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The Checklist of the Sardinian Alien Flora: an Update

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Abstract

Alien plants colonization, due to the fast spreading of highly invasive *taxa*, is more and more a serious source of concerns for habitat and species conservation. Apart direct *in situ* intervention, it is of major importance to acquire the best and up to date knowledge about alien *taxa* that currently threaten the integrity of wild and valuable environments. In this light, here is presented the update to the checklist of alien vascular flora of the island of Sardinia (Italy) on the basis of the new findings, nomenclatural adjustments, and revision of diffusion status of alien *taxa*. The checklist at present, consists of 541 *taxa* (84 doubtful) which represent 17% of the whole flora of the island; 22 *taxa* are new to the island and 7 of them for Italy. Neophytes represent the majority of the whole alien flora (301, 66% of the total) and, in confront to archaeophytes, gather nearly all invasive *taxa* (54 *vs* 4). The new findings are all neophytes. Phanerophytes (42%) are the most representative biological form and Americas represents the region that mostly contributes to the Sardinian alien flora (33%). Further analysis highlights that, in terms of number of *taxa*, highly anthropically impacted environments such as synanthropic (36%) and agricultural (23%) are the eligible habitats for most of the alien species in Sardinia while coastal areas and wetlands, beyond hosting a lower number of *taxa*, are characterized by the relative highest number of invasives.

Keywords: alien *taxa*, conservation, islands, invasions, Mediterranean, Sardinia

Introduction

Alien flora has become an important component of wild flora and stands as a real challenge for environmental management in the future. As this phenomenon is evolving quickly, it is now considered to be one of the most significant threats to European flora (Lambdon *et al.*, 2008a).

Indeed in Europe the total number of alien plants listed in the DAISIE database has reached the dramatic amount of 5789 (Lambdon *et al.*, 2008a; Pyšek *et al.*, 2009) with a more than threefold increase in confront to the 1568 *taxa* reported in *Flora Europaea* (Tutin *et al.*, 1964-1980). Although part of this increase can be attributed to a continuing influx of alien flora to individual countries (Pyšek *et al.*, 2003) and the continent as a whole, this phenomenon alone cannot explain the huge difference. In fact another important reason is the raising awareness of the issue of alien species and the increasing research intensity in the last decades (Pyšek *et al.*, 2006). Among these, national checklists and their updates together with on-line databases are gaining in importance and are more useful than a floral work of the *Flora Europaea* kind (Lambdon *et al.*, 2008a; Tutin *et al.*, 1964-1980) to depict the status of alien plants diffusion in Europe where, at present, 6.2 new alien *taxa* capable of naturalization are arriving each year (Pyšek *et al.*, 2009).

The inventory of alien flora of Italy lists 1023 non-native species and subspecies, which account 13,4% of all the Italian flora (Celesti-Grapow *et al.*, 2009), corresponding to an increase of 1.2% from the previous work of Viegi *et al.* (1974). These data appear even more severe considering the rise of the total number of *taxa* of the Italian checklist since then.

Before the present update, the alien flora of Sardinia represented the 18.8% of the total flora (Podda *et al.*, 2010) that constituted more than a twofold increase in less than 20 years (9.2% in Viegi, 1993). On this basis, it is obvious how the progress of invasive plants is becoming a major concern for native and threatened *taxa* protection.

Similarly, this phenomenon has been observed in other Mediterranean islands that share with Sardinia a similar Mediterranean climate such as that of the nearby islands of Corsica and the Balearic Archipelago where the alien flora has grown in richness of *taxa*. The finding of new 68 alien *taxa* in 11 years corresponds to an increase of 18.1% from the Corsican 1996 list (Jeanmonod *et al.*, 2011; Natali and Jeanmonod, 1996) while Podda *et al.* (2010) reported 40 new alien *taxa* for the Balearic Archipelago in confront

to the previous checklist (Moragues and Rita, 2005). This demonstrates how, apart the improved expertise in alien *taxa* recognition, insular areas, especially in the Mediterranean Basin, seem to be very prone to alien plant invasions (Sala *et al*., 2000).

For this reason, it is of essential importance to maintain up to date the Sardinian checklist of the alien flora on the basis of the investigations that occurred since the last reports (Podda *et al*., 2010, 2011).

In this work the checklist of the Sardinian alien flora is provided and discussed from a biological, ecological, chorological and historical point of view as updated according to the new findings and the nomenclatural changes.

Materials and methods

The basis for the current checklist is represented by the first checklist of the Sardinian alien flora (Bacchetta *et al*., 2009) and the relative updates provided in the subsequent works about the comparison with the Balearic Islands (Podda *et al*., 2010, 2011). The area of investigation comprises the whole Sardinian territory, that covers an approximate area of 24.089 km^2, including about 300 minor islands.

Data relative to the Sardinian alien flora have been subjected to intense revision and integrated with new findings as a result of field activities during the last 3 years. *Taxa* in the checklist (Annex 1: published on the journal web site, as a supplementary file) and data concerning their entry or introduction before or after 1492/1500 A. D. (archaeophyte or neophyte), diffusion status (casual, naturalized or invasive) and ecology are arranged in alphabetical order and grouped into families. Moreover the biological form and the origin are also provided.

The status of invasiveness was determined and ordered on the basis of the criteria proposed by Richardson *et al.* (2000), elaborated by Pyšek *et al.* (2004), and reviewed according to Richardson and Pyšek (2006). Archaeophytes and neophytes, these latter including ephemorophytes in the sense of Holub and Jirásek (1967) and escapees from cultivation, were differentiated depending on their introduction before or after 1492/1500 A. D., respectively. Since it is still a matter of debate if some species can be considered native or not and, in this latter case, if they are archaeophytes or neophytes (Carlton, 1996; Celesti-Grapow *et al.*, 2010), for these *taxa* for which such doubts still persist, we have preferred the attribution to the status of doubtful (D).

New entries in the alien flora checklist are marked with one asterisk or two (for the plants reported in other authors' works) in Annex 1, while the relative data on the sites of finding (name, coordinates, altitude, habitat, diffusion status, thermotype and ombrotype, potential invasiveness as reported in literature and herbarium data) are listed in Tab. 1.

From a nomenclatural point of view and for the attribution of the *taxa* to the plant families it was followed the on-line databases of The Plant List website (2010) and of the Med-Checklist website (Euro+Med, 2006-onwards). Concerning the validity of the plant families it was followed what is reported in the Angiosperm Phylogeny Group III (Chase and Reveal, 2009; Stevens, 2001-onwards) while for gymnosperms and pteridophytes the works of Christenhusz *et al*. (2011a, 2011b). Finally, when available, dedicated taxonomic revisions have been taken into account.

Concerning the biological forms, Raunkiaer lifeform classification (Raunkiaer, 1934) was followed with the adjustments and the abbreviations reported in Pignatti (1982) while data on the areas of origin of the various *taxa* follow what reported by Bacchetta *et al*. (2009) or the relative literature.

The distribution of the *taxa* among the different habitats has been based on their frequency of occurrence as deduced from the specific literature and from field observation according to the following seven categories as proposed by Bacchetta *et al.* (2009): (1) synanthropic; (2) agricultural; (3) wetlands; (4) coastal; (5) riparian; (6) woodlands; (7) matorrals.

Taxa were also classified according to their intentional or not intentional anthropogenic introduction, and following the definitions proposed by the Convention on Biological Diversity (CBD) (Miller *et al*., 2006). Regarding introduction pathways, the categories proposed by Sanz Elorza *et al*. (2004) and Hulme *et al*. (2008b) were followed.

Cultivated, ornamental or forestry *taxa* that do not show any degree of spontaneization have not been taken into account in the present work.

Calculations have been made on the checklist except for those *taxa* that must still be considered doubtful regarding their historical entrance in Sardinia, those that have not been found for a long time and whose actual presence or geographic origin are still unclear.

Results and discussion

On the basis of the recent findings and the revision of herbarium specimens the Sardinian checklist of the alien flora now consists of 541 *taxa* representing the 17% of the whole Sardinian flora (Conti *et al*., 2005, 2007).

Regarding the additions to the Sardinian alien flora, 22 *taxa* are new for the island, seven of which are new also for the Italian territory (Tab. 1). Moreover, with respect to the previous checklist (Bacchetta *et al.*, 2009), 44 new *taxa* from other authors' works are listed in Annex 1 (market with **), 10 of which were already reported in Podda *et al*. (2010).

Of the 541 *taxa*, 84 are doubtfully native in Sardinia and, in comparison with the previous reports (Bacchetta *et al*., 2009; Podda *et al.*, 2010), this group has increased

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Tab. 1. New *taxa* for the Sardinian alien flora

n°	Taxon	Site/Location (place name, municipality, province)	Coord. Geogr. (datum WGS 84)	Elevation	Habitat	Thermotype and ombrotype	Herbarium (CAG)
1	*Antirrhinum siculum* Mill.	Monte Zara, Monastir (CA)	39°22'54.93" N 09° 3'0.86" E	105 m	Synanthropic	Thermomedit. sup. Dry inf.	G. Orrù, G. De Martis *et* B. Mulas, 12.V.2008
2	*Asparagus setaceus* (Kunth) Jessop	Centro abitato, Gonnosfanadiga (VS)	39° 29' 45,40" N 08° 39' 52,58" E	180 m	Synanthropic	Thermomedit. sup. Dry sup.	F. Mascia, 12.IX.2011
		Centro abitato, San Gavino Monreale (VS)	39° 33' 02,18" N 08° 47' 57,11" E	55 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 22.VIII.2011
3	*Bidens aurea* (Ait.) Sherff.	Riu Cixerri, Siliqua (CA)	39° 17' 55,93" N 08° 48' 26,26" E	54 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 03.XI.2010
		Riu S. Giovanni, Selàrgius (CA)	39° 15' 45,24" N 09° 9' 51,45" E	14 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 16.IX.2011
4	*Catharanthus roseus* (L.) G. Don	Centro abitato, Oristano (OR)	39° 54' 17,04" N 08° 35' 23,05" E	10 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 05.VI.2011
		Centro abitato, Villasor (CA)	39° 22' 49,90" N 08° 56' 10,31" E	20-25 m	Synanthropic	Thermomedit. sup. Dry sup.	F. Mascia, 20.V.2011
5	*Datura wrightii* Regel	Zona Cimitero, Villasimius (CA)	39° 08' 07,38" N 09° 31' 22,55" E	20 m	Synanthropic	Thermomedit. sup. Dry inf.	V. Lazzeri, L. Podda, 31.V.2012
6	**Grindelia robusta* Nutt.	Marina di Orosei, Orosei (NU)	40° 22' 28,46" N 09° 43' 7,35" E	0,5 m	Agricultural	Thermomedit. sup. Dry sup.	G. Bacchetta, 27.XII. 2012
7	*Impatiens balfourii* Hook. f.	Sa 'uca manna, Sadali (NU)	39° 49' 05,94" N 09° 16' 41,27" E	708 m	Synanthropic	Mesomedit. sup. Subhumid sup.	F. Mascia, 28.VIII.2011
8	**Ipomoea cairica* (L.) Sweet	Cruxi 'e ponti, Samassi (VS)	39° 29' 9,64" N 08° 54' 17,45" E	54 m	Synanthropic	Thermomedit. sup. Dry sup.	F. Mascia, 20.V.2011
9	**Jaborosa integrifolia* Lam.	Argiolas, Siliqua (CA)	39° 17' 57,52" N 08° 49' 01,94" E	50 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 26.IX.2011
		Is Locis, San Giovanni Suèrgiu (CI)	39° 07' 20,61" N 08° 31' 16,75" E	21 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 26.IX.2011
10	**Kalanchoë* × *houghtonii* D.B. Ward	S. Elia, Cagliari (CA)	39° 11' 11,06" N 09° 09' 12,82" E	8 m	Synanthropic	Thermomedit. sup. Dry inf.	V. Lazzeri, L. Podda, 10.VI.2012
11	*Lathyrus odoratus* L.	Is buronàrgius, Elmas (CA)	39° 15' 09,39" N 09° 04' 02,24" E	11 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 28.IV.2012
12	*Myoporum insulare* R. Br.	Timiama, Villasimius (CA)	39° 07' 08,28" N 09° 31' 13,55" E	2 m	Coastal	Thermomedit. sup. Dry inf.	V. Lazzeri, L. Podda, 31.V.2012
13	*Nigella sativa* L.	Sassu, Arborea (OR)	39° 49' 33,31" N 08° 35' 42,55" E	0 m	Agricultural	Thermomedit. sup. Dry sup.	F. Mascia, 05.VI.2011
14	**Oxalis carnosa* Molina	Centro abitato, Elmas (CA)	39° 15' 56,92" N 09° 02' 41,82" E	2 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 11.III.2011
15	*Paulownia tomentosa* (Thunb.) Steud.	Casa Maxia, Serramanna (VS)	39° 24' 59,44" N 08° 53' 54,00" E	36 m	Agricultural	Thermomedit. sup. Dry sup.	F. Mascia, 20.V.2011
16	*Populus deltoides* Marshall	Rio Pelau, Cardedu, (OG)	39°47'10.19"N 09°40'5.21"E	3	Riparian	Thermomedit. sup. Dry sup.	G. Bacchetta, 23.VI.2012
17	*Sempervivum tectorum* L.	Centro abitato, Sadali (NU)	39° 49' 07,22" N 09° 16' 39,75" E	712 m	Synanthropic	Mesomedit. sup. Subhumid. sup.	F. Mascia, 28.VIII.2011
		Centro abitato, Seui (OG)	39° 50' 22,48" N 09° 19' 14,20" E	770 m	Synanthropic	Mesomedit. sup. Subhumid. sup.	F. Mascia, 27.III.2011
18	**Sparaxis tricolor* (Schneev.) Ker Gawl.	Sa Masa, Gonnesa (CI)	39°16'32.40"N 08°27'25.22"E	13	Wetlands	Thermomedit. sup. Dry sup.	G. Bacchetta 09.IV.2011
19	*Stenotaphrum secundatum* (Walter) Kuntze	Monte Urpinu, Cagliari (CA)	39° 13' 0,49" N 09° 08' 6,48" E	50 m	Synanthropic	Thermomedit. sup. Dry inf.	G. Bacchetta, F. Mascia, L. Podda, 13.IX.2010
20	**Talinum paniculatum* Gaertn.	Monte Urpinu, Cagliari (CA)	39° 13' 0,49" N 09° 08' 6,48" E	50 m	Synanthropic	Thermomedit. sup. Dry inf.	G. Bacchetta, F. Mascia, L. Podda, 16.X.2011
		Centro abitato, Vallermosa (CA)	39° 21' 54,46" N 08° 47' 36,56" E	75 m	Synanthropic	Termomedit. sup. Dry sup.	F. Mascia, 07.VI.2011
21	*Taxodium distichum* (L.) Richt.	Lago piccolo, Poggio dei Pini (CA)	39° 8'48.56"N 08°58'41.90"E	57 m	Wetlands	Thermomedit. sup. Dry sup.	G. Bacchetta, 03.VI.2011
22	*Tristagma uniflorum* (Lindl.) Traub	Centro abitato, Sestu (CA)	39° 17' 38,21" N 09° 5' 48,84" E	45 m	Synanthropic	Thermomedit. sup. Dry inf.	F. Mascia, 13.III.2010

Note: * indicates that the *taxon* is new for the Italian flora

from 20 to 84 since 32 are new for the flora, 10 were already reported as doubtful in Podda *et al*. (2010) and 42 are now considered doubtful (Annex 1).

The diffusion status of 44 naturalized *taxa* has changed since 16 are now considered invasive and 28 casual while, among six *taxa* previously considered casual, four are now listed as naturalized and one as invasive. Moreover, the status of nine *taxa* has changed from invasive to naturalized in six cases and to casual in other three cases, while six doubtful *taxa* are now considered naturalized in three cases and casual in the remaining three cases.

In this update, 66% (previously 62%) of the Sardinian alien flora is represented by neophytes (301 *taxa*) while 156 *taxa*, corresponding to the 34% (previously 38%), are archaeophytes (Fig. 1). Concerning the 22 new *taxa* (Tab. 1), 18 currently must be considered not more than barely casual whilst the other five can come within the category of the naturalized but without showing any invasiveness now. However, among them, at least six *taxa* are considered capable of invasiveness in Europe: *Bidens aurea* (Gassó *et al*., 2012), *Datura wrightii* (Verloove, 2008), *Impatiens balfourii* (Schmitz and Dericks, 2010), *Kalanchoe* × *houghtonii* (Guillot Ortiz, 2005, 2008; Guillot Ortiz *et al*., 2009), *Paulownia tomentosa* (Essl, 2007), *Stenotaphrum secundatum* (Ferrer Merino and Donat, 2011) and one, *Ipomoea cairica*, is reported as invasive at least outside Europe (Huang *et al*., 2009; Weber *et al*., 2008).

Of the 457 alien *taxa* (doubtful excluded), 58 (13%) are invasive, 160 (35%) are naturalized and 239 (52%) are casual. Among the neophytes the number of invasive *taxa* is quite high and has increased from 50 to 54 (11% against 18%) in comparison with the previous data, while 95 (32%) are naturalized and 152 (50%) are casual. Differently, the archaeophytes still show very little invasiveness since only four *taxa* (2%) (Fig. 1), *Acanthus mollis* ssp. *mollis*, *Arundo donax*, *Ricinus communis* and *Sorghum halepense* can be considered as invasive, while 65 (42%) are naturalized and 87 (56%) casual.

Alien *taxa* found in Sardinia belong to 87 families, among which the most represented are *Fabaceae* (45 *taxa*) followed by *Poaceae* (33) and *Asteraceae* (31) (Fig. 2). These families have a well known weedy tendency and are often among the most representative alien plants in the European territory (Daehler, 1998; Pyšek, 1998; Pyšek *et al*., 2009). Notwithstanding, non-Mediterranean families such as *Aizoaceae* and *Cactaceae* display the highest number of *taxa* that can be considered invasive in Sardinia, as expected, due to their absolute lack of archaeophytes (Fig. 3). Making a comparison with the native flora of Sardinia, it appears that important families, in terms of number of *taxa*, such as *Apiaceae*, *Caryophyllaceae*, *Orchidaceae*, *Plumbaginaceae* and *Ranunculaceae* are scarcely represented or totally absent among the alien flora (Annex 1).

The biological spectrum (Fig. 4) reveals a situation where phanerophytes (42%) and terophytes (28%) are dominant among the Sardinian alien flora while other life forms such as hemicryptophytes (11%), geophytes (10%), camephytes (7%) and hydrophytes (2%) are clearly less representative. These data suggest that the woody habit is a major factor for land colonization in the Mediterranean as previously reported (Blondel and Aronson, 1999) and particularly in Sardinia, even if the annual component is likewise important. Indeed, even if not matching with the biological spectrum of the native Sardinian flora (Bocchieri, 1995), this is consistent with what previously observed by other authors for Sardinia and other islands characterized by similar Mediterranean climates (Lloret *et al*., 2004) where the extended dry season appears as one of the main features of selection. In this situation, alien phanerophytes and therophytes occupy different niches and base their success in colonizing the land through different ways to face water scarcity, the first group through their architecture while the second just avoiding the dry season (Allen, 2001). Moreover, it is undoubtful that another important previous factor that affects the present biological spectrum involves the direct human intervention in selecting which species to introduce in the island, and this is particularly true with woody plants for ornamental or forestry uses.

Concerning the geographical origin of the alien *taxa* in Sardinia (Fig. 5) a marked dominance of the American group can be observed (33%) while Mediterranean (15%) or European *s. l. taxa* (9%) represent only a minority thus

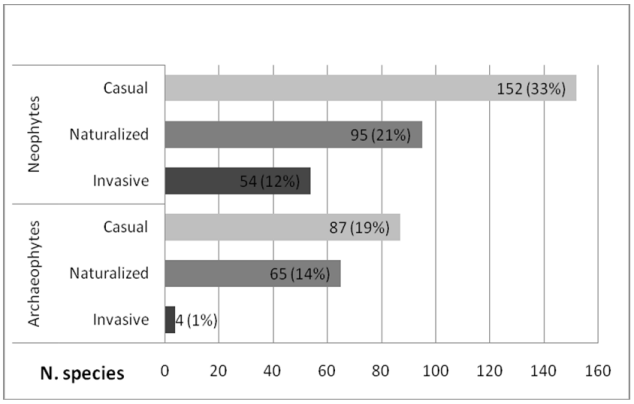

Fig. 1. Number of *taxa* per diffusion status among neophytes and archaeophytes

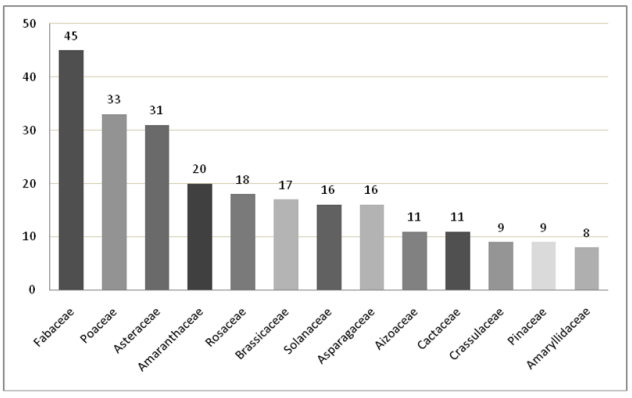

Fig. 2. Number of *taxa* in the most representative families in the Sardinian alien flora

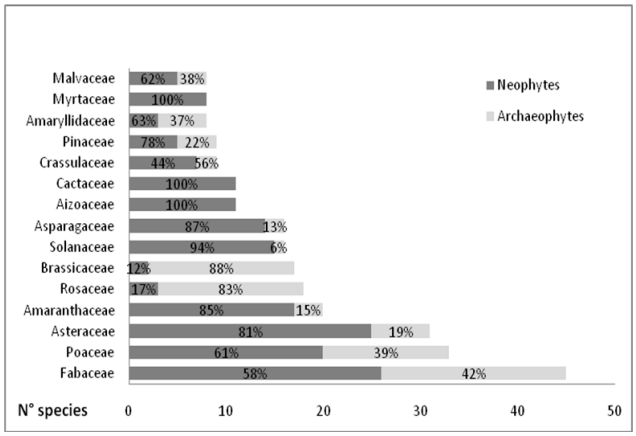

Fig. 3. Number of *taxa* and percentage repartition among neophytes and archaeophytes per family. Only the 15 most representative families are represented

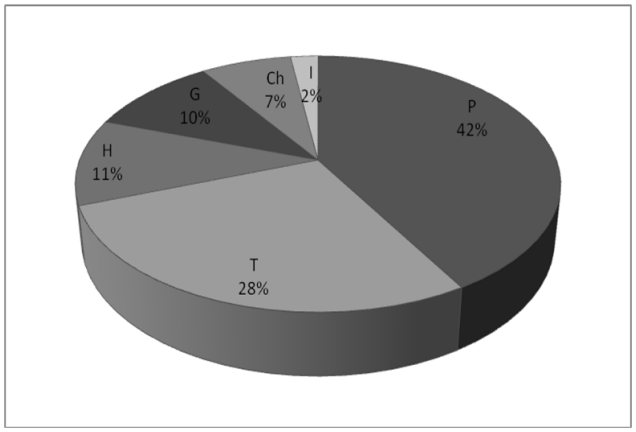

Fig. 4. Biological spectrum of the Sardinian alien flora. Phanerophytes (P), chamaephytes (Ch), hemicryptophytes (H), geophytes (G), hydrophytes (I), therophytes (T)

suggesting that in most of the cases the introduction may have been intentional or involuntary but often through human action.

Regarding the kind of habitat where alien *taxa* have been found in Sardinia (Fig. 6), it appears clear that areas that have been severely modified by human activities such as synantropic (36%) and agricultural areas (23%) are more prone to alien flora colonization. In contrast, more natural habitats such as matorrals and woodlands (respectively 3% and 7%) seem to show an enhanced resistance, in terms of number of *taxa*, to alien plant invasions mainly due to a higher competitiveness of native woody species and to the scarcity of free spaces to be occupied. Instead, wetlands (12%), coastal (10%) and riparian habitats (9%) show an intermediate number of alien colonizing *taxa* and this data might be related to the more restrictive environmental conditions. However, although these latest habitats host a smaller number of alien *taxa*, it must be pointed out that they are the most susceptible to deterioration due to human pressure and/or alien *taxa* establishment (Bacchetta *et al*., 2008; Blondel and Médail, 2009; Mascia *et al*., 2009; Schnitzler *et al*., 2007; Zedler and Kercher, 2004). Moreover, a seriously large extent of the Sardinian coasts -especially sandy shores- is affected by the worrying presence of two of the most invasive pests, *Acacia saligna* and *Carpobrotus* sp. pl. and, together with wetlands, where *Azolla filiculoides, Cortaderia selloana* and *Eichhornia crassipes* constitute a not less severe threat, among all the examined habitats show the highest percentage of invasive *taxa* in proportion to the whole alien flora present in these two habitats (Fig. 7). This means that, despite the relatively low number of alien *taxa*, coasts and wetlands are remarkably far more endangered by alien plants than any other habitats, likely due to their intrinsic homogeneity and relatively high similarity with original habitats of the invaders (Lambdon *et al*., 2008b), especially in the cases where natural sites are stressed by human activities (Shea and Chesson, 2002).

In reference to the introduction pathways (Fig. 8), as already suggested by the data regarding the biological form and the geographical origin and in accordance with the previously discovered by other authors (Hulme *et al*., 2008a; Lambdon *et al*., 2008b; Pyšek *et al*., 2009), most of the alien *taxa* found in Sardinia are supposed to be introduced through human activities and, in most cases voluntarily (79%). Correspondingly, the analysis of the whole alien flora has revealed that cultivation for ornamental purposes is the main source of alien *taxa* in Sardinia (45%)

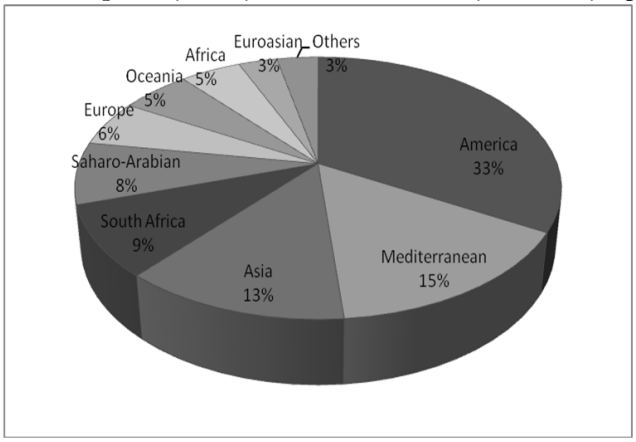

Fig. 5. Geographical origin of the Sardinian alien flora

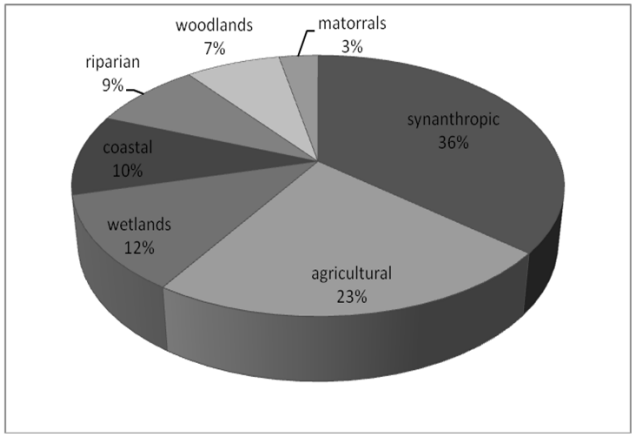

Fig. 6. Distribution of the Sardinian alien flora among different habitats

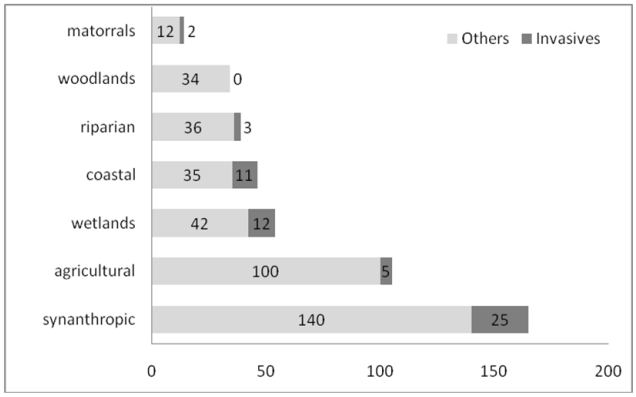

Fig. 7. Alien (light grey) and invasive (dark grey) flora of sensitive habitats

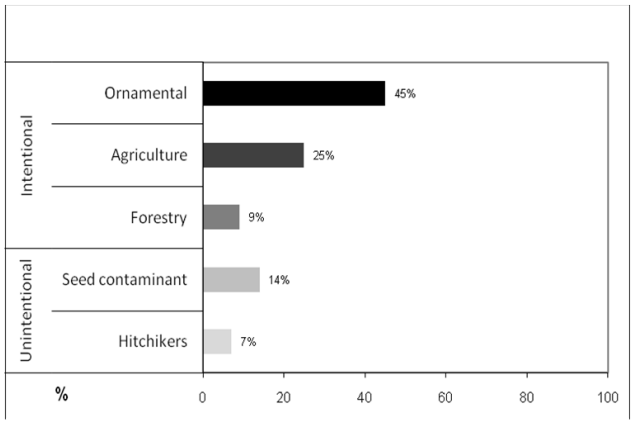

Fig. 8. Introduction pathways of the Sardinian alien flora

followed by crops (25%), weeds (14%), forestry (9%) and accidental elements (7%). In relation with what reported by Lambdon *et al*. (2008b), the ornamental group displays the highest stress tolerance suggesting how this feature is a key factor for success in Mediterranean scenarios. In this regard, stressing environments such as sandy shores may be easily and extensively colonized by strong invaders. Notwithstanding, it is still possible that the overall number of *taxa* due to accidental introductions in a certain area could be underestimated for the difficulty in finding certain proofs that validate these data (Mack *et al*, 2000).

In the end, concerning the number of alien plants in relation to the extent of the studied area (number of *taxa*/log area), the total Sardinian alien *taxa* have shown a density of 53,6 with a fair increase from the last report (46,8; Bacchetta *et al*., 2009) but still markedly lower than that of the whole Italian territory (81,1; Celesti-Grapow *et al*., 2010). Instead, only the total neophytes density has slightly increased since 2010 from 28.8 to 29.8 while all other densities (total naturalized plus invasive, total neophytes, total archaeophytes, naturalized plus invasive neophytes and naturalized plus invasive archaeophytes) have shown a bold decrease.

Conclusions

The issues related to alien plants and their possible management have been taken into account only recently, especially from an institutional and organized point of view. Despite the lack of a specific European legislation, what was stated during the 1992 Convention on Biological Diversity in its 8th Article implies that the knowledgde of the status and the taxonomy of invasive or potentially threatening *taxa* should be the most comprehensive possible by those at the forefront of biodiversity conservation. In this perspective, the data here presented constitute the necessary update of the Sardinian alien flora checklist and, on this basis, the picture that emerges is characterized by the presence of a relatively high number of *taxa* of concern for the examined territory, including those that constitute a severe threat for ecosystems integrity. In detail, it is worth noting that Sardinian alien flora shows certain dominances of neophytes over archaeophytes, of phanerophytes over other biological forms, of casuals over estabilished *taxa*, of the American element over other geographical origins and the likely intentional introduction over accidental one. Notwithstanding, among casuals, a fair component of potentially invasive *taxa* is present and, given the overexploitation which has undergone for a long time in Sardinia and as insularity seems to be a positive factor for the spreading of aliens (Sala *et al*., 2000), it is desirable to keep watch over these *taxa* at present, when they are still not widespread.

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