

New floristic records, amendments and other phytogeographical notes from the Balearic Islands

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Abstract

This paper deals with 61 taxa, 8 of which are new to the Balearic Islands flora: *Bromus macrantherus* Trab., *Buglossoides incrassata* subsp. *splitgerberi* (Guss.) E. Zippel & Selvi, *Erodium neuradifolium* Godr., *Hedera helix* subsp. *rhizomatifera* McAllister, *Misopates calycinum* (Vent.) Rothm., *Narcissus serotinus* L., *Orobanche balsensis* (J.A. Guim.) Carlón, M. Lainz, Moreno Mor. & Ó. Sánchez and *Valerianella locusta* (L.) Laterr. subsp. *locusta*. On the other hand, 8 species [*Aira multiculmis* Dumort., *Aira uniaristata* Lag. & Rodr., *Oenanthe croccata* L., *O. pimpinelloides* L., *Opopanax chironium* W.D.J. Koch, *Puccinellia distans* (Jacq.) Parl., *Silene niceensis* All. and *Tyrimnus leucographus* (L.) Cass.] are removed from the list of the Balearic Islands. Moreover, individual island reports are given for several species, 26 of them representing novelty at island level.

Keywords: native plants, Mediterranean Region, taxonomy, chorology.

Resumen

Nuevos datos florísticos, correcciones y otras notas fitogeográficas de las Islas Baleares.

Este artículo incluye datos de 61 taxones, 8 de los cuales son nuevos para la flora de las Islas Baleares: *Bromus macrantherus* Trab., *Buglossoides incrassata* subsp. *splitgerberi* (Guss.) E. Zippel & Selvi, *Erodium neuradifolium* Godr., *Hedera helix* subsp. *rhizomatifera* McAllister, *Misopates calycinum* (Vent.) Rothm., *Narcissus serotinus* L., *Orobanche balsensis* (J.A. Guim.) Carlón, M. Lainz, Moreno Mor. & Ó. Sánchez y *Valerianella locusta* (L.) Laterr. subsp. *locusta*. Por otra parte, 8 especies [*Aira multiculmis* Dumort., *Aira uniaristata* Lag. & Rodr., *Oenanthe croccata* L., *O. pimpinelloides* L., *Opopanax chironium* W.D.J. Koch, *Puccinellia distans* (Jacq.) Parl., *Silene niceensis* All. and *Tyrimnus leucographus* (L.) Cass.] se excluyen del catálogo florístico de Baleares. Además, se proporcionan datos corológicos novedosos para varias especies, 26 de las cuales representan novedad a nivel insular.

Palabras clave: plantas autóctonas, Región Mediterránea, taxonomía, corología.

Introduction

The Balearic native flora seems to be relatively well known, although some geographic areas have not been carefully surveyed and certain genera are not fully understood. This article continues a series of contributions including additions, confirmations and deletions in order to improve the floristic knowledge of the vascular flora of the Balearic archipelago (see

Sáez *et al.*, 2015). In some cases, new interesting reports are provided concerning previously known taxa for the Balearic Islands.

Materials and methods

The floristic data here presented are the result of fieldwork and herbarium research by the authors. These records were checked for novelties alongside

with previously published records from floristic treatments, scientific papers and plant distributions compendiums. The names of the localities are based on the Balearic cartography provided by the IDEIB (*Infraestructura de Dades Espacials de les Illes Balears*) throughout its web map service. Herbarium acronyms follow Thiers (2022 [continuously updated]).

Micromorphology in *Valerianella* was observed on mature achenes which were glued directly to aluminium stubs, coated with 40–50 nm gold, and examined with a scanning electron microscopy (SEM) (Zeiss Merlin FE-SEM) at 5 kV.

The species are arranged in alphabetical order of genera. Scientific names preceded by a single asterisk (*) are novelty for a single island, while those preceded by two asterisks (**) correspond to new taxa for the flora of the whole Balearic Islands. Names in bold indicate taxa previously known in the archipelago. Names in italics correspond to species that should be excluded from the flora of the Balearic Islands (**) or from a concrete island (*).

Results

Aira caryophyllea L.

Mallorca: Puig de Massanella, lat. S, 1200 m, 11 July 1956, A. Bolòs & O. Bolòs (BC 137240, sub *A. caryophyllea* cf. subsp. *uniaristata*); Massanella, 17 June 1962, [Bonafè] (HJBS-Bonafè-0298, mixed with *A. cupaniana* Guss.); Cornadors, 24 May 1968, [Bonafè] (HJBS-Bonafè-0297).

In the Balearic Islands *A. caryophyllea* is only confirmed for Mallorca where it occurs in grasslands in mountainous areas between 900 and 1250 m a.s.l. Reports from Menorca and Eivissa are due to confusions with other species of the genus, mainly *A. cupaniana*.

***Aira multiculmis* Dumort.

The species was reported from the mountains of L'Ofre, northern Mallorca (Bianor, 1917). Two vouchers specimens are kept at HJBS. One belongs to *Aira cupaniana* Guss.: Sóller, L'Ofre, sitios herbosos, 5 May 1911, *Bianor 1503 bis* (HJBS-944) and the second specimen was collected one year later: Montañas, L'Ofre, 27 May 1912, *Bianor 1503 bis* (HJBS-Bianor-943). None of these specimens corresponds to *A. multiculmis*, a species for which there is no evidence of its presence in the Balearic Islands. The specimen HJBS-944 presents small spikelets (glumes 1.9-2 mm long) and pedicels with a prominent apical annular thickening. Based on these characteristics this specimen corresponds to *A. cupaniana*, the most widespread species of the genus in the Balearic Islands. The specimen HJBS-Bianor-943 is in poor condition to be positively identified, but it is certainly not *A. multiculmis*.

***Aira uniaristata* Lag. & Rodr.

Bolòs & Vigo (2001) and Sáez *et al.* (2015) reported the species from Mallorca (Serra de Tramuntana) based on specimens collected in

Massanella (BC 137240) and Albarca (HJBS-Bonafè-0296), respectively. These herbarium specimens belong to *Aira caryophyllea* (see above) and *Trisetaria aurea* (Ten.) Pignatti, respectively.

Anethum ridolfia Spalik & Reduron [*Ridolfia segetum* (Guss.) Moris]

Eivissa: Plana d'en Francolí, Sant Antoni de Portmany, 31SCD5821, 154 m, cultivated fields, May 2016, *J. Serapio* (BC 984613).

As far as we know, the collection cited is the first unambiguous record for Eivissa. This taxon was previously listed by several authors (Duvigneaud, 1979; Pla *et al.*, 1992; Bolòs & Vigo, 1990; Aedo, 2003) without concrete location.

**Asparagus aphyllus* L. subsp. *aphyllus*

Eivissa: Ses Païses de cala d'Hort, 31SCD4706, 104 m, 22 Aug 2022, *J. Serapio* (BC 984609).

This species was previously reported from Menorca (Fraga-Arguimbau *et al.*, 2021). A wider distribution in the Balearic archipelago can be assumed for *Asparagus aphyllus*.

Asteriscus maritimus L. [*Pallenis maritima* (L.) Greuter]

Formentera: Illa de s'Alga, 31SCC6393, 1 m, coastal habitats, June 2002, *J. Serapio* (BCB).

The species is common in this small islet located north of Formentera. This report allows us to confirm the presence of this plant in Formentera (Stafforini *et al.*, 2001; Gil *et al.*, 2003).

**Atriplex prostrata* DC.

Formentera: S'Estany des Peix, July 2022 *J. Serapio* (BC 984617).

With this report the species is now known from all the Balearic Islands.

**Brachypodium stacei* Catalán, Joch. Müll., L.A.J. Mur & T. Langdon

Cabrera: prop de la casa des Garriguer, 2 May 1933, *A. Marcos* (BC 87559).

This diploid ($2n=20$) Mediterranean species was previously reported from Mallorca, Menorca, Formentera and Sa Dragonera (Catalán *et al.*, 2012; López-Álvarez *et al.*, 2012).

***Bromus macrantherus* Trab.

Eivissa: Cala Vadella, 3 Apr 1978, *J. Duvigneaud 78E207* (SEV 44022, sub *Bromus diandrus*).

This species was considered endemic to S Iberian Peninsula, NW Africa and Sardinia (Talavera, 1987; Arrigoni, 2006; Pignatti, 2017). Some authors included *B. macrantherus* within the variability of *B. diandrus* Roth (Acedo & Llamas, 2021) but from our point of view it deserves taxonomic recognition at species level. The specimen from Cala Vedella has noticeably longer anthers (4-5.5 mm long) than in *B. diandrus* and the panicle barely protrudes from the upper cauline leaf. It should be noted that contrary to what is indicated in *Flora iberica*, IPNI and Euro+med Plantbase, *Bromus macrantherus* was firstly validly

published by Trab. in Batt. & Trab. Fl. de l'Alger. (Monoc.): 226 (1895).

****Buglossoides incrassata** subsp. **splitgerberi** (Guss.) E. Zippel & Selvi

Mallorca: Puig Major, Es Bufador, 31SDE8206, 1380 m, limestone shady cliffs, 14 June 2021, L. Sáez LS-7920 (BC 984628).

The presence of *B. incrassata* in the Balearic Islands (mountain areas of Mallorca) was suggested by Willkomm (1876). However, evidence supporting the presence of this species in the Balearic Islands is scarce. Pastor (2012) listed for Menorca *B. incrassata* (Guss.) I.M. Johnst. subsp. *incrassata* based on herbarium material. However, there is no record of the basis on which this report was based which in all probability was due to confusion with *B. arvensis* subsp. *arvensis*. In June 2021 one of us (L.S.) located a population of small-sized plants (5-14 cm high) with narrow leaves (1-2 mm width) and oblique and partially thickened pedicel (shorter and more thickened than in *B. arvensis* subsp. *arvensis*) growing on cliffs facing north of Puig Major. According to the available literature (Selvi & Cecchi, 2009; Cecchi *et al.*, 2014; Tison & Foucault, 2014), these plants are referable to *B. incrassata* subsp. *splitgerberi*. This subspecies is widely distributed in the Mediterranean region, also occurring in the Middle East, Central Europe, the southern Alps (Selvi & Cecchi, 2009) and the Pyrenees (Schwab, 2020).

***Caucalis platycarpus** L.

Formentera: La Mola, 31SCC7580, 125 m, cultivated fields, May 2019, S. Costa (BCB).
New for Western Balearic Islands.

***Chrozophora tinctoria** (L.) Raf.

Formentera: Venda des Monestir, la Mola, 31SCC4481, 137 m, cultivated fields, 31 Aug 2021. J. Serapio (BC 984611).

Previously known from Mallorca, Menorca and Eivissa (Pla *et al.*, 1992).

Crucianella patula L.

Mallorca: Ca's Català, 27 Oct 1946, P. Palau Ferrer 676 (MA 116846, sub *Crucianella*).

This species had never been reported from the Balearic Islands until it was listed (without a specific location) for Mallorca by Ortega Olivencia & Devesa (2007). This report was based on the herbarium specimen listed above. The locality where it was collected (a coastal area located west of Palma de Mallorca) has been intensely urbanized and the current traces of natural vegetation are scarce. The presence of this Iberian–Maghreb species in Mallorca (the only island where its occurrence is documented) is difficult to explain. Given that *C. patula* usually occurs in continental environments and has not been located since the mid-20th century, it could be an occasional occurrence, although the species does not have mechanisms for long–distance dispersal. However, the existence of some natural areas suitable for this easily overlooked species cannot be

ruled out. A more or less similar case would be the occurrence of *Micromeria inodora* (Desf.) Benth. from west of Palma and currently extinct in Mallorca.

***Digitaria sanguinalis** (L.) Scop.

Formentera: La Savina 31SCC6287, 4 m, waysides, Aug 2019 J. Serapio (BC 984619).

Previously known from Mallorca, Menorca and Eivissa (Pla *et al.*, 1992).

****Erodium neuradifolium** Godr.

Eivissa: Illa des Bosc, 31SCD4514, rocky places, 14 Apr 1993, G. Bibiloni & J. Soler (UIB 4391); Illa de s'Espartar, 31SCD4514, rocky places, 14 Apr 1993, G. Bibiloni & J. Soler (Figure 1).

This Mediterranean species was not listed for the Balearic Islands by Navarro (2013). Our specimens have mericarps with eglandular apical pit, with an eglandular and a relatively narrow furrow. This set of characters allows to separate the samples of Eivissa from *Erodium chium* (L.) Willd [mericarps without furrow] and *E. malacoides* (L.) L'Hér. [mericarps with a glandular furrow].



Figure 1. Field photo of *Erodium neuradifolium* from s'Espartar island, Eivissa.

Figura 1. Foto de campo de *Erodium neuradifolium* del isolde de s'Espartar, Eivissa.

****Erucastrum gallicum** (Willd.) O.E. Schultz

According to Stafforini *et al.* (2001) the alleged occurrence of this species in the Balearic Islands, Eivissa (Duvigneaud, 1979; Rivas-Martínez *et al.*, 1992; Pla *et al.*, 1992) would probably be due to confusion with *Diploaxis ibicensis* (Pau) Gómez Campo. Their suspicions are now confirmed by examination of the herbarium specimen that was used for the report of *E. gallicum* by Duvigneaud (1979). The voucher specimen "Ibiza: chemin le long de la mer, Isla Plana y Grosa, 10 July 1965, J. Duvigneaud 65E876 (BR 608292)" belongs to *Diploaxis ibicensis*. Other reports (Rivas-Martínez *et al.*, 1992; Pla *et al.*, 1992) are doubtful and are not supported by herbarium material.

***Gastridium phleoides** (Nees & Meyen) C.E. Hubb.

Formentera: Playa Mitjorn [Migjorn], Feldrand

(Feldfrüchte, Erbsen, Linsen, Kichererbsen, Hafer, Gerste), 200 m vom Strand, 4 June 1972, *H. Kuhbier* & *G. Finschow* (SEV 23823).

This species was not included in the floristic catalogue of Formentera (Gil & Llorens, 2001).

*****Hedera helix* subsp. *rhizomatifera* McAllister**

Mallorca: Puig Major, 31DE8206, 1380 m, rocky places in a karst landscape, 16 June 2021, *L. Sáez LS-7931* (BC 984626).

The detailed study of materials of *Hedera helix* L. in a broad sense from karst rocky habitats in high mountain areas of Mallorca has shown that there are specimens referable to subsp. *rhizomatifera*, according to Valcárcel & Vargas (2002) and Valcárcel *et al.* (2003). Plants of subsp. *rhizomatifera* from Puig Major are rhizomatous, with leaves (0)3-lobed, cordate at base; upper leaf surface with strongly prominent whitish veins, covered with greyish-white waxes; leaf trichomes are stellate, white, 0.4-0.8 mm in diameter, with (3)4-6(7) rays parallel or subparallel to leaf surface. The presence of subsp. *rhizomatifera* in Mallorca it is not surprising, since it is common in mountain limestone areas in eastern and southern Spain.

****Helianthemum apenninum* (L.) Mill.**

The species is known from mountain areas in northern Mallorca, where it occurs in open scrub, slopes and rocky places at elevations between 900 and 1390 m. *Helianthemum apenninum* has been documented very recently in Eivissa (Nualart & Montes, 2021a) based on the specimen: Eivissa: Sant Antoni, 25 March 1918, *P. Font Quer* (BC 841676). However, examination of this material revealed that it belongs to *H. salicifolium* (L.) Mill., a species previously known from Eivissa (Torres *et al.*, 1986).

****Helichrysum pendulum* (C. Presl) C. Presl**

Formentera: Sa Roqueta, maritime sands, 31SCC6588, 3 m, 28 May 2019, *J. Serapio* (BC 984614).

Previously known from Mallorca, Eivissa and Cabrera. In Sa Roqueta we have observed a single reproductive individual with abundant young seedlings.

***Juncus minutulus* Prain**

Menorca: Mercadal, aledaños de Ses Salines, camino a Cala Blanca, 40°01'24"N 04°07'20", 10 m, pinar de *Pinus halepensis*, 5 May 2013, *A. Quintanar AQ5168* (MA 876306, sub *Juncus ranarius*).

The species is only known from two Minorcan localities: Ses Fonts Rodones and Basses de Son Guarners (Fraga-Arguimbau *et al.*, 2019). The specimen MA 873306 (initially identified as *J. ranarius*) shows clearly acute inner tepals.

****Juncus ranarius* Songeon & E.P. Perrier**

Eivissa: peus del Puig des Savinar, Sant Josep de sa Talaia, 31SCD4604, 63 m, wet meadows, growing together with *Solenopsis laurentia* (L.) C. Presl, 1 June 2022, *J. Serapio* (BCB).

Previously known from Mallorca, Menorca and Formentera (Sáez *et al.*, 2015; Fraga-Arguimbau *et al.*, 2020).

Kickxia elatine* (L.) Dumort. subsp. *elatine

Mallorca: Deià, camí de can Miquelet, 31SDE7102, 224 m, 17 June 2021, *P. Valls* (BC 984624).

Second report for the Balearic Islands. This taxon was previously documented from Santa María, Mallorca, where it was collected by Palau in 1949 (Sáez *et al.*, 2015).

****Linum corymbulosum* Rchb. [*L. strictum* subsp. *corymbulosum* (Pers.) Rouy]**

Cabrera: Serra d'en Castell, 22 Apr 1948, *Palau Ferrer* (BC 104090).

The collection cited is the first unambiguous record for Cabrera. This taxon was previously reported from Formentera [S'Espalmador] (Kuhbier & Finschow, 1977) and Mallorca (Bolòs & Vigo, 1990). A report from Eivissa (Pau, 1900) requires verification. A closely related species, *Linum strictum* L. subsp. *strictum*, also occurs in Cabrera island: Canal de les Quatre Quarterades (BC 87386); Na Picamosques (BC 128316).

****Lamium amplexicaule* L.**

Formentera: La Mola, 31SCC7580, 126 m, cultivated fields, Jan 2019, *S. Costa* (BCB).

Previously known from Mallorca, Menorca and Eivissa (Pla *et al.*, 1992).

****Lathyrus hirsutus* L.**

Bonafè (1978) reported this species from Mallorca: Sòller, Hort de can Batistet and Pujol den Banyà. The voucher specimens Can Batistet, 28-III-1960 [*Bonafè*] (HBJS-Bonafè 1832, 1834) and Pujol den Banyà 10-V-1960 [*Bonafè*] (HBJS-Bonafè 1833) are clearly attributable to *Vicia bithynica* (L.) L. So far *Lathyrus hirsutus* is confirmed only for Menorca (Porta, 1887; Fraga *et al.*, 2007).

***Lathyrus inconspicuus* L.**

Menorca: Ferreries, Costa Nova, 31TEE8029, pinar, suelo fresco, 100 m, 30 Apr 1951, *P. Montserrat* (JACA 47151).

The species was not confirmed for Menorca by Fraga *et al.* (2004). The specimen from Ferreries would confirm its occurrence, at least in the middle of the 20th century.

****Limonium wiedmannii* Erben**

Eivissa: Punta de s'Embarcador, Sant Josep de sa Talaia, 31SCD4513, 20 m., costals habitats, Aug 2011, *J. Serapio* (BC 984621).

This rare endemic species was known only of a small area in northern Formentera.

***Medicago rigidula* (L.) All.**

Eivissa: Cas Galops, Sant Josep de sa Talaia, 31SCD5908, 101 m, waysides between cultivated fields, May 2022, *J. Serapio* (BC 984622).

Rivas-Martínez *et al.* (1992) listed the species for Eivissa without concrete location and Bolòs (1998) listed it from Eivissa in a vegetation inventory.

***Medicago scutellata* (L.) Mill.**

Eivissa: Pla de Morna, Santa Eulària des Riu, 31SCD7321, 75 m, cultivated fields, May 2022, *J. Serapio* (BC 984610).

As far as we know, the collection cited is the first unambiguous record for Eivissa. This taxon was previously listed by Rivas-Martínez *et al.* (1992) and Pla *et al.* (1992) without concrete location.

*****Melica uniflora* Retz.**

Willkomm (1876) reported this species from Pollensa, Mallorca. Although *M. uniflora* was later listed in several floristic syntheses of the Balearic Islands (Duvigneaud, 1979; Smythies, 1986), its presence in the archipelago was not accepted by Cantó *et al.* (2020). Previously, Bolòs & Vigo (2001) considered the presence of *M. uniflora* in Mallorca very doubtful. However, the presence of *M. uniflora* has been documented very recently in Mallorca (Nualart & Montes, 2021b) so it is advisable to review the information on this species in the Balearic Islands. Firstly, there is no herbarium specimen at COI-Willk. supporting the report due to Willkomm, and on the other hand the characteristics of the area are not suitable for *M. uniflora*, therefore, Willkomm's report must have been the result of confusion. On the other hand, Bonafè (1977) documented the existence of a herbarium specimen of *M. uniflora* (certainly referable to this species) in the Bianor herbarium, but as already indicated by F. Bonafè, there is no evidence that said material had been collected in Mallorca. It is known that the Bianor herbarium held at HBJS includes (in some few cases) specimens that were not collected in the Balearic Islands, but in these cases there is no indication of a specific locality in the label and these species were not included in the article published by Bianor on floristic data for Mallorca (Bianor, 1917). The only Balearic report of *M. uniflora* supported by herbarium material is that due to Nualart & Montes (2021b) based on: Mallorca: Pollensa, Formentor, esquerra d'una roca, 26 Apr 1971, *F. Masclans* (BC 915995, sub *M. uniflora*). However, examination of this material revealed that it belongs to *M. minuta* L. subsp. *minuta*. *Melica uniflora* must be excluded from the flora of the Balearic Islands.

****Melilotus infestus* Guss.**

This species was reported from two mountain areas (summits of Puig Major and Massanella) in northern Mallorca (Bonafè, 1979). However, the voucher specimens Puig Major, June 1968 [*Bonafè*] (HBJS-Bonafè 1892) and Massanella, s.d. [*Bonafè*] (HBJS-Bonafè 1892) consist of *Medicago lupulina* L. On the other hand, Duvigneaud (1979) listed this species as seen by itself in Mallorca. We have found the voucher specimen collected by J. Duvigneaud [Mallorca, La Puebla, a bords de l'Albufera, 3 Apr 1977, *J. Duvigneaud* 77E23, SEV 30248] identified as *M. infestus*. However, this specimen has no fruits,

which prevents a positive identification. This specimen probably corresponds to *M. sulcatus*. *Melilotus infestus* is known from several locations in Menorca, representing the only confirmed occurrences so far in the Balearic Islands.

****Mercurialis huetii* Hanry**

Cabrera: Isla Conejera, calizas nitrificadas, 31SDD9738, 15 June 1980, *E. Valdés-Bermejo & al.* EV5674 (MA 441181). Menorca: Ciutadella, solar cerca del puerto, 5 Sept 2004, *S. Pyke* (BC 865621).

New for Menorca and Cabrera (cf. Pla *et al.*, 1992; Fraga *et al.*, 2004). A wider distribution in the Balearic archipelago can be assumed for *M. huetii*.

*****Misopates calycinum* (Vent.) Rothm.**

Mallorca: Between Santa María and Bunyola, 31SDD7690, 120 m, waysides, 11 March 2016, *J. Rita & L.A. Domínguez* (UIB 16819) (Figure 2).



Figure 2. Field photo of *Misopates calycinum* from Mallorca. **Figura 2.** Foto de campo de *Misopates calycinum* de Mallorca.

This mainly western Mediterranean species was not listed for the Balearic Islands by Güemes (2009). Previous records of *M. calycinum* from the Balearic Islands (Willkomm, 1876; Marès & Vigineix, 1880; Font Quer, 1921; Marcos, 1936) have proven to be misidentifications of *M. orontium* (L.) Raf. The known population includes several individuals that regularly reappear each year. Although there is potential habitat for *M. calycinum*, no other populations have been found in the surrounding area. The environment in which it exists for the above population may raise

questions about its native character; however, these more or less disturbed habitats are characteristic of this species (Güemes, 2009).

**Muscari neglectum* Ten.

Formentera: La Mola, 31SCC7681, 125 m, abandoned cropfields, March 2021, S. Costa (BCB).

Previously known from Mallorca, Menorca and Eivissa (Pla *et al.*, 1992).

***Narcissus serotinus* L.

Formentera: Sant Francesc, cap de Barbaria, between Cova Foradada and torrent des Ras, rocky places, 31SCD7578, 90 m, 26 Sept 2016, F.J. Lloret & A. Lloret-Villas FLS12176 (BCB, Figure 3).

The collection cited is the first unambiguous record for the Balearic Islands (Aedo, 2013).



Figure 3. Field photo of *Narcissus serotinus* from Formentera.

Figura 3. Foto de campo *Narcissus serotinus* de Formentera.

***Oenanthe croccata* L. and ***O. pimpinelloides* L.

The presence of these species in the Balearic Islands was accepted by Jury & Southam (2003), based on herbarium specimens. However, there is no list of herbarium vouchers from the Balearic Islands for the treatment of Jury & Southam (2003). We have located several herbarium specimens from the Balearic Islands identified as *O. croccata* or *O. pimpinelloides* by S. Jury or M. Southam. Their identity is discussed below.

Specimen identified as *O. croccata* L. by M. Southam (VII-1999): Menorca, Mahón, Binisarmenya 7 May 1914 Font Quer (MA 423906). The examination of this collection revealed that it belongs to *O. lachenalii* C.C. Gmel., a species already well known from Mallorca and Menorca which was not listed as studied based on herbarium material by Jury & Southam (2003).

Specimen identified as *O. croccata* L. by M. Southam (X-1999; it was previously revised by S. Jury and M. Southam in 1993 as *O. lachenalii*): Mallorca: Bahía de Alcudia, 10 June 1951, Palau (MA 159254). This material belongs to *O. lachenalii*.

Two specimens (belonging to the same collection) identified as *O. croccata* L. by M. Southam (I-2000):

Menorca, Son Puig, Alaior, 17 Apr 1900, A. Pons (MA 88024 and MA 88824). Although this ancient material is not in optimal conditions, we conclude that it does not belong to *O. croccata* or *O. pimpinelloides*, given that the inflorescences have 4-5 rays and the styles measure 3 mm long. These Minorcan materials are compatible with *O. globulosa* L.

Finally, at BCN herbarium there is a Balearic specimen currently listed as *O. pimpinelloides* L.: Menorca, Cala Mesquida, Mahó, torrente que baja a Cala Mesquida, 28 Apr 1951, P. Montserrat (BCN 28395, sub *O. cf. pimpinelloides*, f^a [forma] de *O. globulosa*?). This specimen, which is not in optimal conditions and does not have ripe fruits, cannot be referred to *O. pimpinelloides*, since the umbels have only 2-4 rays (*O. pimpinelloides* has 6-15 rays) and styles measure 3 mm long (1,3-2,5mm long in *O. pimpinelloides*). In our opinion the specimen BCN 28395 could correspond to *O. globulosa*. Another specimen from the same locality, Cala Mesquida, collected a year later by P. Montserrat (10 May 1952, MA 164000, sub *O. peucedaniifolia* Pollich), is perfectly assimilable to *O. globulosa*, as it has globose fruits.

Therefore, we have not been able to locate any herbarium specimens of *Oenanthe croccata* and *O. pimpinelloides* from the Balearic Islands. On the contrary, the already traditionally accepted occurrence of *O. globulosa* and *O. lachenalii* in the Balearic archipelago is confirmed.

**Ononis alopecuroides* L.

Eivissa: Near Sant Francesc, 31SCD6003, 2 m, abandoned crop fields margins, 20 May 2021, J. Serapio (BC 984620, Figure 4).

New for western Balearic Islands; previously reported from Menorca (Sáez & Fraga, 1999). *Ononis exalopecuroides* G. López [*O. alopecuroides* subsp. *exalopecuroides* (G. López) Greuter & Burdet] was listed for Mallorca, without precise locality (Pla *et al.*, 1992). This report is not supported by voucher specimens.

***Opopanax chironium* W.D.J. Koch

Villar (2003) listed this species for the Balearic Islands "PM[Conejera]" based on the specimen "Cabrera: isla Conejera, calizas nitrificadas, 31SDD9738, 15-VI-1980, E. Valdés-Bermejo & al. MA 421597" (see Stafforini *et al.*, 2001). The presence of *Opopanax chironium* in the Conejera islet is certainly surprising. Therefore, we have studied more materials, specifically a specimen that corresponds to the same collection (isla Conejera, calizas nitrificadas, 31SDD9738, 15 June 1980, E. Valdés-Bermejo & al. MA 421593, identified as *Ferula communis* L.) which includes vegetative parts of the plant, specifically glabrous leaves with last-order segments linear (not hairy leaves with ovate segments as in *Opopanax*). The material of specimen MA 421597 has glabrous rays and branches (they are hairy in *Opopanax*), the fruits are larger (10 mm long) and the umbels are denser than in *Opopanax*. The materials of the sheets MA 421593 and MA 421597 correspond to, respectively, the

vegetative and reproductive parts of *Ferula communis*, a common species in the Conejera islet. Therefore, *O. chironium* must be excluded from the flora of the Balearic Islands.

It is interesting to notice that the fruit of *Opopanax chironium* drawn in *Flora iberica* (Villar, 2003, lam. 111) was based on the sheet MA 421597, which corresponds to *Ferula communis*.



Figure 4. Field photo of *Ononis alopecuroides* from Eivissa, Sant Francesc.

Figura 4. Foto de campo de *Ononis alopecuroides* de Eivissa, Sant Francesc.

*****Orobanche balsensis*** (J.A. Guim.) Carlón, M. Laínz, Moreno Mor. & Ó. Sánchez

Mallorca: Artà, garrigue près de l'ermita de Betlem, sur *Carlina corymbosa*, 13 May 1977, *J. Duvigneaud* 77E226, *J. Lambinon* & *R. Renard* (BR 611274, sub *Orobanche loricata* Rchb., groupe *O. minor*); Escorca: Puig Major, vessant SE, 31SDE8206, 1350 m, karstic depressions, growing on *Carlina corymbosa*, 1 July 2016, *L. Sáez* LS-7732 (BCB); Escorca, Sa Rateta, 31SDE8102, 850 m, grassy slopes, growing on *Carlina corymbosa*, 3 July 2020, *E. Guasp* & *L. Sáez* LS-7885 (BC 984619) (Figure 5); Escorca, Penyal des Migdia, c. Coll de Coma de n'Arbona, 31SDE8105, 1211 m, open scrub, growing on *Carlina corymbosa*, 17 June 2021, *L. Sáez* LS-7945 (BC 984625) (Figure 6); Menorca: 6 May 1975, (AMD 84143, sub *Orobanche minor* [growing on *Carlina*]); Maó, Sa Mesquida 31SFE1018, 20 m, 25 Apr 2003, *G. Moreno Moral* MM0052/03, (herb. Sánchez Pedraja 11207); Cabrera: Del Castillo a sa Punta de sa Creueta, *P. Palau Ferrer*, 31 May 1947 (MA 115012).

The verification that plants of the genus *Carlina* are parasitized by some Orobanchaceae in the Balearic Islands comes from ancient times. Rodríguez (1879) reported "*Orobanche loricata* Rchb.?" from Puig de Torrella, growing on the roots of *Carlina* [in all probability *C. corymbosa*]. This record was repeated by Barceló (1879-1881), Knoche (1922, sub *O. picridis*), Bonafè (1980, sub *O. loricata*), Beckett (1993 sub *O. loricata*) and Bolòs & Vigo (1996, sub *O. artemisiae-campestris* subsp. *picridis*). Recently, Alomar *et al.* (1995) and Fraga-Arguimbau *et al.* (2016) reported for Menorca *O. picridis* and *O. artemisiae-campestris*, respectively, in both cases parasitizing *Carlina corymbosa*. According to Sánchez Pedraja *et al.* (2016+) *O. artemisiae-campestris* and *O. picridis* exclusively parasitize *Artemisia campestris* and *Picris hieracioides*, two species absent in the Balearic Islands. Habashi & Jeanmonod (2008) ruled out the presence in Corsica of both *O. picridis* and *O. artemisiae-campestris*. Pujadas (2001; 2010) provided a list of herbarium specimens belonging to *Orobanche santolinae* from the Balearic Islands. One of them (indicated above) was collected in Cabrera. Based on the arrangement of the corollas (patent to erect-patent) this specimen is referred to *O. balsensis*. In fact, there is no evidence of the presence on Cabrera of plants of the genus *Santolina*, which are the hosts of *O. santolinae*.



Figure 5. Field photo of *Orobanche balsensis* from Mallorca, Sa Rateta.

Figura 5. Foto de campo de *Orobanche balsensis* de Mallorca, Sa Rateta.

In all probability, in the Balearic Islands *O. balsensis*

is more widely distributed than the available data suggests. In addition to the data here provided, in the website "Biodiversidad Virtual" [consultation: March 2013] there is an image of a Majorcan specimen of *Orobanche* from Esporles, which undoubtedly corresponds to *O. balsensis*.



Figure 6. Field photo of *Orobanche balsensis* from Mallorca, Penyal des Migdia.

Figura 6. Foto de campo de *Orobanche balsensis* de Mallorca, Penyal des Migdia.

Phelipanche olbiensis (Coss.) Carlón, G. Gómez, M. Laínz, Moreno Mor., Ó. Sánchez & Schneew.

Mallorca: Escorca, Sa Rateta, 31SDE8102, vertical cliffs facing N, 960 m, growing on *Helichrysum crassifolium* (L.) D. Don, 3 July 2020, E. Guasp & L. Sáez LS-7884 (BC 984623) (Figure 7).

This western Mediterranean endemic was reported as new for the Balearic Islands, almost simultaneously, from southern Mallorca (Pujadas & Mus, 2010) and northern Eivissa (Sáez *et al.*, 2011). Later it was reported from southern Menorca (Fraga-Arguimbau, 2015). So far, in the Balearic Islands *P. olbiensis* was from known coastal habitats, parasitic on *Helichrysum pendulum* (C. Presl) C. Presl, *H. stoechas* (L.) Moench and *H. cf. crassifolium*, between 2 and 160 m a.s.l. The locality of Sa Rateta mountain is at a remarkable altitude and on a north-facing cliffs and represents the first report of *P. olbiensis* in the Tramuntana mountain range of Mallorca. As far as we know, this is the highest altitude where this species has been documented. At this new locality *P. olbiensis* grows together with the

Balearic endemics *Helichrysum crassifolium* and *Galium crespianum* Willk. According to Pujadas & Mus (2010) *P. olbiensis* should be considered an endangered species in the Balearic Islands. The populations from southern Mallorca are perhaps under threat from habitat disturbance caused by human activities. By contrast, the populations from northern Eivissa and northern Mallorca are not exposed to significant threats. Considering the whole of the populations of the Balearic Islands, this species would not qualify for a risk category according to IUCN (2012) criteria. This parasitic species is probably more frequent in the Balearic Islands than available data suggest.



Figure 7. Field photo of *Phelipanche olbiensis* from Mallorca, Sa Rateta.

Figura 7. Foto de campo de *Phelipanche olbiensis* de Mallorca, Sa Rateta.

****Poa infirma*** Kunth

Cabrera: Ses Cases de s'Hort, camí, a l'ombra de les figueres, 18 May 1949, *Palau Ferrer* (BC 830156, sub *P. annua* L.).

As far as we know, this is the first report for Cabrera. The specimen is clearly attributable to *P. infirma* among other characters by its small (0.2 mm long), rounded anthers.

Parapholis filiformis (Roth) C.E. Hubb.

Formentera: La Sabina, SO - Ecke des Estanque del Peix, chemaliger Salinengraben, 12 June 1972, *H.*

Kuhbier & G. Finschow (SEV 20878).

The unlocated report from Formentera (Rivas Martínez *et al.*, 1992) was not confirmed by Gil & Llorens (2001).

**Polypogon viridis* (Gouan) Breistr.

Formentera: La Sabina, im Ort auf einer Ruderalstelle, 12 June 1972, H. Kuhbier & G. Finschow (SEV 23649).

The species was not included in the floristic catalogue of Formentera (Gil & Llorens, 2001).

***Puccinellia distans* (Jacq.) Parl. subsp. *distans*

Willkomm (1876) reported the species from northern Mallorca "Albufereta pr. Pollenza". The voucher specimen (Mallorca in loco humido salsuginoso inter Salicornias frut. in ditone Albufereta pr. Pollenza, 25 Apr 1873, M. Willkomm herb. Balear 336, COI00036610) consists of *P. fasciculata* (Torr.) E.P. Bicknell subsp. *fasciculata*. Previously, Minorcan records of *P. distans* (Porta, 1887) were regarded as erroneous, probably representing misidentifications of *P. fasciculata* (Fraga *et al.*, 2004).

Rubus caesius L.

Cabrera: A uns 100-150 m de les Casernes, a la vora dreta del camí, anant cap als Calons, 14 June 1951, Palau Ferrer (BC 830910).

The species was doubtfully reported for Cabrera by Pla *et al.* (1992). The collection cited above confirms its occurrence in Cabrera.

**Rubus ulmifolius* Schott

Formentera: Sant Francesc, 31SCC6385, 41 m, disturbed places, July 2020, J. Serapio (BC 984615).

With this report, the species is now known for all the Balearic Islands.

**Rumex crispus* L.

Formentera: Sant Francesc, 31SCC6385, 27 m, margin of cultivated fields, June 2017, J. Serapio (BC 984612); Es Pujols, 31SCC6587, 3 m, waysides near a residential area, June 2022, J. Serapio (BCB).

Previously reported from Mallorca, Menorca, Eivissa and Cabrera (Palau, 1976; Pla *et al.*, 1992).

Salsola oppositifolia Desf.

Eivissa: Es Cap des Metge, Sant Josep de sa Talaia, 31SCD5303, 16 m, coastal habitats, Sept 2015, J. Serapio (BC 984608).

Previously known from Formentera and different small islets surrounding Eivissa (Puget *et al.*, 1995).

**Selaginella denticulata* (L.) Spring

Cabrera: Puig de Picamosques, 31SDD9332, c. 130 m, grietas de caliza, 14-X-1986, C. Lado & G. Nieto GN 1632 (MA 502999).

Surprisingly, the presence of this species in Cabrera has gone unnoticed so far. With this report, the species is now known for all the Balearic Islands.

Silene almolae Gay

The information on the presence of the species in

the Balearic Islands is limited only to the provincial list provided by Talavera (1990) who indicated it for Mallorca based on herbarium material. Later, this information was repeated by Pla *et al.* (1992). However, so far, no specific locality of *S. almolae* was known in the Balearic Islands. After various inquiries, with the help of the late S. Talavera, we have located the voucher specimen on which the Balearic report of Talavera (1990) was based: [Mallorca]: Torrente de Betlem, Artà, Mayo [19]39, [s.r.] (SANT 465, sub *Silene ambigua* Camb.). This specimen is attributable to *S. almolae* according to the taxonomic treatment of Talavera (1990). Here we provide a description based on the Majorcan material, highlighting those characters that allow its separation with *S. secundiflora* Otth., the morphologically closest existing species in the Balearic Islands.

Plants with erect stems 19-36 cm long, with retrorse eglandular hairs 0.1-0.5 mm long; basal leaves 15-22 x 1.5-3 mm; calyx 14-15 mm long, with 10 not anastomosed veins [anastomosed veins in *S. secundiflora*]; calyx teeth 2-2.2 x 1.3-1.5 mm, covered with antrorse eglandular hairs c. 0.1 mm long [these hairs are (0.2)0.3-0.7 mm long in *S. secundiflora*], limb of petals 2.5-3 mm long [7-8 mm in *S. secundiflora*], white [usually pink in *S. secundiflora*]; carpophore c. 3 mm long, glabrous [puberulous in *S. secundiflora*]; capsule 11 mm long; seeds c. 0.9-1.1 mm.

Silene almolae is apparently a rare species which is probably overlooked in the Balearic Islands; its distribution needs further investigation. The presence in eastern Mallorca of some Iberian endemic taxa occurring only in the Balearic Islands in this area of Mallorca is noticeably. In addition to *S. almolae*, it is also the case of *Centaurium quadrifolium* subsp. *barrelieri* (Dufour) G. López and *Jasminum fruticosum* L., only known from scattered localities in eastern Mallorca (Garcias Font, 1953; Conesa, 2008; Sáez *et al.*, 2011).

***Silene niceensis* All.

The presence of this species in the Balearic Islands was considered doubtful (Talavera, 1990). The first report of *S. niceensis* for the Balearic archipelago was due to Willkomm (1876) who observed this species from Mallorca (Palma in maritime sands). However, the same author did not accept two years later (Willkomm, 1878) the occurrence of *S. niceensis* in the Balearic Islands. Barceló (1879-1881) also reported this species from the same Majorcan location provided by Willkomm (1876), so the first author could have repeated the report of the German author. Knoche (1921) included *S. niceensis* in the list of species to be verified. *Silene niceensis* was also reported from eastern Mallorca by Garcias Font (1907) but it was definitively excluded by himself (Garcias Font, 1949). Alomar (1995) listed this species for S'Albufera (northern Mallorca) but no vouchers were found in the Majorcan herbaria consulted (see below) nor we were able to obtain specific locations for this plant. Bolòs (1998) listed "*Silene cf. nicaeensis*" from a location close to Eivissa village in a vegetation inventory. However, there is no

voucher specimen at BC and the type of vegetation is not the typical one in which *S. niceensis* occurs. In fact, Bolòs *et al.* (2005) did not list *S. niceensis* for the Balearic Islands in their later floristic synthesis. Recent field work and screening of herbarium material (BC, BCN, BR, HBJS, HJBS-Bianor and HJBS-Bonafè, MA, COI, MA, MPU, P and UIB) did not yield specimens of this species to corroborate the occurrence of the species in the Balearic Islands.

**Teucrium flavum* subsp. *glaucum* (Jord. & Fourr.) Ronniger

Mallorca: Castell de Santueri, Felanitx, Apr 1969, [Bonafè] (HJBS-3024); Castell de Santueri, Felanitx, 22 June 1989, *M. Mus* (HJBS-5514); Puig de Sant Salvador, Felanitx, 31SED1667, 21 July 2012, *J. Cursach* (HJBS-4122).

New for Mallorca (see Navarro, 2011). This taxon was known from Eivissa (Navarro, 2011) and Menorca (Fraga-Arguimbau *et al.*, 2021). Both subspecies occur in Mallorca: plants with holotrichous vegetative stems, hairy or glabrescent leaves and calyx with glandular hairs restricted to the margin of the teeth (subsp. *flavum*) exist in northern and western Mallorca (Serra de Tramuntana) and eastern Mallorca (Península de Llevant, Talaia Freda), whereas plants with goniotrichous vegetative stems, glabrous (or sparsely hairy at base) leaves and calyx with glandular hairs (subsp. *glaucum*) occur in southern Mallorca (Castell de Santueri and Sant Salvador).

**Tribulus terrestris* L.

Formentera. La Savina, 31SCC6288, 2 m, waste places, July 2019, *J. Serapio* (BCB); Sant Francesc, 31SCC6385, 32 m waste places, June 2022, *J. Serapio* (BC 984618).

Previously known from Mallorca, Menorca and Eivissa (Pla *et al.*, 1992).

Tuberaria praecox (Boiss. & Reut.) Grosser

Formentera: Cap de Berberia, ca. 2 Km südl. von Ca'n Fita Bodenaushubfläche am Wege, 8 June 1972, *H. Kuhbier* & *G. Finschow* (SEV 23838).

The unlocated report from Formentera (Gallego, 1993) was not confirmed by Gil & Llorens (2001).

***Tyrimnus leucographus* (L.) Cass.

There is a considerable confusion in the literature on the presence of this species in the Balearic Islands. It was first mentioned (without concrete location) from Mallorca by Willkomm (1876). Later, this information was repeated by several authors (Barceló, 1879-1881; Smythies, 1984; Bolòs & Vigo, 1996; Pla *et al.*, 1992). This Balearic report of *T. leucographus* could not be checked because no vouchers were found in the herbaria consulted (BC, BCN, MA, COI, P, UIB, HBJS, HJBS-Bianor and HJBS-Bonafè). The species was not listed for the Balearic Islands in Flora iberica (Devesa, 2014) while in Euro+Med PlantBase (Greuter, 2006) its presence was questionable. As in the case of *Melica uniflora*, *Silene niceensis* and *T. leucographus*, several species listed by Willkomm

(1876) have no voucher specimens nor have they been subsequently confirmed for the Balearic Islands. The following species, which are hard to confuse with other related taxa, are absent from the Balearic archipelago (or from a specific island). Among them are: *Asperugo procumbens* L., *Clinopodium acinos* (L.) Kuntze [sub *Calamintha acinos* Benth.], *Glechoma hederacea* L., *Iberis pinnata* L., *Satureja cuneifolia* Ten., *Scorzonera hispanica* L. (from Mallorca) and *Thymus vulgaris* L. (from Mallorca).

The only Balearic report of *T. leucographus* supported by herbarium material is due to Duvigneaud (1979) who found this species in Mallorca: Escorca, Plan de Cuber, Bord de la route, zone à pâturage intensif, 17 May 1977, *J. Duvigneaud* 77E302, *J. Lambinon* & *R. Renard* (BR 607745). However, examination of the collection cited above revealed that it belongs to *Notobasis syriaca* (L.) Cass. *Tyrimnus leucographus* must be definitely excluded from the flora of the Balearic Islands.

**Valerianella discoidea* (L.) Loisel.

Formentera: Sant Francesc, 28 March 1918, *Font Quer* (BC 28273).

The species was not included in the floristic catalogue of Formentera (Gil & Llorens, 2001).

***Valerianella locusta* (L.) Laterr. subsp. *locusta*

Mallorca: Escorca, Puig Major, Es Bufador, 31DE8206, 1350 m, grassy places in shady cliffs, 14 June 2021, *L. Sáez* LS-7621 (BC 984627).

Our specimens are referable to f. *carinata* (Loisel.) Devesa, J. López & R. Gonzalo, based on their oblong achenes (Figure 8).

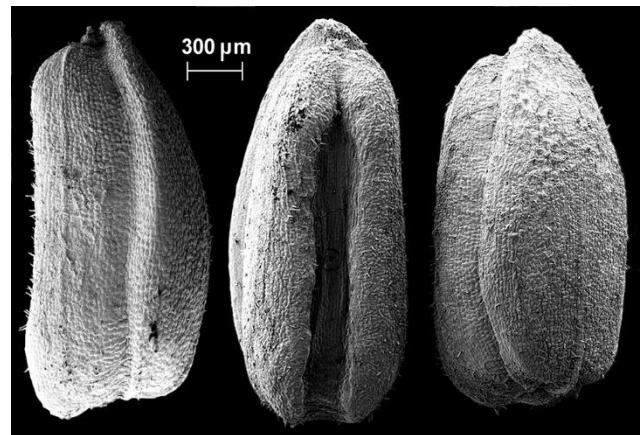


Figure 8. Scanning-electron micrographs of achenes of *Valerianella locusta* from Mallorca, Puig Major.

Figura 8. Fotografías al microscopio electrónico de achenes de *Valerianella locusta* de Mallorca, Puig Major.

Porta (1887) reported from the same area (Puig Major, Mallorca) *V. gibbosa* (Guss.) DC., a taxonomic synonym of *V. costata* (Steven) Betcke. Later, this information was repeated by several authors (Duvigneaud, 1979; Smythies, 1986; Pla *et al.*, 1992; Bolòs & Vigo, 1996; Raab-Straube, 2017). *Valerianella costata* is mainly distributed across the central and eastern Mediterranean region, occurring also in the Pontic region. Its occurrence in the Balearic

Islands is doubtful, with no voucher specimens in the herbaria revised (Devesa & López Martínez, 2007). Porta (1887) probably confused *V. locusta* with *V. costata*, a closely related to *V. locusta* but distinguished by strongly marked carpological traits.

****Verbascum creticum*** (L.) Cav.

Formentera: Sa Talaiassa, La Mola. Few individuals in cultivated fields margins, 31SCC7280, 190 m, Apr 2021, S. Costa (BCB).

Previously known from Mallorca, Menorca, Eivissa and Cabrera (Pla *et al.*, 1992; Sáez *et al.*, 2011).

****Vicia benghalensis*** L.

Formentera: sa barda de ses Roques, 31SCC6785, 50 m, open scrub, Apr 2006. *J. Serapio* (BC 984616).

Previously known from Mallorca, Menorca, Eivissa and Cabrera (Pla *et al.*, 1992; Porta, 1887).

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Juan Devesa confirmed that the herbarium specimen on the basis of which *Crucianella patula* was listed for Mallorca in *Flora iberica* is the one indicated in this article. Vicent Marí provided information about *Asparagus aphyllus* and *Verbascum creticum*. The identification of *Orobancha balsensis* and *Phelipanche olbiensis* was confirmed by Óscar Sánchez and Luis Carlón. Federico Selvi provided helpful comments about our sample of *Buglossoides incrassata* subsp. *splittgerberi*. The identification of the specimen of *Notobasis syriaca* was confirmed by Alfonso Susanna. Salvador Talavera kindly informed us about *Silene almolae*. Filip Verloove helped in providing information about J. Duvigneaud. The curators and staff of the herbaria cited in the text are kindly thanked for the loan of vouchers and/or digital images.

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