

LIMONIUM INEXPECTANS (PLUMBAGINACEAE), A NEW APOMICTIC SPECIES FROM MALLORCA (BALEARIC ISLANDS)*

by

LLORENÇ SÁEZ** & JOSEP A. ROSSELLÓ***

Resumen

SÁEZ, L. & J.A. ROSSELLÓ (1996). *Limonium inexpectans* (Plumbaginaceae), una nueva especie apomíctica de Mallorca (Islas Baleares) *Anales Jard. Bot. Madrid* 54: 285-289 (en inglés).

Se describe *Limonium inexpectans* L. Sáez & Rosselló de una localidad del sudoeste de Mallorca. La nueva especie es apomíctica y presenta una combinación polínico-estigmática tipo B. *L. inexpectans* pertenece a la subsección *Dissitiflorae* Boiss. (subgénero *Limonium* sección *Limonium*), y por sus características morfológicas debería ser incluido en el agregado de *L. gibertii* [*L. gibertii* (Sennen) Sennen y *L. marisoliai* L. Llorens].

Palabras clave: *Spermatophyta*, *Plumbaginaceae*, *Limonium*, taxonomía, Islas Baleares.

Abstract

SÁEZ, L. & J.A. ROSSELLÓ (1996). *Limonium inexpectans* (Plumbaginaceae), a new apomictic species from Mallorca (Balearic Islands). *Anales Jard. Bot. Madrid* 54: 285-289.

Limonium inexpectans L. Sáez & Rosselló is described from a single salt marsh locality of southwest Mallorca. The new species is apomictic and has a single pollen/stigma combination (B type). *L. inexpectans* belongs to subsect. *Dissitiflorae* Boiss. (subgenus *Limonium* sect. *Limonium*) and, on morphological grounds, should be included in the *L. gibertii* aggregate [*L. gibertii* (Sennen) Sennen and *L. marisoliai* L. Llorens].

Key words: *Spermatophyta*, *Plumbaginaceae*, *Limonium*, taxonomy, Balearic Islands.

INTRODUCTION

The *Plumbaginaceae* is one of the most outstanding taxa of the vascular flora of the Balearic Islands. The absence of any representative of the genus *Armeria* and the great diversity and endemism of the agamosperous species of *Limonium* are the main relevant features. Despite the existence of several recent check-lists (GREUTER & *al.*,

1989; LLORENS & *al.*, 1992) and taxonomic revisions of *Limonium* (ERBEN, 1993) covering the whole archipelago there is still much field work to be done before a thorough biosystematic approach can reveal the evolutionary relationships among the species.

One of the richest *Limonium* salt marshes of Mallorca is the Magalluf area. Seven species are recorded to grow there (LLORENS, 1986; ROSSELLÓ & *al.*, 1994; Rosselló & Sáez,

* Part two of the series "A taxonomic and biosystematic revision of the genus *Limonium* (Plumbaginaceae)". For part one see *Anales Jard. Bot. Madrid* 51: 199-209. This work was supported by DGICYT research grant PB93-0350.

** Departament de Botànica, Facultat de Biologia, Universitat de Barcelona. E-08028 Barcelona.

*** Departamento de Biología Vegetal, Facultat de Biologia, Universidad de Valencia. E-46100 Burjasot (Valencia).

unpublished data), of which three (*L. boirae* L. Llorens & Tébar, *L. ejulabilis* Rosselló & al., and *L. magallufianum* L. Llorens) are endemics restricted to that locality. A comprehensive search of the area led to the discovery of two very small populations of an unknown taxon of *Limonium*. The only reported salt marsh *Limonium* from Magalluf not seen by us was *L. migjornense* L. Llorens, an endemic Balearic plant with type locality in south Mallorca (LLORENS, 1986). That author stated that the species was once present in the disturbed remains of the salt marsh area surrounding Magalluf before its disappearance. The examination of the voucher specimen convinced us that the reported *L. migjornense* from Magalluf was closely related to *L. magallufianum* and clearly different from true *L. migjornense*. The comparison of the Magalluf samples with the other Balearic taxa revealed that the plant belonged to the *L. delicatulum* complex, and was related to the *L. gibertii* aggregate (Rosselló, unpublished data). However, the combination of the morphological characters was unique, enabling its distinction from allied plants. Since the combination of morphological characters does not fit well with any of the known taxa of *Limonium*, we decided to describe it as a new species, *L. inexpectans*.

RESULTS

Limonium inexpectans L. Sáez & Rosselló, sp. nov. (figs. 1, 2)

Speciei L. gibertii similis, sed ab ea spiculis minoribus (4.5-5 mm), calyce sparse piloso atque bractea inferiore minore (1.1-1.5 × 1.3-1.6 mm) differens. Speciei L. marisoliae similis, sed bractea superiore minore (3.5-4 × 2.4-2.8 mm) ab ea differens.

Derivatio nominis: From the latin *inexpectans*, *-is* = unexpected.

Perennial with many stems, glabrous. Caudices 5-25 cm, loosely branched, spirally leafy in the upper part. Basal leaves green at anthesis, 15-56 × 7-23 mm. Blade spatulate-

elliptical, tip subobtuse to retuse, with a short 0.2 mm, long apiculum; flattened, smooth on both faces, 1-3 (5) nerved. Petiole slightly canaliculate, 1/3-1/2 as long as the blade, 1-2 mm wide. Stem 28-60 cm long, erect; ramified above the lowest third part. Inflorescence paniculate, loosely branched, rhombic, 16-30 × 7-15 cm. Branches

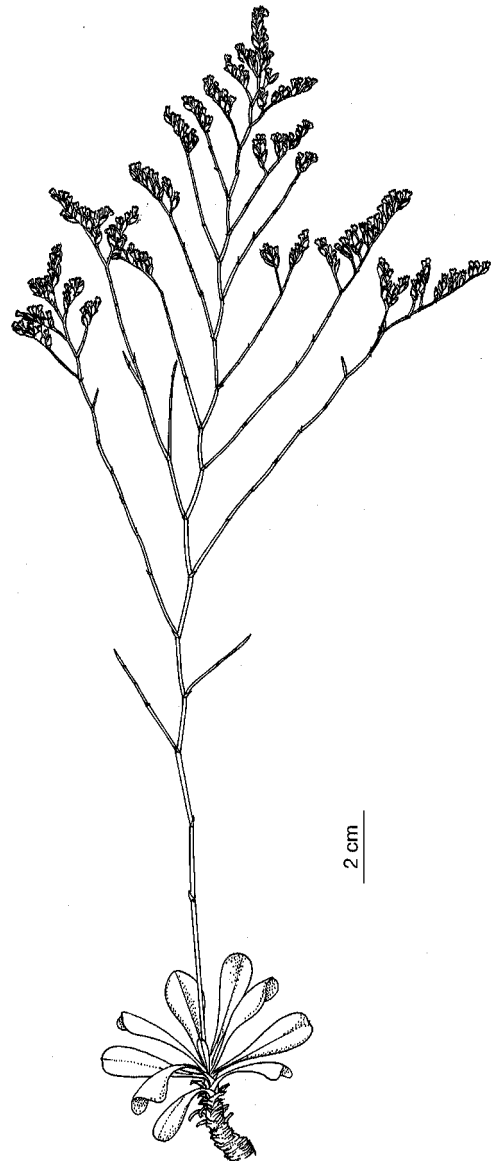


Fig. 1.—*Limonium inexpectans*, Magalluf, Mallorca (holotype, BCC): habit.

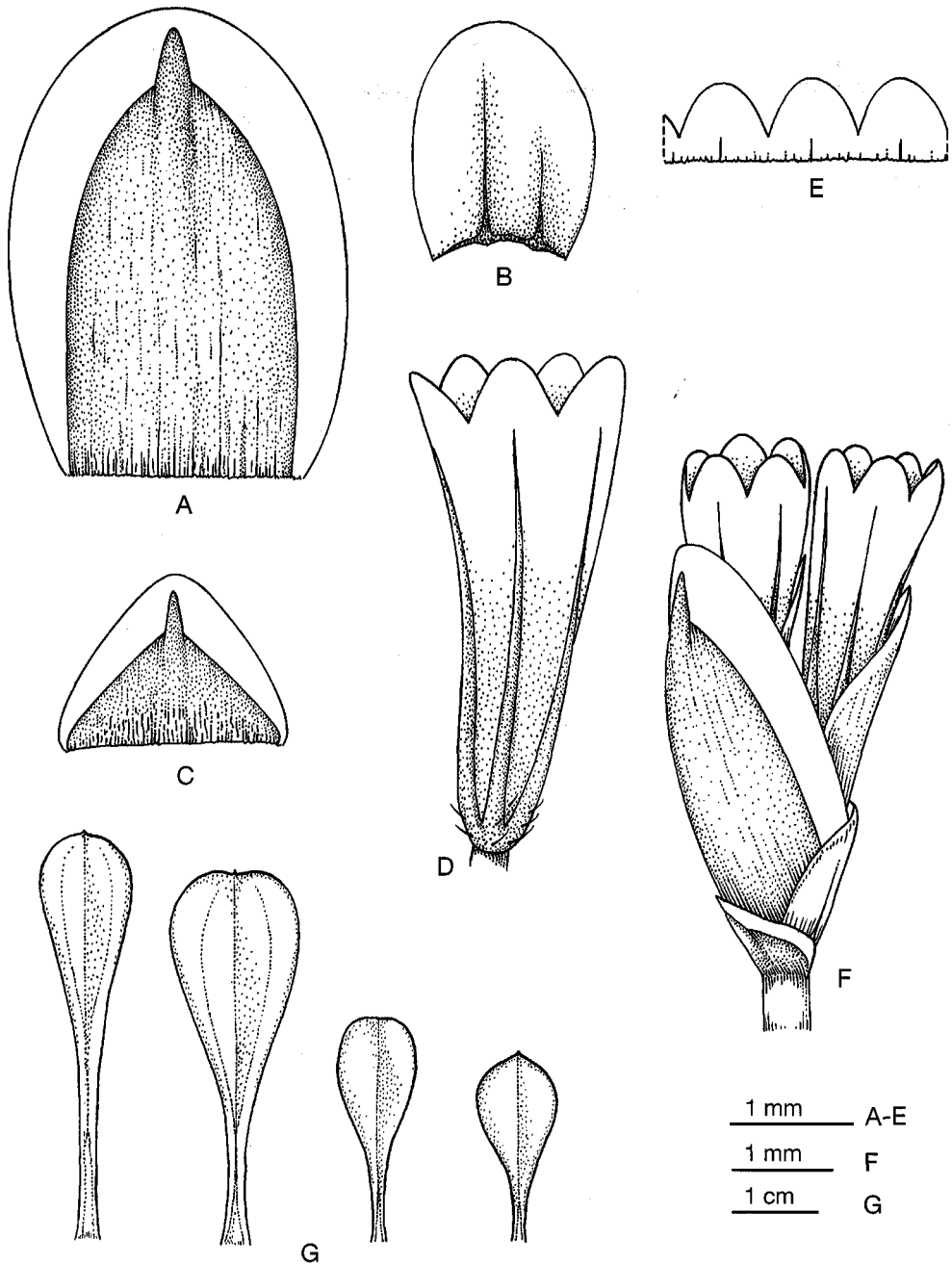


Fig. 2.—*Limonium inexpectans*, Magalluf, Mallorca (BCC): A, inner bract; B, middle bract; C, outer bract; D, calyx; E, calyx teeth; F, spikelet; G, leaves.

distichous, up to 20 cm long, erect to erect-patent, subcurved at the ends, obliquely inserted (30-50°), non-flowering branches few (1-2) or absent. Spikes 15-25 mm long, slightly subcurved, with 4-6 spikelets per cm. Spikelets 4.5-5 mm long, 1-4 flowered. Outer bract 1.1-1.5 × 1.3-1.6 mm, triangular-ovate, acute to obtuse; margin broadly membranous, central part subfleshy, long acuminate, the acumen nearly reaching the margin. Middle bract 1.5-1.8 × 1.1-1.3 mm, oblong-elliptic, blunt to submarginate, membranous. Inner bract 3.5-4 × 2.4-2.8 mm, obovate to elliptical, obtuse to rounded, with a broad membranous margin up to 0.7 mm; central part subfleshy, 3.0-3.3 × 1.7-1.9 mm, oblong, triangular-acuminate, acumen 0.4-0.7 mm not reaching the margin. Calyx 3.8-4.4 mm long, surpassing by 0.8-1.3 mm the inner bract; tube scarcely hairy, with very few long eglandular hairs; tooth ca. 0.4-0.6 mm, semielliptic; midrib not reaching the calyx lobes. Corolla funnel-shaped. Petals cuneate, violet, 6-6.7 × 1.8-2 mm. Pollen-stigma combination: B type.

Holotypus: Insulae Baleares, Majorica, ubi loco dicto Son Matías (Magalluf, 31S DD67), in paludibus argillosis salsis, die 4-VIII-1995, J.M. González, J.A. Rosselló & L. Sáez legerunt (BCC).

Material examined: Prat de Magalluf, 31SDD57, 5 m, 11-IX-1994, J.A. Rosselló & L. Sáez, BCC; ibidem, 7-I-1995, J.M. González, J.A. Rosselló & L. Sáez, BCC. Son Maties 31SDD67, 27-XII-1994, J.A. Rosselló & L. Sáez, BCC; ibidem, 7-I-1995, J.M. González, J.A. Rosselló & L. Sáez, BCC

COMPARISON WITH OTHER SPECIES

As stated before, *Limonium inexpectans* has close similarities with the *L. gibertii* aggregate, i.e. *L. gibertii* and *L. marisolii*, which also grow in neighbouring localities. The shrubby habit, the spatulate leaves, the tip length and the overall shape of the inflorescences are very similar in all three taxa. However, *L. inexpectans* is readily distinguished from the other species by its smaller spikelets, outer and inner bracts and by its nearly glabrous calyx. The only pollen-

stigma combination (B type) and the pollen irregularities found so far suggest an apomictic origin for polyploidy in *L. inexpectans*, which could be further tested by means of cytological work. This would not be surprising since the Balearic populations of *L. gibertii* and *L. marisolii* are triploids (cf. ERBEN, 1986; 1989). The former attribution of *L. inexpectans* to *L. migjornense* (LLORENS, 1986) has no sound basis. The oblanceolate leaves, with a terminal tip of 1-2 mm, the shape of the inflorescences, the longer outer bracts and narrower inner bracts and the hairy calyx tube clearly separate *L. inexpectans* from the latter species. In addition, *L. migjornense* does not have the developed aerial rootstock of *L. inexpectans*; the only common feature relating both species is their sharing of the same habitat.

The very reduced area of *L. inexpectans* could be explained by some or both of the following causes. First, one can conceive of *L. inexpectans* as a relict species with a broader area of distribution in the past. Drastic transformations of the Balearic coastal habitats, in the last few decades could account for its severe restricted distribution. Alternatively, the new taxon could have arisen in the Magalluf area after a hybridization event, probably between two salt marsh species. If this was the case, a relatively recent hybrid origin could easily explain the failure to spread over broader areas. Strong evidence supporting any of the two working hypothesis is currently lacking. However, it should be borne in mind that the most important Mallorcan salt marshes, notably those of the south coast (Magalluf, Ses Fontanelles and Campos area), have several *Limonium* species, all of apomictic nature, growing at single localities. We hope that this pattern of distribution mirrors local hybridization events rather than selective extinction following human disturbances.

The lack of sound knowledge about the origin of *L. inexpectans* does not invalidate its distinctiveness as a new species, at least from a morpho-geographic point of view. Clear morphological gaps between *L. inexpectans*

and the presumed related species *L. marisolia* and *L. gibertii* do exist, and can be easily recognised both in the field and in the herbarium. Molecular work is now in progress (RAPDS and RFLP of nuclear and chloroplastic genomes) to ascertain deeper levels of relationships among the Balearic taxa of the *L. delicatulum* complex.

HABITAT AND CONSERVATION

The two small populations of *L. inexpectans* known to occur in the salt marsh remains of the Prat de Magalluf. The ecology of this species is similar that of to the other *Limonium* species growing in this area; however, *L. inexpectans* is found in the most disturbed places together with *L. magalufianum* and *L. virgatum* (Willd.) Fourr. Associated species are *Pistacia lentiscus*, *Pinus halepensis*, *Oxalis pes-caprae*, *Plantago coronopus*, *Aegilops geniculata*, *Piptatherum miliaceum*, *Inula viscosa*, *Hedysarum spinosissimum* and *Anagallis arvensis*; *Arthrocnemum glaucum*, *Inula crithmoides* and *Juncus acutus* are the only remaining species of a formerly more developed and structured brackish community.

L. inexpectans has very reduced populations and, despite intensive search, fewer than fifteen individuals are currently known. We have noted moderate seedling production in one population, but developed young individuals are, as a rule, rare. As far as we know, seed germination is high in all Balearic and Iberian species we have tested (Rosselló, unpublished data). It is therefore possible that seedling mortality is one of the most outstanding factors limiting plant establishment. Competitive therophytic species growing in the same disturbed habitat could be responsible for the failure of *L. inexpectans* seedlings to reach maturity. It should be also noted that in both populations there are very few places where soil characteristics are suitable for plant

development. Accordingly, a high seedling density and strong competition should be expected.

The low number of *L. inexpectans* individuals known and the increasing rate of touristic building in the area indicate a threat of extinction for this plant; it should therefore be included in the CR (critical) UICN categories (UICN, 1994). The highly disturbed habitat where *L. inexpectans* grows is not a desirable or feasible locality for *in situ* protection of the species. Since *L. inexpectans* is an apomictic plant, it would be more meaningful to keep viable seeds for long term storage in germplasm collections. Preliminary isozyme studies with some Balearic apomictic *Limonium* have not detected any genetic variation within populations (Rosselló, unpublished data). If, as expected, this is also true for *L. inexpectans* it should be easier to protect the genetic resources of this endangered plant.

REFERENCES

- ERBEN, M. (1986). Bemerkungen zur Taxonomie der Gattung *Limonium*. IV. *Mitt. Bot. Staatssamml. München* 27: 381-406.
- ERBEN, M. (1989). Bemerkungen zur Taxonomie der Gattung *Limonium*. V. *Mitt. Bot. Staatssamml. München* 28: 313-417.
- ERBEN, M. (1993). *Limonium*. In: S. Castroviejo, C. Aedo, S. Cirujano, M. Lafniz, P. Montserrat, R. Morales, F. Muñoz Garmendia, C. Navarro, J. Paiva & C. Soriano (eds.), *Flora iberica*. Vol. 3: 2-143. Madrid.
- GREUTER, W., H.M. BURDET & G. LONG (1989). *Med-Check List. Dicotyledones (Lauraceae-Rhamnaceae)*. Vol. 4. Genève.
- LLORENS, L. (1986). Revisión sistemático-taximétrica del género *Limonium* Miller en la isla de Mallorca (I). *Lazaroa* 8: 11-68.
- LLORENS, L., F. TÉBAR & L. GIL (1992). Sobre la corología del género *Limonium* Miller en las Islas Baleares. *Itinera Geobot.* 6: 237-245.
- ROSSELLÓ, J.A. (1996). An overview of the *Limonium* flora of the Balearic Islands. *Anales Jard. Bot. Madrid* 55 (in press).
- ROSSELLÓ, J.A., M. MUS & J.X. SOLER (1994). *Limonium ejulabilis*, a new endangered endemic species from Majorca (Balearic Islands, Spain). *Anales Jard. Bot. Madrid* 51 (2): 199-204.
- UICN (1994). *Categorías de las Listas Rojas de la UICN*. Gland, Schweiz.