



Anales del Jardín Botánico de Madrid

ISSN: 0211-1322

anales@ma-rjb.csic.es

Consejo Superior de Investigaciones

Científicas

España

Erben, Matthias; Arán, Vicente J.  
Limonium mateoi (Plumbaginaceae), a new species from Central Spain  
Anales del Jardín Botánico de Madrid, vol. 62, núm. 1, 2005, pp. 3-7  
Consejo Superior de Investigaciones Científicas  
Madrid, España

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# *Limonium mateoi* (Plumbaginaceae), a new species from Central Spain

by

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## Abstract

*Limonium mateoi* Erben & Arán, an endemic species from the gypsaceous soils of the Huete-Buendía area ("Alcarria conquense" zone, Cuenca province, Central Spain), is described. According to its morphology and chromosome number ( $2n = 18$ ), *L. mateoi* seems to be related with *L. dichotomum* (Cav.) Kuntze and *L. erectum* Erben; the distribution areas of these three species are close although they do not overlap.

**Keywords:** Central Spain, *Limonium*, *Plumbaginaceae*, taxonomy.

## Resumen

Se describe *Limonium mateoi* Erben & Arán, especie endémica de los terrenos yesíferos de la zona de Huete-Buendía (Alcarria conquense). Por su morfología y número cromosómico ( $2n = 18$ ), *L. mateoi* parece estar relacionado con *L. dichotomum* (Cav.) Kuntze y con *L. erectum* Erben; las áreas de distribución de estas tres especies, aunque próximas, no llegan a solaparse.

**Palabras clave:** España central, *Limonium*, *Plumbaginaceae*, taxonomía.

## Introduction

The genus *Limonium* is very diversified in the Iberian Peninsula. After the monograph of Erben (1993) for *Flora iberica* in which 69 specific taxa are included for this area, several new species such as *L. alicunense* Gómiz (Gómiz, 1995), *L. cordovillense* Stübing & Cirujano and *L. pinillense* R. Roselló & Peris (Roselló & al., 1997), *L. interjectum* J.X. Soler & Roselló (Soler & Roselló, 1997), *L. vigoii* L. Sáez, Curcó & Roselló (Sáez & al., 1998), *L. mansanetianum* M.B. Crespo & Lledó (Crespo & Lledó, 1998), *L. nydeggeri* Erben (Erben, 1999) and *L. perplexum* L. Sáez & Roselló (Sáez & Roselló, 1999) have been described. However, according to the comments of the authors and to the reported morphological affinities, some of these new taxa are somehow closely related to other previously described species or they seem to be of clear hybridogenic origin.

As a result of the systematic botanical exploration of the Cuenca province (Central Spain) in which one of the authors is involved, some *Limonium* specimens, initially identified as "*L. cf. erectum* Erben" (Mateo &

Arán, 2002: 2), were collected near Huete. This plant is very likely the same mentioned as "*Limonium sp.*" by López González (1976a: 40) in some phytosociological inventories arising from the Huete-Buendía region; effectively, we have found in MA (MA 426067) a voucher collected by this author in Huete, determined only at generic level, which corresponds to the plant we are referring to. Further studies have shown, however, that the mentioned *Limonium* constitutes a good new species which is described in the present paper.

## *Limonium mateoi* Erben & Arán, **sp. nov.**

Holotype: **Cuenca**, Huete, hacia Garcinarro, valle del arroyo de Valquemado, 40°11'28"N, 2°42'43"W (30TWK2449), 750 m, al pie de cerros yesosos, 13-IX-2003, V.J. Arán 5696 & M.J. Tobá (MSB 116293); isotypes, ABH, COA, MA, MACB, MAF 163590, SESTAO, VAL, VIT, Herb. Alexandre, Herb. Arán 93-03-44d, Herb. Erben (Fig. 1 & 2).

*A Limonio erecto spiculis brevioribus 5,5-6,5 mm longis, bracteis brevioribus, bractea inferiore 1,6-2,1*



Fig. 1. *Limonium mateoi* (holotype, MSB 116293).

mm longa, bractea superiore 4,8-5,2 mm longa, calyce ex bractea superiore 1,0-1,5 mm exserto, petalo brevior 6,5-7,0 mm longo differt.

Perennial plant, several-stemmed, completely glabrous except sometimes at the base of the stem. Caudices 5-40 mm, densely branched, spirally leafy in the upper part. Basal leaves at anthesis, frequently, only partially faded, herbaceous, warty on the adaxial face, 25-100 mm long and 5-18 mm wide, cuneate-spatulate or spatulate, apex obtuse to rounded or emarginate, small leaves 1-nerved, large ones 3-5-nerved, gradually attenuated in a sheathing petiole 1-2 mm wide, shorter than the blade (Fig. 3). Stems cylindrical, 30-90 cm long, erect, subflexuous, frequently branched not far from the base, glabrous or shortly pilose-papillose at the lower part, hairs 0.05-0.15 mm long. Inflorescence paniculate, frequently obtrullate. Few and scattered sterile branches, 1-15 cm long, straight or slightly arched, entire or the longer loosely branched. Fertile branches up to 25 cm long, slightly arched, obliquely directed upwards, forming an angle of 25-55° with the stem, the lower sometimes with some few, short, entire and sterile branchlets, the higher loosely branched. Spikes (10)20-60(80) mm long, placed at the top of fertile branches, straight to arched, obliquely inserted. Spikelets 5.5-6.5 mm long, 2-4-flowered, loosely arranged with up to 3-6 spikelets per cm, placed in a single row. Outer bract 1.6-2.1 mm long and 1.6-2.0 mm wide, triangular to triangular-ovate, obtuse, with the margin broadly membranaceous, central part subfleshy, dark, acuminate, with the acumen almost reaching the margin. Middle bract 1.7-2.3 mm long and (1.4-)1.6-1.9 mm wide, oblong-elliptic, rounded to subemarginate, membranaceous. Inner bract 4.8-5.2 mm long and (2.5-)2.8-3.2 mm wide, elliptic, obtuse, with the margin narrowly membranaceous; central part thick, oblong, (3.5-)3.8-4.6 mm long and 1.8-2.2 mm wide, attenuated in an acumen 0.6-0.8 mm long almost reaching the margin. Calyx 4.2-5.1 mm long, surpassing 1.0-1.5 mm the inner bract, funnel-shaped, lacerate after anthesis; tube 1.9-2.4 mm long, variably covered with hairs or unilaterally hairy; tube ribs ending near the base of the lobes; calyx teeth 0.8 × 1 mm, semielliptic. Corolla funnel-shaped, diameter 4.5-5.0 mm; petals 6.5-7.0 mm long and 1.8-2.0 mm wide, pale violet, cuneate, emarginate. Flowering period: from August to October.

This new species is dedicated to Prof. Gonzalo Mateo Sanz, from the University of Valencia (Spain), for his outstanding contribution, among

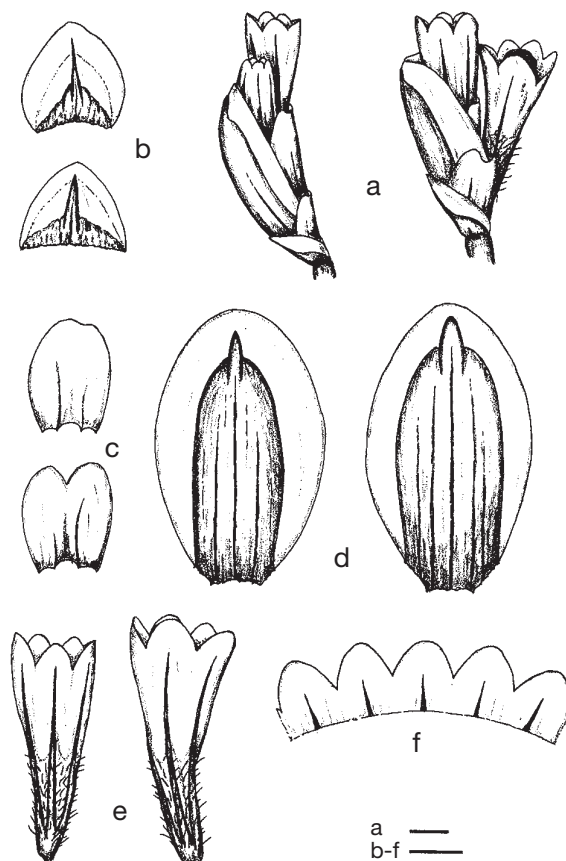


Fig. 2. *Limonium mateoi*: a, spikelet; b, outer bract; c, middle bract; d, inner bract; e, calyx; f, calyx margin (holotype, MSB 116293). Scale: 1 mm.

other fields, to the knowledge of the flora of the Spanish Iberian Range (“Sistema Ibérico” or “Cordillera Ibérica”).

The chromosome number  $2n = 18$  (Erben) is a new count of plants cultivated at Botanical Garden Munich under the numbers Li-1664 and Li-1680. The study of the pollen and stigma of *L. mateoi* shows, as one would expect for sexual species, both self-incompatible combinations A and B (Erben, 1979). Combination A means that the flowers possess stigmata with a cob-like pattern and produce pollen grains with a coarsely reticulate sculpturing of exine; on the other hand, in combination B, the stigmata show a papillate pattern and the pollen grains are finely reticulate. Since coarsely reticulate pollen can only germinate on papillate stigmata and, correspondingly, finely reticulate pollen only on cob-like stigmata, plants such as *L. mateoi* showing combinations A and B are self-sterile.



**Fig. 3.** *Limonium mateoi*: leaves rosette (from the locality of holotype, January 24<sup>th</sup> 2004).

#### Material studied

SPAIN. **Cuenca:** Huete, hacia Garcinarro, valle del arroyo de Valquemado, 40°11'28"N, 2°42'43"W (30TWK2449), 750 m, al pie de cerros yesosos, 13-IX-2003, *Arán 5696 & Tobá* [ABH, COA, MA, MACB, MAF 163590, MSB 116293, SESTAO, VAL, VIT, Herb. Alexandre, Herb. Arán 93-03-44d, Herb. Erben (Li-1664)]. Huete, hacia Valdemoro del Rey, El Gredal, 40°15'3"N, 2°40'44"W (30TWK2755), 780 m, al pie de cerros yesosos, 13-X-2001, *Arán 5044 & Tobá* [ABH, MA 697015, MAF 161397, SESTAO, VAL, Herb. Alexandre, Herb. Arán 93-03-44c (sub *Limonium* cf. *erectum* Erben)]. Ibid., 3-VIII-2002, *Arán 5326 & Tobá* (MA, VAL, Herb. Arán 93-03-44a, Herb. Erben). Saceda del Río, pr. molino de Larez, barranco lateral del valle del río Peñahora, 40°11'29"N, 2°39'50"W (30TWK2849), 820 m, suelo yesoso, 4-X-2003, *Arán 5699 & Tobá* (ABH, MA, VAL, Herb. Alexandre, Herb. Arán 93-03-44g, Herb. Erben). Huete, entre Moncalvillo y Valdemoro del Rey, pr. El Gredal, 40°15'3"N, 2°40'10"W (30TWK2855), 800 m, suelos yesosos, 13-IX-2003, *Arán 5697 & Tobá* (MACB, MAF 163587, Herb. Arán 93-03-44e). Huete, 40°9'N, 2°35'W (30TWK34), margas yesíferas, matorral de *Lepidion subulati* y depresiones húmedas, 7-VII-1974, *Bondía & López* (N° 1237 GF) (MA 426067). Portalrubio de Guadamejud, hacia Tinajas, sobre un arroyo tributario del río Guadamejud, 40°17'4"N, 2°35'51"W (30TWK3459), 760 m, laderas yesosas, 3-VIII-2002, *Arán 5327 & Tobá* (MA, VAL, Herb. Arán 93-03-44b, Herb. Erben). Ibid., 13-IX-2003, *Arán 5698 & Tobá* (ABH, COA, MACB, MAF 163589, SESTAO, VIT, Herb. Alexandre, Herb. Arán 93-03-44f). La Peraleja, hacia Gascueña, pr. Loma de los Calderines, 40°16'29"N, 2°32'15"W (30TWK3958), 820 m, laderas yesosas, 4-X-2003, *Arán 5700 & Tobá* [MA, MAF 163588, VAL, Herb. Arán 93-03-44h, Herb. Erben (Li-1680)].

#### Distribution, habitat and taxonomic relationships

To the best of our knowledge, the distribution of *L. mateoi* seems to be restricted to the "Alcarria conquense" zone (Cuenca province, Central Spain). It appears in an area of about 20 × 20 km placed between the town of Huete and the reservoir of

Buendía, in the basins of Mayor and Guadamejud rivers, tributaries of Guadiela river. It preferably grows in dry flat or scarcely sloping soils at the base of gypsaceous hills (Fig. 4), together with a characteristic gypsicole vegetation (*Gypsophiletalia*) including also some other halophytes and additional plants of *Rosmarinetalia*: *Gypsophila struthium* L. subsp. *struthium*, *Centaurea byssopifolia* Vahl, *Helianthemum squamatum* (L.) Dum. Cours., *Helianthemum conquense* (Borja & Rivas Goday ex G. López) Mateo & Arán, *Gypsophila bermejoi* G. López, *Lepidium caramines* L., *Sonchus crassifolius* Pourr. ex Willd., *Sideritis incana* L., *Salvia lavandulifolia* Vahl, *Helianthemum syriacum* (Jacq.) Dum. Cours., etc. An extensive list of the accompanying species can be found in the inventories of López González (1976a: 40).

In the mentioned area we have not been able to find any other species of *Limonium*. However, *L. dichotomum* (Cav.) Kuntze and/or *L. echioides* (L.) Mill. (sometimes under *Statice*) have been mentioned from the gypsaceous zones between Tarancón and Horcajada de la Torre, ca. 20-25 Km south of our localities by Rivas Goday & al. (1957: 456), Rivas Martínez & Costa (1971: 212), López González (1976b: 351) and Costa Tenorio (1978: 150); the last two authors also comment an unconvincing Willkomm's report of *L. ovalifolium* (Poir.) Kuntze for this area that, as expected taking into account the present distribution of this taxon (Erben, 1993: 90), they could not confirm.

*Limonium mateoi* is morphologically similar to *L. dichotomum* and, especially, to *L. erectum*, and it might be derived from the latter (or vice versa) by geographical isolation; or perhaps they both proceed from a common ancestor. All listed taxa are diploid with  $2n = 18$  chromosomes.



**Fig. 4.** Habitat of *Limonium mateoi*. Locality of holotype, with gypsicole vegetation (*Gypsophiletalia*), January 24<sup>th</sup> 2004.

*Limonium dichotomum*, with its *loc. class.* located by the little village of Rivas de Jarama (Madrid province) but rather widespread through the appropriate ecosystems of the provinces of Ciudad Real, Cuenca, Madrid and Toledo (Erben, 1993: 77), differs from *L. mateoi* by having broader leaves, more abundant and shorter branches, and distinctly shorter bracts (see Table 1).

On the other hand, near Pastrana (Guadalajara province), ca. 20 Km NE of the localities of *L. mateoi* but separated by the “Sierra de Altomira”, appears

the *loc. class.* (Erben, 1993: 75) and the only known locality of *L. erectum*. This species differs from *L. mateoi* by having more delicate spikelets and also distinctly shorter bracts (see Table 1). *Limonium erectum* grows on argillaceous soils without or with low gypsum contents, with a characteristic *Rosmarinetalia* vegetation and accompanied only by some scarce and scattered individuals of *Helianthemum squamatum* (L.) Dum. Cours. and *Gypsophila struthium* L. subsp. *struthium* as gypsicole plants.

**Table 1.** Comparison of selected flower characters of *Limonium mateoi* and its closest relatives *L. erectum* and *L. dichotomum*.

	<i>L. mateoi</i>	<i>L. erectum</i>	<i>L. dichotomum</i>
Outer bract	1.6-2.1 × 1.6-2.0 mm	1.1-1.5 × 1.5-2.1 mm	1.0-1.5 × 1.3-2.1 mm
Middle bract	1.7-2.3 × 1.6-1.9 mm	1.6-1.9 × 1.1-1.3 mm	1.3-1.7 × 1.2-1.4 mm
Inner bract	4.8-5.2 × 2.8-3.2 mm	3.0-3.8 × 2.1-2.4 mm	3.1-4.4 × 2.1-2.7 mm
Length of calyx	4.2-5.1 mm	4.4-5.0 mm	4.2-5.1 mm

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Received: 9-XI-2004  
Accepted: 10-III-2005