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New contributions to the knowledge of the alien flora of the Barcelona province (Catalonia, Spain)

Carlos Gómez-Bellver[1], Hilari Álvarez[2], Llorenç Sáez[3]

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Abstract

In this contribution we provide new records of 20 non-native vacular plants for Barcelona province observed between 2014 and 2016. The following taxa are new for Europe: *Baccharis salicifolia*, *Enneapogon cenchroides*, *Lonicera fragrantissima*, *Porophyllum ruderale* subsp. *ruderale* and *Selenicereus grandiflorus*; three are first records for the Iberian Peninsula: *Cardiospermum grandiflorum*, *Phymosia umbellata* and *Salvia hispanica*; *Muehlenbeckia sagittifolia* is new for Spain and *Physalis philadelphica* is new for Catalonia. In addition, several new local records are provided for 10 taxa.

Keywords: non-native plants; Iberian Peninsula; distribution range.

Resum. *Noves aportacions al coneixement de la flora al·lòctona de la província de Barcelona (Catalunya, Espanya)*

En aquest treball aportem dades sobre la presència de 20 plantes vasculars al·lòctones trobades a la província de Barcelona durant el període 2014-2016. Els tàxons següents suposen novetat per a la flora d'Europa: *Baccharis salicifolia*, *Enneapogon cenchroides*, *Lonicera fragrantissima*, *Porophyllum ruderale* subsp. *ruderale* i *Selenicereus grandiflorus*; tres són espècies noves per a la península Ibèrica: *Cardiospermum grandiflorum*, *Phymosia umbellata* i *Salvia hispanica*; *Muehlenbeckia sagittifolia* és novetat per a Espanya i *Physalis philadelphica* per a Catalunya. D'altra banda, s'aporten noves citacions a escala local per a 10 tàxons.

Paraules clau: plantes al·lòctones; península Ibèrica; àrea de distribució.

1. Universitat de Barcelona. Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals. Secció Botànica i Micologia. Facultat de Biologia. Avda. Diagonal, 643. 08028 Barcelona. cgomezbellver@ub.edu
2. Departament d'Agricultura, Ramaderia, Pesca i Alimentació. C/ Tints, 13. 08830 Sant Boi de Llobregat. hilari.alvarez@gmail.com
3. Universitat Autònoma de Barcelona. Unitat de Botànica, Facultat de Biociències. 08193 Bellaterra. llorens.saez@uab.cat

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Introduction

The introduction of non-native species is the result of the direct or indirect human action, which is a serious threat to biodiversity and ecological integrity of native habitats and ecosystems (Dogra et al., 2010; Girado-Beltrán et al., 2015). As a consequence, during the last decades the scientific community has shown increasing interest to improve the knowledge of this phenomenon, focused mainly on the biology of the taxa involved and their effects on biodiversity. Understanding this is essential in order to implement effective preventive measures or early detection that may help us to mitigate their impact (Campos & Herrera, 2009), because once introduced plants are established in a new region, they are extremely difficult to eradicate or control.

Barcelona is the second most populous province of Spain, with more than 5.5 million of inhabitants living whithin an area of ca 7.700 km^2. It is the capital of the autonomous community of Catalonia, located on the northeastern Mediterranean coast of the Iberian Peninsula.

The Mediterranean Basin is particularly vulnerable due to its climatic conditions (mild temperatures and stational rains), witch potentially allow the establishment of non-native species (Brunel et al., 2010). Over the last decades in Catalonia there has been a significant increase in the number of non-native plants, that Girado-Beltrán et al. (2015) estimate in 110 with regard to the nearly 450 of a previous work published 23 years earlier (Casasayas, 1989). The large number of recent publications describing new exotic plants in Catalonia make us think that number could be notabily higher.

The aim of this study is to provide information about 20 non-native vascular plants found in Barcelona that were unknown or that we had few details so far. Some of these, such as *Phymosia umbellata* (Cav.) Kearney or *Selenicereus grandiflorus* (L.) Britton & Rose are casual or persistent in cultivation and probably do not represent a threat to native species or to local ecosystems. But others, such as *Cardiospermum grandiflorum* Sw. are naturalized or in the process of naturalization, and could become invasive species.

Materials and methods

The botanical names of families, genera and specific and subspecific epithets are based on *Angiosperm Phylogeny Website* (Stevens, 2001) and *Tropicos.org* website. The names of the authors, dates and references of original publications for each taxa follow *The International Plant Names Index* (IPNI, 2012).

Plants are arranged following alphabetical order of genera. We used the standardized terminology for alien plants of Pyšek et al. (2004) in order to define their status, that can be: casual (it can reproduce occasionally outside cultivation but do not form self-replacing populations for at least 10 years), naturalized (it sustains self-replacing populations without direct intervention of humans) or invasive (it produces reproductive offspring and has the potential to spread over a large area). For each plant we provide the sort of novelty, main details of the

records and some comments about the native range, and its distribution in our territory. A brief botanical description is also provided in those cases we consider proper.

For the geographic reference of the records we used the 1 × 1 km UTM square grid (31T zone), ETRS89 datum. Except for *Aloe perfoliata* L., *Cereus repandus* (L.) Mill. and *Opuntia elata* Link & Otto ex Salm-Dyck, at least a voucher specimen is preserved in BC or BCN.

Aloe perfoliata L., Sp. Pl.: 319 (1753) (Asphodelaceae)
Casual. New for Barcelona province (Fig. 1A).

Barcelona: Garraf, Sitges. On the top of a rocky promontory above the small bay called "cala Ginesta", DF0968, 15 m, 7 July 2016, C. Gómez-Bellver & H. Álvarez. A young individual separated about 3 m from another well-developed adult; Tarragona: Baix Ebre, Calafat, in a waste ground between the l'Ametlla de Mar Avenue and Garbí street, CF1833, 23 m, 19 July 2016, C. Gómez-Bellver, J. López-Pujol & N. Nualart. Two small groups of plants, each about 2 m, growing together with *Aloe maculata* and *Austrocylindropuntia subulata*.

Aloe endemic to Namibia and South Africa, known as rubble aloe or called by its synonym *Aloe mitriformis* Mill. It can de distinguished from the more common *Aloe maculata* by the presence of harmless yellowish-white teeth in the margin and underside of leaves and because leaves tend to curve inward.

This species has been reported for Girona and Tarragona provinces (Aymerich, 2015b; Aymerich & Gustamante, 2016). It has also been reported from Valencia (Guillot et al., 2008; Sanz et al., 2011). We provide the first record for Barcelona province. This species will probably increase its distribution nearby urbanised areas in coastal regions.

Baccharis salicifolia (Ruiz & Pav.) Pers., Syn. Pl. 2: 425 (1807) (Asteraceae)
Casual. New for Europe (Fig. 1B).

Barcelona: Baix Llobregat, el Prat de Llobregat, between the Pratenc industrial estate and Llobregat river, DF2674, 4 m, 28 March 2016, H. Álvarez; ibidem, 11 Apr 2016, H. Álvarez & C. Gómez-Bellver (BC 951236, BCN 130207). A single individual 2 m tall, with male flowers, in good conditions, in a disturbed site dominated by *Dittrichia viscosa*, 60 m from the river.

The mule fat is native to the coastal sage scrub and desert communities in the southwest of the United States and northern Mexico, especially in riparian and wet areas. Nowadays, this plant has spread to South America. It forms long straight even stems with few branches.

This perennial and decidious shrub up to 3 m has willow-like foliage. Small hemispherical involucres, gathered in terminal corymbiform arrays. Bracts ovate to lanceolate, green or reddish, with scarious margin. Corollas are whitish. Female inflorescences bear 50-150 pistillate florets. Male inflorescences with 17-48 staminate florets, each with a showy stigma and a mace-shaped style.

In Catalonia, the conspecific *Baccharis halimifolia* is commonly reported, with oblanceolate or spatulate smaller leaves. We provide the first European report for *Baccharis salicifolia*. In case of new introductions this species could become invasive in wetlands.

Berberis vulgaris L. subsp. **vulgaris** (Berberidaceae)
Casual. New for Barcelona province (Fig. 1C).

Barcelona: Vallès Oriental, Fogars de Montclús, Santa Fe de Montseny, Puig Porquer, DG5524, 1173 m, 29 July 2014, H. Álvarez (BCN 117983). A single population in a shady bush on a beech edge, well established and expanding. All evidence suggest that it was originated by means of zoochory from specimens grown nearby.

This is an Eurasian plant regarded as non-native in Catalonia, at least in the Pyrenees and Pre-Pyrenees (Aymerich, 2015a). The latter author reported this taxon from Bolvir and Fontanals de Cerdanya. Some other reports provided under subsp. *vulgaris* should actually be referred to subsp. *seroi*, according to Aymerich (2015a). Oliver & Font (2009) listed it for Garrotxa county but as uncertain. Our finding represents the most southern report in Catalonia.

Cardiospermum grandiflorum Sw., Prodr. Veg. Ind. Occ. 64 (1788) (Sapindaceae)
Naturalized. New for the Iberian Peninsula (Fig. 1D).

Barcelona: Baix Llobregat, Molins de Rei, in the path to the watercourse "Camí de la Riera Bonet", DF1883, 22 m, 5 Nov 2014, H. Álvarez (BC 879607, BCN 117034); ibidem, 11 Nov 2014, H. Álvarez & C. Gómez-Bellver (BC 879608). We observed this plant densely covering some walls and fences.

This large, semi-woody perennial vine is regarded as native from South and Central America. Known as ballon vine due to its spheric fruits, *Cardiospermum* species have been extensively moved around the world because of their medicinal and ornamental values. This ruderal plant covers densely some walls and fences that separate crops and orchards. Some populations of the similar *C. halicacabum* L. were found in Catalonia (Casasayas, 1982, 1989; Royo, 2006). Both species are considered problematic due to their potential invasiveness (Gildenhuys et al., 2013).

Cardiospermum grandifolium is a weed in disturbed grounds, specially in wetland areas or in riparian corridors. It is considered naturalized or an environmental weed in different world regions, including: Australia, New Zealand, North America and South Africa (Randall, 2012). In Europe it was listed for Balearic Islands, Canary Islands, Madeira, Sicilie, France and Belgium (DAISIE, 2016).

We have observed a significant increase of well-stablished populations in this area in recent years, where this plant might become an undesirable weed.

Figure 1. *Aloe perfoliata*, from Sitges (A). *Baccharis salicifolia*, from El Prat del Llobregat (B). *Berberis vulgaris* subsp. *vulgaris*, from Fogars de Montclús (C). *Cardiospermum grandiflorum*, from Molins de Rei (D).

Cereus repandus (L.) Mill., Gard. Dict., ed. 8. n. 5 (1768) (Cactaceae)
Casual. New for Vallès Oriental county (Fig. 2A).

Barcelona: Vallès Oriental, Sant Feliu de Codines, El Gurugú, DG3015, 470 m, 10 April 2016, L. Sáez (photo). A small population of about 10 individuals grows in open rocky slopes on siliceous substrate. It is accompanied by the following species: *Dactylis glomerata* L. subsp. *hispanica* (Roth) Nyman, *Hyparrhenia sinaica* (Delile) G. López, *Opuntia ficus-indica* (L.) Mill., *O. microdasys* (Lehm.) Pfeiff. and *Sedum sediforme* (Jacq.) Pau.

It is difficult to define clearly the original area of the Peruvian apple cactus' distribution, very likely placed in the north part of South America. However, some authors consider that this plant is native to the Antilles, Venezuela and the northeastern coast of Colombia (Anderson, 2001; Nassar, 2013).

It is regarded as invasive in the United States and South Africa, and naturalized in the southern France and Spain (Sanz et al., 2004; Essl & Kobler, 2009).

Dumping of yard trimmings and green waste could explain the establishment of *C. repandus* in this area.

Enneapogon cenchroides (Licht. ex Roem. & Schult.) C.E. Hubb. in Bull. Misc. Inform. Kew 1934: 119 (1934) (Poaceae)
Casual. New for Europe (Fig. 2B).

Barcelona: Barcelonès, Montjuïc mountain, DF2979, 173 m, 25 July 2015, H. Álvarez (BC 990114, BCN 126387). A single specimen in full bloom in the castle moat's perimetral way. It was thriving on sandy substrate of compacted gravel, accompanied by other ruderal alien species.

The nine awned grass is a plant native to Africa and Asia. It is a pioneer grass that grows in dense bushes in the veld (large areas of grass or bushes in South Africa) and quickly colonizes disturbed, sandy, rocky or cultivated soils, especially after suffering drought or overgrazing. This plant is useful for erosion control (Quatrocchi, 2006).

Enneapogon cenchroides is a hardy annual or short-lived perennial grass, 15-100 cm long, erect or semierect, densely covered with glandular hairs. Flat leaves, frequently involutes, ligule with a row of short hairs. Inflorescence in dense panicle, spreading at maturity. Solitary 3-flowered spikelets: a single fertile floret with 9 awns, the upper glume generaly 3-nerved and the lower glume 5 to 7-nerved (Clayton et al., 2002).

Introduced as casual, this is the first report for Europe.

Euphorbia davidii Subils in Kurtziana 17: 125 (1984) (Euphorbiaceae)
Naturalized. Third record for Barcelona province.

Barcelona: Baix Llobregat, Molins de Rei, besides the motorway E-90/B-23, DF1784, 23 m, 14 May 2014, H. Álvarez (BC 934824, BCN 111732). A large amount of plants growing as spreading weed in a disturbed dry soil beside the motorway.

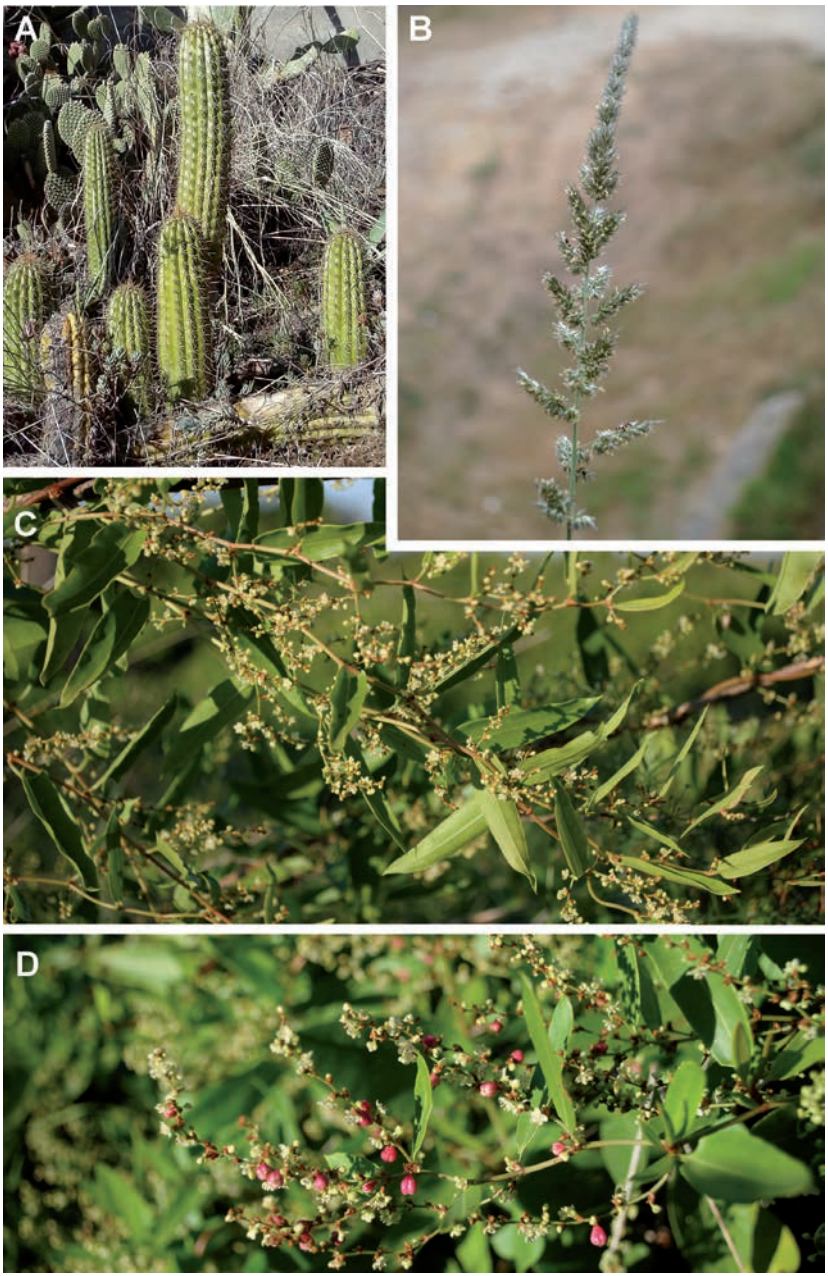

Figure 2. *Cereus repandus*, from Sant Feliu de Codines (A). *Enneapogon cenchroides*, from Montjuïc (B). *Muehlenbeckia sagittifolia*, from El Prat del Llobregat; with white tepals (C), with red tepals (D).

Native to North Mexico, United States, Canada, but introduced to South America (Argentina), Australia and Europe (Purger et al., 2015). It was first introduced in Europe around 1968 (Mikheev, 1971). Recent publications indicate that european records of *E. dentata* Michx. should be referred to *E. davidii* (Vladimirov & Petrova, 2009; Galasso & Banfi, 2011; Barina et al., 2013; Aymerich & Sáez, 2015; Purger et al., 2015).

This is the third report of this plant for the Baix Llobregat county, in addition of the two previously provided by S. Pyke (Pyke, 2008; Aymerich & Sáez, 2015).

Lonicera fragrantissima Lindl. & J. Paxton, Paxt. Fl. Gard. 3: 75, f. 268 (1852) (Caprifoliaceae)
Casual. New for Europe.

Barcelona: Baix Llobregat, Viladecans, Ca n'Alemany, DF1872, 5 m, 13 March 2014, H. Álvarez (BC 934822); ibidem, 24 March 2014, H. Álvarez (BCN 111730). A single flowering individual in a disturbed nitrophilous wasteland.

The fragrant honeysuckle is native to China and blooms in late winter. This plant is used as hedgerow with ornamental purposes. As a matter of fact, some technical issues (Fraga-Arguimbau, 2009; Anonymous, 2014) propose it as a "good alternative" to other potentially weeds.

This species is considered to be one of the parentals, along with *L. standishii* Carr., of *L.* × *purpusii* Rehder (Flora of Missouri, 2016). This hybrid and many other Eurasian honeysuckles, as *L. japonica* and *L. fragrantissima*, are considered weeds in North America and Australia (Randall, 2001; Miller, 2003; USDA-NRCS, 2016).

In Europe *L. fragrantissima* has been only reported as subespontaneous for two localities in France (Tela Botanica, 2016). A voucher specimen is preserved in the BC herbarium, collected by S. Pyke & A. Escudero from the Monjuïc mountain in Barcelona, in 2010. According to a personal communication by the first author, this plant thrives in the edge of a pine forest, likely due to seed dispersed by birds. Ours is the second report for Barcelona, and consequently for the Iberian Peninsula.

The use in private and public gardens could facilitate the naturalization of this honeysuckle.

Muehlenbeckia sagittifolia (Ortega) Meisn., Pl. Vasc. Gen. 1: 227 (1839) (Poly-gonaceae)
Naturalized. New for Spain (Fig. 2C and D).

Barcelona: Baix Llobregat, El Prat de Llobregat, Cal Montes, DF2376, 7 m, 12 Nov 2014, H. Álvarez (BC 879687, BCN 117033). We found a large and expanding population, growing together with another weed as *Senecio angulatus* L. f. It occupies an area around 150 m^2 in a disturbed wasteland.

It is native to warm areas of South America (Raroport et al., 2009). Its fruits are edible, and the leaves and roots have different uses in folk medicine (Alonso

& Desmarchelier, 2015). The flowers have white-greenish tepals that turn red at maturity. It can cover the ground and climb up bushes and trees.

This species is known in the Iberian Peninsula as naturalized in Lisbon and Porto, in Portugal (Nogueira, 1990). Also, it has been reported only for Russia in Europe, and for the Macaronesian archipelagos of the Azores and Madeira (DAISIE, 2016). This is the first report for Spain.

Opuntia elata Link & Otto ex Salm-Dyck, Hort. Dyck.: 361 (1834) (Cactaceae) Casual. New for Vallès Oriental county (Fig. 3A).

Barcelona: Vallès Oriental, Sant Feliu de Codines, La Serra, between Serrat de les Moles and Solanes, DG2915, 555 m, 18 Sept 2016, L. Sáez. A small but more or less well established group of plants was found growing on dry banks.

This prickly pear is native to Argentina, Bolivia, Brazil, Paraguay and Uruguay (Duarte et al., 2013) from the sea level up to 500 m in altitude.

This species is known as naturalized in Portugal (Marchante et al., 2008), eastern Spain (Guillot et al., 2009; Guillot, 2013; Sáez et al., 2015; López-Pujol et al., 2016), northern Italy (Selvaggi et al., 2009), Australia (Downey et al., 2010; PlantNET, 2016) and South Africa (Walters et al., 2012).

It was not possible to find *O. elata* in the neighboring area, although a detailed prospection was carried out.

Opuntia schickendantzii F.A.C. Weber, Dict. Hort.: 898 (1898) (Cactaceae) Naturalized. New for Baix Llobregat county (Fig. 3B).

Barcelona: Baix Llobregat, Sant Climent de Llobregat, between the hill of the Mas and the mountain pass of Can Bori, DF147760, 152 m, 3 Feb 2016, C. Gómez-Bellver & H. Álvarez, vidi vivam; ibidem, 31 March 2016, C. Gómez-Bellver (BC 951239, BCN 130206). It grows on both sides of a road, 7-8 m along a fence outside a rustic property, and on the other side, a group about 7-8 m^2 on the edge of a holm-oak wood, clearly in spreading process. We have recently seen this cactus in Cambrils (Tarragona), in the dry riverbed of Riudecanyes, 31TCF3347, and Alforja, 31TCF3550, 19 July 2016, with J. López-Pujol and N. Nualart.

It is native to the mountains of northern Argentina (Britton et al., 1919; Anderson, 2001) and Bolivia (Santecchia & Rajal, 2010). The terminal cladodes of this erect shrub bear some resemblance with *O. linguiformis*. Both are compressed, narrow, elongated, dull green and covered by many close-set areoles (VicFlora, 2015). These similitudes led some authors to misidentificate the earlier reports of this plant in Spain (Guillot, 2014).

Guillot & Sáez (2014) reported this species from eastern Spain as new for Europe. Further observations have confirmed that *O. schickendantzii* has a much wider distribution in the Iberian Peninsula: Vázquez (2014) and Guillot (2016) in Castellón, Aymerich (2015b) in Barcelona, Girona and Tarragona, and Sánchez et al. (2014) in western Andalucia. In the latter region the authorities have proceeded to its eradication.

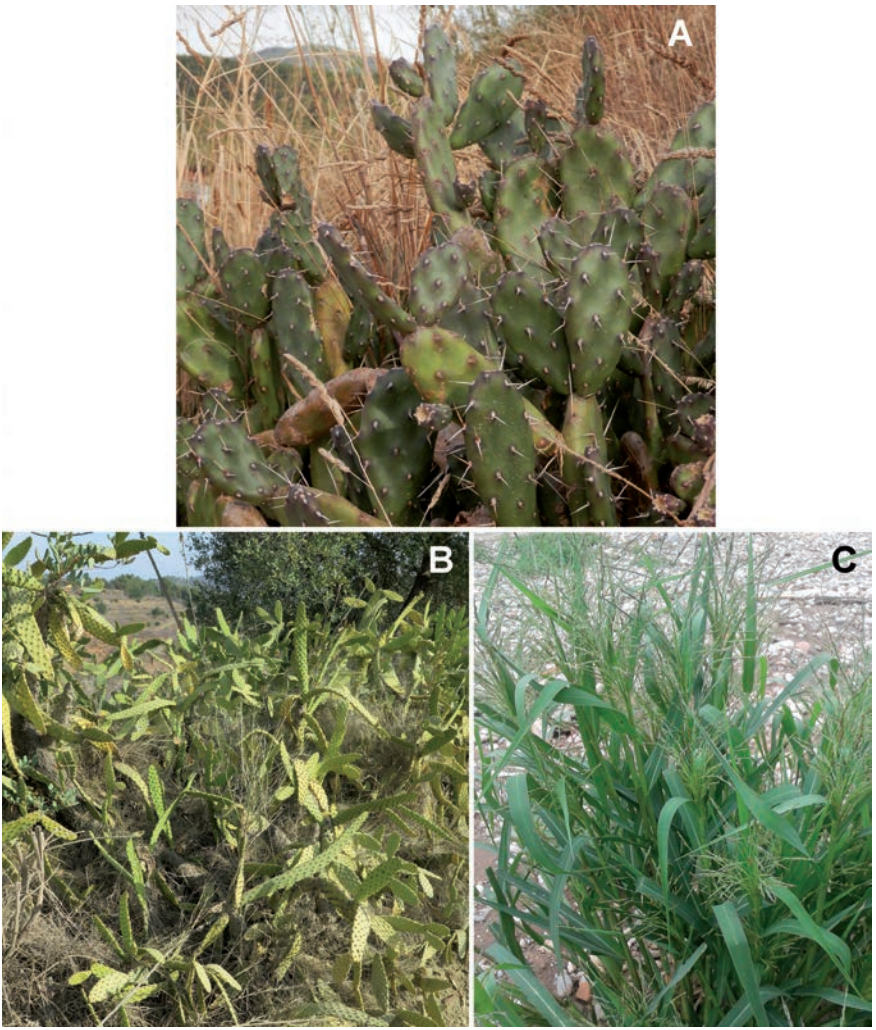

Figure 3. *Opuntia elata*, from Sant Feliu de Codines (A). *Opuntia schickendantzii*, from Sant Climent de Llobregat (B). *Panicum dichotomiflorum*, from El Papiol (C).

Panicum dichotomiflorum Michx., Fl. Bor.-Amer. 1: 48 (1803) (Poaceae)
Naturalized. New for the Baix Llobregat county (Fig. 3C).

Barcelona: Baix Llobregat, El Papiol, in the dry riverbed of Rubí, few meters from the bridge of the road B-150, DF1689, 42 m, 11 Sept 2015, H. Álvarez (BC 990118, BCN 126385). One plant of about 70 cm tall with many branches and in full bloom growing on gravel and sandy banks in the riverbed.

This annual grass is native to America. It was unintentionally introduced in Europe mixed with seeds of corn and soybeans (Casasayas, 1989). This species has acknowledged invasiveness potential (Sanz et al., 2001) and nowadays, it is clearly widespreading in Europe.

In the Iberian Peninsula it was reported for the first time in 1982 in Zaragoza. The first report in Catalonia dates from 1984 in Almenara, Lleida province (Izquierdo, 1985). This author suggests that the absence of hairs in the leaf sheath is the main differential character of this plant within the genus *Panicum* in Spain.

The chief distribution range of this plant in Catalonia includes the Girona region, the Ebro Valley, the flat areas of Lleida, Montblanc and Sant Romà de Sau (Font, 2012). The sampling that we recorded in el Papiol, near the central Catalan coast, represents the first one for the Llobregat river basin and for the county of the Baix Llobregat as well.

Phymosia umbellata (Cav.) Kearney in Leafl. W. Bot. 5: 190 (1949) (Malvaceae) Casual. New for the Iberian Peninsula (Fig. 4A).

Barcelona: Barcelonès, Collserola, road of the Aigües, near the the pathway, DF2785, 185 m, 3 Aug 2014, C. Gómez-Bellver (BC 879468). A single plant of about 2 m in bloom that grows in the shade of a tree. We have revisited it in 2015 and 2016.

This ornamental plant is native to the rainforests of Mexico. In Europe so far is only known as casual from Rhodes, Greece (Galanos, 2015), which seems to be persisting for more than 35 years.

Evergreen tree or shrub from 2.5 to 6 m, robust and scarcely branched. Stem, petiole and abaxial side of leaves densely tomentose. Leaves alternate to 20 cm, palmatilobed, the upper side is light green and the back side is dull pale green with prominent ribs. Stipules 4-7 mm long. Corolla campanulated with five heart-shaped petals 2-3.5 cm long, dark red, scarlet or purple, clawed at the base. Epicalyx trimerous, shorter than calyx. Ovary densely hairy at the top. The genus *Phymosia* has certain similarities with *Lavatera*, but it differs by having flowers grouped in number of (1)2-6 in axillary umbels, longer pedicels, and bracts of epicalyx spatulate or lanceolate, without trend to fuse towards the base (Fryxell, 1993).

Physalis ixocarpa Brot. ex Hornem., Hort. Bot. Hafn. 26 (1819) (Solanaceae) Naturalized. New for Baix Llobregat county (Fig. 4B).

Barcelona: Baix Llobregat, El Papiol, in the dry riverbed of Rubí, DF1688, 32 m, 20 Aug 2015, H. Álvarez (BC 990115, BCN 126383). Small plant of about 60 cm tall, growing on a nitrophilous substrate of sand and muds, in a flood area of the riverbed of the stream.

Physalis ixocarpa and *Ph. philadelphica* Lam. are native from Mexico. They have been used as food since pre-Columbian times and are still cultivated today. In the last decades, the taxonomical relationship between these two taxa has remained uncertain and they have often been mistaken with each other, likely due to the similarity between both plants regarding morphology, usage and areas of

distribution. Some publications proposeed both plants as synonyms (Hawkes, 1972). Recently, Sanz et al. (2012) recognized both taxa at species level.

This plant was fist reported for Catalonia in 1986 (Casasayas, 1989) under *Ph. philadelphica*. Aymerich & Sáez (2015) concluded that all the reports referred to Catalonia of *Ph. philadelphica* should be regarded as *Physalis ixocarpa*. Our plant bears small flowers and fruits generally less than 1.5 cm in diameter. These characteristics fit with the description given by Sanz & Sobrino (2012) for this species.

Figure 4. *Phymosia umbellata*, from Collserola (A). *Physalis ixocarpa*, from El Papiol (B). *Physalis philadelphica*, from Castellbisbal; general port (C), in early fruiting stage (D).

Physalis philadelphica Lam., Encycl. 2: 101 (1786) (Solanaceae)
Casual. New for Catalonia (Fig. 4C and D).

BARCELONA: Vallès Occidental, Castellbisbal, in the dry riverbed of Rubí, DF1690, 46 m, 16 Oct 2015, H. Álvarez (BC 990117, BCN 126384). One single plant with fruits, growing on a sandy and gravelly riverbed, as a part of the hygro-nitrophilous vegetation.

The first report for the Iberian Peninsula is from Guadalajara in 1821 (Carretero, 1983), an nowadays is distributed in northwest, center and eastern Spain (Sanz et al., 2012). We provide the first report for Catalonia.

Porophyllum ruderale (Jacq.) Cass., Dict. Sci. Nat., ed. 2., 43: 56 (1826) subsp. **ruderale** (Asteraceae)
Casual. New for Europe (Fig. 5A).

BARCELONA: Vallès Occidental, Castellbisbal, in the dry riverbed of Rubí, DF1689, 46 m, 16 Oct 2015, H. Álvarez (BC 990119, BCN 126386). One individual plant found in bloom in gravelly riverbed, in a zone covered by water only in major floods periods, among nitrophilous ruderal vegetation.

The Bolivian coriander is native to Mexico and distributed from southern United States to Argentina. It lives in warm-temperate places, from sea level up to 2000 m in altitude. It is often cultivated in familiar orchards to obtain their smelly and bitter leaves, very appreciated in salads or as a condiment.

Annual herbaceous plant, glabrous, from 40 to 150 cm, leaves slightly glaucous, ovate or elliptical to obovate, 8-35 mm wide, stalked, the basal opposite and the upper alternate. Flowers green-yellowish to brown.

Two subspecific taxa has been proposed, either as varieties (Cronquist, 1970) or subspecies (Johnson, 1969). Based on the latter author, the two subspecies can be distinguished as indicated below:

Subsp. *ruderale*: Achenes shorter than 9 mm, pappus longer than achenes, leaves usually elliptical with apex mucronate to obtuse, base usually attenuate. It is distributed from Costa Rica to all South America. It grows from lowlands up to 1300 m in altitude.

Subsp. *macrocephalum*: Achenes, usually longer than 10 mm, leaves widely (ob)ovate or rarely (ob)lanceolate, apex rounded, base usually rounded, sometimes attenuate. Its distribution range is further north than the previous one and reachs northern Brazil, southern Peru and Bolivia. It occurs in higher elevations, in submontane thickets or forests, sometimes in disturbed areas, often as a ruderal weed (Johnson, 1969; Villarreal, 2003).

The plant that we found fits the description given above for subsp. *ruderale*. As Johnson (1969) indicates, both subspecies are sympatric in northern South America, where it is not uncommon to find plants with intermediate characters.

So far, it remains unknown as casual or weed in Europe.

Figure 5. *Porophyllum ruderale*, from Castellbisbal (A). *Salvia hispanica*, from Santa Coloma de Cervelló (B).

Salvia hispanica L., Sp. Pl.: 25 (1753) (Lamiaceae)
Casual. New for the Iberian Peninsula (Fig. 5B).

Barcelona: Baix Llobregat, Santa Coloma de Cervelló, dry riverbed of Can Via, DF1779, 27 Nov 2015, H. Álvarez (BC 990111, BC 990112, BCN 127536). A small population of about 15 flowered plants in the margin of a crop of cherries, close of the stream.

It is native to Guatemala, Nicaragua and the center and south of Mexico. Popularly known as chia, *S. hispanica* does not tolerate frost, and could be cultivated from the sea level up to 2500 m (Ruíz et al., 2013). It has been traditionally used by indigenous people as food, medicines and cosmetics, and it was domesticated probably since the pre-Columbian period in order to improve its production. This selective process has driven evolution to obtain larger seeds, compact inflorescences, self-pollination (usually by means of cleistogamy) and loss of genetic variability (Hernández & Miranda, 2008). This plant has a worldwide reputation for its seeds, which contain oils rich in healthy fatty acids, protein and fiber (Cahill, 2003). Chia producing countries are increasing considerably its exports due to the growing demand for Western food and pharmaceutical industries (Mohd Ali et al., 2012).

In Europe *S. hispanica* is known from Sweden (ArtDatabanken, 2016), Germany (Natural History Museum Maastricht, 2016) and Belgium (Verloove, 2016).

Selenicereus grandiflorus (L.) Britton & Rose in Contr. U.S. Natl. Herb. 12: 430 (1909) (Cactaceae)
Casual. New for Europe (Fig. 6A, B and C).

BARCELONA: Baix Llobregat, Sant Climent de Llobregat, in the path Ral, that crosses the upper area of the Salom stream, DF1476, 113 m, 3 Feb 2016, H. Álvarez & C. Gómez-Bellver (BC 990191, BCN 129809). Beside a road. In the last three years we have seen some individuals climbing the trunk of a large tree.

The queen of the night is considered native from eastern Mexico, Mesoamerica to the Caribbean, although the exact native range is not well known (Wiersema & León, 2016). This species inhabits in tropical dry forests, tropical subdeciduous forests, flooded forests, and coastal dunes (Taylor et al., 2013). Different parts of the plant are used in traditional medicine and fruits are edible and the main ingredient for making spirits (Meza, 2011). This cactus is very popular in gardening for its spectacular flowers that remain open only for few hours and give off a vanilla-like fragrance. The most cultivated *Selenicereus* species are *S. grandiflorus*, with long cladodes, and *S. validus*, with much shorter cladodes.

The morphological characteristics and the habit of the plants that we found place this species in the tribe *Hylocereeae*, clambering or epiphytic cactus, well represented in the tropical forests of Central America (Kubitzki et al., 1993). Within this tribe, in addition to *Selenicereus*, there are two genus frequently cultivated as ornamental: *Epiphyllum*, with broad and flat stems and edible fruits, and *Disocactus*, an epiphytic hanging plant, non-climber, with daytime red flowers and stems round whether only at the base or throughout their length.

Selenicereus grandiflorus is a clambering cactus, with cylindrical stems, not jointed (or very little), 1-2.5 cm in diameter, very long, some of about 2-2.5 m, with 7-8 ribs, aureoles separate 1-2 cm along ribs, 6-8(18) radial spines, intermixed with light brown to whitish hairs. White flowers 18(25) cm long, with orange or brown linear external tepals. The distal part of the stem has some adventive roots for attach the plant to the substrate (Hawkes, 2004; Meyran, 2008). Some authors consider the existence of four subspecies.

Selenicereus grandiflorus is included in the CITES Appendix II that lists "species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled". So far, it is unknown as casual or weed in Europe, but this cactus is introduced in Florida (Wunderlin et al., 2016) and Mexico (Villaseñor & Espinosa-Garcia, 2004; Wiersema & León, 2016) in areas outside its natural range. Many garden nurseries offer this plant all around the world, even online.

There is no evidence that these individuals were cultivated: there are no houses or gardens nearby.

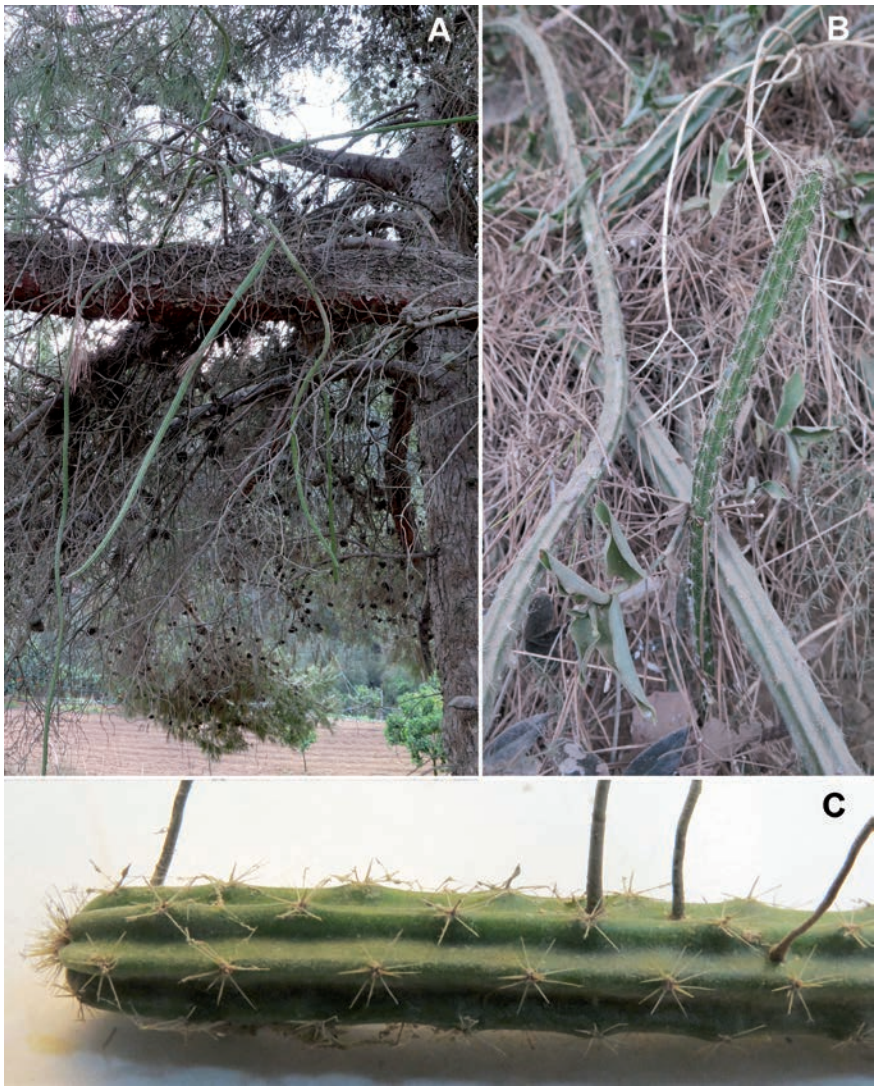

Figure 6. *Selenicereus grandiflorus*, from Sant Climent de Llobregat; growing on *Pinus halepensis* (A), young stem (B), adventive roots (C).

Sesamum indicum L., Sp. Pl.: 634 (1753) (Pedaliaceae)
Casual. New for Barcelona province (Fig. 7A and B).

Barcelona: Baix Llobregat, El Papiol, in the dry riverbed of Rubí, DF1688, 32 m, 31 Aug 2015, H. Álvarez (BC 990116, BCN 126382). We have located numerous

plants scattered along the riverbed of the final section of the stream, growing on gravel, sand and mud, as part of the hygro-nitrophilous vegetation.

Sesame is native to India and Africa. Within Europe is distributed in Belgium, Cyprus, France and Greece (DAISIE, 2016). It has been cultivated and domesticated from over 3000 years ago, and nowadays seeds are very popular worldwide as a condiment and for obtaining cosmetic oils.

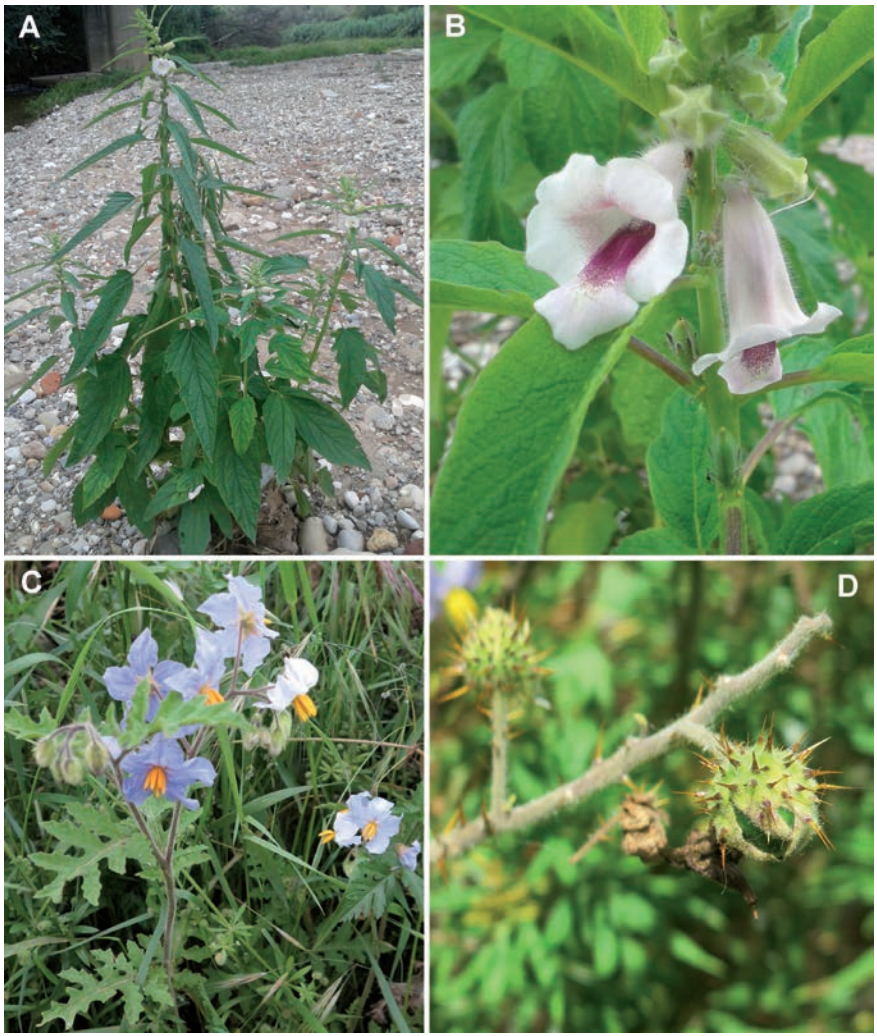

Figure 7. *Sesamum indicum*, from El Papiol; general port (A), flowers in detail (B). *Solanum sisymbriifolium*, from Mollet del Vallès; general port (C), immature fruit (D).

In the Iberian Peninsula it has been reported from Alicante (Camuñas & Crespo, 1998) and Amposta (Royo, 2006). Peri-urban and urban areas represent a potential source for the escape of this plant. Very likely, one important factor is the rise of sesame growings in these areas due to the recent trend of urban gardens.

Solanum sisymbriifolium Lam., Tabl. Encycl. 2: 25 (1794) (Solanaceae)
Casual. New for Barcelona province (Fig. 7C and D).

Barcelona: Vallès Oriental, Mollet del Vallès, close to the Can Prat industrial estate, on the right bank of the Besòs river, about 50 m upwards from the pedestrian bridge across the river, DF3598, 53 m, 20 May 2016, C. Gómez-Bellver (BC 990258, BCN 130202). Population of 25-30 individual plants in bloom. We revisited it a month later, still flowering and early fruiting.

Satansbos is a South American species of temperate climate, frequent in the center and north of Argentina and in Uruguay. It is a ruderal and nitrophilous plant that usually grows in roadsides, wastelands and as a weed of crops.

The presence of this species outside its area of origin was probably favored by its use as a biocontrol of nematodes that parasite other Solanaceae with economic relevance such as tomatoes, potatoes and eggplants. It is intentionally cultivated near the crop as a trap for the cysts made for these worms, and this is carry out by removing the plant before the end of the reproductive nematode cycle (Dias et al., 2012; Sorribas et al., 2014). But in some cases, the plant used as trap crop has become invasive, as in South Africa (Olckers et al., 1999).

This species is distributed in almost all European countries (DAISIE, 2016), probably as ephemeral (Verloove, 2016), except in Italy, where it is considered naturalized. In the Iberian Peninsula is known from Andalusia, the Basque Country and Galicia. Regarding Catalonia, Andreu et al. (2012) and Andreu & Pino (2013) listed “a single report” without a concrete location. We are aware about two confirmed records from Garrotxa county, in Girona: a report without specific locality in Oliver (2009) and a voucher specimen from Argelaguer collected in 2005 by J. Mayné & A. Mallol (HGI 6065). In 2004 J. Llistosella (pers. comm.) photographed some plants in la Llagosta, Vallès Oriental, in Barcelona province, DF3395, 300 m from the C-33 motorway toll.

It seems that this plant is well established in our area, and its future spread is quite plausible.

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