

On the identity of *Opuntia elata* s.l. (Cactaceae) introduced in the Mediterranean region. A taxonomic and nomenclatural update

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Abstract. *Opuntia elata* and *O. monacantha* are two species of *Opuntia* series *Armatae* traditionally accepted as naturalized in the Mediterranean region and Europe. However, a review based on the analysis of the available images and on the criteria of the most recent taxonomic proposals shows that *O. elata* s.s. is not present. The plants so far assigned to *O. elata* belong to *O. bonaerensis*, a clearly differentiated species, or to *O. rioplatensis* and *O. canterae*, both species similar to *O. elata* and recently segregated. The situation looks similar for South Africa and Australia, where the iconography shows other species of this group but not *O. elata* in the strict sense.

Keywords: Cactaceae, Europe, alien flora, invasive species.

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Introduction

The group of species of the genus *Opuntia* (Cactaceae) gathered in the series *Armatae* K. Schum. (1899, 1903) [= series *Elatae* Britton & Rose (1919)] is the most conspicuous of the large shrubby *Opuntia* with orange flowers in southern South America. It comprises a set of old names, published between 1819 and 1930, very little studied and collected, and, in general, only known from their original descriptions. Given the scant information, until the beginning of the 21st century many of these species were erroneously attributed to the name *O. paraguayensis* K. Schum.

The first modern critical revision of this series was carried out by Leuenberger (2001a,b; 2002), who showed that *O. paraguayensis* is a synonym of *O. ficus-indica* (L.) Mill. and recognized eight species, using the classic morphological characters for Cactaceae taxonomy: shape of articles, spination and habit of the plants. This author reinstated the name *O. elata* Salm-Dyck, not used long ago, with a very broad concept that included different taxa, a criterion that was normally used indiscriminately to describe South American species with orange flowers. Given the evidence that the classic characters are extremely variable and led to confusion at the specific and synonymic level, Font (2014) proposed another set of main morphological characters to circumscribe the species within the *Armatae* series. The morphology of the flower buds, the colour of the stigma and the colour of the internal tissue of the fruits were

discrete and useful main characters that allowed to delimit groups, diagnose species and reorganize a synonymy that was historically problematic, while the classic characters were also used, but secondarily. With these new criteria, *O. elata* was circumscribed only to individuals that show buds with blunt apex, suppressing from this taxonomic entity the plants with acute buds formerly included under *O. elata* by Leuenberger (*O. elata* s.l., Leuenberger, 2002). Thus, the *Armatae* series was delimited by the following species: *O. arechavaletae* Speg., *O. bonaerensis* Speg., *O. elata* S-D., *O. megapotamica* Arechav., *O. monacantha* Haw., and *O. rioplatensis* Font (as *O. rioplatense*), in addition to *O. penicilligera* Speg., which is currently considered allochthonous for the Argentinean flora.

In later years, there have been new taxonomic proposals for this group. Las Peñas *et al.* (2017) add the arilar pubescence as a main character to define species within this series, and they reintegrated *O. rioplatense* to *O. elata* with a varietal rank and recovered the name *O. stenarthra* K. Schum. However, in a later paper, the same authors recognized *O. rioplatense* with specific range (Köhler *et al.*, 2021). Köhler & Majure (2020) recovered the name *O. canterae* Arechav. for an Uruguayan taxon. These last species were practically ignored and not collected since their description, so they were referred to the synonymic lists due to the little knowledge about them. There are also other proposals, not argued, of combinations and synonymy of these plants

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within *O. elata* (Guiggi, 2017) that are rejected in this paper, because they are contradictory with the molecular results and with the morphology used here for defining groups of species.

From the phylogenetic approach, the *Armatae* series is supported by the studies of Majure *et al.* (2012), Majure & Puente (2014), Realini *et al.* (2014a) and Köhler *et al.* (2020). It basically contains tetraploid species ($2n=44$), with the exception of *O. arechavaletae* and *O. monacantha*, for which diploid counts $2n=22$ are also available (Realini *et al.*, 2014b; Las Peñas *et al.*, 2017); so far, the chromosome number of *O. canterae* remains unknown.

Species of this group are more or less naturalized in Europe and the Mediterranean basin, and also in South Africa and Australia, where some are reported as invasive. Only two species have been formally recorded in the Mediterranean basin. One is *O. monacantha*, which is clearly established, known in almost all the circum-Mediterranean countries and is considered common in some coastal regions; this species is also well established in South Africa and Australia. The other species reported, much rarer and more local, would be *O. elata*, with an accepted presence in Portugal (Domingues de Almeida & Freitas, 2012), in Spain (Sanz *et al.*, 2011; Aymerich & Sáez, 2019), in the Peninsular Italy (Galasso *et al.*, 2018) and on the Sicily island (Raimondo *et al.*, 2010). Plants attributed to *O. elata* only appear to be locally naturalized in Europe, but are more common and, in some cases, clearly invasive in South Africa and Australia.

Formal records of *O. elata* in Europe and the Mediterranean basin are scarce, apparently less than twenty, and when accompanied by images it is evident that they refer to plants with a remarkably morphological diversity. More or less detailed reports are known from northern Portugal (Freitas *et al.*, 2008; Verloove & Alves, 2016), from Catalonia (Sáez *et al.*, 2015; Gómez-Bellver *et al.*, 2016; López-Pujol *et al.*, 2016; Verloove & Guiggi, 2019), and the Valencian Community (Guillot *et al.*, 2009; Guillot & Lodé, 2012; Guillot, 2013) in Eastern Spain, and in Piemonte (Guiggi, 2009) and Tuscany (Guiggi & Messina, 2014; Bonari & Angilioni, 2016; Gei *et al.*, 2016) in Peninsular Italy. The presence of *O. elata* s.l. in Mediterranean France is doubtful (Tison *et al.*, 2014), while it is not cited in the lists of alien flora of Greece (Korakari *et al.*, 2021), Turkey (Uludağ *et al.*, 2017) or in other Mediterranean areas.

These Mediterranean bibliographic references always use the name *O. elata*, although occasionally plants from some areas have been named also *O. bonaerensis* in informal media (internet pages). The situation is similar in South Africa and Australia, where these plants can be invasive and are reported

as *O. elata* in both botanical works and technical reports or webs.

Due to the revision, in recent times, of the taxonomy of *Opuntia* ser. *Armatae* in its South American native range and the morphological diversity observed in the plants introduced in Europe, we consider necessary to update the identities of these European plants, with the aim of homogenizing their taxonomic treatment and nomenclature according to the latest approaches.

Material and Methods

This work is based on the review of available images of *Opuntia elata* s.l. apparently naturalized in Europe (no images have been found for Mediterranean countries in Africa and Asia), complemented with own observations of plant populations of this group known in the east of the Iberian Peninsula. Most of these images come from Internet webs (especially inaturalist.org) where many amateur naturalists and taxonomists publish their own photos. Therefore, this is mainly the result of the analysis of information provided by “citizen science” initiatives. These photographs were identified in some cases as *O. elata* in the webs, but very frequently also as *Opuntia* sp. or erroneously as other species of *Opuntia*. Images available in the botanical bibliography have also been used, but in a minority way, because only a part of the papers includes photographs and, when they exist, often are of poorer quality than those available on Internet. Only the images of plants that are explicitly reported as naturalized and those that apparently are, due to the location of the images and/or their habitat, have been used. Those that, according to available information, seem only cultivated, have been excluded.

For the taxonomic assignment of the plants, characters -or combinations of characters- that are considered discriminant have been used. The main characters, referred to *O. elata* s.s. and the related taxa that have been identified in Europe as a result of this work, are summarized in Table 1 and Figure 1, and are expanded upon in the specific comments of the results section. When not enough diagnostic characters were appreciated, the images have not been referred to any taxon.

The species considered in the analysis are those that are accepted in the updated list of Cactaceae by Korotkova *et al.* (2021) and that at some point had been included in *O. elata* s.l., which for Europe have turned out to be three: *O. bonaerensis*, *O. canterae* and *O. rioplatensis*. The circumscription of these species follows the criteria of Font (2014) and Köhler & Majure (2020).

Table 1. Main distinctive characters of *Opuntia elata* and related taxa found in Europe.

	<i>O. elata</i>	<i>O. rioplatensis</i>	<i>O. canterae</i>	<i>O. bonaerensis</i>
Flower colour	orange	orange	orange	orange
Stigma lobes colour	creamy	creamy	creamy/yellowish	green
Flower bud apex	rounded, obtuse	acute	acute	acute
Fruit shape	obpyriform	obovate	obovate-elongate	obconical
Internal fruit colour	green	green	green	purple
Fertility	fertile	fertile	sterile	fertile
Stem segments shape	long ellipsoid	obovate	subcylindrical	spathulate, elliptic

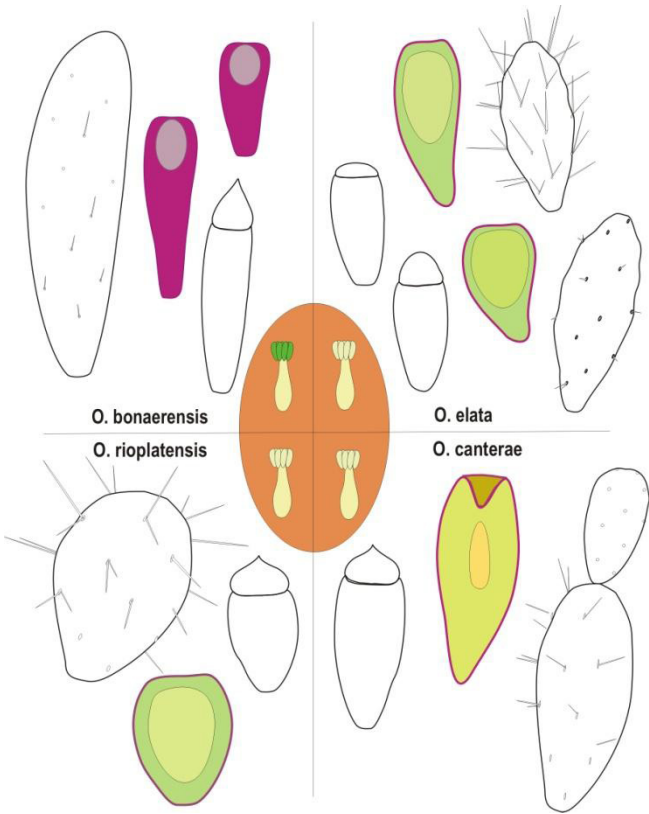


Figure 1. Graphical synthesis of the main distinctive characters. Drawings are not to scale.
All these species may have spineless individuals or populations.

Results

Once the review was carried out, we identified, with a good or acceptable degree of confidence, the taxa of the images obtained in 29 European localities (16 from Spain, ten from Portugal, two from Italy, one from Greece). This review confirms the presence in Europe of three taxa of the series *Armatae* previously cited as *Opuntia elata*: *O. bonaerensis*, *O. rioplatensis* and *O. canterae*. The first species has been detected in Portugal, Spain, Italy and Greece, while the other two have been recognized only in Spain (Figure 2). However, the review has not allowed to found images of naturalized plants with characters belonging to *O. elata* in the strict sense (according to Font, 2014), with the sole exception of one from Sicily (Italy), from the small island of Filicudi, that both by image and by geolocation it seems clearly a cultivated specimen (inaturalist.org/observations/28541499).

The information obtained for each species is presented in the following sections, with different details

depending on the sources of information, generally greater for bibliographic reports. For each locality, the following information is shown: state, administrative division of higher rank (district in Portugal, autonomous community in Spain, region in Italy), municipality, data on the habitat, observation date and source of data (bibliographic or image).

Opuntia bonaerensis Speg. (Figure 3)

A taxon recovered by Font (2014), extracted from the synonymy of *O. elata*, within which it was for about 100 years. The specific treatment is supported by previous molecular studies (Realini *et al.*, 2014a), reinforced by the results of Köhler *et al.* (2020), who showed that it is a different evolutionary lineage of *O. elata*. Recently, its presence has been confirmed in Uruguay, as well as a relictual population in Brazil (Köhler *et al.*, 2020).

This is the taxon that differs most from *O. elata* s.s., with which it does not share any of its main characters. It is recognized by a set of easily verifiable characters in the field: acute buds, green stigma and short to long obconic

fruits, with purple internal pericarpel tissue, spatulate to long elliptic stem segments of a shiny dark green colour and with a continuous outline, sometimes with a subareolar purple macula. The original description of *O. bonaerensis*

refers to a plant without spines or rarely with 1–2 spines per areola, this being the most abundant phenotype, although there are also other very spiny forms that have straight upward spines of a dark or greyish colour.



Figure 2. European locations of confirmed taxa. Blue: *Opuntia bonaerensis*. Red: *O. rioplatensis*. Orange: *O. cantherae*.

Native distribution: Argentina (Provinces of Buenos Aires, La Pampa, South of Córdoba, rare to the South of Entre Rios, possibly naturalized in Mendoza); Uruguay (Departments of Colonia and Montevideo); Brazil (extreme west of Rio Grande do Sul).

As an introduced species, it has been identified in 17 European localities:

- Greece: Thasos Island: Nisos Thasos, field borders, 2019 (image at: inaturalist.org/observations/32129073)
- Italy: Piemonte: Cannero Riviera, suburban habitat, 235 m (images at: http://dbiodbs.units.it/carso/chiavi_pub26?spez=15063; this same locality was reported, without images, by Guiggi, 2009)
- Italy: Tuscany: Prato, Figline di Prato, 250 m, field borders, 2011–2016 (images at: https://www.actaplantarum.org/galleria_flora/galleria1.php?aid=4950&seo=Opuntia%20elata; Antonino Messina; this same locality was reported, without images, by Guiggi & Messina, 2014, and image without locality in Guiggi, 2014).
- Portugal: unknown place, in the northern half of the country (images at: <http://plantas-espeoas.blogspot.com/2011/11/opuntia-elata-salm-dyck.html>; Duarte Silva)
- Portugal: Coimbra: Cantanhede, Tocha, Lagoa Salgueira, next to a dirt road and in a pinewood in coastal dunes, 12-IX-2015 (Verloove & Alves, 2016)
- Portugal: Coimbra: Alvares, June 2021 (image at: inaturalist.org/observations/84041958)
- Portugal: Guarda: Guarda, Faia, west to the Capela da Sagrada Familia, c. 500 m, open pinewood next to houses, 2017 (images at: inaturalist.org/observations/8009027; inaturalist.org/observations/15603664)
- Portugal: Guarda: Figueira de Castelo Rodrigo, Castelo Rodrigo, suburban habitat, 24-VI-2021 (image at: inaturalist.org/observations/88435467)
- Portugal: Lisboa: Loures, Santo António dos Cabaleiros, grassland in a suburban area, 2020 (image at: inaturalist.org/observations/63000438)
- Portugal: Vila Real: Alijó, Pinhao, unknown habitat (apparently grassland and roadsides), 2015–2018 (images at: inaturalist.org/observations/14822933; inaturalist.org/observations/14849525; inaturalist.org/observations/14822963; inaturalist.org/observations/14822933)
- Portugal: Viseu: Sao Joao da Pesqueira, south to the village, abandoned field, 2016 (image at: inaturalist.org/observations/62967224)
- Portugal: Viseu: Sao Joao da Pesqueira, next to Miradouro de Sao Salvador do Mundo, scrubland, 2019 (images at: inaturalist.org/observations/40890355; inaturalist.org/observations/40890354; inaturalist.org/observations/40890352; inaturalist.org/observations/40890350; inaturalist.org/observations/40890351)
- Portugal: Viseu: between Abreiro and Vieiro, Mirandela, scrubland in former fields, 2020 (image at: inaturalist.org/observations/61381132)
- Spain: Castilla y León: Zamora, Toro, UTM 30TUL09, 710 m, suburban habitat, 11-VI-2021 (images at <https://www.biodiversidadvirtual.org/>)

herbarium/Opuntia-1-de-3-img640950.html; Javier Soto)

- Spain: Comunidad Valenciana: Nàquera, UTM 30SYJ9420, 349 m, mountain slope next to an urbanized area, 12-III-2007 (Guillot *et al.*, 2009; as *O. elata* var. *elongata*).
- Spain: Comunidad Valenciana: Nàquera, track to the hermitage of San Francisco, 264 m,

vacant lot, 12-III-2007 (Guillot *et al.*, 2009; as *O. elata* var. *elongata*).

- Spain: Comunidad Valenciana: Serra Calderona, naturalized in dry scrubland (images at: http://www.florasilvestre.es/mediterranea/Cactaceae/Opuntia_elata.htm; José Quiles)



Figure 3. *Opuntia bonaerensis* (La Pampa, Argentina). Left: plant; right: flower detail, with green stigma (Fabián Font).

***Opuntia rioplatensis* Font (Figure 4)**

A species recently splitted from *O. elata*, based on *O. elata* var. *obovata* Walther, which is a clearly differentiated haplotype (Realini *et al.*, 2014a - published as *O. elata* 27) and phylogenetically is included in the clade Elatae (Majure *et al.*, 2012). It is a component of the Argentinean flora known since the end of the 19th century by the first cactologists, but it was always erroneously cited as *O. vulgaris* Mill. or *O. paraguayensis* K. Schum., and in more recent times, until 2014, as *O. elata*.

It has buds with acute apex, a creamy stigma, short ovate and purple-reddish fruits with greenish pulp, and short obovate-elliptic cladodes with continuous and thick contour. In contrast, *O. elata* has a rounded or obtuse flower bud apex, elongated-oblong cladodes with somewhat wavy outlines, and obpyriform fruits. These main characters are constant in all the populations studied. The return to the varietal range *O. elata* var. *obovata* proposed by Las Peñas *et al.* (2017: 111), based on a continuous secondary character (pubescence of the arils) and on the supposed existence of populations with others shape buds, was finally abandoned by the same authors in favour of *O. rioplatensis* (Köhler *et al.*, 2021). It is a taxon recently incorporated to the Brazilian flora (Köhler *et al.*, 2018).

Native distribution: Argentina (Provinces of Buenos Aires, Entre Ríos, Corrientes, Santa Fe, SE

Córdoba, E La Pampa); Brazil (Extreme west of the State of Rio Grande do Sul); Uruguay (Western Uruguay).

As alien plant, it has been identified in 6 European locations:

- Spain: Catalonia: Cambrils, left bank of Riera de Riudecanyes, UTM 31TCF3347, 20 m, suburban habitat, 4-VII-2014 (López-Pujol *et al.*, 2016)
- Spain: Catalonia: Mont-roig del Camp, Riera de Vilanova, UTM 31TCF2950, 90 m, suburban habitat, 12-IX-2018 (Verloove & Guiggi, 2019)
- Spain: Comunidad Valenciana: Bétera, UTM 30SYJ18, 93 m, scrubland, 28-XI-2019 (Guillot, 2016)
- Spain: Comunidad Valenciana: La Pobla de Vallbona, Lloma Llarga, UTM 30SYJ390, 166 m, vacant lot, 15-V-2009 (Guillot & Lodé, 2012)
- Spain: Extremadura: Mérida, highway A-5, UTM 29SQD20, highway borders, 18-IX-2017 (Vázquez & García, 2017; as *O. humifusa*)
- Spain: Navarre: Sartaguda, southern border of the village, slope over Barranco street, UTM 30TWM7792, 335 m, dry suburban habitat, 8-X-2021 (P. Aymerich, pers. obs.)



Figura 4. *Opuntia rioplatensis*. Left: plant (Sartaguda, Navarre, Spain) (Pere Aymerich); right: obovate and fertile fruits (Fabián Font).

Opuntia canterae Arechav. (Figure 5)

This is another species included until very recently in the synonymy of *O. elata*. It has elliptic to long oblanceolate articles, with a subcylindrical tendency, the apex of the flower bud is acute to conical, the stigma whitish and the fruits long obconic, internally green. Current populations in Uruguay are reported as sterile, with stamens without anthers and consequently with seedless fruits, a characteristic also observed in naturalized plants in Europe. The sterility suggests that it could be a hybridogenous taxon (Köhler & Majure, 2020), although Arechavaleta (1902) mentioned the finding among the mostly sterile specimens of some fruits with seeds.

Native distribution: Uruguay (Departments of Canelones, Montevideo, Río Negro and San José).

In Europe it has been detected in 6 locations, limited to the eastern part of the Iberian Peninsula:

- Spain: Catalonia: Artés, UTM 31TDG1228, 315 m, suburban habitat, 2013–2021 (Sáez *et al.*, 2015, and our own observations)
- Spain: Catalonia: Cambrils, left bank of Riera d'Alforja north to T-314 highway, UTM 31TCF3551, 90 m, temporary watercourse bed, 2018–2019 (Verloove & Guiggi, 2019, and our own observations). This location has been erroneously referred to Vinyols i els Arcs municipality by Verloove & Guiggi (2019).
- Spain: Catalonia: Capmany, south to the village, UTM 31TDG930, 140 m, suburban habitat, 12–XII-2015 (López-Pujol *et al.*, 2016)
- Spain: Catalonia: Cruïlles, Daró river bank south to the village, UTM 31TEG0144, 40 m, low density pinewood, 18-IX-2014 (Enric Bisbe, pers. com. & images)
- Spain: Catalonia: Sant Feliu de Codines, La Serra, UTM 31TDG2915, 555 m, former fields in a dry slope, 18-IX-2015 (Gómez-Bellver *et al.*, 2016)

- Spain: Murcia: Librilla, UTM 30SXG49, 235 m, fields, 12-V-2014 (images at: <http://www.biodiversidadvirtual.org/herbarium/Opuntia-B-2d3-img478950.html>; Emilio Alejandro Pagán)

Discussion

This review of plants previously attributed to *Opuntia elata* in Europe shows that none belongs to *O. elata* s.s., but to three other taxa. The most widespread species has turned out to be *O. bonaerensis*, which appears to be the most naturalized taxon of the series *Armatae* in Europe after *O. monacantha*. *Opuntia rioplatensis* and *O. canterae* are known, for now, only from limited areas of Spain. The apparent absence of *O. elata* s.s. (Font, 2014) could be due to climatic limitations, since in its natural area it is distributed in tropical and subtropical regions where frosts are almost absent, with a limit to the south marked by the lower basin of the Paraná River and the left bank of the Río de la Plata, on the border between the provinces of Entre Ríos-Buenos Aires and Argentina-Uruguay. As stated in the methodology, the criterion followed in this work is that *O. elata* according to Font (2014) is restricted to plants with blunt or rounded flower bud apex, creamy-whitish stigma, and obpyriform fruits internally greenish; a secondary characteristic is the presence of the wavy outline of the articles, slightly depressed between the areolas. Morphological variation is wide in *O. elata*, but many forms (sometimes considered species, e.g. *O. cardiosperma*) with this combination of characters can be best treated as infraspecific taxonomic ranks of *O. elata*.

The three species found in Europe generally occur as escapes close to residences, in more or less anthropized habitats, and do not show an invasive behaviour. The exception may be the north of Portugal, where it seems that *O. bonaerensis* spreads frequently in natural and



Figure 5. *Opuntia canterae* (Artés, Catalonia, Spain). Top image: plant (Pere Aymerich). Bottom left: flower with creamy-yellowish stigma (Marc Sallent); bottom right: sterile fruits (Pere Aymerich).

semi-natural habitats (grasslands and thickets) and could have some invasive tendency, already suggested by Verloove & Alves (2016). This greater implantation is probably related to an early arrival of the species, since Domingues de Almeida & Freitas (2012) indicate that the first data on the presence of *O. elata* s.l. in Portugal dates back to 1910. The populations and individuals from other areas of Europe seem to have been introduced recently, probably after 1990, the time when another boom in the cactus trade and in xerogardening began.

The presence in Europe of plants attributable to *O. canterae* is particularly interesting, as it is a species currently only known from very few localities in its presumed natural distribution area in Uruguay, and because its sterility means that it apparently spreads only by vegetative multiplication (Köhler & Majure, 2020). The search on internet pages led to the knowledge that an ornamental cultivar consisting of *Opuntia* plants with small and subterete articles, from subspherical to ovate, that grow in a rosary, has been commercialized for many years under the name *O. canterae*. Apparently, the small space of the pot and the low nutrient substrate make these plants remain dwarf (observation shared by Roy Mottram, pers. comm.). It is not sure that the plants identified as wild *O. canterae* in Europe and South Africa have naturalized from discarded remains of these dwarf ornamental plants, but it seems likely that when these plants are planted in places with sufficient soil it develop

well, until they acquire the proper characteristics of the original populations of *O. canterae*.

Although it has not been the main purpose of this work to analyze the identity of the plants called *O. elata* in extra-European areas where they have also become naturalized, the situation seems quite similar in Australia and South Africa, where they frequently behave invasive. For these two regions, it has not been possible to identify plants attributable to *O. elata* s.s either, although they do not present the climate limitations existing in Europe. A non-exhaustive analysis of floristic works, technical documents and digital pages quickly confirms that *O. bonaerensis* is also the most widespread species, perhaps the only one, in Australia, where it is currently classified as invasive under the name *O. elata* (e.g. Morrissey *et al.*, 2020), although *O. bonaerensis* was already cited as a synonym of *O. paraguayensis* by Telford (1984). In South Africa, there is more diversity of naturalized species related to *O. elata* s.l., in addition to *O. bonaerensis*. It is the only region outside of South America where the naturalized presence of *O. megapotaamica* Arechav. has been verified, based first on images available in GBIF and recently published (Paterson *et al.*, 2021). Although Paterson *et al.* (2021) report many South-African sites for *O. elata* and this species was recognized as one of the most problematic Cactaceae (Henderson & Wilson, 2017), the images available look like *O. canterae*. An

image published in Walters *et al.* (2011), as *O. elata* var. *elata*, shows a possible second record of *O. canterae* fertile plants after the original description in Uruguay (Arechavaleta, 1902).

A review of synthetic works on introduced cacti (e.g. Novoa *et al.*, 2015) and reference webs on global biodiversity (idigbio.org, eol.org, gbif.org, inaturalist.org, ipni.org, itis.gov, iucnredlist.org, theplantlist.org, powo.science.kew.org, tropicos.org, worldfloraonline.org) or territorial biodiversity (Australia: ala.org.au, biodiversity.org.au, florabase.dpaw.wa.gov.au, vicflora.rbg.vic.gov.au; South Africa: sanbi.org; United States: npgsweb.ars-grin.gov; Argentina: flora.argentina.edu.ar) shows that the very broad criterion of *O. elata* established by Leuenberger (2002), which is currently obsolete, is predominantly applied. Only few sites accept *O. bonaerensis*, a species very clearly differentiated from *O. elata*. *Opuntia rioplatensis* is not recognized as species but some webs accept the criterion of Las Peñas *et al.* (2017), citing *O. elata* var. *obovata*. *Opuntia canterae*, due to its recent rediscovery (Köhler & Majure, 2020) is not reported or appears as doubtful, cited as *O. elata* or *Opuntia* sp. Although it is true that there are still taxonomic aspects pending of satisfactory resolution within *Opuntia* series *Armatae*, these excessively synthetic treatments affect negatively the understanding of native or introduced biodiversity, so it is adequate to update these databases according to the specific delimitations of Korotkova *et al.* (2021).

Author contribution statement

P.A.: Conceptualization, Research, Methodology, Resources, Visualization, Writing (first draft, review and editing)

F.F.: Research, Methodology, Resources, Writing (review and editing).

Conflict of interest

None.

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