid ($2n=44$; Ehrendorfer 1961; Kliphuis 1962; Gadella and Kliphuis 1963), and even rarely as diploid ($2n=22$; Kliphuis 1962; Moore 1982). Unlike *G. verum* (section *Galium*), the shoots of the new species *G. belizianum* are completely glabrous and glaucous-pruinose; the leaves are broader and flat (sometimes with revolute margin, especially the uppermost), the inflorescences are laxer. The colour of the flowers are pale-yellow or lemon-yellow instead of the intense yellow colour typical for *G. verum*.

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