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***Linaria becerrae* (Plantaginaceae), a new endemic species from the southern Spain, and remarks on what *Linaria salzmannii* is and is not**

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Abstract

A new species of the genus *Linaria* is described, illustrated and compared with its morphologically closest relatives from *L. sect. Versicolores*: *L. salzmannii*, *L. viscosa* and *L. spartea*. Furthermore, the identity of *L. salzmannii*, with which it has been usually misidentified, is discussed. The new species occurs on molasse substrates, forming part of communities of ephemeral annual herbs, in the province of Málaga (southern Spain), near the locality El Chorro. Synonymy is revised for the concerned names, and an identification key is reported for the Iberian taxa of *L. sect. Versicolores*.

Key words: Antirrhineae, endemic plants, Iberian Peninsula, taxonomy

Introduction

The genus *Linaria* Miller (1754), the largest genus of tribe Antirrhineae Dumortier (1827: 34) (Plantaginaceae), includes nearly 150 species, distributed mainly in Europe, North Africa, and C & W Asia. Its main centre of diversity is found in the Iberian Peninsula and the Maghreb, where many species are endemic to relative small areas and often show a specialized ecological behaviour (Valdés 1970, Hong 1983, Sutton 1988, Sáez *et al.* 2004, Sáez & Bernal 2008, Fernández-Mazuecos *et al.* 2013, Vigalondo *et al.* 2015).

Linaria sect. Versicolores (Bentham 1846: 275) Wettstein (1895: 59) includes annual and biennial to perennial species with heteromorphic shoots, fertile ascendant to erect and sterile decumbent or ascendant; flowers arranged in bracteate racemes; corolla personate and spurred, with the lower lip protruding and completely enclosing the throat (palate); bifid or rarely emarginate style with discrete stigmatic areas (a distinctive synapomorphy of this monophyletic section; Fernández-Mazuecos & Vargas 2011, Fernández-Mazuecos *et al.* 2013); and seeds subreniform, trigonous or tetrahedral, not laterally compressed and unwinged but with conspicuous transverse crests, more rarely smooth. In this section, Viano (1978) included 14 species in the Western Mediterranean, and Fernández-Mazuecos *et al.* (2013) and Vigalondo *et al.* (2015) indicated that it is the largest section of the genus, including ca. 30 species and subspecies. Sáez & Bernal (2008) cited 10 species for the Iberian Peninsula, including *L. salzmannii* Boissier (1841: 456), which is endemic to southern Spain, specifically Granada and Málaga provinces (Sáez & Bernal 2008). However, after visiting different populations of the latter species, we found significant differences between populations growing in each of both cited provinces, mainly concerning corolla colour and morphology.

As a result of Boissier's visit to southern Spain in 1837, he published numerous new species (Boissier 1838, 1839–1845). Many were named honouring botanists who had previously visited the region and had contributed to the knowledge of its flora, or who had helped Boissier in his work, such as Agardh, Bory, Clemente, Haenseler, Lagasca, López, Prolongo, Rambur, Salzman, Webb, Willdenow, etc. One of those species, which is the focus of the present contribution, is *L. salzmannii* Boissier (1841: 456).

The current concept of this species, assigning the Granada and Málaga populations to the same species, was contributed by Boissier himself (1841: 456), who recognised two varieties in his *L. salzmannii*: i) “var. [α] *purpurea*”

with violaceous flowers, and ii) “var. [β] *flava*” Boissier (1841: 456), with yellow flowers. Furthermore, Boissier indicated in the protologue the following type localities for each one: “Varietas α crescit in arenosis regionis montanae, in provinciâ Malacitanâ Salzmann, in viâ à Granada ad pagum Guejar. Alt. circ. 3500’. Varietas β in cultis regionis montanae superioris et alpinae, Sierra Nevada en la Dehesa de San Gerónimo et in latere meridionali suprâ Trevez. Alt. 4000’–5000’. Fl. aest.” [sic]. However, Boissier did not visit the Málaga populations of this species, which he found near the locality of El Chorro (Cabezudo 1987), a circumstance that is clearly appreciated in the indication of the type locality, as Boissier emphasised with italics the populations that he had personally visited. The mention of the populations in Málaga province was due to the botanist M. Jean Gay, who showed him Salzmann’s herbarium, as stated by Boissier himself (1845: VIII): “M. Jean Gay a trouvé, au milieu de ses occupations nombreuses et multipliées, le temps de parcourir avec moi bien des parties de son riche herbier, et j’ai pu ainsi examiner toutes les plantes rapportées d’Andalousie par M. Salzmann, et dont il possède la suite complète....”. This was the only time that Boissier had contact with the plant from Málaga province, so that the only material that he used to describe *L. salzmannii* was collected in Granada province.

Burdet *et al.* (1990: 618), in their work on the nomenclatural types of the Iberian taxa of the Scrophulariaceae described by E. Boissier, chose a specimen from Granada province (“entre Grenade et Guejar”) as lectotype of *L. salzmannii*, adding the observation that “Nous n’avons pas trouvé dans les herbiers de Genève (G) d’exsiccatum de Salzmann relatif à ce taxon”. This is also an indirect evidence that Boissier did not study material from Málaga province to describe this species.

We have visited the type locality of *L. salzmannii*, situated between the city of Granada and the town of Güéjar, and it is very probable that the original populations have disappeared due to the construction of the Canales reservoir. Nevertheless, we have been able to study the Granada plants at a nearby location, Sierra de Huétor, close to the town of Huétor Santillán. Plants growing in that area show morphological characters matching the detailed illustration in Boissier’s (1841: tab. 128) protologue.

Conversely, the populations from western Málaga differ notably from those of Granada, primarily because of corolla morphology and colour. Taking into account these considerations and after reviewing the most important regional floras (e.g. Willkomm & Lange 1865–1870, Willkomm 1893, Tutin *et al.* 1972, Valdés *et al.* 1987, Sáez & Bernal 2008, Blanca *et al.* 2011, among others), we conclude that the Málaga populations belong to a different taxon, which is described below as a new species of *L.* sect. *Versicolores*. Data on its morphological characteristics, distribution and habitat are discussed with regard to other closely related Iberian taxa of that section.

Taxonomy

Linaria becerrae Blanca, Cueto & J. Fuentes, *sp. nov.* (Fig. 1A–B)

– *Linaria salzmannii* auct., non Boissier (1841: 456)

Type:—SPAIN. Málaga: Ardales, El Chorro, near Iglesia Rupestre and Portezuelos, 450 m elevation, 2 March 2016, G. Blanca, M. Becerra & J. Fuentes (holotype: GDA 62532!).

Diagnosis:—It differs from *Linaria salzmannii* Boiss. in having calyx lobes shorter (up to 3.5 mm); corolla smaller [(12–)13–15 mm, spur excluded], upper lip shorter (up to 9 mm), and spur longer (14–16 mm) and straight; corolla uniformly and intensely violet, excepting the yellow palate, with hardly visible veins.

Description:—Annual herb. Stems thin, often simple or slightly branched; fertile stems 5–15 cm long, arcuate-ascending, sparsely leafy, bare below the inflorescence, glabrous except the inflorescence, which is glandular-pubescent; sterile stems shorter (up to 7 cm) and more numerous, pubescent. Leaves on fertile stems up to 20 × 1 mm, alternate, linear; those on sterile stems up to 9 × 1.4 mm, 3–4 whorled, oblanceolate. Racemes short, corymbiform, dense, pauciflorous, glandular-pubescent. Bracts 2.5–3 mm long, linear-lanceolate. Pedicels c. 3 mm long, erect, mostly adnate to the axis of the inflorescence, as long as the bracts, slightly longer at fruiting, glandular-pubescent. Calyx 4–5 mm, with lobes up to 3.5 × 0.5–0.9 mm, fused at the base, linear-oblanceolate, glandular-pubescent on margins. Corolla personate, spurred, up to 30 mm long (spur included), or (12–)13–15 mm (spur excluded), uniformly and intensely violet, excepting the yellow palate, with hardly visible veins; tube as long as the calyx; upper lip up to 9 mm long, bilobate, with a slit of ca. 3 mm; spur 14–16 mm long, somewhat longer than the rest of the corolla, narrowly conical, straight, violet. Capsule 2.5–3 mm, shorter than the calyx, broadly ellipsoid, apex bilobate; style 4–5 mm long, persistent, apex bifid. Seeds 0.6–0.7 mm, wingless, with deep transverse and slightly sinuous crests, black in colour.

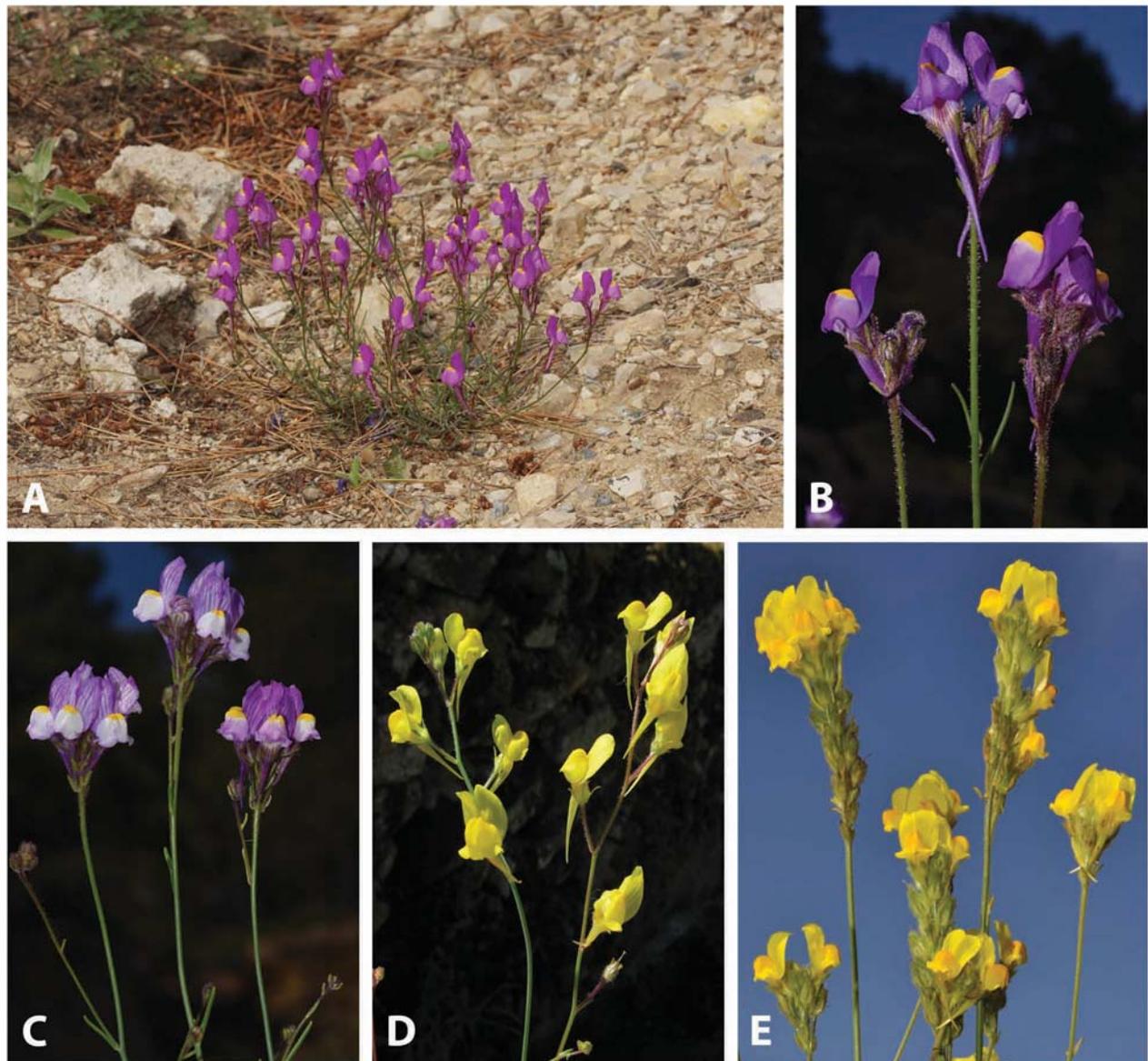


FIGURE 1. A–B) *Linaria becerrae*; C) *Linaria salzmannii*; D) *Linaria spartea*; E) *L. viscosa*.

Eponymy:—The specific epithet honours Manuel Becerra, who encouraged our study of the *Linaria* populations from Málaga province, as he himself had already noticed the differences between the new species and *L. salzmannii*.

Distribution and habitat:—*Linaria becerrae* is a species endemic to southern peninsular Spain, restricted to western Málaga province. It grows exclusively on sandy substrates from the decomposition of molasse (conglomerates and detritic sandstones), forming part of communities of ephemeral annual herbs, near the locality El Chorro.

Additional specimens examined (paratypes):—SPAIN. Málaga: Álora, Mesas de Villaverde, 28 April 1983, Ladero, Navarro, Valdés Franzi & González (MA 330533!); Álora, próx. Pantano del Chorro, 29 April 1981, Pérez Raya & Molero Mesa (GDA 12941!); Álora, Sierra del Agua, mesa de Villaverde, arenas miocenas, 30 April 1977, Fuertes, Ladero & G. López (GDA 8670!, MA 330541!); Ardales, cruce con Bobastro, 260 m, 26 March 1993, B. Cabezudo, A. Flores & P. Navas (MGC 35995!); Ardales, mesa de Villaverde, antigua ciudad de Bobastro, calcarenitas, 600 m, 15 March 2013, B. Soriguer & F. Soriguer (MGC 76334!); Ardales, Monte Almorchón, 11 June 1930, L. Ceballos & C. Vicioso (MA 109353!); Ardales, Paraje Natural Desfiladero de los Gaitanes, Sierra del Almorchón, carretera MA-444, poco antes del cruce a Bobastro, 300 m, 15 March 2013, B. Soriguer & F. Soriguer (MGC 76342!); Ardales, Sierra del Almorchón, cerro por encima del arroyo Granado, 300 m, 15 March 2013, B. Soriguer & F. Soriguer (MGC 76351!); Ardales, Sierra de la Pizarra, 16 June 1993, A.V. Pérez Latorre & P. Navas (MGC 36088!); El Chorro, 17 April 1982, E. Rico (MA 330539!); El Chorro, areniscas, 14 April 1969, P. Gibbs, S. Silvestre & B. Valdés (MA 194849!, MA 423605!); El Chorro, Sierra de Almorchón, 300 m, 17 April 2009, M. Fernández-Mazuecos & J. Ramírez (MA