# New records in vascular plants alien to the Balearic Islands

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**Abstract**

This paper deals with 67 taxa, 25 of which are new to the Balearic Islands flora: *Agave fourcroydes*, *Amaranthus emarginatus, Asparagus aethiopicus*, *Bidens pilosa*, *Cardiospermum grandiflorum, C. halicacabum, Cotyledon orbiculata*, *Eschscholzia californica, Freesia leichtlinii* subsp. *alba*, *Gomphocarpus physocarpus, Gossypium hirsutum, Hedera hibernica*, *H. maroccana*, *Lathyrus odoratus, L. sativus, Lycianthes rantonnetii*, *Malephora uitenhagensis*, *Opuntia engelmannii* subsp. *lindheimeri*, *Osteospermum ecklonis*, *Phytolacca icosandra* (new for Europe), *Vitis* × *koberi*, *V.* × *ruggeri*, *V. rupestris*, *Washingtonia robusta* and *Yucca gigantea*. Moreover several taxa are novelties for the flora of certain islands.

**Keywords:** Non-native plants; Balearic Islands; naturalization; range expansion.

**Resum.** *Noves citacions de plantes vasculars al·lòctones per a les Illes Balears*

Aquest article inclou dades per a 67 tàxons, 25 dels quals són nous per a la flora de les Illes Balears: *Agave fourcroydes*, *Amaranthus emarginatus, Asparagus aethiopicus*, *Bidens pilosa*, *Cardiospermum grandiflorum, C. halicacabum, Cotyledon orbiculata*, *Eschscholzia californica, Freesia leichtlinii* subsp. *alba*, *Gomphocarpus physocarpus, Gossypium hirsutum, Hedera hibernica*, *H. maroccana*, *Lathyrus odoratus, L. sativus, Lycianthes rantonnetii*, *Malephora uitenhagensis*, *Opuntia engelmannii* subsp. *lindheimeri*, *Osteospermum ecklonis*, *Phytolacca icosandra* (primera citació per a Europa), *Vitis* × *koberi*, *V.* × *ruggeri*,

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*V. rupestris*, *Washingtonia robusta* i *Yucca gigantea*. A més, diversos tàxons suposen novetats per a la flora d'algunes illes de l'arxipèlag.

**Paraules clau:** plantes al·lòctones; Illes Balears; naturalització; expansió d'àrea.

## Introduction

Although the knowledge of the non-native flora of the Balearic Islands has undergone an advance in the last decade (Moragues & Rita, 2005; Podda et al., 2010; Guillot & Sáez, 2014; Sáez et al., 2015), available information about alien plants in the Balearic archipelago is still scarce. The present contribution aims at completing the gaps in the knowledge on the alien flora of the Balearic Islands.

## Material and methods

Records of alien plants from the Balearic Islands were obtained by the authors during the last years. These records were checked for novelties against the information published in floristic treatments and accounts of plant distributions (Bioatles). The names of localities are based on the Balearic topographic maps (IDEIB – <http://www.ideib.cat/>). Voucher specimens are preserved in BC or in the private herbarium of the authors. The species are arranged in alphabetical order. For each taxon information on its distribution in the Balearic Islands and its estimated degree of naturalization (Richardson et al., 2000) is provided. For some species (mainly those that are new to the flora of the Balearic Islands), additional information (origin, overall distribution, invasiveness, etc.) is also provided.

## Results

**Abutilon teophrasti** Medik., Malvenfam.: 28 (1787)

Eivissa: Can Tití, Sa Carroca, Sant Josep de sa Talaia, 31SCD6007, 60 m, cultivated fields, 2 June 2016, J. Serapio (herb. pers.).

New for Eivissa. Casual.

This species was known from all the main islands of the Balearic archipelago except Eivissa. It was reported Formentera by Stafforini et al. (2001).

**Acanthus mollis** L., Sp. Pl.: "939" [639] (1753)

Eivissa: Canal des Ferrer (Sant Josep de sa Talaia) 31SCD5708, 142 m, 14 Sept 2014, J. Serapio (photo); Torrent des Codolar (Sant Josep de sa Talaia), 31SCD5704, 15 m, 20 May 2016, J. Serapio. Formentera: camí d'en Parra, 31SCC6382, 7 m, stream, Aug 2015, J. Serapio.

New for Formentera. Naturalized.

Although this species was listed for Eivissa by Pla et al. (1992), these are the first concrete records for western Balearic Islands.

**Aeonium haworthii** (Salm-Dyck ex Webb & Berthel.) Webb & Berthel., Hist. Nat. Îles Canaries 1(2, 3): 193 (1840)

Eivissa: Puig des Molins, 8 m, 31SCD6407, coastal cliffs, 4 Apr 2016, J. Serapio (photo). Formentera: Punta Prima 31SCC6786, 26 m, 20 Apr 2015, J. Serapio; Cap de Barbaria, 31SCC5978, 37 m, coastal cliffs, 8 July 2016, J. Serapio (Fig. 1A).

New for western Balearic Islands. Casual.

This species is native to northwestern Tenerife (Canary Islands) (Liu, 1989). The cultivation of this plant as an ornamental caused its naturalization in other areas: Iberian Peninsula, France, Australia and California (Santos-Guerra et al., 2014). *Aeonium haworthii* was previously reported from Sa Dragonera (Alomar et al., 1998), Menorca (Fraga et al., 2004) and Mallorca (Guillot & Sáez, 2014).

**Agave angustifolia** Haw., Syn. Pl. Succ. 1: 72 (1812)

Mallorca: c. Cala de ses Penyes Rotges, Calvià, 31SDD5572, 30 m, open scrub and waysides, 2 Apr 2015, L. Sáez (Fig. 1B).

First concrete record for the Balearic Islands. Casual.

This species of American origin is listed for the Balearic Islands (without precise locality) by Moragues & Rita (2005); therefore this is the first concrete record for the Balearic archipelago. The specimens were found in an urbanized area with vestiges of natural vegetation. In all probability this species was planted for ornament in the area a few decades ago and now seems to be expanding because at least a dozen young specimens are colonizing new areas.

**Agave fourcroydes** Lem. in Ill. Hort. 11: 65 (1864)

Mallorca: Calvià, Portals Nous, 31SDD6376, 20 m, growing along the side of a stream, 2 Apr 2015, L. Sáez & al. (Fig. 1C). Menorca: Cala Rata, 31SFE0916, 15 m, open scrub, waysides and siliceous screes, 14 Apr 2014, L. Sáez & al. (Fig. 1D).

New for the Balearic Islands. Casual.

Native to Mexico (Yucatan Peninsula). Its origin was attributed to *A. angustifolia* Haw. (Gentry, 1982), the only wild species of *Agave* growing in Yucatan Peninsula. *Agave fourcroydes* is widely cultivated as an ornamental in tropical and temperate areas. It was not listed for the Balearic Islands (Fraga et al., 2004; Moragues & Rita, 2005).

**Agave sisalana** Perrine, Trop. Pl.: 87 (1838)

Mallorca: Cala Fornells, 31SDD5176, 45 m, 2 Apr 2015, L. Sáez (Fig. 1E); southwestern slope of Puig de s'Espart, Andratx, 31SDD4677, 115 m, open scrub and rocky places, 2 Apr 2015, L. Sáez.

First concrete records for the Balearic Islands. Casual.

This species is cultivated for its fiber, ornamental, and medicinal value. *Agave sisalana* is a sterile plant of hybrid origin, due to its general inability to produce viable seed (Gentry, 1982). Its origin is uncertain because it was originally ex-

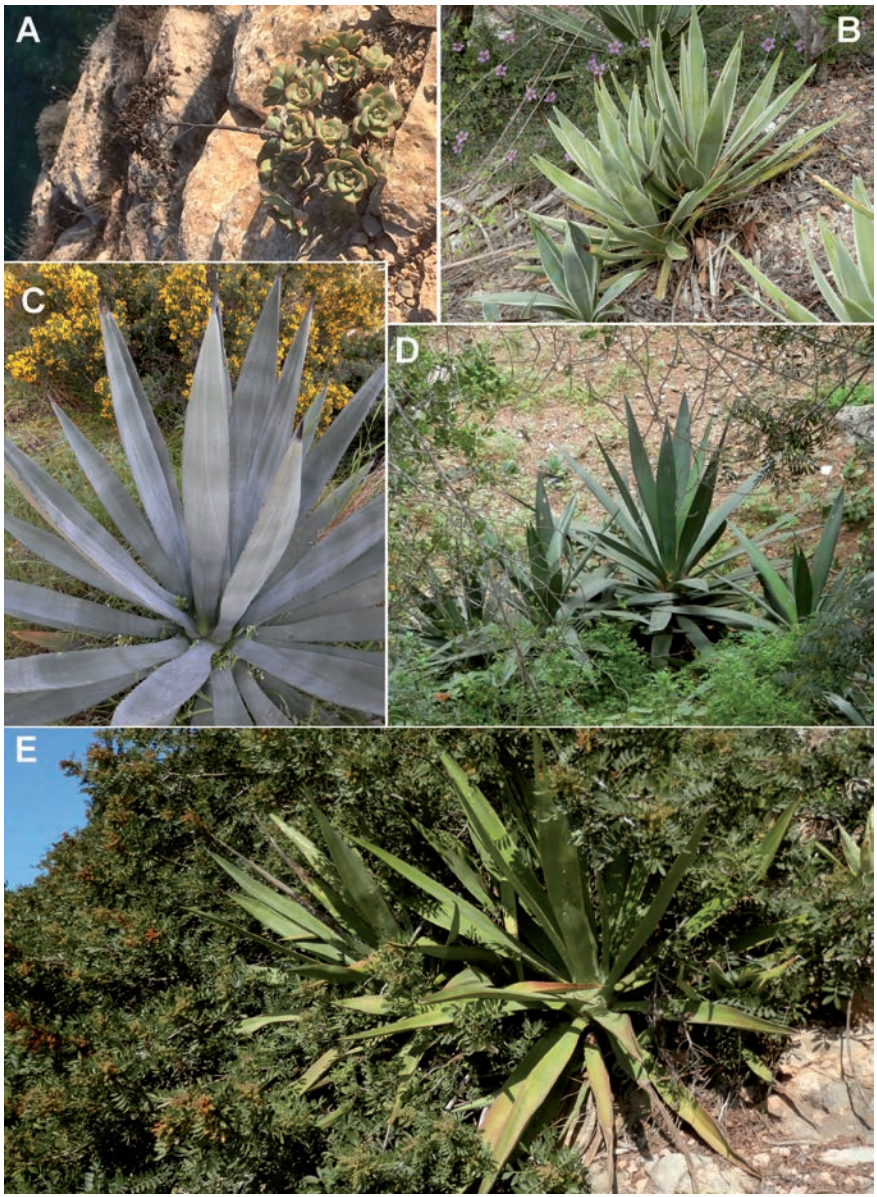


**Figure 1.** A: *Aeonium haworthii* from Formentera; B: *Agave angustifolia* from Mallorca; C-D: *Agave fourcroydes* from Menorca (C) and Mallorca (D); E: *Agave sisalana* from Mallorca. Photographs: J. Serapio (A) and L. Sáez (B-E).

ported from Mexico via the port of Sisal in Yucatan. However, no botanical collections of the plant have ever been made in Yucatan, and botanists who have worked in Yucatan did not find the plant there (Gentry, 1982). Fiber plantations in Yucatan are reported to be *Agave fourcroydes*. Residents in the neighboring state of Chiapas grow *A. sisalana* as fence rows and for fiber. Gentry (1982) states that the "occupation appeared indigenous and, since this is the only area in which *A. sisalana* has been observed and regularly employed in the village complex, I regard the area as a likely place of origin."

According to Moragues & Rita (2005) *A. sisalana* is present in the Balearic Islands, although these authors did not indicate specific localities.

**Amaranthus emarginatus** Moq. ex Uline & Bray, Bot. Gaz. 19: 319 (1894) [*A. blitum* L. subsp. *emarginatus* (Moq. ex Uline & Bray) Carretero, Muñoz Garmendia & Pedrol in Anales Jard. Bot. Madrid 44: 599 (1987)]

Mallorca: Sa Pobla, S'Albufera, 31SEE0602, irrigation ditch, 6 July 2005, J. Rita & C. Fontcuberta (UIB 16692) (Fig. 2A).

New for the Balearic Islands. Casual.

Native to Tropical America (Iamonico, 2015). Introduced in the warm temperate regions of North America and Europe (Invasive Species Compendium, 2016).

**Artemisia verlotiorum** Lamotte in Compt.-Rend. Assoc. Franç. Avancem. Sci. 1876: 513 (1877)

Mallorca: Torrent de sa Pobla, 5 Nov 2002, E. Moragues (UIB 16346).

New for Mallorca. Casual.

It was previously reported from Eivissa (Stafforini et al., 2001) and Menorca (Fraga et al., 2007).

**Asparagus aethiopicus** L., Mant. Pl.: 63 (1767)

Mallorca: Cala Comtessa, Calvià, 31SDD6476, 5 m, scrub, 25 July 2014, L. Sáez LS-7556 (Herb. pers.) (Fig. 2B).

New for the Balearic Islands. Naturalized (locally).

This species, native to South Africa, is a perennial shrub or scrambler, growing from tuberous roots. It is often used as an ornamental plant and is common in gardens. *Asparagus aethiopicus* is considered an invasive species in many locations (Parsons & Cuthbertson, 2001; Baldwin et al., 2012).

In Cala Comtessa five reproductive individuals persist since 2013. This small population is more or less established or tending to become so. In the same area another xenophyte was recently detected by Guillot & Sáez (2014): *Plumbago auriculata*.

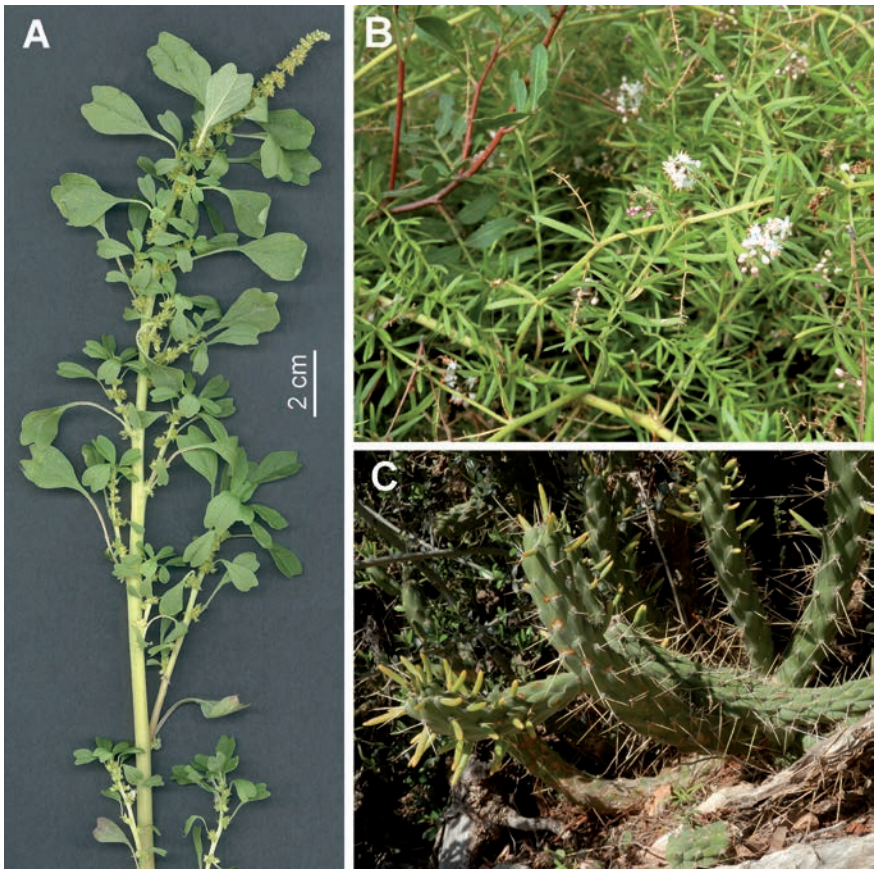


**Figure 2.** A: *Amaranthus emarginatus* from Mallorca; B: *Asparagus aethiopicus* from Mallorca; C: *Austrocylindropuntia subulata* from Mallorca (Portals Nous). Photographs: J. Rita (A) and L. Sáez (B-C).

**Asparagus asparagoides** (L.) Druce in Bot. Exch. Club. Soc. Brit. Isles 3: 414 (1914)

Mallorca: Bellver, Palma, 31SDD6779, 110 m, open scrub and rocky places, L. Sáez, 29 March 2015; Cala Mondragó, 31SED1655, 29 Apr 2015, J. Rita (photo).

New for eastern Balearic Islands. Casual.

It was reported from Eivissa, as casual or locally naturalized in streams (Vericad et al., 2003). The population from Bellver is known since 1986 and seems to have little capacity to spread.

**Asparagus officinalis** L., Sp. Pl.: 313 (1753)

Mallorca: Albufereta de Pollensa, 31SEE0613, 1 June 2004, J. Rita (photo); Son Bosc, 31SEE1103, 27 Apr 2016, J. Rita.

New for eastern Balearic Islands (Mallorca). Casual.

It was reported from Eivissa, as casual or locally naturalized in streamsides and orchards (Puget et al., 1995).

**Austrocylindropuntia subulata** (Mühlenpf) Backeb., Cactaceae (Berlin) 1939(2): 12 (1939) [*Pereskia subulata* Mühlenpf. in Allg. Gartenzeitung 13: 347 (1845)]

Mallorca: Between Cala Fornells and Peguera, Calvià, 31SDD5237, 20-40 m, open scrub, 2 Apr 2015, L. Sáez (Fig. 2C); Portals Nous, Calvià, 31SDD6376, 20 m, growing along the side of a stream, 2 Apr 2015, L. Sáez (Fig. 2C); southern slope of Puig de s'Espart, Andratx, 31SDD4677, 70 m, open scrub, 2 Apr 2015, L. Sáez. Formentera: Punta Prima, 31SCC6786, 28 m, coastal cliffs close to residential areas, 18 March 2014, J. Serapio (photo).

New for Mallorca and Formentera. Naturalized.

This species, native to Peru, Bolivia and Argentina (Anderson, 2001, Hunt et al., 2006), was previously reported from Eivissa and Menorca by Sanz Elorza et al. (2004) and Fraga et al. (2004) respectively. Our records apparently are the first for Mallorca and Formentera.

**Bidens pilosa** L., Sp. Pl.: 832 (1753)

Eivissa: Can Rubió, Sant Joan de Labritja, 31SCD6726, 80 m, field margins, Oct 2013, J. Serapio (herb. pers.).

New for the Balearic Islands. Naturalized (locally).

It is native to Central and South America; introduced in Asia, Europe, Africa and Australia. In Spain is found in southern and western Iberian Peninsula and the Canary Islands (Sanz Elorza et al., 2004). In the Ibizan locality an abundant and well established population was found in crop field margins. This species will probably spread to nearby areas, where suitable habitat exists.

**Boussingaultia cordifolia** Ten. in Ann. Sci. Nat., Bot., ser, 19: 355 (1853)

Formentera: Can Carlos, 31SCC6384, 37 m, waste places, Aug 2015, J. Serapio.

New for Formentera. Casual.

Previously reported from Mallorca, Menorca and Eivissa (Moragues & Rita, 2005; Martín Prieto et al., 2011).

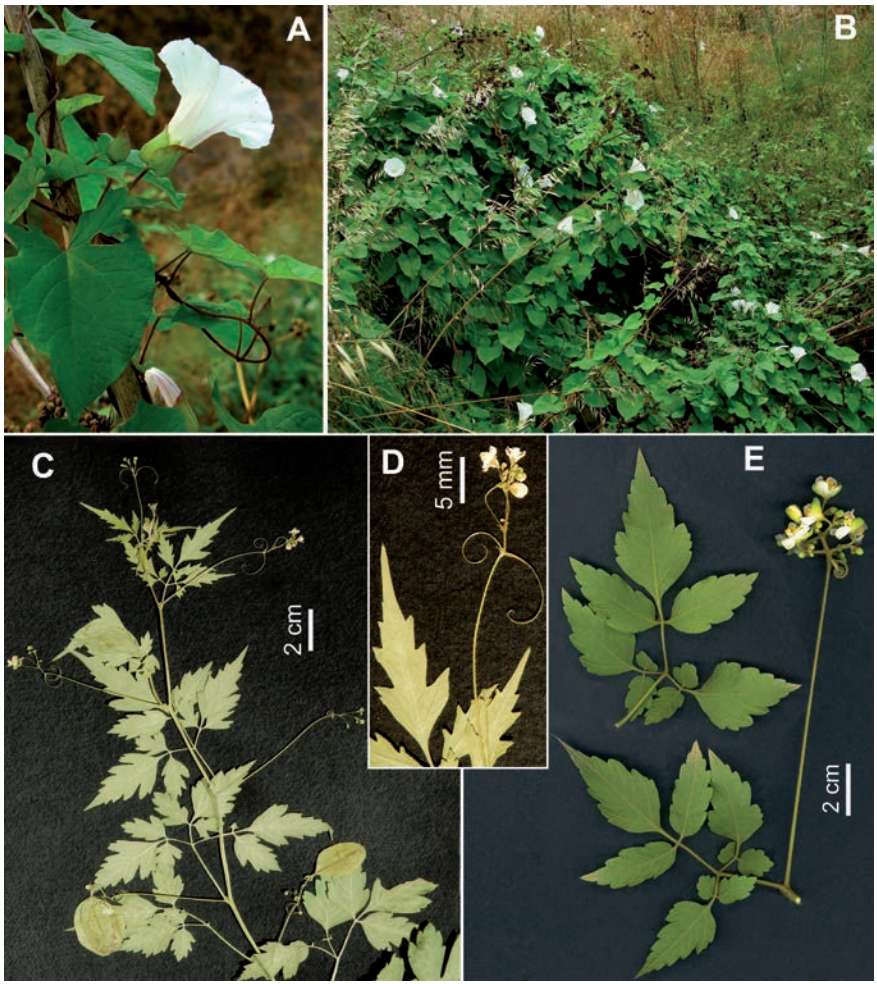


**Figure 3.** A-B: *Calystegia sylvatica* subsp. *disjuncta* from Mallorca; C-D: *Cardiospermum halicacabum* from Eivissa. E: *Cardiospermum grandiflorum* from Mallorca. Photographs: J. Rita (A-B, E) and L. Sáez (C-D).

**Calystegia sylvatica** (Kit.) Griseb. subsp. **disjuncta** Brummit in Lagascalia 18: 339 (1996)

Mallorca: Esporles, 31SDD6491, disturbed stream, 21 June 2004, J. Rita (UIB 16596) (Fig. 3A-B).

New for Mallorca. Naturalized.

Second report for the Balearic Islands; it was previously reported (as native) from Menorca. This Mediterranean species is grown for ornament and can be

found as naturalized in riparian habitats. It readily spreads from cultivation and becomes naturalized in several areas of the Iberian Peninsula (eastern Andalusia, Galicia) (Blanca, 2009; Pino Pérez & Pino Pérez, 2014). In this context, it would be advisable to clarify if the Minorcan plants are actually native.

**Capparis spinosa** L., Sp. Pl.: 503 (1753) subsp. **spinosa**

Eivissa: Can Manyà, Sant Josep de sa Talaia, 31SCD6006 48 m, waysides, 3 June 2015, J. Serapio (photo).

New for eastern Balearic Islands. Casual.

Previously reported from Mallorca and Menorca (Pla et al.,1992; Fraga et al., 2002).

**Cardiospermum grandiflorum** Sw., Prodr.: 64 (1788)

Mallorca: Gènova, Palma, 31SDD6680, 17 July 2004, J. Rita (UIB 16631) (Fig. 3E).

New for the Balearic Islands. Casual.

Its native range seems to be restricted to the Americas (Gildenhuys et al., 2013), the Neotropical region from southern Mexico to Brazil and in the Caribbean islands. The native status of populations in West Africa is unclear. It has been widely planted as an ornamental plant around the world. *Cardiospermum grandiflorum* has escaped from cultivation and become naturalized, and sometimes invasive: Oceania, Africa, North America, South Asia and Europe (Invasive Species Compendium, 2016).

**Cardiospermum halicacabum** L., Sp. Pl.: 366 (1753)

Eivissa: Can Tití, Sant Jordi de ses Salines, 31SCD6007, 64 m, waste places and crops fields margins, 10 Oct 2014 and 11 Nov 2015, J. Serapio (Herb. pers.) (Fig. 3C-D).

New for the Balearic Islands. Casual.

This annual vine is native to tropical regions of Asia, the Caribbean, and Central and South America from southern Mexico to Brazil. It was introduced into Australia, the Canary Islands, United States, Oceania, South Europe and South Africa (Henderson, 2001). Its native status in Tropical Africa is unclear (USDA, 2013).

In the localities here provided we have found several reproductive individuals and seem to be well established.

**Cenchrus setaceus** (Forssk.) Morrone in Ann. Bot. (Oxford) 106: 129 (2010) [*Pennisetum setaceum* (Forssk.) Chiov. in Boll. Soc. Bot. Ital. 1923: 113 (1923)]

Menorca: Between Cala Rata and Cala de Sant Antoni, 31SFE0916, 9 m, 14 Apr 2014, waysides, L. Sáez & al. LS-7457 (herb. pers.). Eivissa: Can Frígoles (Sant

Josep de sa Talaia), 31SCD5904, 15 m, 5 June 2013, waysides, J. Serapio; Cas Costes (Sant Josep de sa Talaia) 31SCD5806 57 m, 18 Aug 2013, waysides, J. Serapio. FORMENTERA: Between La Savina and Sant Francesc, 31SCC6287, 4 m, waysides, 17 Aug 2014, J. Serapio (herb. pers.).

New for western Balearic Islands. Naturalized.

Native to North-East Africa and South Asia; widely cultivated in many parts of the world as an ornamental grass. It is a serious weed in many dry habitats. Fraga et al. (2004, sub *Pennisetum setaceum*) were the first who reported this species from the Balearic archipelago, as a naturalized plant occurring in coastal regions of eastern Menorca (La Mola, Maó). These authors suggested that this plant is expanding its range. Our observations confirm this view. This species has also been found recently in Mallorca (Guillot & Sáez, 2014): Calvià, Illetes, 25 m, L. Sáez & al. 25 July 2013, LS-7444 (this herbarium specimen was erroneously listed as LS-7323).

**Coronilla glauca** L., Cent. Pl. 1: 23 (1755)

EIVISSA: Sant Antoni de Portmany, 31SCD5216 15 m, disturbed areas, May 2014, J. Serapio (herb. pers.); Carretera de Cala Vedella, 31SCD4707 174 m, waysides within forest vegetation, 28 Feb 2016, J. Serapio (herb. pers.).

New for Eivissa. Naturalized.

Previously reported from Mallorca, Menorca and Formentera. Although this species is regarded as native by García Martín & Talavera (2000), it seems to be a non-native species in the Balearics Islands (Bolòs & Vigo, 1984; Gil & Llorens, 2001; Moragues & Rita, 2005).

**Cortaderia selloana** (Schult. & Schult. fil.) Asch. & Graben., Syn. Mitteleur. Fl. 2(1): 325 (1900)

FORMENTERA: Punta Prima, Parc Natural de Ses Salines, 31SCC6686, 27 m, waste places, 18 Apr 2014, J. Serapio.

New for Formentera. Locally naturalized.

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

**Cotyledon orbiculata** L., Sp. Pl.: 429 (1753)

MALLORCA: Capdepera, Cap Vermell, between Es Mollet and Na Blava, 31SED3889, 20-25 m, 3 Apr 2015, L. Sáez (Fig. 4A).

New for the Balearic Islands. Casual.

This southern African leaf-succulent shrub is sometimes cultivated as an ornamental, but so far has not been reported as escaped or naturalized in the Balearic Islands. *Cotyledon orbiculata* has also been reported naturalised in the Mediterranean climates of Australia and California, a pattern typical of southern African plants that have become weeds overseas (Randall & Kessal, 2004; Thuiller et al. 2005). In the Majorcan locality *C. orbiculata* grows in a maritime

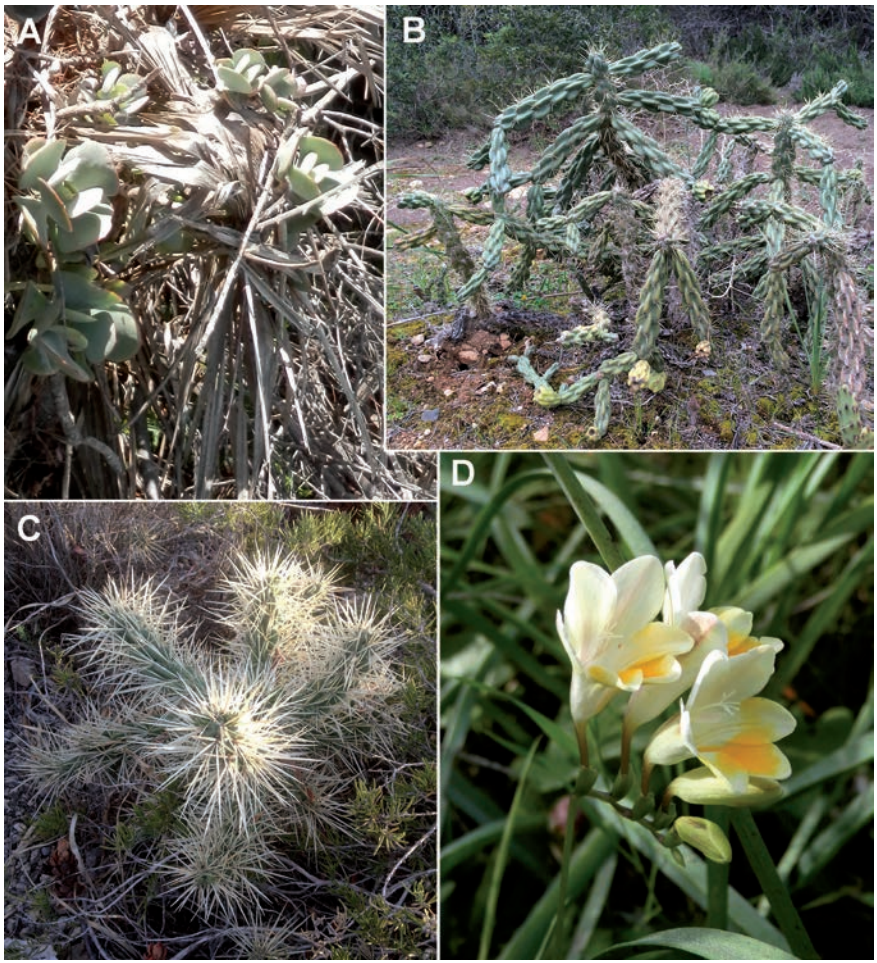


**Figure 4.** A: *Cotyledon orbiculata* from Mallorca; B: *Cylindropuntia imbricata* from Eivissa; C: *Cylindropuntia pallida* from Eivissa; D: *Freesia leichtlinii* subsp. *alba* from Mallorca. Photographs: L. Sáez.

slope facing south near the base of a stone wall adjacent to a road. There are two sub-populations at Cap Vermell, although in all probability there might be several other groups of plants scattered in the area. Dumping of yard trimmings and green waste could explain the establishment of *C. orbiculata* in Cap Vermell area.

**Crassula ovata** (Mill.) Druce, Rep. Bot. Soc. Exch. Club Brit. Isles 1916: 617 (1917)

Eivissa: Sa Canal, Sant Josep de Sa Talaia, 31SCD5900, 10 m, 30 Apr 2016, J. Serapio (photo).

New for western Balearic Islands. Casual.

This species, native to South Africa (Jaarsveld, 2003), is cultivated everywhere as an ornamental plant. It is present as casual or naturalized in other territories of Africa, America, Asia (China), Europe and Oceania (Wang et al., 2015). *Crassula ovata* was previously reported from northern Mallorca (Deià) by Guillot & Sáez (2014).

**Cylindropuntia imbricata** (Haw.) F.M. Knuth in C. Backeberg & F.M. Knuth, Kaktus-ABC: 125 (1935) [*Cereus imbricatus* Haworth, Suppl. Pl. Succ., 70 (1819)]

Eivissa: Sa Sal Rosa (Sant Josep de sa Talaia) 31SCD6103, 8 m, waysides, 19 May 2015, J. Serapio (Fig. 4B).

New for western Balearic Islands. Naturalized.

Native to central and northern Mexico and southern United States (Walters et al., 2011). It is naturalised in Australia, South Africa and Mediterranean region.

This species was listed for Mallorca by Moragues & Rita (2005). Dumping of yard trimmings and green waste could explain the establishment of *Cylindropuntia imbricata* in the locality of Sal Rosa.

**Cylindropuntia pallida** (Rose) F.M. Knuth in C. Backeberg & F. M. Knuth, Kaktus-ABC: 126 (1935)

Eivissa: Illa grossa (Port d'Eivissa) 31SCD6607 15 m, 29 Apr 2014, J. Serapio (Fig. 4C). Formentera: Punta Prima, 31SCD6786, 31 m, 18 March 2014, J. Serapio (photo).

New for the Balearic Islands. Casual.

*Cylindropuntia pallida* is native from Mexico; its phylogenetic origin is uncertain (Laguna et al., 2013). This species was reported as naturalized in South Africa, Australia and the Iberian Peninsula. The present records apparently are the first for the Balearic Islands.

**Cyrtomium falcatum** (L. f.) C. Presl, Tent. Pterid.: 86 (1836)

Eivissa: Can Parent des Fornàs, Sant Rafel, 31SCD6111, 87 m, 4 Jan 2015, J. Serapio (photo).

New for western Balearic Islands. Casual.

Native to East Asia, this fern is a popular garden plant in temperate zones. It was reported as escaped from cultivation from Mallorca (Alomar et al., 2000) and Menorca (Fraga et al., 2004). A group of a dozen individuals (some of them reproductive) were found within a rain tank.

**Datura ferox** L., Demostr. Pl.: 6 (1753)

Mallorca: Cas Busso, Llucmajor, 31SDD8561, 28 May 2002, J. Rita, C. Fontcuberta & E. Moragues (UIB 16349); Pont d'Inca, Torrent Gros, 31SDD7383, 1 March 2006, J. Rita (photo).

New for Mallorca. Naturalized.

It was previously reported from Dragonera (Alomar et al., 1992), Eivissa (Puget et al., 1995) and Menorca (Fraga et al., 2007).

**Datura stramonium** L., Sp. Pl.: 179 (1753)

Formentera: Ses Bardetes (Sant Francesc de Formentera), 31SCC6384, 38 m, 16 Aug 2014, J. Serapio; Camí des Brolls (Formentera) 31SCC6386, 5 m, 17 Aug 2014, J. Serapio (photo).

New for Formentera. Casual.

With this report the species is now known for all the Balearic Islands. In Formentera *D. stramonium* grows in waste places and cultivated fields.

**Dichondra micrantha** Urb., Symb. Antill. 9: 243 (1924)

Mallorca: Palma, Parc de les Fonts, 31SDD7082, 39 m, escaped in roadsides, 30 July 2014, L. Sáez LS-7562 (BC 879619). Eivissa: Cuitat d'Eivissa, 31SCD6308, 5 m, urban pavements, 2014 J. Serapio (herb. pers.).

New for Mallorca and Eivissa. Casual.

This species, native to East Asia (China, Japan and Korea), has been spread around the world as a lawn weed and grass substitute (Austin et al., 1998). *Dichondra micrantha* was recently discovered in Menorca, Cala en Porter (Podda et al., 2010) and is here reported for the first time from Mallorca and Eivissa.

**Drosanthemum floribundum** (Haw.) Schwantes in Z. Sukkulentenk. 3: 29 (1927)

Eivissa: Pas de s'Illa, Sant Miquel de Balansat, 31SCD6427, 3 m, coastal habitats, Aug 2013, J. Serapio (herb. pers.). Formentera: Illot de S'Espardell, 31SCC6795, 10 m, naturalized in open scrub and coastal habitats, 11 May 2016, J. Serapio (photo).

New for western Balearic Islands. Naturalized (locally).

It is a native species to South Africa (Jacobsen, 1954) which is grown for ornament in warm-temperate and subtropical regions of the world. This species was reported as naturalized in California and South-West Europe (Guillot et al., 2009). In the Balearic Islands it was first recorded as naturalized from Menorca (Fraga et al., 2004).

**Eschscholzia californica** Cham. in Nees, Horae Phys. Berol.: 74 (1820)

MALLORCA: Valldemossa, 31SDD6394, 1 July 2005, J. Rita (photo).

New for the Balearic Islands. Casual.

Native to western North America. Because of its ornamental value *E. californica* was introduced into several regions with Mediterranean climates. It is naturalized in Australia, South and tropical Africa, South America and Europe (GBIF, 2016).

This species was doubtfully listed for Balearic Islands by Paiva (1986). As far as we know this is the first concrete Balearic record for *E. californica*.

**Freesia leichtlinii** Katt subsp. **alba** (G.L. Mey.) J.C. Manning & Glodblatt in Sterlitzia 27: 70 (2010)

MALLORCA: Bellver, 31SDD6738, 42-50 m, *Pinus halepensis* forest, 29 March 2015, L. Sáez (Fig. 4D). EIVISSA: Sa Canal, Sant Josep de sa Talaia, 31SCD5900, 10 m, *Pinus halepensis* forest, 8 March 2015, J. Serapio (herb. pers.). FORMENTERA: Punta Prima, 31SCC6786, 28 m, coastal cliffs close to residential areas, 18 March 2014, J. Serapio (photo).

New for the Balearic Islands. Naturalized.

This southern African plant is widely cultivated as an ornamental, but so far has not been reported as escaped or naturalized in the Balearic Islands. *Freesia leichtlinii* subsp. *alba* often has been confused with *F. refracta* (Jacq.) Klatt (Goldblatt, 2002; Goldblatt & Manning, 2000), and therefore the latter has been erroneously reported from Balearic Islands. In fact, *F. refracta* is rarely cultivated (Goldblatt, 2002).

Our specimens correspond to *F. leichtlinii* subsp. *alba* by the following characters: bracts green; tepals predominantly white, often with yellow markings on lower tepals (Goldblatt, 2002; Hurrell & Delucchi, 2005). The population from Bellver has about 100 individuals that are apparently well established. Initially one of us (LS) found this population in 1986 (L. Sáez, herb. pers., sub *F. refracta*) and, in our opinion, *F. leichtlinii* subsp. *alba* is currently expanding in this area.

**Gomphocarpus physocarpus** E. Mey. in E. May. & Drége, Comm. Pl. Afr. Austr.: 202 (1838)

MALLORCA: Can Torrent, between Felanitx and Cala d'Or, 31SED16, 18 Sept, 2002, J. Rita, E. Moragues & C. Fontcuberta (UIB 16160) (Fig. 5A).

New for the Balearic Islands. Casual.

A species native to South-East Africa (South Africa, Swaziland and southern Mozambique) that is introduced in other parts of the world (the Caribbean, South Asia, Hawaii, Australia, New Zealand, New Caledonia and the Mediterranean region) (Dar et al., 2012). Arista & Ortiz (2012) reported this species from southern and eastern Spain and northwestern Portugal.

**Gossypium hirsutum** L., Sp. Pl. ed. 2, 2: 975 (1763)

MALLORCA: Road to Port d'Alcúdia, 31SEE1210, 4 Nov 2002, J. Rita & E. Moragues (UIB 16338)

New for the Balearic Islands. Casual.

This species is widely distributed in Central America and northern South America, the Caribbean, and even reaches distant islands in the Pacific (Solomon Islands, Marquesas) (Wendell & Grover, 2015). It is cultivated worldwide in suitable climates and may be found also as an escape. Two species of this genus (*Gossypium barbadense* L. and *G. herbaceum* L.) were listed for the Balearic Islands (Mallorca) by Paiva & Nogueira (1993). However, there are no recent observations of both species in the Balearic archipelago.

**Hedera hibernica** (G. Kirchn.) Bean, Trees Shrubs Brit. Isles 1: 609 (1914)

MALLORCA: Calvià, Caló de ses Llises, 31SDD5175, 10 m, stream, 2 Apr 2014, L. Sáez LS-7577 (herb. pers.).

New for the Balearic Islands. Casual.

It is a tetraploid species native to Atlantic Europe (Valcárcel et al., 2003), is widely used as a ground cover and frequently escapes from cultivation (McAllister & Rutherford, 1990).

Plants collected in Caló de ses Llises were characterized by the following characters: i) remarkably larger leaves (up to 15 cm width) than those of *H. helix*, ii) sessile and smaller trichomes (up to 0.7-0.9 mm in diameter), iii) greater average number of rays per trichome and iv) rays almost always lie flat along the surface of the leaf, all in one plane (McAllister & Rutherford, 1990; Valcárcel et al., 2003).

**Hedera maroccana** McAll. in Plantsman 15: 126 (1993)

MALLORCA: Campanet, torrent de Sant Miquel, 31SDE9704, 46 m, 25 July 2014, L. Sáez LS-7557 (herb. pers.).

New for the Balearic Islands. Casual.

An escape from cultivation. Only one specimen has been found growing along the side of a stream.

*Hedera maroccana* is a diploid species, native to North-West Africa (Morocco), which belongs to the *Hedera canariensis* Willd. complex, a group of Macaronesian and Mediterranean ivies with small reddish scale hairs (Valcárcel & Vargas, 2010). *Hedera maroccana* has been traditionally grown for ornament in the Iberian Peninsula, being the most common species in cultivation with small reddish scale hairs.

**Kalanchoe delagoensis** Eckl. & Zeyh., Enum. Pl. Afric. Austral.: 305 (1837)

EIVISSA: Es Corb Marí, Sant Josep de sa Talaia, 31SCD6001, 50 m, several specimens growing along waysides, 30 Oct 2009, J.C. Palerm (photo); Punta des Cavallet, Sant Josep de sa Talaia, 31SCD6101, 5 m, one specimen growing on maritime rocks, 30 Oct 2009, J.C. Palerm.

New for western Balearic Islands; presence confirmed for the Balearic archipelago. Casual.

This species is native to Madagascar (Ward, 2008). It was introduced in many regions as an ornamental and it can now be found naturalized in dry habitats in North and Central America, Caribbean, South-West Europe, South and Tropical Africa, China and Oceania (Wang et al., 2016; Invasive Species Compendium, 2016). In many of these areas *K. delagoensis* has become invasive. *Kalanchoe delagoensis* is close to *K. daigremontiana* Raym.-Hamet & H. Perrier and *K.* × *houghtonii* D.B. Ward [*K. daigremontiana* × *K. delagoensis*], but *K. delagoensis* and can be distinguished by its subcylindrical, narrow (usually 2-6 mm wide) leaves, toothed only at apex, with petioles and blades indistinguishable.

*Kalanchoe delagoensis* was listed for southwestern Mallorca by Gil & Seguí (2015) but with doubts about its specific identity ["*Kalanchoe* cf. *delagoensis*"]. It is possible that this species exists in southwestern Mallorca, although Gil & Seguí (2015) not listed *K.* × *houghtonii* which is in fact present in this area.

**Kleinia neriifolia** Haw., Syn. Pl. Succ.: 312 (1812)

Eivissa: Can Mariano Burgos, Sant Josep de sa Talaia, 31SCD6007, 63 m 18 Dec 2013, J. Serapio (photo). Formentera: Punta Prima (Formentera) 31SCD6786, 31 m, waste places, 18 Apr 2014, J. Serapio (photo).

New for western Balearic Islands. Casual.

This species, endemic to the island of Tenerife (Canary Islands), was previously reported from Mallorca by Moragues & Rita (2005). Several well-established specimens were found in the localities listed above. Dumping of yard trimmings and green waste could explain the establishment of *Kleinia neriifolia* in these localities.

**Lantana strigocamara** R.W. Sanders in Sida 22: 394 (2006)

Mallorca: Platga de S'Hostalet, Calvià, 31SDD6275, 8 m, waysides, 12 Aug 2016, L. Sáez LS-7760 (herb. pers.) (Fig. 5B).

New for Mallorca. Casual.

The aggregate species known as *L. camara* is regarded as a variable polyploid complex of interbreeding taxa (Sanders, 2006) which includes a wide diversity of varieties arising from horticultural and natural hybridisation, selection and somatic mutation (Swarbrick et al., 1998). *Lantana strigocamara* is of cultivated origin. This species is cultivated worldwide and escaped pantropically (Sanders, 2012).

This is the second report of *L. strigocamara* as an escape from cultivation in the Balearic Islands: Fraga (2016, in press) recorded this species from Menorca.

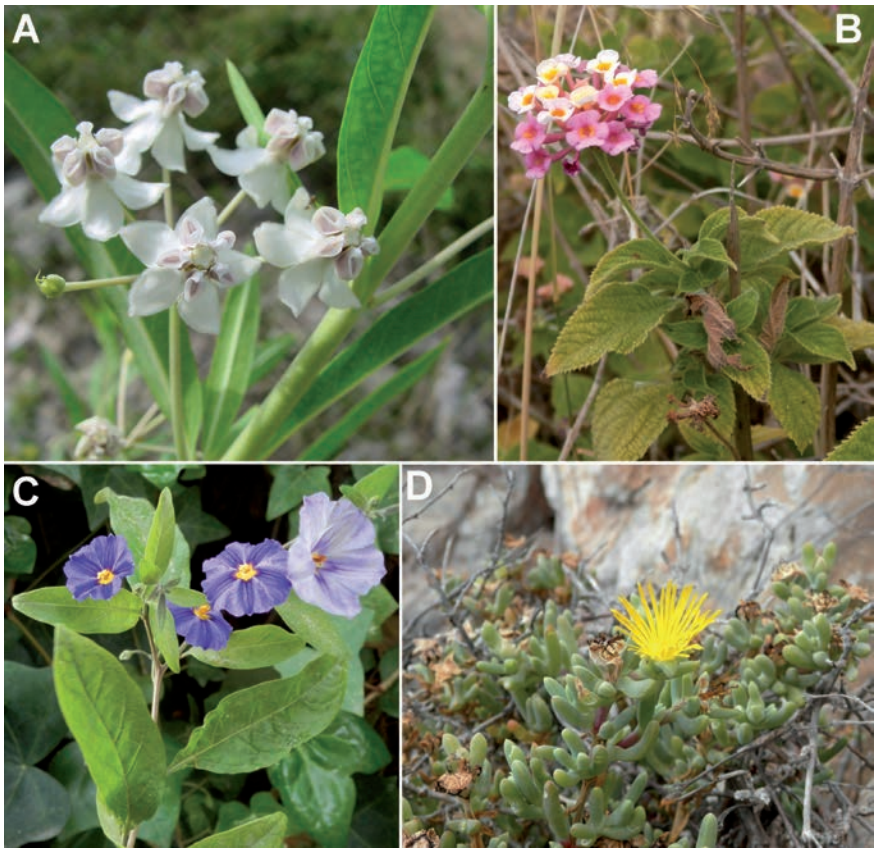


**Figure 5.** A: *Gomphocarpus physocarpus* from Mallorca; B: *Lantana strigocamara* from Mallorca; C: *Lycianthes rantonnetii* from Mallorca; D: *Malephora uitenhagensis* from Mallorca. Photographs: J. Rita (A) and L. Sáez (B-D).

**Lathyrus odoratus** L., Sp. Pl.: 732 (1753)

Mallorca: S'Amarador (Mondragó), 31SED1655, 25 March 2003, E. Moragues (UIB 16222). Eivissa: Prop Cala Sant Vicent, 31SCD7726, 8 May 2003, E. Moragues, J. Rita (UIB 16254).

New for the Balearic Islands. Casual.

This species is native only to the extreme southwest of Italy and Sicily, but is widely cultivated worldwide and naturalized in some areas (Branca & Donnini, 2011).

**Lathyrus sativus** L., Sp. Pl.: 730 (1753)

Eivissa: Between Sant Rafel-Santa Agnès, 31SCD51, waysides, 8 May 2003, E. Moragues & J. Rita (UIB 16255).

New for the Balearic Islands. Casual.

Its origin is unclear, but it may be East Europe (Balkan Peninsula) or Near East (Gallego, 1999). According to the former author this species is introduced in South Asia, Europe, North Africa, Macaronesia and Southern America. With regard the Balearic archipelago, *L. sativus* was reported as cultivated from Mallorca (Marès & Vigineix, 1880) and Menorca (Rodríguez, 1904). As far as we know, the above record is the first for *L. sativus*, as escaped from cultivation, in the Balearic Islands.

**Lavandula dentata** L., Sp. Pl.: 572 (1753)

Formentera: Sant Francesc de Formentera 31SCC6385 28 m, 18 Apr 2014, J. Serapio.

New for Formentera. Locally naturalized.

This Mediterranean species is native in Mallorca and Eivissa, whereas in Menorca is considered non-native (Fraga et al., 2004). The population of Formentera is found in the vicinity of residential areas and has a clear non-native character.

**Limoniastrum monopetalum** (L.) Boiss. in DC., Prodr. 12: 689 (1848)

Formentera: S'Espardell islet, 31SCC6795, 23 Aug 2014, J. Serapio (herb. pers.).

New for Formentera. Casual.

This Mediterranean species was listed for Mallorca, Menorca and Eivissa by Moragues & Rita (2005). In s'Espardell islet *L. monopetalum* is relatively well established. It is accompanied by other exotics viz *Disphyma crassifolium* (L.) L. Bolus and *Opuntia ficus-indica* L.

**Linum usitatissimum** L., Sp. Pl.: 277 (1753)

Eivissa: Platja den Bossa, 31SCD6105, 3 m, disturbed areas, 28 Feb 2016, J. Serapio (herb. pers.).

New for western Balearic Islands.

As far as we know, this is the first concrete report for the Balearic Islands. *Linum usitatissimum* was listed for Menorca, on the basis of a bibliographic reference, by Martínez Labarga & Muñoz Garmendia (2015).

**Lycianthes rantonnetii** (Carrière) Bitter in Abh. Naturwiss. Vereins Bremen 24: 332 (1920) [*Solanum rantonnetii* Carrière in Rev. Hort. 32: 135 (1859)]

Mallorca: Calvià, Portals Nous, 31SDD6376, 20 m, growing along the side of a stream, 2 Apr 2015, L. Sáez LS-7578 (Fig. 5C).

New for the Balearic Islands. Casual.

Native to South America (Argentina, Bolivia, Brazil and Paraguay) (Gallego, 2012); widely grown for ornament in warm-temperate and subtropical regions of the world. In the Iberian Peninsula *L. rantonnetii* is considered to be naturalized in southern Spain (Málaga province) and subspontaenous in Madrid (Gallego, 2012). The present record near Palma de Mallorca apparently is the first for the Balearic Islands. *Lycianthes rantonnetii* is accompanied by other exotics viz *Agave fourcroydes, Myoporum laetum* and *Oxalis pes-caprae.*

**Malephora uitenhagensis** Jacobsen & Schwanthes in Nat. Cact. & Succ. J. 13: 78 (1958)

Mallorca: Between Punta des Carregador and Platja de S'Hostalet, Calvià, 31S6275, 2-6 m, maritime rocks, 12 Aug 2016, L. Sáez (Fig. 5D).

New for the Balearic Islands. Naturalized (locally).

Native to South Africa (Hartmann, 2001); sometimes used for ornament in warm regions of the world. In Europe *M. uitenhagensis* has only been reported as casual from Sardinia and northeastern Iberian Peninsula (as naturalized) (cf. Aymerich, 2015). In the locality given above it occurs with c. 20 individuals and is obviously naturalized, at least locally.

**Malus domestica** (Borkh.) Borkh., Theor. Prakt. Hand. Forsbot. 2: 1272 (1803)

Eivissa: Sant Antoni de Portmany, 31SCD5316, 13 m, waysides, 20 Aug 2016, J. Serapio (herb. pers.).

New for western Balearic Islands. Casual.

It was previously reported from Menorca (Fraga et al., 2004).

**Matricaria chamomilla** L., Sp. Pl.: 891 (1753)

Formentera: camí vell de la Mola, 31SCC6883, 8 m, waysides, Apr 2014, J. Serapio (herb. pers.).

New for Formentera. Casual.

The present record is the first for Formentera; previously reported from Mallorca (Alomar et al., 1992), Eivissa (Puget et al., 1995) and Menorca (Fraga, 1998).

**Nicotiana rustica** L., Sp. Pl.: 180 (1753)

Eivissa: Cala Xarraca, 31SCD7028, 2 Sept, 2002, J. Rita & E. Moragues (UIB 16171).

New for western Balearic Islands. Casual.

It was previously reported from Menorca (Porta, 1887) and Mallorca (Gil, 2004).

**Nothoscordon borbonicum** Kunth, Enum. Pl. 4: 462 (1843)

Mallorca: Es Carnatge, Palma, 31SDD7477, 5-7 m, scrub and *Pinus halepensis* forest, 3 May 2014, L. Sáez LS-7518 (herb. pers.). Eivissa: Es Viver, Eivissa, 31SCD6207, 12 m, 6 March 2013, J. Serapio (herb. pers.).

First concrete report for western Balearic Islands and Mallorca. Naturalized (locally).

The forest concrete Balearic report for this species is due to Font Quer (1919), who reported it from eastern Menorca. This species was listed for Mallorca, Menorca and Eivissa (without concrete localities) by Moragues & Rita (2005).

There is considerable controversy over the correct epithet for this plant (Jacobsen & McNeal, 2002; Aedo, 2013). The latter authors use the name *N. gracile* (Dryand. ex Aiton) Stearn in Taxon 35: 338 (1986), whereas Ravenna (1991) postulated that *N. borbonicum* originated as a natural hybrid between two wild species, *N. entrerianum* and genuine *N. gracile*, in the area of Buenos Aires, Argentina.

**Opuntia engelmannii** Salm-Dyck ex Engelmann in Boston J. Nat. Hist. 6: 207 (1850) subsp. **lindheimeri** (Engelm.) U. Guzman & Mandujano in Cactaceae Systematics Init. 16: 18 (2003) [*O. lindheimeri* Engelmann in Boston J. Nat. Hist. 6: 207 (1850)]

Mallorca: Calvià, Caló de ses Llises, 31SDD5175, 10 m, rocky places, 2 Apr 2015, L. Sáez (Fig. 6A). Eivissa: Illa Grossa, port d'Eivissa, 31SCD6607, 15 m, 29 Apr 2014, J. Serapio (Fig. 6B).

New for the Balearic Islands. Naturalized.

Native to Chihuahuan Desert (northern Mexico and southern United States); widely cultivated for ornament in warm-temperate and subtropical regions of the world. In South-West Europe this species has been reported as naturalized in the Iberian Peninsula (Guillot, 2003; Sanz Elorza et al., 2006) and Italy (Guiggi, 2010). The Balearic specimens bear stem segments lanceolate to narrowly lanceolate, becoming very elongate, more than 2 times longer than wide. On the basis of these morphological characters the Balearic specimens are referable to a garden form called "*linguiformis*". In Illa Grossa *Opuntia engelmannii* subsp. *lindheimeri* is fully naturalized, whereas in the Mallorca locality this taxon is casual.

**Osteospermum ecklonis** (DC.) Norl., Stud. Calend.: 244 (1943)

Mallorca: Es Camp de Mar, 31SDD5076 and 31SDD5077, 10-16 m, open scrub and waysides, 4 Apr 2015, L. Sáez (photo).

New for the Balearic Islands. Casual.

It is a popular garden plant native to South Africa. This species is regarded as a weed in Mediterranean-climate regions (Mediterranean basin, North America and Australia). In the Iberian Peninsula *O. ecklonis* has been reported as naturalized in Galicia, Valencian Community, Galicia and Catalonia (González-Martínez, 2015; Aymerich, 2016).

**Passiflora caerulea** L., Sp. Pl.: 959 (1753)

Eivissa: Torrent des Codolar, Sant Josep de sa Talaia, 31SCD5703, 3 m, 13 Aug 2013, J. Serapio (photo).

New for western Balearic Islands. Casual.

This South American vine is widely cultivated as a wall-climber or as ground-cover. In milder regions it can be found as casual or naturalized. It was previously reported from Menorca (Torre Solí) by Podda et al. (2010). In Torrent des Codolar this species is accompanied by other exotics viz *Agave americana, Arundo donax, Cyperus rotundus, Opuntia fiscus-indica, Oxalis pes-caprae, Ricinus communis* and *Stenotaphrum secundatum*.

**Physalis peruviana** L., Sp. Pl. ed. 2: 1670 (1763)

Eivissa: Can Tití, Sant Josep, 31SCD6007 60 m, field margins, Sept 2013, J. Serapio (herb. pers.).

Second record for western Balearic Islands. Casual.

This species was previously reported from Mallorca (Alomar & Salom, 2003), Eivissa (Guara et al., 2004) and Menorca (Fraga et al., 2007).

**Phytolacca icosandra** L., Syst. Nat. ed. 10, 2: 1040 (1759)

Mallorca: Bunyola, 31SDD7394, crop margins, 1 Sept 2003, J. Rita (photo); Gènova, Palma, disturbed places, 31SDD6680, 17 July 2004, J. Rita (UIB 16630) (Fig. 6 C-E).

New for Europe. Casual.

Its native area is unclear, but it may be Central and South America (from Mexico to Peru) (Rzedowsky & Calderón, 2000; Nienaber & Thieret, 2003). This species is introduced in Asia, Oceania, Africa and North America (GBIF, 2016). As far as we know, this is the first concrete report for Europe (see GBIF, 2016 and Uotila, 2011).

The Majorcan specimens are clearly referable to *Ph. icosandra* based on the following diagnostic characters: Inflorescences (erect spike-like racemes) up to 30 cm long, surpassing subtending leaves; pedicel absent or 0.5-2 mm long; stamens, at least in middle and proximal flowers, 14-20, usually in 2 whorls; carpels connate; fruits berries, purple to purple black.

*Phytolacca octandra* L. can be separated by its inflorescences (equaling or shorter than subtending leaves) and its stamens (7-10, in 1 whorl) (Nienaber & Thieret, 2003). *Phytolacca polyandra* has a relatively high number of bicyclic stamens (12-16), but is easily separable from *Ph. icosandra* by its longer peduncles (1-1.8 cm long) (see Dequan & Larsen, 2003).

*Phytolacca polyandra* Batalin was listed for Mallorca by Moragues & Rita (2005). However, the voucher specimen that had served as base for this report corresponds to *Ph. icosandra*. As far as we know, this is the first European report for *Ph. icosandra* (see GBIF, 2016 and Invasive Species Compendium, 2016).

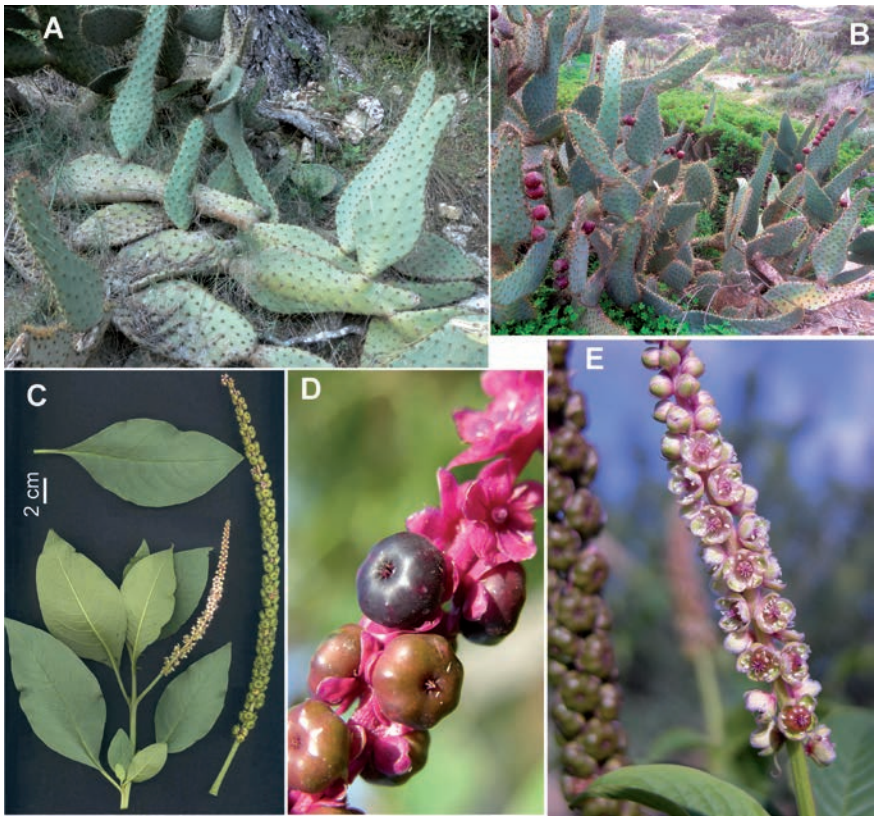


**Figure 6.** A-B: *Opuntia engelmannii* subsp. *lindheimeri* from Mallorca (A) and Eivissa (B); C-E: *Phytolacca icosandra* from Mallorca. Photographs: L. Sáez (A), J. Serapio (B) and J. Rita (C-E).

**Pittosporum tobira** (Thunb.) W.T. Aiton, Hortus Kew. 2: 27 (1811)

Eivissa: Sa Sal Rosa, Sant Josep de sa Talaia, 31SCD6103, 8 m, open scrub, 19 May 2015, J. Serapio; Torrent de Santa Eulària, 31SCD7116, 26 m, stream banks, 21 Jan 2016, J. Serapio; Sa Canal, Sant Josep de Sa Talaia, 31SCD5900, 10 m, 30 Apr 2016, J. Serapio (photo).

New for western Balearic Islands. Casual (locally naturalized in eastern Balearic Islands).

Native to East Asia (China, Japan and Korea) and widely cultivated for ornament in warm-temperate and subtropical regions of the world. This species was previously reported from Mallorca and Menorca, where it is naturalized in streams and human-disturbed areas such as urban areas, waysides, abandoned lands, old garden sites, fallow or abandoned fields (Fraga et al., 2004; Moragues & Rita, 2005).

**Plumbago auriculata** Lam., Encycl. 2: 270 (1786)

Eivissa: Pla de ses Formigues, Sant Vicent de sa Cala, 31SCD7727, 129 m, waysides, 10 May 2016, J. Serapio (herb. pers.); Salt de Rubió, 31SCD6224, 144 m, waysides, 22 Feb 2014. J. Serapio.

New for western Balearic Islands. Casual.

Previously reported from western Mallorca by Guillot & Sáez (2014).

**Podranea ricasoliana** (Tanfani) Sprague, Fl. Cap. (Harvey) 4: 450 (1904)

Mallorca: Torrent de s'Hostalet, Calvià, 31SDD6376, 25-30 m, 2 Apr 2015, 28 June 2016, L. Sáez.

First concrete record for the Balearic Islands. Casual.

This woody creeper is generally thought to be native to South Africa (Hassler, 2016). However, according to Lee et al. (2016) many South African botanists suspect that this species may not be indigenous to South Africa, apparently based upon historical perspective. *Podranea ricasoliana* was introduced into North, Central and South America, the Caribbean, Asia, Oceania, South Europe and Tropical Africa (Lee et al., 2016; Hassler, 2016; Invasive Species Compendium, 2016).

*Podranea ricasoliana* was listed for the Balearic archipelago as subspontaenous, without indication of concrete island (Moragues & Rita, 2005). Dumping of yard trimmings and green waste could explain the establishment of *Podranea ricasoliana* in this locality.

**Sorghum bicolor** (L.) Moench, Methodus: 207 (1794)

Eivissa: Sta Eulària, barri Can Guasch, 31SCD7316, 33 m, waysides, 21 March 2015, J. Serapio (herb. pers.).

New for western Balearic Islands. Casual.

As far as we know, this is the first concrete report for western Balearic Islands. Previously, this species was collected in Puig de Teix (northern Mallorca) by F. Bonafè (HJBS-Bonafè-0156, sub *S. vulgare*), and later it was reported from Algaida (central Mallorca) (Gil, 2004).

**Sorghum halepense** (L.) Pers., Syn. Pl. 1: 101 (1805)

Formentera: Carretera la Savina-Sant Franscesc, 4 m, roadsides, 31SCC6287, 10 Aug 2013, J. Serapio (herb. pers.); Es Arenals, 7 m, field margins, 31SCC7081, 9 Aug 2016 J. Serapio.

New for Formentera. Naturalized.

This species was previously known from all the main islands of the Balearic archipelago except Formentera.

**Tropaeolum majus** L., Sp. Pl.: 345 (1753)

Eivissa: near Sant Carles. 31SCD7521, 78 m, waysides near field margins, May 2014, J. Serapio (herb. pers.).

New for western Balearic Islands. Casual.

As far as we know, this is the first concrete report for western Balearic Islands. *Tropaeolum majus* is naturalized in eastern Balearic Islands, mainly in Mallorca (Moragues & Rita, 2005) where it usually grows in streams.

**Vinca difformis** Pourr. in Hist. & Mém. Acad. Roy. Sci. Tolouse 3: 333 (1788)

Formentera: Carretera Cap de Barbaria, 31SCC6181, 67 m, waysides, 15 May 2014, J. Serapio (herb. pers.).

New for western Balearic Islands. Casual.

As far as we know, this is the first concrete report for western Balearic Islands. This species was previously known from Mallorca and Menorca, where it is usually regarded as native.

**Vitis × koberi** Ardenghi, Galasso, Banfi & Lastrucci in Phytotaxa 166: 184 (2014) [*V. berlandieri* Planch. × *V. riparia* Michx.]

Eivissa: Sa Joveria, 31SCD6308, 8 m, abandoned fields, 18 Aug 2016, J. Serapio (herb. pers.) (Fig. 5 C).

New for the Balearic Islands. Casual.

*Vitis* × *koberi*, along with *V.* × *ruggerii*, is currently one of the most employed rootstocks in Europe and the Mediterranean region, where it is regarded as one of the most invasive alien grapes (Ardenghi et al., 2014; Ardenghi & Cauzzi, 2015).

**Vitis × ruggeri** Ardenghi, Galasso, Banfi & Lastrucci in Phytotaxa 166: 187 (2014) [*V. berlandieri* Planch. × *V. rupestris* Scheele]

Mallorca: Campanet, torrent de Sant Miquel, 31SDE9704, 48 m, stream banks, 25 July 2014, L. Sáez LS-7558 (herb. pers.) (Fig. 5 D).

New for the Balearic Islands. Casual.

The plants collected in Campanet belong to the cultivar '57 R', characterized by 3- to slightly 5-lobed leaf blades and already recorded from Sicily (Ardenghi & Cauzzi, 2015).

**Vitis rupestris** Scheele in Linnaea 21: 591 (1848)

Mallorca: al NE de Sóller, Ses Alzines, 31SDE7503, 55 m, scrub and banks, 22 June 2015, L. Sáez LS-7651 (herb. pers.) (Fig. 5 E).
Eivissa: Can Murtera, 31SCD6308, 3 m, abandoned fields, 18 Aug 2016, J. Serapio (herb. pers.)

New for the Balearic Islands. Naturalized (locally).

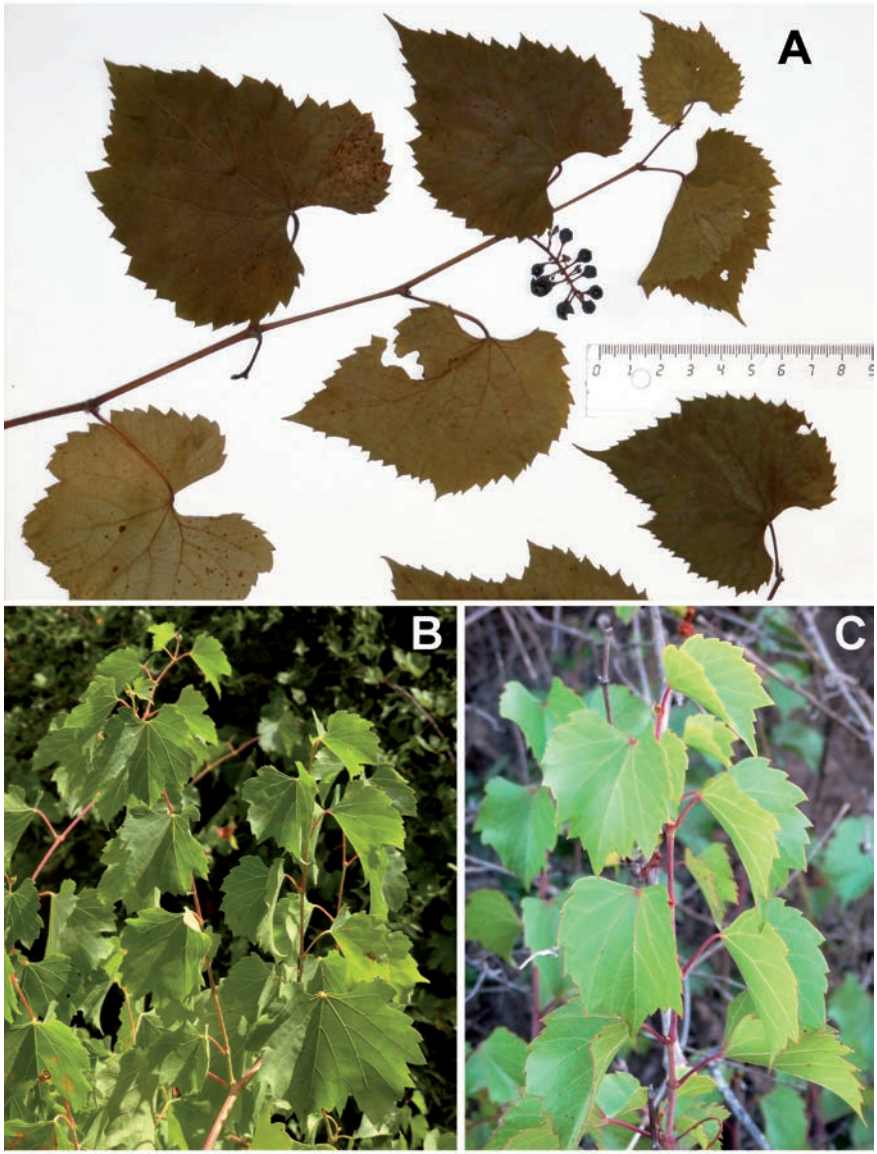


**Figure 7.** A: *Vitis* × *koberi* from Eivissa; B: *Vitis* × *ruggeri* from Mallorca; C: *Vitis rupestris* from Mallorca. Photographs: L. Sáez.

*Vitis rupestris* has been one of the first rootstocks to be used to face at the phylloxera crisis; its employment decreased in recent times, having been replaced by hybrids (such as *V.* × *ruggerii*) more resistant to drought and characterized by a minor vigor. This species is regarded as naturalized and invasive in different parts of Europe and the Mediterranean region (Laguna, 2003; Ardenghi et al., 2014; Ardenghi & Cauzzi, 2015).

**Washingtonia robusta** H. Wendl. in Gart.-Zeitung (Berlin) 2: 198 (1883)

MALLORCA: Torrent de Cala Blanca, Calvià, 31SDD5474, 3-5 m, streambed, 2 Apr 2015, L. Sáez (photo).

New for the Balearic Islands. Casual.

This species, native to Mexico, is widely cultivated as an ornamental in the warm-temperate and subtropical regions of the world (Verloove, 2013). Several young specimens were found growing along a stream close to an urbanized area.

**Yucca gigantea** Lem. Ill. Hort. 6: 91 (1859)

MALLORCA: Torrent de s'Hostalet, Calvià, 31SDD6376, 25 m, 2 Apr 2015, L. Sáez.

New for the Balearic Islands. Casual.

This species is native to Central America (Thiede, 2001). It is widely cultivated as an ornamental in warm regions of the world (López-Pujol & Guillot, 2014). The latter authors reported this species as casual or naturalized from southern and eastern Iberian Peninsula. In the Majorcan locality two specimens were found growing along the side of a stream, together with *Podranea ricasoliana*. The occurrence of this species in Torrent de s'Hostalet probably originated from discarded garden waste of ornamental specimens. The expansion of both species in torrent de s'Hostalet and its surroundings is rather limited because it is an intensely urbanized area.

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**Bibliographical references**

Aedo, C. 2013. *Nothoscordum* Kunth. In E. Rico, M.B. Crespo, A. Quintanar, A. Herrero & C. Aedo (eds.). Flora iberica Vol. XX: Liliaceae-Agavaceae: 273-276. Real Jardín Botánico, CSIC. Madrid.

Alomar, G.; González, J.M.; Mascaró, C. 1992. Notes florístiques de les Illes Balears (IV). Boll. Soc. Hist. Nat. Balears 35: 67-72.

Alomar, G.; Reynés, A.; Ferrer, I.; Rodríguez, R.; Mus, M. 2000. Alguns pteridòfits interessants dels camps marjats de la serra de Tramuntana (Mallorca). Boll. Soc. Hist. Nat. Balears 43: 99-104.

Alomar, G.; Rosselló, J.A.; Pons, M. 1998. Materials per a l'inventari de Biodiversitat del Parc Natural de Sa Dragonera: Flora i Vegetació i invertebrats. Conselleria de Medi Ambient, Ordenació del Territori i Litoral. Gràfiques Son Espanyolet. Palma de Mallorca.

Anderson, E.F. 2001. The Cactus Family. Timber Press, Portland.

Ardenghi, N.M.G.; Cauzzi, P. 2015. Alien grapes (*Vitis*, Vitaceae) in Sicily (Italy): novelties for the Sicilian and Mediterranean flora. Nat. Hist. Sci. 2: 137-148.

Ardenghi, N.M.G.; Galasso, G.; Banfi, E.; Zoccola, A.; Foggi B.; Lastrucci, L. 2014 A taxonomic survey of the genus *Vitis* L. (Vitaceae) in Italy, with special reference to Elba Island (Tuscan Archipelago). Phytotaxa 166: 163-198.

Arista, M.; Ortiz, P.L. 2012. *Gomphocarpus* R. Br. In S. Talavera, C. Andrés, M. Arista, M.P. Fernández Piedra, M.J. Gallego, P.L. Ortiz, C. Romero Zarco, F.J. Salgueiro, S. Silvestre & A. Quintanar (eds.). Flora iberica Vol. XI. Gentianaceae-Boraginaceae: 114-117. Real Jardín Botánico, CSIC. Madrid.

Austin, D.F.; Demissew, S, Young, J. 1998. Studies of the Florida Convolvulaceae-VI. *Dichondra*. Florida Scientist 61: 195-202.

Aymerich, P. 2015. Nuevos datos sobre plantas suculentas alóctonas en Cataluña. Bouteloua 22: 99-116.

Aymerich, P. 2016. Algunas citas de plantas alóctonas de origen ornamental en al zona del Penedès (Cataluña). Bouteloua 24: 78-92.

Blanca, G. 2009. *Calystegia* R. Br. In G. Blanca, B. Cabezudo, M. Cueto, C. Fernández López & C. Morales Torres (eds.). Flora de Andalucía Oriental Vol. 3: Rosaceae-Lentibulariaceae: 321. Consejería de Medio Ambiente, Junta de Andalucía. Sevilla.

Branca, F.; Donnini, D. 2011. *Lathyrus odoratus*. The IUCN Red List of Threatened Species 2011: e.T176367A7227153. <http://dx.doi.org/10.2305/IUCN.UK.2011-1.RLTS.T176367A7227153.en>

Dar, G.H.; Malik, N.A.; Khuroo, A.A. 2012. *Gomphocarpus physocarpus* E. Mey. (Apocynaceae): a new species record for the North-west Himalaya from Rajouri (J & K), India. J. Himalayan Ecol. Sustain. Dev. **7**: 35-38.

Dequan, L.; Larsen, K. 2003. *Phytolacca* L. In Wu, Z. Y., P. H. Raven & D. Y. Hong (eds.) Flora of China. Vol. 5 (Ulmaceae through Basellaceae): 435-436. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis.

Font Quer, P. 1919. Adiciones a la flora de Menorca. Bol. Soc. Esp. Hist. Nat. 19: 268-273.

Fraga, P. 1998. Notes florístiques de les Illes Balears (XI). Boll. Soc. Hist. Nat. Balears 41: 81-86.

Fraga, P. 2016. Notes i contribucions al coneixement de la flora de Menorca (XII). Notes florístiques. Boll. Soc. Hist. Nat. Balears (in press).

Fraga, P.; Mascaró, C.; Carreras, D.; Garcia, O.; Pallicer, X.; Pons, M.; Seoane M.; Truyol, M. 2004. Catàleg de la flora vascular de Menorca. Institut Menorqui d'Estudis Maó.

Fraga, P., C. Mascaró, D. Carreras, O. Garcia, M. Pons & M. Truyol (2002). Notes i contribucions al coneixement de la flora de Menorca. (III). Boll. Soc. Hist. Nat. Balears 45: 69-79.

Gallego, M.J. 1999. *Lathyrus* L. In Talavera, S., C. Aedo, S. Castroviejo, C. Romero Zarco, L. Sáez, F.J. Salgueiro & M. Velayos (eds.). Flora iberica. Vol. VII(I). Leguminosae (partim): 423-482. Real Jardín Botánico, CSIC. Madrid.

Gallego, M.J. 2012. *Lycianthes* (Dunal) Hassl. In S. Talavera, C. Andrés, M. Arista, M.P. Fernández Piedra, M.J. Gallego, P.L. Ortiz, C. Romero Zarco, F.J. Salgueiro, S. Silvestre & A. Quintanar (eds.). Flora iberica Vol. XI. Gentianaceae-Boraginaceae: 198-200. Real Jardín Botánico, CSIC. Madrid.

García Martín, F; Talavera, S. 2000. *Coronilla* L. In Talavera, S., C. Aedo, S. Castroviejo, C. Romero Zarco, F.J. Salgueiro & M. Velayos (eds.). Flora iberica. Vol. VII(II). Leguminosae (partim): 881-891. Real Jardín Botánico, CSIC. Madrid.

GBIF. 2016. *Phytolacca icosandra* L. in Global Biodiversity Information Facility. <http://www.gbif.org>. [accessed 14 Nov 2016].

Gentry, H.S. 1982. Agaves of continental North America. University of Arizona Press, Tucson.

Gil, L. 2004. La flora del terme municipal d'Algaida: distribució en quadrícules de 5x5 km. Ajuntament d'Algaida.

Gil, L.; Llorens, L. 2001. Plantes vasculars de l'Illa de Formentera. ORCA. Catàlegs Florístics locals 8. Institut d'Estudis Catalans. Barcelona.

Gil, L.; J. Seguí, J. 2015. ["2014"]. Diversitat florística de l'Àrea Natural d'Especial Interès del Cap de Cala Figuera-Refeubeig i àrea d'influència (Calvià-Mallorca). Boll. Soc. Hist. Nat. Balears 57: 105-127.

Gildenhuys, E.; Ellis, A.G.; Carroll, S.P.; Roux, J.J. 2013. The ecology, biogeography, history and future of two globally important weeds: *Cardiospermum halicacabum* Linn. and *C. grandiflorum* Sw. NeoBiota 19: 45-65.

Goldblatt, P. 2002. Iridaceae. In: Flora of North America 26: 348-409. Oxford University Press, New York.

Goldblatt, P.; Manning, J. 2000. Cape Plants. A Conspectus of the Cape Flora of South Africa. Nat. Bot. Inst., Pretoria - Missouri Bot. Gard. Press. Missouri.

González-Martínez, I. X. 2015. Contribución al conocimiento de la flora alóctona de Galicia (NO Península Ibérica, España). Bot. Complut. 39: 79-85.

Guara, M., Ferrer, P.B., Ciurana, M.J., Herrero-Borgoñón, J.J. 2004. Flora alóctona adventicia o naturalizada en la Comunidad Valenciana e Islas Baleares. Fl. Montiberica 27: 15-22.

Guiggi, A. 2010. Aggiunte e correzioni al Catalogo delle Cactaceae naturalizzate in Italia. Riv. Piemontese Storia Nat. 31: 35-54.

Guillot, D., 2003. Sobre la presencia de 17 táxones de la familia Cactaceae en la comunidad valenciana. Fl. Montiberica 24: 6-13.

Guillot, D.; Laguna Lumbreras, E.; Rosselló Picornell, J.A. 2009. Flora alóctona suculenta valenciana: Aizoaceae y Portulacaceae. Monogr. Bouteloua 7: 1-68.

Guillot, D.; Sáez, L. 2014. Algunas citas de neófitos de la isla de Mallorca. Bouteloua 17: 135-144.

Guillot, D.; P. van der Meer, P. 2010. Nuevos taxones vegetales alóctonos de jardinería en el área continental de NE de España: comportamiento e historia. Manag. Biolog. Invasions 1: 6-12.

Hartmann, H.E.K. 2001. Illustrated Handbook of Succulent Plants: Aizoaceae F-Z. Springer-Verlag Berlin Heidelberg New York.

Hassler. M. 2016. *Podranea ricasoliana* in World Plants: Synonymic Checklists of the Vascular Plants of the World (version Oct 2016). In: Species 2000 & ITIS Catalogue of Life, 31st October 2016 (Roskov Y., Abucay L., Orrell T., Nicolson D., Flann C., Bailly N., Kirk P., Bourgoin T., DeWalt R.E., Decock W., De Wever A., eds). Digital resource at <www.catalogueoflife.org/col>. Species 2000: Naturalis, Leiden, the Netherlands. [accessed 14 november 2016].

Hunt, D.; Taylor, N.; Charles, G. (eds.). 2006. The New Cactus Lexicon. Dh Books, Milborne Port.

Hurrell, J.A.; Delucchi, G. 2005. Iridaceae Ixioideae adventicias en la Argentina. Bol. Soc. Argentina Bot. 40: 289-296.

Iamonico, D. 2015. Taxonomic revision of the genus *Amaranthus* (Amaranthaceae) in Italy. Phytotaxa 199: 1-84.

Invasive Species Compendium. 2016. Available at <http://www.cabi.org/isc> [accesssed October 2016].

Jaarsveld, E. van 2003. Crassula. In: Eggli, U. (Ed.) Illustrated handbook of succulent plants: Crassulaceae: 32-84. Springer-Verlag, Berlin.

Jacobsen, H. 1954. Handbuch der sukkulenten Pflanzen. Veb Gustav Fischer Verlag. Jena.

Jacobsen, T.D.; McNeal Jr., D.W. 2002. Nothoscordum Kunth. In: Flora of North America 26: 276-277. Oxford Univ. Press, New York.

Laguna, E. 2003. Sobre las formas naturalizadas de *Vitis* L. (Vitaceae) en la Comunidad Valenciana, I. Especies. Fl. Montiberica 23: 46-82.

Laguna, E.; Deltoro, V.I.; Ferrer, P.P.; Novoa, A.; Guillot, D. 2013. About the binomen *Cylindropuntia rosea* (Cactaceae) and its invasive individuals recorded in the Valencian Community (Spain). Bouteloua 16: 40-51.

Lee, K.L.; Singhurst, J.R.; Holmes, W.C. 2016. *Podranea ricasoliana* (Bignoniaceae) adventive in Texas. Phytoneuron 40: 1-3.

Liu, H.Y. 1989. Systematics of *Aeonium* (Crassulaceae). Taichung. [Natl. Mus. Nat. Sci. [Taiwan], Special Publ. 3.]

López-Pujol, J.; Guillot, D. 2014. *Yucca gigantea* Lem., primeras citas en Cataluña, y área potencial de naturalización en la Península Ibérica e Islas Baleares. Bouteloua 19: 212-220.

Marès, P.; Vigineix, G. 1880. Catalogue raisonné des plantes vasculaires des îles Baléares. Ed. G. Masson. Paris.

Martín-Prieto, J.A.; Espinosa, J.; Roig-Munar, F.X.; Vericad, M.; Rodríguez-Perea, A.; Torres, N.; Pons, G.X.; Mir-Gual, M. 2011. Descripció del sistema dunar d'es Codolar (Eivissa, Illes Balears). Boll. Soc. Hist. Nat. Balears 54: 183-195.

Martínez Labarga, J.M.; Muñoz Garmendia, F. 2015. *Linum* L. In Muñoz Garmendia, F.; Navarro, C.; Quintanar, A.; Buira A. (eds.). Flora iberica Vol. IX. Rhamnaceae-Polygalaceae: 174-266. Real Jardín Botánico, CSIC. Madrid.

McAllister, H.A.; A. Rutherford 1990. *Hedera helix* L. and *H. hibernica* (Kirchner) Bean (Araliaceae) in the British Isles. Watsonia 18: 7-15.

Moragues, E.; Rita, J. 2005. Els vegetals introduïts a les Illes Balears. Conselleria de Medi Ambient, Govern de les Illes Balears. Palma de Mallorca.

Nienaber, M.A.; Thieret, J.W. 2003. Phytolaccaceae. In: Flora of North America 4: 3-12. Oxford University Press, New York and Oxford.

Paiva, J. 1986. *Eschscholzia* Cham. In Castroviejo, S., M. Laínz, G. López González, P. Montserrat, F. Muñoz Garmendia, J. Paiva & L. Villar (eds.). Flora iberica Vol. I. Lycopodiaceae-Papaveraceae: 425-426. Real Jardín Botánico, CSIC. Madrid.

Paiva, J.; Nogueira, I. 1993. *Gossypium* L. In Castroviejo, S., C. Aedo, S. Cirujano, M. Laínz, P. Montserrat, R. Morales, F. Muñoz Garmendia, C. Navarro, J. Paiva & C. Soriano (eds.). Flora iberica Vol. III. Plumbaginaceae (partim)-Capparaceae: 191-193. Real Jardín Botánico, CSIC. Madrid.

Pino Pérez, R.; Pino Pérez, J.J. 2014. Asientos corológicos LOU 2014. Boletín BIGA, 14: 27-41.

Pla, V.; Sastre, B.; Llorens, L. 1992. Aproximació al catàleg de la flora vascular de les illes Balears. Universitat de les Illes Balears, Jardí Botànic de Sóller. Palma.

Podda, L., Fraga i Arguimbau, P.; Mayoral García-Berlanga, O.; Mascia, F.; Bacchetta, G. 2010. Comparación de la flora exótica vascular en sistemas de islas continentales: Cerdeña (Italia) y Baleares (España). Anales Jard. Bot. Madrid 67: 157-176.

Porta, P. 1887. Stirpium in insulis Balearicum anno 1885 collectarum enumeratio. Nuovo Giorn. Bot. Ital. 19: 276-324.

Puget, G.; Stafforini, M.; Torres, N. 1995. Notes florístiques de les Illes Balears (V). Boll. Soc. Hist. Nat. Balears 38: 63-74.

Randall, R.; Kessal, O. 2004. National list of naturalised invasive and potentially invasive garden plants. WWF Australia, Sydney, Australia.

Ravenna, P. 1991. *Nothoscordum gracile* and *N. borbonicum* (Alliaceae). Taxon 40: 485-487.

Thuiller, W., Richardson, D.M., Pyšek, P., Midgley G.F., Hughes G.O., Rouget, M. 2005. Nichebased modelling as a tool for predicting the risk of alien plant invasions at a global scale. Global Change Biology 11: 2234-2250.

Richardson, D.M.; Pysek, P.; Rejmanek, M.; Barbour, M.G.; Panetta, F.D.; C.J. West 2000. Naturalization and invasion of alien plants: concepts and definitions. Diversity and Distributions 6: 93-107.

Rodriguez, J.J. 1904. Flórula de Menorca. Impr. Fàbregues, Maó.

Rzedowsky, J.; Calderón, G. 2000. Notas sbre el género *Phytolacca* (Phytolaccaceae) en México. Acta Bot. Mexicana 53: 49-66.

Sáez, L.; Bibiloni, G.; Rita, J.; Gil; L.; Moragues, E.; Romero, C.; Vicens, J. 2015. Additions and amendments to the flora of the Balearic Islands. Orsis 29: 173-192.

Sanders, R.W. 2006. Taxonomy of *Lantana* sect. *Lantana* (Verbenaceae): I. Correct application of Lantana camara and associated names. Sida 22: 381-421.

Sanders, R.W. 2012. Taxonomy of *Lantana* Sect. *Lantana* (Verbenaceae): II. Taxonomic Revision. Bot. Research Inst. Texas 6: 403-441.

Santos-Guerra, A.; Padrón Mederos, M.A.; Mesa Coello, R.; Ojeda Land, E.; Reyes-Betancort, J.A. 2014. Establecimiento de plantas introducidas en la flora vascular silvestre Canaria II (Dicotiledóneas). Acta Bot. Malacitana 39: 227-237.

Sanz-Elorza M., Dana Sánchez E.D., Vesperinas E.S., 2006. Further naturalised Cactaceae in northeastern Iberian Peninsula. Anales Jard. Bot. Madrid 63: 7-11.

Swarbrick, J.T., Wilson, B.W.; Hannan-Jones, M.A. 1998. Lantana camara. Chapter 9 In: F.D. Panetta, R.H. Groves; R.C.H. (Eds.). The Biology of Australian Weeds. Volume 2: 119-140. Shepherd. Richardson, Meredith, Victoria.

Thiede, J. 2001. Agavaceae. In: Eggli, U. (Ed.) Illustrated handbook of succulent plants. Vol. I. Springer. Heidelberg.

Uotila, P. 2011. Phytolaccaceae. In: Euro+Med Plantbase - the information resource for Euro-Mediterranean plant diversity. <http://www.emplantbase.org>. [accessed 12 Nov 2016].

USDA. 2013. Weed Risk Assessment for *Cardiospermum grandiflorum* Sw. (Sapindaceae). Plant Protection and Quarantine Animal and Plant Health Inspection Service United States Department of Agriculture 1730 Varsity Drive, Suite 300 Raleigh, NC 27606. <https://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/Cardiospermum_grandiflorum_WRA.pdf> [accessed 30 Apr 2016].

Valcárcel, V.; McAllister, M.H.; Rutherford, A.; Mill, R.R. 2003. *Hedera* L. In: Nieto Feliner, G.; Jury, S.L.; Herrero, A. (eds.) Flora iberica. Vol. X. Araliaceae-Umbelliferae: 3-12. Real Jardín Botánico, CSIC. Madrid.

Valcárcel, V. & P. Vargas. 2010. Quantitative morphology and species delimitation under the general lineage concept: Optimization for *Hedera* (Araliaceae). Amer. J. Bot. 97: 1555-1573.

Vericad, M.; Stafforini, M.; Torres, N. 2003. Notes florístiques de les Illes Balears (XVII). Boll. Soc. Hist. Nat. Balears 46: 145-151.

Verloove, F. 2013. New xenophytes from Gran Canaria (Canary Islands, Spain), with emphasis on naturalized and (potentially) invasive species. Collect. Bot. (Barcelona) 32: 59-82.

Walters, M.; Figueiredo, E.; Crouch, N.R.; Winter, P.J.D.; Smith, G.F.; Zimmermann, H.G.; Mashope, B.K. 2011. Naturalised and invasive succulents of southern Africa. In: Samyn, Y.; Vanden Spiegel, D.; Degreef, J. (eds.). Abc taxa the Series of Manuals dedicated to capacity building in taxonomy and collection management. Vol. 11. Royal Belgian Institute of Natural Sciences. Brussels. <https://issuu.com/ysamyn/docs/abctaxa_vol11_with_covers_lr/137>.

Wang, Z.Q.; Guillot, D.; López-Pujol, J. 2015. *Crassula ovata*, a new alien plant for mainland China. Collect. Bot. (Barcelona) 34: e009.

Wang, Z.-Q.; Guillot, D.; Ren, M.-X.; López-Pujol, J. 2016. Kalanchoe (Crassulaceae) as invasive aliens in China – new records, and actual and potential distribution. Nordic J. Bot. 34: 349-354.

Ward, D.B. 2008. Keys to the flora of Florida: 18, *Kalanchoe* (Crassulaceae). Phytologia 90: 41-46.

Wendell, J.F.; Grover, C.E. 2015. Taxonomy and Evolution of the Cotton Genus, Gossypium. In Fang, D.D. & R.G Percy (eds.). Cotton. (ed. 2) Agronomy Monograph 57: 1-20.