# Inventory of the non-native flora of Italy

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# Inventory of the non-native flora of Italy

L. CELESTI-GRAPOW[1], A. ALESSANDRINI[2], P. V. ARRIGONI[3], E. BANFI[4], L. BERNARDO[5], M. BOVIO[6], G. BRUNDU[7], M. R. CAGIOTTI[8], I. CAMARDA[7], E. CARLI[1], F. CONTI[9], S. FASCETTI[10], G. GALASSO[4], L. GUBELLINI[11], V. LA VALVA[12], F. LUCCHESE[13], S. MARCHIORI[14], P. MAZZOLA[15], S. PECCENINI[16], L. POLDINI[17], F. PRETTO[1], F. PROSSER[18], C. SINISCALCO[19], M. C. VILLANI[20], L. VIEGI[21], T. WILHALM[22], & C. BLASI[1]

[1]*Plant Biology Department, Sapienza University, Rome, Italy,* [2]*Cultural Heritage Institute, Bologna, Italy,* [3]*Plant Biology Department, University of Florence, Florence, Italy,* [4]*Museo di Storia Naturale di Milano, Milan, Italy,* [5]*Botanical Garden, University of Calabria, Rende (CS), Italy,* [6]*Regional Natural Sciences Museum of Aosta Valley, Saint-Pierre (AO), Italy,* [7]*Department of Botany and Plant Ecology, University of Sassari, Sassari, Italy,* [8]*Department of Applied Biology, University of Perugia, Perugia, Italy,* [9]*Environmental Sciences Department, University of Camerino, Camerino, Italy,* [10]*Biology Department, Basilicata University, Potenza, Italy,* [11]*Floristic Research Centre of Marche, Pesaro, Italy,* [12]*Biology Department, Federico II University, Naples, Italy,* [13]*Biology Department, University Roma Tre, Rome, Italy,* [14]*Biology Department, University of Lecce, Lecce, Italy,* [15]*Plant Biology Department, University of Palermo, Palermo, Italy,* [16]*Landscape Study Department, University of Genova, Genova, Italy,* [17]*Biology Department, University of Trieste, Trieste, Italy,* [18]*Civic Museum, Rovereto, Italy,* [19]*Plant Biology Department, University of Turin, Turin, Italy,* [20]*Biology Department, University of Padova, Padova, Italy,* [21]*Biology Department, University of Pisa, Pisa, Italy, and* [22]*Museum of Nature South Tyrol, Bolzano, Italy*



**Abstract**

In this paper we present a comprehensive inventory of the non-native vascular flora of Italy, which was produced within the project "A survey of the Italian non-native flora", funded by the Italian Ministry for the Environment. Previously published floristic accounts were the main source of information. Historical records were critically revised and integrated with recent literature, data from herbaria and some unpublished information, so as to obtain a complete, up-to-date catalogue of the non-native vascular plant species that occur spontaneously in Italy. The inventory lists 1023 non-native species and subspecies, which account for 13.4% of all the Italian flora. The Italian non-native flora was divided, according to its residence time, into 103 archaeophytes and 920 neophytes. According to its current invasion status, it was classified into 437 casual (42.7% of all non-native) and 524 established taxa, the latter being divided into 361 naturalized non-invasive (35.3%) and 163 invasive taxa (15.9%). The inventory includes a group of 62 species (6.1%) that lack recent records (i.e. since 1950). By combining local expertise into a unified, nationwide scheme using a standardized method and terminology, the inventory provides the essential scientific basis for the development of plant invasion research and management in the country.

**Keywords:** *Alien flora, Italy, plant invasions, residence time, species inventories*

## Introduction

Owing to the dual need to control the spread of harmful invasive species and to provide new theoretical insights into evolutionary and ecological processes (Davis 2006), human-driven biotic invasions have, ever since the classic work by Elton (1958), yielded an increasing number of studies published in scientific papers, reviews and books (e.g. Drake et al. 1989; Mooney et al. 2005; Nentwig 2007), thereby becoming one of the "hottest topics" in ecological research

Correspondence: L. Celesti-Grapow, Plant Biology Department, Sapienza University, Rome, Italy. Tel: +39 0649912845. Fax: +39 49912420. Email: laura.celesti@uniroma1.it

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(Sol 2001; Henderson et al. 2006; Pyšek et al. 2006).

Within this context, comprehensive data sets such as national inventories of alien species, i.e. those species transported by man to new regions in which they are not native (see Table I for definitions), are widely recognized as providing a crucial source of information and an important tool for invasion research and management (Cadotte et al. 2006; Richardson & Pyšek 2006).

In Europe, national inventories of non-native plants, ranging from complete catalogues to specialized lists that focus on the most relevant species, have been compiled for several countries (e.g. Clements & Foster 1994; Weidema 2000; Essl & Rabitsch 2002; Gojdičová et al. 2002; Pyšek et al. 2002b; Reynolds 2002; Kühn & Klotz 2003; Balogh et al. 2004; Muller 2004; Sanz Elorza et al. 2004; Hill et al. 2005; Tokarska-Guzik 2005; Wittenberg 2005; Almeida & Fretias 2006; Verloove 2006); moreover, the international DAISIE project (Delivering Alien Invasive Species Inventories for Europe) has provided a global inventory on alien plant taxa in the pan-European region (Lambdon et al. 2008). However, as fewer studies of this kind have been conducted in southern Europe, and generally in the Mediterranean Basin countries, than in northern, central and western Europe, there is a general need for updated, complete sets of data on non-native floras, collected by means of a standardized approach, to use as a basis for plant invasion research in this region.

Located as it is in southern Europe, and stretching across the centre of the Mediterranean sea, from the Alps south to the coasts of Africa, with relatively marked altitudinal and latitudinal ranges, Italy represents a good case study for non-native plants. The varied phytoclimate, lithology, morphology, human population density and land use have created a high degree of environmental heterogeneity (Blasi 2007). Italy's central position within the Mediterranean Basin has also strongly influenced plant invasion, insofar as its territory has been a centre of intense exchange and colonization of non-native biota as a result of human trade and migrations ever since ancient times (Blasi et al. 2007).

A team of botanists from the Italian Botany Society has been working on a national catalogue of the non-native vascular plant species since 2002 (Camarda et al. 2005; Viegi et al. 2005). In the years 2005–2008, the team became involved in the project "A survey of the non-native flora of Italy", which is funded by the Italian Ministry for the Environment, is directed by Professor Carlo Blasi and is aimed at providing a report on current knowledge of the non-native flora in the country (Blasi 2006; Celesti-Grapow et al. 2009).

This paper presents the results of the first phase of this project, designed to produce an up-to-date inventory of the non-native vascular flora that occurs spontaneously in Italy. The second phase consists of a report on the distribution and threats posed by each species in the catalogue (Celesti-Grapow et al. in press). The aim of the third and final phase of the project is to use this information to draw up a watch list of the most relevant species, i.e. those species which need to be closely monitored owing to the rapid rate at which they are spreading and to their current or potential impact (Blasi et al. 2008).

Italy, like other countries in Europe, has a long tradition of floristic research on non-native plants, whose appearance and establishment have long been documented by botanists (Saccardo 1909). General catalogues of the Italian non-native flora were published in 1916 (Béguinot & Mazza) and 1974 (Viegi et al.). A large amount of information has been accumulated since then, but has never been systematically collected in a general study. While some information has been gathered in regional reviews (e.g. Viegi & Cela Renzoni 1981;

Table I. Terminology adopted in the present study (modified from Pyšek et al. 2004a).

| | |
|---|---|
| Non-native plants | (synonyms: alien, allocthonous, introduced, non-indigenous, exotic, xenophytes) Plant taxa in a given area whose presence is due to intentional or unintentional human involvement |
| Casual plants | (synonym: not established) Alien plants that may flourish and even reproduce occasionally outside cultivation, but that eventually die out because they do not form self-replacing populations, and rely on repeated introductions for their persistence |
| Naturalized plants | (synonym: established) Alien plants that sustain self-replacing populations for at least 10 years, without the direct intervention of people, through the recruitment of seeds or ramets capable of independent growth |
| Invasive plants | A subset of naturalized plants that produce reproductive offspring, often in very large numbers and at considerable distances from the parent plants, and thus have the potential to spread over a large area |
| Archaeophytes | Alien plant species introduced before the year 1492, i.e. before the discovery of America by European colonizers. This date is conventionally rounded off to 1500 |
| Neophytes | Alien plant species introduced after the year 1492. This date is conventionally rounded off to 1500 |
| Doubtful aliens | (synonym: cryptogenic) Species whose native or introduced (archaeophyte) status remains undefined owing to insufficient information |

Viegi et al. 1990, 2003a, 2003b; Peccenini 1992; Viegi 1992–1993, 1999; Martini & Poldini 1995; Brundu et al. 2003; Camarda & Brundu 2004), the majority of the data are dispersed in innumerable sources, ranging from botanical publications that do not focus on aliens, to herbaria in museums and scientific institutions scattered throughout the country, and countless local and specialized journals of natural sciences whose circulation is limited or that are difficult to access outside the scientific community. General lists of non-native plant species in Italy may be extracted from major floras (e.g. Tutin et al. 1964–1980, 1993; Pignatti 1982; Greuter et al. 1984–1989; Conti et al. 2005a, 2006a). However, as they use different criteria to include taxa in the catalogue and to define the native versus alien status, these works provide considerably diverse lists. Moreover, since standard floras focus on the native biota, they do not generally provide detailed information on non-native species (Pyšek 2003). Consequently, the survey of the non-native flora of Italy arose from the need to organize this large, heterogeneous body of data in a general compilation using standardized methods.

A further major goal of the project "A survey of the non-native flora of Italy", is to differentiate the species according to the role they play in plant invasion in the country. Indeed, the vast majority of the introduced species do not develop into invasions, but a few have a negative impact (Williamson 1996; Brundu et al. 2001). Although the distribution and spread of the species are the main topics of the second phase of the project (Celesti et al. in press), in this initial stage we made some important preliminary distinctions, classifying each species according to its residence time (i.e. whether it is an archaeophyte or neophyte – see definitions in Table I) and invasion status (whether it is casual, naturalized or invasive – see definitions in Table I). This type of classification, which has a long tradition in central Europe (Trepl 1990; Sukopp 1998; Richardson et al. 2000; Kowarik 2003a), has not yet been systematically applied in southern Europe. A clearer distinction between the different groups of species that make up the non-native flora, as well as between native and non-native plant species, is instead needed to shed more light on plant invasion patterns in this region, where the long history of human impact has selected a group of local taxa that are well adapted to human activities (Heywood 1989; Zohary & Hopf 2000). Indeed, this is likely to be one of the reasons why the majority of noxious weeds in the Mediterranean are actually native, and why this is the area of origin of many of today's most successful invasive species, spread by European colonizers throughout the world (Di Castri et al. 1990; Groves & Di Castri 1991).

Hence, the aim of the present paper is to provide an up-to-date, comprehensive inventory of Italian non-native vascular flora classified according to its residence time and current invasion status, in order to establish a national set of data that may be used as a scientific base for the development of research on, and management of, plant invasion in the country.

## Materials and methods

### *Study area*

Italy covers an area of about 301,336 km$^2$, spanning from 35°30′ to 47°06′ of latitude, and from 6°37′ to 18°31′ of longitude. The highest mountains reach an altitude of 4810 m a.s.l. in the Alps, which stretch across northern Italy and form Italy's northern border, and 2912 m a.s.l. in the Apennines, a chain of mountains that runs south along the whole peninsula. Italy includes a series of islands, i.e. Sicily, the largest Mediterranean island, Sardinia, and numerous minor islands and archipelagos. Inland water is found in several lakes, the largest being Garda, Maggiore and Como, and an extensive system of rivers, the longest being the Po, which flows eastwards for 652 km from the Alps to the Adriatic sea through the fertile Po valley (Pianura Padana). The territory is mainly mountainous (35%) and hilly (42%), with the plains accounting for only 23% of the total surface (ISTAT 2008).

Biogeographically, Italy stands at the intersection of the Eurosiberian and the Mediterranean regions (Rivas-Martínez et al. 2001). This is reflected in the wide range of phytoclimates, which can be grouped in 28 classes and 4 climatic regions. The Temperate (covering 56% of the Italian territory) and Transitional Temperate (15%) regions comprise northern Italy, extend south down the Apennines and the adjacent areas and are even found locally at high altitudes in Sardinia and Sicily. The Transitional Mediterranean (9%) and the Mediterranean (20%) regions are found along the coastline and on the islands (Blasi & Michetti 2007).

The Italian population currently stands at 59.4 million people, with an average population density of 196.1 inhabitants/km$^2$. The distribution of this density is, however, very uneven, varying from large uninhabited areas, to densely populated urban agglomerations, such as the most populated Italian municipality, Portici, in the province of Naples, which attains a population density of 13,323 inhabitants/km$^2$ (ISTAT 2001).

The marked geographical diversity and variety of the landscape (Blasi 2007) promotes a remarkably

rich vascular flora, which numbers 6711 species and 7634 entities (including subspecies) (Conti et al. 2005a).

Owing to its geographical position, Italy has, ever since ancient times, been at the crossroads of exchanges between the main ethnic areas in the Old world, e.g. Neo-Latin, Germanic and Slav-Balkan civilizations from the north, and eastern Mediterranean and Arab Islamic civilizations from southwest Asia and northern Africa; these exchanges have consequently strongly promoted the transportation of plant propagules. Two great pre-Roman civilizations, i.e. Etruscan and Greek, which settled in approximately the 8th century BC in central and southern Italy, respectively, are believed to have introduced many different species of plants (Saccardo 1909; Pignatti 1982). The Greeks colonized large areas in southern Italy, and maintained for centuries intense exchanges with their homeland and its other colonies, scattered all along the Mediterranean coasts. Later, the Romans played a major role in the introduction of plants to and from various regions in Europe, northern Africa and Asia; ever since then, Italy has been a centre of human-mediated plant transportation, both of a deliberate and accidental kind, through trade, human migrations, even wars (see, e.g. Pignatti 1982; Prosser 1999) and, more recently, tourism.

### *Data sources and criteria for the compilation of the inventory*

The survey was carried out in the years 2006–2007 and covered the whole of Italy. The information was compiled at a regional level, the aim being to provide a report not only on the country as a whole, but also for each Italian administrative area, so as to improve local knowledge and awareness and to provide a basis for local management. One expert for each of 21 Italian administrative units, i.e. 19 regions and the two so-called autonomous provinces of Trento and Alto Adige/Südtirol (hereafter referred to as "regions"), was placed in charge of reviewing the published sources on the occurrence of non-native species, and of assessing the invasion status of each taxon in each area. The majority of the regional experts sought the involvement of a group of local collaborators, which led to an extensive network of botanists being set up.

The published literature, which was the main source of data, was integrated with records from the most important herbaria, though a thorough revision of the innumerable historical, public and private herbaria in the country could not be undertaken in this project. Moreover, some unpublished data were added in many regions, and several field surveys were conducted, though not exhaustively, to verify outdated or uncertain information and to assess the invasive status of the taxa. Only solid, reliable sources were taken into account. When doubts arose, we excluded all uncertain records, such as all those believed to refer to only cultivated specimens or incorrect determinations. Synonyms were thoroughly checked.

As the main sources of information, we used (1) comprehensive Italian checklists and floras (Pignatti 1982; Conti et al. 2005a, 2006a); (2) major international works with data on Italy, such as the Flora Europaea (Tutin et al. 1964–1980, 1993), the Med Checklist (Greuter et al. 1984–1989) and the Flora Alpina (Aeschimann et al. 2004); (3) national (Béguinot & Mazza 1916; Viegi et al. 1974) and (4) regional (Abbà 1979; Viegi & Cela Renzoni 1981; Viegi et al. 1990, 2003a, 2003b; Peccenini 1992; Viegi 1992–1993, 1999; Martini & Poldini 1995; Camarda 2001; Camarda & Brundu 2004) inventories of non-native species; and (5) other botanical literature including regional (e.g. Prosser & Festi 1993; Anzalone 1994, 1996; Lucchese 1995; Conti 1998; Poldini et al. 2001; Poldini 2002; Wilhalm et al. 2006, 2007; Giardina et al. 2007; Bovio et al. 2008; Conti et al. 2008) and local floras, new flora records (e.g. Conti et al. 2005b, 2006b, 2007a, 2007b) and taxonomy papers on critical taxa (for a compilation of Italian botanical literature see Scoppola & Magrini 2005).

Three of us (E. Banfi, G. Galasso & F. Conti) reviewed the taxonomy and nomenclature of the flora. We considered taxa at a specific and subspecific level, and did not therefore take into account varieties derived from cultivation (cultivars). The taxonomy and nomenclature of the taxa generally follow the checklist of the Italian flora (Conti et al. 2005a, 2006a), though some changes, based on the systematic and/or taxonomic revision of some genera, have more recently been made, and some taxa required specialist revision. We paid particular attention to the new phylogenetic works based on nucleotide sequences so as to use monophyletic families and genera, according to the principles expressed by Backlund and Bremer (1998) and Potter and Freudenstein (2005). This resulted, for instance, in *Hydrocotyle* being transferred to the Araliaceae (see Plunkett et al. 1997; Chandler & Plunkett 2004), while the genera *Acacia* s.l. (see Brummitt 2004; Kodela & Wilson 2006; Seigler & Ebinger 2006; Banfi & Galasso 2008), *Aster* s.l. (Nesom 1994; Kim & Jansen 1995; Noyes & Rieseberg 1999; Fiz et al. 2002), *Chenopodium* s.l. (Mosyakin & Clemants 2002; Kadereit et al. 2003) and *Cupressus* s.l. (Little 2006) were subdivided into several genera. By contrast, *Conyza* was included in

*Erigeron* (Noyes & Rieseberg 1999; Noyes 2000) and *Coronopus* in *Lepidium* (Al-Shehbaz et al. 2002). The "Flora of North America" (Mosyakin & Robertson 2003) was used for the genus *Amaranthus*, whose definition and nomenclature are still quite controversial in Europe, while Zuloaga and Morrone (1996) were used for *Panicum* s.s. For the non-native taxa of the genus *Boerhavia*, we followed the systematic and nomenclatural treatment of Stannard's (1988) work, although the highly complex systematics of this genus is still far from clear (see, among others, Quézel & Sintès 1959; Maire 1962; Fosberg 1978; Noba & Ba 1992; Miller 1996; El-Husseini 2000).

The authors of plant names are abbreviated according to Rec. 46A of ICBN (McNeill et al. 2006), namely International Plant Names Index (2008, http://www.ipni.org). The attribution of each species to a family mainly followed Stevens (2001), based on APG II (2003) and subsequent papers.

As regards the terminology of non-native plants, we had to deal with a heterogeneous array of terms used in the local literature. Even the most extensively used terms, such as "exotic", "naturalized", "spontaneous", "introduced" or "adventive", may take on a variety of meanings depending on the authors who use them and the historical period in which they are used. The system proposed by Viegi (1974) constituted an important step towards the standardization of non-native plant terminology in Italy. Nevertheless, it was designed for a floristic perspective and combines two criteria: the degree of naturalization (i.e. whether or not the species is established) and the mode of introduction (i.e. deliberate or accidental) that need to be kept separate in plant invasion (see the discussion in Pyšek et al. 2004a). Consequently, we adopted the more recent terminology system proposed by Richardson et al. (2000) and elaborated by Pyšek et al. (2004a), which is based on a biogeographical and ecological approach, and we reviewed all the sources accordingly (see Table I for definitions).

The information on the residence time of the species was obtained from records from herbaria and published literature, i.e. the flora works (1)–(5) mentioned above and several other specific works such as Heywood and Zohary (1995), Maniero (2000), Zohary and Hopf (2000) and Gressel (2005). One of the main sources of information on the introduction of non-native plants in ancient times was the "Chronology of the Italian Flora", in which Saccardo (1909) gives a detailed historical account of early records of non-native plant species since Roman times, including medieval illuminated manuscripts and botanical literature dating from the fifteenth to seventeenth centuries with a pre-Linnean nomenclature. A thorough review of the uncertain group of archaeophytes has not yet been attempted in the Mediterranean Basin countries and was not possible within the framework of this project. Nevertheless, a group of experts among us (A. Alessandrini, P. V. Arrigoni, E. Banfi, F. Conti, G. Galasso, P. Mazzola & L. Poldini) was assigned the task of reconsidering the status of the doubtful taxa, and consequently, on the basis of the information available, of deciding whether to include them in (i.e. non-native) or exclude them from (i.e. native) the inventory. When current knowledge was insufficient to propose even a preliminary definition of their status, some taxa were defined as doubtful aliens (also referred to as cryptogenic in the literature, Carlton 1996).

There was also some degree of uncertainty when a specimen had to be classified either as spontaneous or as present in cultivation alone. For instance, while some flora works take into account all species that grow spontaneously, including escapees in gardens and nurseries, others include only species found in the wild, though this may not always be clear from the source, especially when dealing with old records or herbaria. Taxa that are only found in cultivation and do not escape were not included in this inventory. As a rule, we covered all habitats, i.e. both natural/semi-natural and artificial. However, species found exclusively in sites strongly influenced by human cultivation practices (e.g. watering, fertilizers), such as those in the immediate vicinity of the parent plant, were not considered. We thus generally excluded records of casuals observed in plant nurseries and flowerbeds, as well as seedlings found around the base of street trees and crop species that spontaneously grow in the field (e.g. arable land) in which they were sown the previous season.

Only aliens on a nationwide scale were taken into account; this means that species that are native even to one location alone in Italy were regarded as native and thus excluded. In this respect, this catalogue differs markedly from the checklist of the Italian flora (Conti et al. 2005a) since the native/non-native classification in the latter refers to the status of a species within each Italian administrative region, e.g. Mediterranean species are regarded as introduced in the northern regions of the country, and vice versa.

We considered hybrids between native and non-native taxa as aliens, and thus included them in the catalogue if they have at least one non-native parental taxon, even if hybridization occurred in Italy (see, e.g. Pyšek et al. 2002b; Kowarik 2003b).

Each species in the inventory was classified as casual, naturalized or invasive according to Pyšek et al. 2004a (Table I). In this stepwise scheme, the

invasion status is a measure of the stage reached by an introduced species in the invasion process, by its ability to overcome various barriers in the new environment (Richardson et al. 2000). This system has the advantage of defining invasive species on a strictly ecological basis, i.e. on the rate of establishment and spread of the non-native species, and thus separates this concept from that of the possible negative impacts. This distinction is crucial, because plants that spread more rapidly are not necessarily those that cause the most serious problems (Daehler 2001; Kowarik 2003b; Levine et al. 2003; Rejmánek et al. 2005; Ricciardi & Cohen 2007). According to this system, casual species are non-native species that rely on repeated introductions to maintain their populations; naturalized species are those that have become established, and thus maintain self-perpetuating populations, regardless of the contribution of new propagules; lastly, the term "invasive" is used to refer to a subset of naturalized species that spread rapidly in a new region (Table I).

Despite the extensive, fruitful discussions that have taken place, and the good progress that has been made in recent years to reach a consensus on the terminology (e.g. Davis & Thompson 2000; Richardson et al. 2000; Pyšek et al. 2004a; Colautti et al. 2006; Ricciardi & Cohen 2007), considerable variety persists in the use that different sources make of the term "invasive". This variety is partly due to the fact that the term is used by authors who do not share the same perspective, either because they come from distant, markedly different countries and continents that do not have the same invasion-related problems, or from different institutions, in which management or scientific objectives might prevail. There is, instead, general agreement regarding the distinction of taxa that are established (i.e. naturalized) from those that are not (i.e. casual), with most studies considering exclusively the former. For this reason, in order to allow comparisons between the results of our study with those of other studies, we make a distinction between casual and naturalized taxa, as well as divide the latter into naturalized non-invasive and invasive.

The invasion status of non-native plant species was assessed by each local expert from the 21 Italian administrative regions. On a national scale, status was assigned on the basis of the highest stage in the invasion process documented in any region. This means that species were considered to be naturalized if they are naturalized in at least one region in the country. Similarly, we defined a taxon as being invasive in Italy, if it is so in at least one region. Within the invasive species, we defined as "local invasive" those taxa that were only found to be invasive in one or two locations, so as to highlight a few species whose range is currently limited. We also grouped into a separate category those taxa that lack recent records, i.e. that have not been detected since 1950, such as those represented by a single herbarium specimen collected 60 or more years ago. This approach (i.e. the use of 1950 as a cut-off date) is conventionally used in the Italian botanical literature to distinguish historical accounts from more recent data (Scoppola & Magrini 2005).

In order to identify the geographical provenance of the non-native species of the Italian flora, we recorded the native distribution range for each taxon listed in the catalogue. Besides the main continental categories, i.e. Europe, Asia, Africa, North America, South America (including Central America) and Australasia (Hollis & Brummitt 1992), we used intercontinental groups, such as the Mediterranean, Eurasia and the Tropics, to include those species with extensive native distribution ranges across different continents, or whose provenance cannot be determined more accurately. The source of the data were the above mentioned flora works (1)–(5) and some additional works (e.g. Meusel et al. 1965, 1978, 1992; Weber 2003; eFloras, http://www.efloras.org).

### *Statistical analysis on over- and under-represented families*

The aim of the analysis was to assess differences in the family distribution of non-native and native taxa. Assuming that the processes leading to the introduction and the establishment of non-native taxa are the same as those that had previously controlled the establishment of the native flora, we may assume that the probability of any non-native taxa belonging to each family is proportional to the number of taxa belonging to that family in the native flora.

A resampling procedure was thus used to identify families in which the number of observed non-native taxa was either higher or lower than expected (Daehler 1998). A set of 1023 taxa (species and subspecies) was randomly extracted from a pool of 6611 native taxa, thereby conferring upon each sample the probability of belonging to any given family according to the ratio between non-native and native taxa for that family. To err on the conservative side, a probability of 1/6611 was used for families with no known representative in the Italian native flora. The procedure was repeated 10,000 times. A taxon was considered as over- or under-represented (Bonferroni's adjusted $p < 0.05$, i.e. $p < 0.05/213 = 0.00023$) if the actual number of non-native taxa recorded was higher or lower than the 0.023th or the 99.977th percentile, respectively, of the resampled distribution of the number of taxa for that family.

## Results

### *Number of taxa, residence time, native range*

The inventory of the non-native flora of Italy numbers 1023 taxa, including species and subspecies (hereafter called indifferently "taxa" or "species"), of which 103 (10.1%) are archaeophytes and 920 are neophytes (89.9%) (Table II). They are listed alphabetically in Appendix 1 together with their family, residence time, invasion status and native range. The inventory also mentions whether each taxon is present in the most recent Italian flora (Pignatti 1982) or checklist (Conti et al. 2005a). Should the current binomial differ, we have also listed, under the current one, the name as it is found in Pignatti (1982) or Conti et al. (2005a), since it is still widely used. We did not list previous names that differ from the current ones only in authorship. A group of 40 additional species classified as doubtful aliens (cryptogenic) are listed separately (Appendix 2) and are not included in the analysis of the data. As a consequence, several species that have traditionally, though very roughly, been defined as archaeophytes, do not appear in our inventory, either because they were recognized as being native to at least one area in the country (e.g. *Ceratonia siliqua*, *Cercis siliquastrum* and *Ficus carica*), or were included in the uncertain species group listed in Appendix 2 (e.g. *Agrostemma githago*, *Camelina sativa*, *Consolida regalis* and *Papaver* spp.).

The majority of the species originally came from the Americas (387) and Eurasia (366), followed by species of African origin (99) and those that have been introduced from other regions in the Mediterranean Basin (62) (Table III). Thirty-eight species are widely distributed across tropical regions, while 21 species originate in Australasia (Australia and/or New Zealand). The geographical origin of 19 species is unknown or uncertain, while 19 species result from hybridization. Lastly, we grouped together 12 species that are widely distributed in more than one continent and whose native range could not be defined more precisely.

Table II. The number of taxa in different categories of residence time and invasion status in the non-native flora of Italy (see Table I for definitions).

| | *N* | % |
|---|---|---|
| *Non-native total* | **1023** | |
| Not recorded since 1950 | 62 | 6.1 |
| Casual | 437 | 42.7 |
| Naturalized non-invasive | 361 | 35.3 |
| Invasive | 163 | 15.9 |
| *Archaeophytes* | **103** | |
| Not recorded since 1950 | 5 | 4.9 |
| Casual | 38 | 36.9 |
| Naturalized non-invasive | 51 | 49.5 |
| Invasive | 9 | 8.7 |
| *Neophytes* | **920** | |
| Not recorded since 1950 | 57 | 6.2 |
| Casual | 399 | 43.4 |
| Naturalized non-invasive | 310 | 33.7 |
| Invasive | 154 | 16.7 |

Table III. Native range of the species and subspecies of the non-native flora of Italy.

| Native range | *N* | % |
|---|---|---|
| North America | 200 | 19.6 |
| South America | 99 | 9.7 |
| North and South America | 88 | 8.6 |
| Total America | 387 | 37.8 |
| Asia | 235 | 23.0 |
| Eurasia | 86 | 8.4 |
| Europe | 45 | 4.4 |
| Total Eurasia | 366 | 35.8 |
| Africa | 45 | 4.4 |
| Macaronesia | 12 | 1.2 |
| Southern Africa | 42 | 4.1 |
| Total Africa | 99 | 9.7 |
| Mediterranean | 62 | 6.1 |
| Tropics | 38 | 3.7 |
| Australasia | 21 | 2.1 |
| Uncertain | 19 | 1.9 |
| Hybrids | 19 | 1.9 |
| Widely distributed | 12 | 1.2 |
| Non-native total | 1023 | |

### *Invasive status*

Casuals (437 species) make up the most numerous group of the Italian non-native flora, numerically accounting for 42.7% of all aliens (Table II). There are 361 (35.3%) naturalized non-invasive and 163 (15.9%) invasive species, which amount to 524 established taxa (51.2% of all aliens). Twelve of the invasive taxa can be considered as local invasive as they occur in one or two sites. There are no recent records (i.e. since 1950) for 62 taxa (6.1%).

The archaeophytes comprise 38 casual (36.9% of the total archaeophytes) and 60 established species, of which 51 are naturalized non-invasive (49.5%) and 9 invasive (8.7%). Five archaeophytes (4.9%) lack recent records (Table II). The neophytes comprise 399 casual (43.4% of the total number of neophytes) and 464 established species, the latter being divided into 310 naturalized non-invasive (33.7%) and 154 invasive taxa (16.7%). There is no recent record of 57 neophytes (6.2%) (Table II).

### *Taxonomy*

Of the 1023 non-native species recorded in the inventory, nine are pteridophytes, 23 are gymnosperms and 991 are angiosperms, which are in turn

divided into 775 dicotyledons and 216 monocotyledons. The Italian non-native flora belongs to 544 genera and 138 families. Three hundred and nineteen genera and 48 families are new additions to the flora of Italy, i.e. they are not present in the native flora. The genera that account for the highest number of non-native taxa are *Oenothera* (22), *Amaranthus* (19) and *Opuntia* (19) (Figure 1). There are 364 genera represented by only one species.

The families represented most in the non-native Italian flora are Asteraceae (112), Poaceae (88), Rosaceae (51) and Fabaceae (47) (Figure 2). The families represented most among the established species are Poaceae (56), Asteraceae (55) and Rosaceae (30), while those represented most among the invasive species are Asteraceae (28), Poaceae (19) and Amaranthaceae (15). Forty-eight families are represented by only one species.

The 28 families listed in Appendix 3 are significantly over-represented in the non-native flora if compared with the overall Italian vascular flora. The nine most numerous families in the non-native flora are highlighted with the plus symbol (+) in Figure 2. By contrast, 11 families, which include, among the most numerous, Asteraceae, Apiaceae and Caryophyllaceae (highlighted with the minus symbol (–) in Figure 2), are significantly under-represented.

## Discussion

### *A standard approach and terminology for the Italian non-native flora*

The main results achieved by this study were the establishment of an extensive network of experts on non-native flora across the country, and the compilation of a national set of data on non-native plant species using a common approach and terminology. Yet, the compilation of the catalogue entailed dealing with remarkable differences in the ways of defining and classifying introduced species used in the vast body of botanical literature that was analysed. The current approaches to the classification of non-native plants, as well as the problems involved in attributing a taxon to one group or another, have previously been discussed in depth by several authors (e.g. Webb 1985; Preston 1986; Pyšek et al. 2004a). The main difficulty encountered in the

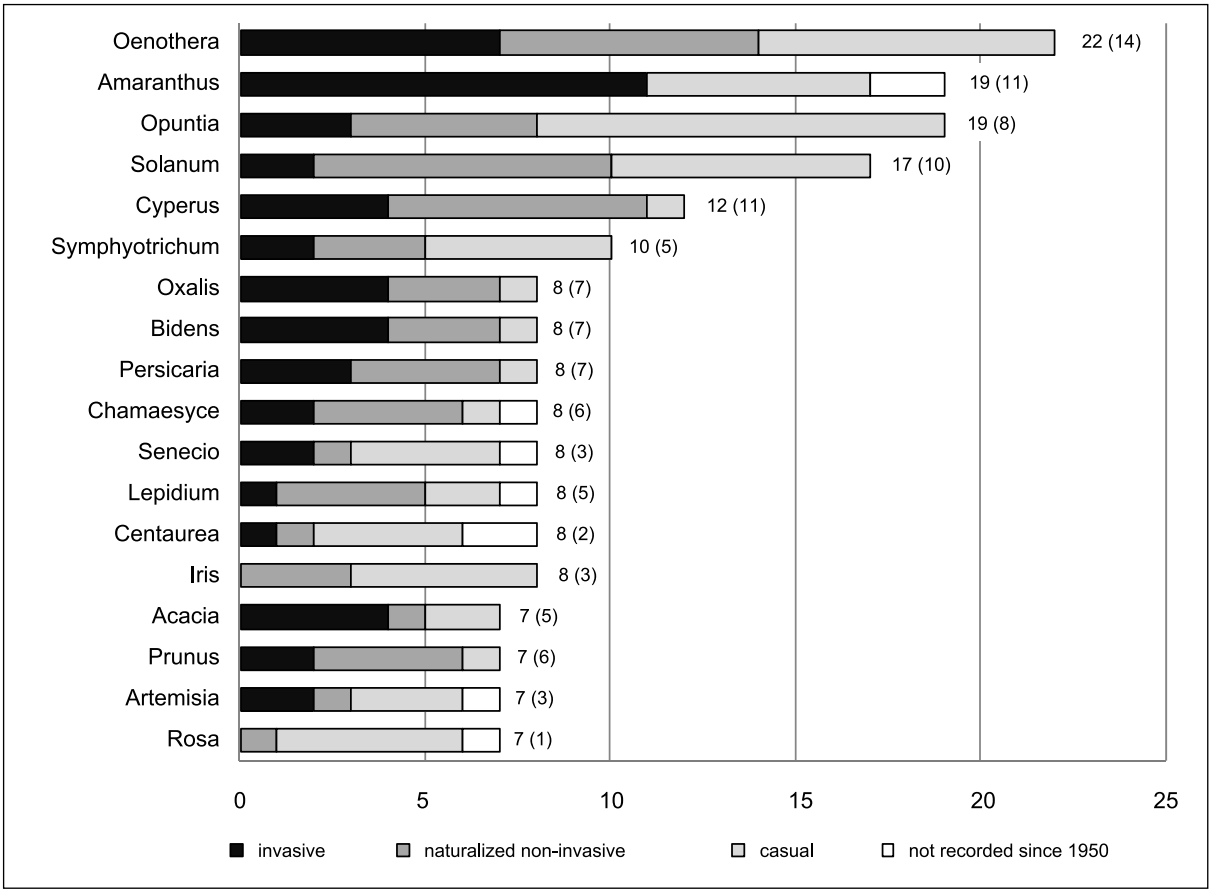


Figure 1. The most represented genera in the non-native flora of Italy classified according to their invasion status. The numbers next to each bar and those in brackets refer to the total number of species and the number of established species (naturalized non-invasive and invasive) in the genus, respectively (see Table I for definitions).

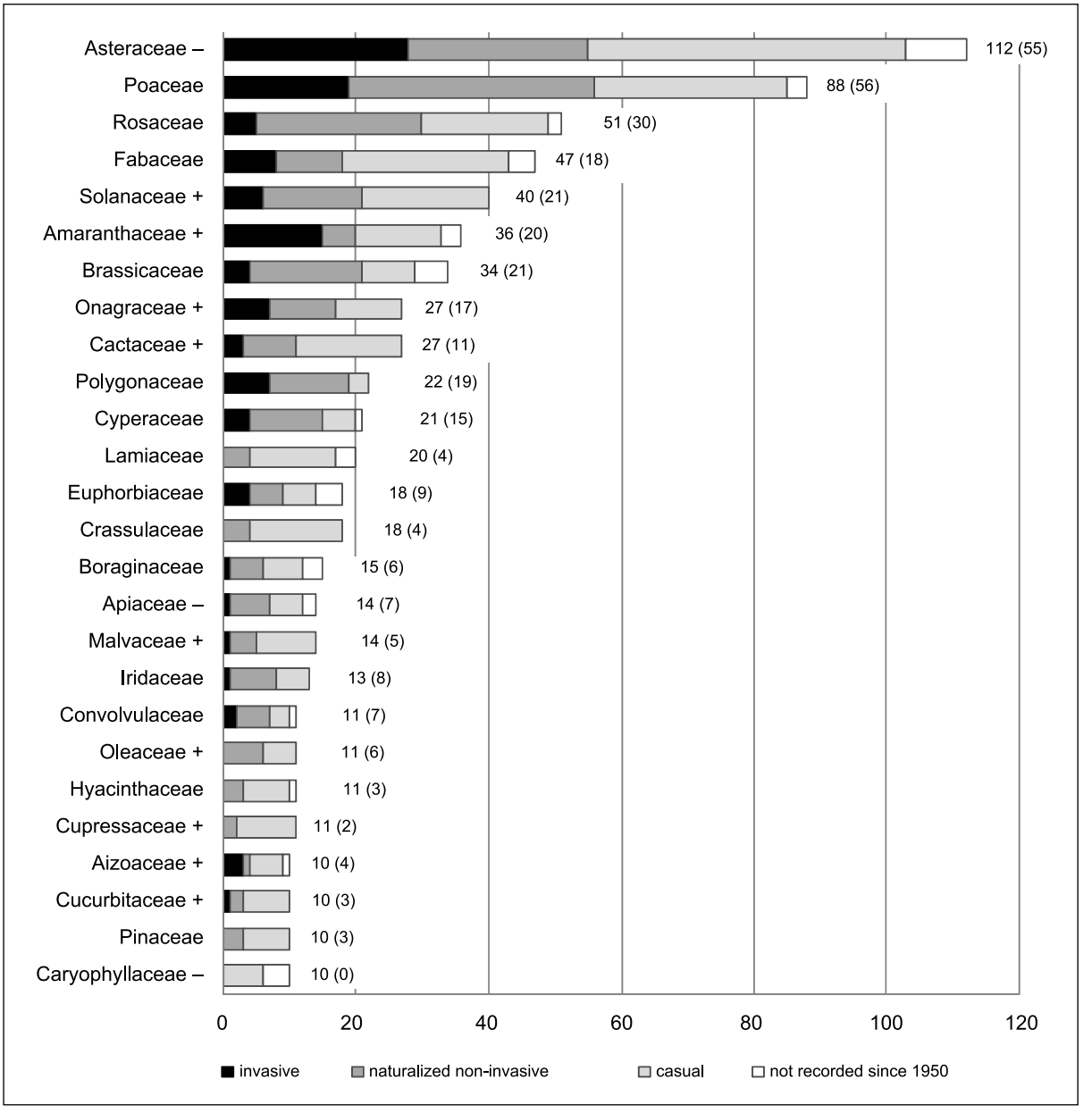


Figure 2. The most represented families in the non-native flora of Italy classified according to their invasion status. The numbers next to each bar and those in brackets refer to the total number of species and the number of established species (naturalized non-invasive and invasive) in the family, respectively (see Table I for definitions). Under-represented families are indicated with the minus symbol (–), while over-represented families are indicated with the plus symbol (+).

specific case of the flora of Italy was how to deal with the undefined group of archaeophytes. The division of non-native species into either archaeophytes or neophytes according to whether they were introduced before or after the year 1500 has a solid tradition in central Europe (e.g. Holub & Jirásek 1967; Schroeder 1969; Richardson et al. 2000) and has also been systematically applied in the UK (Preston et al. 2004). By contrast, it has only sporadically been used in southern Europe and the Mediterranean. Med Checklist (Greuter et al. 1984–1989), for instance, includes archaeophytes among the native flora. However, given the marked differences that exist between these two groups, e.g. in their habitat preferences and introduction history (Pyšek et al. 2002a, 2004b, 2005; Chytrý et al. 2005; Celesti-Grapow et al. 2006), the distinction between early and recent introductions should be considered crucial in plant invasion ecology, and be borne in mind when trends in non-native species are analysed (Kühn et al. 2004). Although it cannot be denied that there is still a great deal to learn on this subject and that we will probably never have enough data to draw up a flawless classification of all the species, it

is also true that we do have enough information to classify many of the taxa, and that the information yielded outweighs the flaws due to the intrinsic difficulties in compiling such a classification.

In general, owing to insufficient paleobotanical, archaeological or historical evidence, we found great inconsistencies in the way different sources approach archaeophytes, and that the attribution of many species to this group varies depending on the source. While some cases are well documented, in others the information in the literature is contradictory or insufficient, and thus prevented the classification of several taxa with any degree of certainty. For all these reasons, the classification of 103 archaeophytes and 40 cryptogenic species proposed here should not be considered as final, but rather as a preliminary attempt based on what is currently known.

In an early review of the criteria used to define the alien or native status of the species, Webb (1985) stated that the more recent the introduction, the more certain the definition of alien status is. In fact, unlike the lingering uncertainty regarding the division between native species and archaeophytes, more reliable evidence allowed the distinction of the neophytes of the Italian flora. The introduction of most of these neophytes is generally well documented in herbaria and the literature, thanks to specific studies and to the long-standing tradition of recording new flora and updates in major Italian botanical journals, such as the article series "Schedae ad floram italicam exsiccatam" in *Nuovo Giornale Botanico Italiano*, "Segnalazioni Floristiche Italiane" and the subsequent "Notulae" in *Informatore Botanico Italiano* (Conti et al. 2005b, 2006b, 2007a, 2007b). The compilation of the group of 920 neophytes may be considered a major achievement of this study, not only on account of the ecological and biogeographical interests involved, but also because it provides a base that may be used to define priorities in invasion management.

Specimen labels in national and local herbaria provided a large amount of useful information throughout the compilation of this inventory. These collections are acknowledged as being of crucial support in plant invasion studies, particularly when compiling lists of non-native plants and reviewing old accounts (Mack 2000; Delisle et al. 2003; Wu et al. 2005; Verloove 2006; Siniscalco & Forneris in press). As an example, incorrect determinations are frequent for newly introduced species, which might be difficult to identify because they do not appear in local floras (Mack 2000), and are often corrected only when herbarium specimens are subsequently reviewed. This happened in Italy for several taxa which were incorrectly classified when they first appeared, before either a field survey or a systematic review had been conducted, e.g. *Cyperus microiria* (Stucchi 1969, 1972), *Senecio inaequidens* (Zangheri 1976; Arietti & Crescini 1980), *Acalypha australis* (Zanotti 2008), and the genera *Ammannia* (Soldano 1986), *Galinsoga* (Camoletto Pasin & Dal Vesco 1992), *Heteranthera* (Soldano 1992), *Oenothera* (Soldano 1993), *Ludwigia* (Galasso 2007), *Reynoutria* (Padula et al. 2008) and *Opuntia* (Guiggi 2008).

The classification of the non-native species according to their invasion status into casual, naturalized or invasive is also systematically applied here for the first time in a Mediterranean country. In particular, a complete account of casual species is a novelty in Italy, a country in which general floras have tended to record only naturalized aliens (see discussion on invasive status below in this paper). The approach towards these non-established, ephemeral components of non-native floras varies markedly in different papers: they are occasionally included in studies that focus on small-scale floristic accounts or on human-made areas (e.g. cities, urban parks), whereas more general floras of extensive geographical areas and studies on natural habitats tend to exclude them. Nevertheless, when species inventories are meant to be used in invasion studies, the inclusion of non-established species may be crucial. There is, in fact, a time lag between the introduction of a new taxon and the sudden invasion, which is not predictable and may span years, even decades (Kowarik 1995; Mack et al. 2000). Several accounts of the history of non-native species have reported that some invasive species have worked their way through the invasion process by starting as a casual population (Kowarik 2003b). Thus, highly invasive species in early stages of invasion might first be detected as casual species, before they suddenly establish and spread (Caley et al. 2008). Some examples in Italy include *Heracleum mantegazzianum* and *Pueraria lobata*, two well-renowned harmful species (see, e.g. Blaustein 2001; EPPO 2007; Pyšek et al. 2007) that were long referred to as casual but have recently become invasive, as well as species such as *Ambrosia artemisiifolia* (Dal Bo 1980), *Prunus serotina* (Sartori 1985; Starfinger 1997) and *Lemna minuta* (Desfayes 1993), whose invasive potential was overlooked until they started to spread. As pest control is most effective in the initial stages of invasion, early detection of these harmful taxa may be crucial in invasion management (e.g. Rejmánek & Pitcairn 2002).

### *Number of taxa and native range*

All these issues have led to the identification of 1023 non-native taxa (species and subspecies), which account for 13.4% of the 7634 taxa of the whole Italian flora (Conti et al. 2005a). If considered on their own, the 524 established taxa account for 6.9%

of the flora in Italy. A comparison of these percentages with those obtained for other European countries is not always possible because different sets of data may be included in national floras as a result of varying approaches, e.g. to casuals and archaeophytes. Nevertheless, a comparison between our inventory and other lists based on approaches that are most similar to ours reveals comparable percentages of non-native taxa in the flora of other southern European countries, e.g. 12% in Spain (Sanz-Elorza et al. 2004), though higher percentages in the flora of central European countries, e.g. 25% in Germany (Kühn & Klotz 2003), 29% in Poland (Tokarska-Guzik 2005) and 33.4% in the Czech Republic (Pyšek et al. 2002b). These data suggest that non-native species make up a larger proportion of the flora in central than in southern Europe, probably owing to the fact that the native Mediterranean flora is relatively richer and that many archaeophytes in central Europe are actually of Mediterranean origin (as well as to the diverse approaches to casuals – see discussion on invasive status below in this paper). This numerical difference between the Mediterranean and central European alien floras has previously been pointed out (e.g. in urban areas Celesti-Grapow & Blasi 1998), though further studies and thorough quantitative comparisons are required to confirm this trend and shed light on the possible reasons underlying it.

The review undertaken while compiling this inventory and the reassessment of the taxonomy, nomenclature and status of the species led to the exclusion of a large number of entities. New taxa were however also added, many of these being post-1500 plant immigrants. To present a detailed figure of the species that have either been added to or eliminated from previous accounts is beyond the scope of this paper because the numbers are complicated by the difficulties involved in disentangling an assortment of different cases such as (1) new arrivals, e.g. those species that were only recently recorded; (2) revision of the status, e.g. taxa that were excluded because we considered them to be only found in cultivation, or to be local aliens, i.e. introduced in some areas, though native in at least one location in Italy; (3) taxonomic revisions; and (4) new nomenclature (synonyms). However, to give a very general picture, we may say that more than 500 entities (including synonyms) previously recorded as non-native in post-1980 floristic works were excluded from the present inventory. Nevertheless, despite the numerous exclusions, comparisons with previous lists of aliens in the country indicate a general increase in the updated total number of species: Fiori and Paoletti (1896–1908) reported a total of 267 species, Saccardo (1909) reported 331, Béguinot and Mazza (1916) reported 538 and Viegi et al. (1974) reported 674. This increase is both due to a major awareness of the presence of aliens and to the appearance of new species. The comparison with whole national flora works yields a similar trend: 643 of the 1023 taxa found in the present inventory were included in Pignatti (1982) and 740 taxa were included in Conti et al. (2005a) (see Appendix 1). It should however be borne in mind, as mentioned before, that these two national flora works only partially considered casual species. Lastly, the Flora Europea lists 294 established species in Italy (Weber 1997).

As for the native range, we found that a strictly continent-based classification only partly describes the Italian non-native flora. In the Mediterranean Basin, which spans three continents, i.e. Europe, Asia and Africa, trade and transport in ancient times were more intense across the sea than by land. Therefore, Italy may have been more exposed to the introduction of species from northern Africa and the eastern Mediterranean than to many species that originated within Europe itself, such as those from northern Europe, owing to the Alps, which have until relatively recently acted as a major barrier to the introduction of non-native species from the north.

As Baker (1974) observed in his early review on the ecology of weeds, the most successful weeds on a worldwide scale are often those whose origin is most difficult to identify; indeed, the place of origin of a large number of Italian non-native species, classified in the flora of Italy (Pignatti 1982) as "widely distributed", is not clearly identifiable within the current cosmopolitan or sub-cosmopolitan range. This applies to several species that are widely distributed across Eurasia, the Tropics and the Mediterranean Basin.

### *Invasive status*

The 1023 non-native taxa of the Italian flora are divided into 437 casual, 361 naturalized non-invasive and 163 invasive species (Table II). Despite being prevalent among aliens, the number of casual species is lower than those recorded in other countries, e.g. 1486 in Belgium (Verloove 2006), 891 in the Czech Republic (Pyšek et al. 2002b), 835 (neophytes alone) in Austria (Rabitsch & Essl 2006) and 566 in Hungary (Balogh et al. 2004). Although this is somewhat surprising if the size of Italy is taken into account, it may be explained by the fact that Italian botanical research, whose focus is above all on native flora, has traditionally recorded the presence of naturalized aliens alone. Indeed, as the inclusion of casual species in floristic papers has generally been frowned upon, if we exclude a few studies on urban, agricultural or artificial systems, these species

have often been deliberately excluded from local floras inventories, and only sporadically do they appear in the major regional or national floras. As a result, the data on both the current and historical presence of casuals included in the present list are probably biased in favour of the most common casuals, as previously observed in Germany (Kühn et al. 2004), while rare casuals, particularly those that are no longer present (no records since 1950), are most certainly underestimated.

Among the invasive taxa of the Italian flora listed in Appendix 1, we draw attention to the 12 taxa that are currently restricted to only a few sites and were thus classified as local invasive: *Azolla filiculoides*, *Chorispora tenella*, *Hydrochotyle ranunculoides*, *Lagarosiphon major*, *Ludwigia peploides, Myoporum tenuifolium*, *Nonea pulla* subsp. *pulla*, *Opuntia humifusa*, *Reynoutria sachalinensis, Rubus phoenicolasius*, *Salvinia molesta* and *Spartina xtownsendii*. It is worth mentioning that half of these species (six) are freshwater plants. As local invasive species might be harmful invaders that are not yet widespread simply because they have not been present long enough, the implications of such species are particularly relevant to invasion management and they should be major targets of invasion control.

### *Species that failed*

The inventory lists 62 plant taxa that have not recently been found (no records since 1950), most of which are local extinctions. This group, however, also includes a few species whose presence could not be verified, though this does not necessarily mean that they are no longer present. The difficulty encountered in attesting their occurrence is often due to the insufficient information on the location of their populations provided by old, albeit reliable, sources such as labels on herbarium specimens, which do not provide detailed information on where they were collected (e.g. "along the River Tiber"). We hope that having highlighted them in this inventory will make botanists more alert to their presence in the coming years. Since their reappearance in the near future cannot be excluded, it is too early to say whether these species are non-native plant introductions that have failed to establish or whether they have merely been overlooked. As the main aim of this catalogue was to detect major naturalized and current invasive species to use as a basis for plant invasion studies, we focused on invasive species rather than casual species, and on current records rather than ancient records. Indeed, as already stated, our main source of information was published literature rather than herbaria records. It is thus possible that a thorough analysis of the innumerable herbaria in the country, kept in scientific institutions as well as private collections, would bring to light a number of old records that have not been included here.

### *Taxonomy*

The taxonomic patterns for genera and families in the Italian non-native flora are similar to those found more generally in the European non-native flora (Lambdon et al. 2008). The families represented most are Asteraceae and Poaceae, followed by Rosaceae and Fabaceae. However, while the fifth largest family in Europe is Brassicaceae (Lambdon et al. 2008), in Italy we find Solanaceae, probably as a result of the higher degree of thermophily of the Italian flora if compared with the whole European flora. Similar patterns are also found on a worldwide scale, in so far as Poaceae and Asteraceae are the families represented most in alien floras for the whole world (e.g. Baker 1974; Heywood 1989; Mack 1996; Weber 1997; Daehler 1998; Pyšek 1998). This finding is due above all to the fact that they are among the largest families and thus contribute most to the total number of species (Pyšek 1997, 1998; Daehler 1998). Indeed, if compared with the overall Italian flora, Asteraceae were found to be under-represented in the Italian non-native flora, whereas no significant difference was found between the native and non-native flora for Poaceae (Figure 2). The prevailing over-represented families, i.e. Solanaceae and Amaranthaceae, include well-renowned agricultural weeds.

As for genera, the prevalence of *Oenothera* is due to its peculiar chromosomal configuration (Soldano 1993) and to the marked inter-fertility of this genus (Mihulka & Pyšek 2001; Mihulka et al. 2006; Lambdon et al. 2008). Its prevalence, along with that of the second largest genera *Opuntia* and *Amaranthus*, is however also the result of more detailed knowledge of these taxa, which have been the subject of thorough reviews (Cacciato 1966; Soldano 1992; Guiggi 2008), though the *Amaranthus* review does need to be updated. Moreover, the abundance of the *Opuntia* species is also largely ascribable to its popularity among collectors of succulent plants.

This study has obviously not solved all taxonomy-related problems, but it has in several cases led to the identification of issues that warrant further study and highlighted some little-known taxa that will need to be thoroughly revised. Such taxa include for example *Deutzia scabra*, which might actually correspond to *Deutzia crenata* Siebold & Zucc., and the non-native taxa ascribed to genus *Vitis*, which have received little attention in Italy, but whose analysis is crucial, owing to the rate at which they are spreading in this country (Galasso et al. 2007), just as they have in Spain (Laguna Lumbreras 2003, 2004).

## Conclusions

Reliable, accurate taxonomic knowledge is an essential base for further detailed studies on plant invasion and for effective management policies. Dividing ancient from recently introduced taxa and naturalized from non-naturalized taxa is a first crucial step in the transition from a floristic-based approach for recording species to using such lists for invasion studies or management purposes. Nevertheless, the data available to date do not allow a definitive classification of each species to be drawn up, and some gaps in our knowledge will have to be filled in the future. For instance, the 40 species listed as doubtful aliens and the 62 species lacking recent records will need to be studied more accurately. Moreover, as the main source of information for the compilation of this inventory was the published literature, the definition of the invasion status of some records in regions that have been studied either less, or less recently, will need to be updated by means of field surveys. Generally speaking, experimentation and quantitative evaluations are urgently needed in all aspects of Italian non-native species research. For all these reasons, this inventory does not claim to be an end point, but rather a starting point designed to lay the foundations for further monitoring and research on plant invasions in Italy.

By involving a large group of local botanists and adopting standard categories and approaches, this study combines local expertise and synthetically presented information into a unified nationwide scheme. We believe that by collecting, in one comprehensive report, information on the occurrence and status of non-native species over a wide geographical area using a standardized approach, and by making a first attempt to differentiate ancient from recent plant introductions in a southern European and Mediterranean country, this study will improve our understanding of mechanisms of alien plant invasion. Indeed, this report provides the basis for future comparisons of non-native flora patterns, as well as of the various groups of species that make up the highly diverse Mediterranean flora. Moreover, the inventory is likely to be a useful tool for land planning and management, habitat restoration, forestry interventions, at both the local and national levels, and will help draw up a national action plan for controlling harmful invasive species.

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## Appendix 1. The inventory of the non-native vascular flora of Italy

Each species and subspecies is listed together with its family, residence time (Archaeo = archaeophyte; Neo = neophyte), invasion status (Nr = taxa that lack recent records, i.e. that have not been reported since 1950, Cas = casual, Nat = naturalized non-invasive, Inv = invasive) and native range (Medit = Mediterranean; Temp = Temperate; Trop = Tropical) (see Table I and text for definitions). C = presence in the most recent checklist of the Italian flora (Conti et al. 2005a); P = presence in the most recent Italian Flora (Pignatti 1982). Should the current binomial differ, the name as it is found in Conti et al (2005) and Pignatti (1982) is listed under the current one. Previous names that differ from the current ones only in authorship are not shown.

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Abies nordmanniana* (Steven) Spach | Pinaceae | Neo | Cas | W & C Asia | | |
| *Abutilon theophrasti* Medik. | Malvaceae | Archaeo | Inv | Europe, Asia-Temp | ♦ | ● |
| *Acacia dealbata* Link | Fabaceae | Neo | Inv | Australia | ♦ | ● |
| *Acacia longifolia* (Andrews) Willd. | Fabaceae | Neo | Nat | Australia | ♦ | ● |
| *Acacia mearnsii* De Wild. | Fabaceae | Neo | Inv | Australia | | ● |
| *Acacia melanoxylon* R.Br. | Fabaceae | Neo | Cas | Australia | ♦ | ● |
| *Acacia pycnantha* Benth. | Fabaceae | Neo | Cas | Australia | ♦ | ● |
| *Acacia retinodes* Schltdl.<br>♦ *Acacia retinoides* Schltdl. | Fabaceae | Neo | Inv | Australia | ♦ | ● |
| *Acacia saligna* (Labill.) H.L. Wendl. | Fabaceae | Neo | Inv | Australia | ♦ | ● |
| *Acalypha australis* L. | Euphorbiaceae | Neo | Nat | Soviet Far East, China, E Asia, Malesia | ♦ | |
| *Acalypha ostryifolia* Riddell | Euphorbiaceae | Neo | Cas | N & C America | | |
| *Acalypha virginica* L. | Euphorbiaceae | Neo | Inv | USA | ♦ | ● |
| *Acca sellowiana* (O. Berg.) Burret | Myrtaceae | Neo | Cas | S America | | |
| *Acer negundo* L. | Sapindaceae | Neo | Inv | N America | ♦ | ● |
| *Acer palmatum* Thunb. | Sapindaceae | Neo | Cas | China & E Asia | | |
| *Acer saccharinum* L. | Sapindaceae | Neo | Cas | Canada & USA | | |
| *Achillea filipendulina* Lam. | Asteraceae | Neo | Cas | W & C Asia | | |
| *Aconogonum polystachyum* (Wall. ex Meisn.) Small<br>♦ *Aconogonon polystachyum* (Wall. ex Meisn.) Small | Polygonaceae | Neo | Nat | Asia-Temp, Asia-Trop | ♦ | |
| *Acorus calamus* L. | Acoraceae | Archaeo | Nat | Asia-Temp, Asia-Trop | ♦ | ● |
| *Actinidia deliciosa* (A. Chev.) C.F. Liang & A.R. Ferguson | Actinidiaceae | Neo | Cas | China | | |
| *Aeonium arboreum* (L.) Webb & Berthel. | Crassulaceae | Archaeo | Cas | Canary Islands | ♦ | ● |
| *Aeonium decorum* Webb ex Bolle | Crassulaceae | Neo | Cas | Canary Islands | ♦ | |
| *Aeonium gomerense* (Praeger) Praeger | Crassulaceae | Neo | Cas | Canary Islands | | |
| *Aeonium haworthii* Salm-Dyck ex Webb & Berth. | Crassulaceae | Neo | Cas | Canary Islands | ♦ | |
| *Aeonium simsii* (Sweet) Stearn | Crassulaceae | Neo | Cas | Canary Islands | ♦ | |
| *Aesculus carnea* Hayne | Sapindaceae | Neo | Cas | Hybrid | ♦ | ● |
| *Aesculus hippocastanum* L. | Sapindaceae | Neo | Cas | SE Europe | ♦ | ● |
| *Agave americana* L. | Agavaceae | Neo | Inv | USA & Mexico | ♦ | ● |
| *Agave attenuata* Salm-Dick | Agavaceae | Neo | Nat | Mexico | | |
| *Agave franzosinii* Bak. | Agavaceae | Neo | Cas | Uncertain | | |
| *Agave salmiana* Otto ex Salm-Dyck<br>♦ *Agave ferox* K. Koch | Agavaceae | Neo | Nat | Mexico | ♦ | |
| *Agave sisalana* Perrine | Agavaceae | Neo | Nat | Mexico | | |
| *Ageratina ligustrina* (DC.) R.M. King & H. Rob. | Asteraceae | Neo | Cas | Mexico & C America | | |
| *Ageratum houstonianum* Mill. | Asteraceae | Neo | Cas | Mexico & C America | | |
| *Agrimonia repens* L. | Rosaceae | Neo | Nr | W Asia | ♦ | ● |
| *Agropyron desertorum* (Fisch. ex Link) Schult. | Poaceae | Neo | Nat | E Europe, C Asia & China | ♦ | |
| *Ailanthus altissima* (Mill.) Swingle | Simaroubaceae | Neo | Inv | China | ♦ | ● |
| *Ailanthus excelsa* Roxb. | Simaroubaceae | Neo | Nr | Indian Subcontinent | | |
| *Akebia quinata* (Houtt.) Decne. | Lardizabalaceae | Neo | Nat | China & E Asia | ♦ | |
| *Albizia julibrissin* Durazz.<br>♦ *Albizzia julibrissin* Durazz.<br>● *Albizzia julibrissin* (Willd.) Durazzo | Fabaceae | Neo | Cas | Asia-Temp | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Albuca altissima* Dryand. | Hyacinthaceae | Neo | Nr | S Africa | | |
| *Alcea biennis* Winterl subsp. *biennis* | Malvaceae | Neo | Nat | Europe | ♦ | ● |
| *Alcea rosea* L. | Malvaceae | Archaeo | Nat | Uncertain | ♦ | ● |
| *Alcea setosa* (Boiss.) Alef. | Malvaceae | Neo | Nat | Medit (Asia, Europe) | ♦ | ● |
| *Alchemilla mollis* (Buser) Rothm. | Rosaceae | Neo | Cas | E & SE Europe, W Asia | | |
| *Allium cepa* L. | Alliaceae | Archaeo | Cas | W Asia | ♦ | ● |
| *Allium fistulosum* L. | Alliaceae | Archaeo | Cas | Asia-Temp | ♦ | ● |
| *Allium giganteum* Regel | Alliaceae | Neo | Cas | W Asia, Soviet Middle Asia | | |
| *Allium porrum* L. | Alliaceae | Archaeo | Cas | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Allium sativum* L. | Alliaceae | Archaeo | Cas | Asia-Temp | ♦ | ● |
| *Allium scorodoprasum* L. | Alliaceae | Archaeo | Nat | Europe, W Asia | ♦ | ● |
| *Aloe arborescens* Mill. | Asphodelaceae | Neo | Cas | Trop & S Africa | | |
| *Aloe saponaria* (Aiton) Haw. | Asphodelaceae | Neo | Cas | S Africa | | |
| *Aloe vera* L.<br>● *Aloe barbadensis* Miller | Asphodelaceae | Archaeo | Nat | Arabian Peninsula, E-Africa | | ● |
| *Aloysia citrodora* P. Palau<br>♦ ● *Lippia triphylla* (L'Hér.) Kuntze | Verbenaceae | Neo | Cas | S America | ♦ | ● |
| *Alternanthera philoxeroides* (Mart.) Griseb. | Amaranthaceae | Neo | Nat | S America | ♦ | |
| *Amaranthus acutilobus* Uline & W.L. Bray | Amaranthaceae | Neo | Nr | Mexico | ♦ | |
| *Amaranthus albus* L. | Amaranthaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Amaranthus blitoides* S. Watson | Amaranthaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Amaranthus caudatus* L. | Amaranthaceae | Neo | Cas | S America | ♦ | ● |
| *Amaranthus crassipes* Schltdl. | Amaranthaceae | Neo | Nr | USA, Mexico & Caribbean | | |
| *Amaranthus crispus* (Lesp. & Thévenau) N. Terracc. | Amaranthaceae | Neo | Cas | S America (Argentina) | ♦ | ● |
| *Amaranthus cruentus* L.[1] | Amaranthaceae | Neo | Inv | America | ♦ | ● |
| *Amaranthus deflexus* L. | Amaranthaceae | Neo | Inv | S America | ♦ | ● |
| *Amaranthus graecizans* L. | Amaranthaceae | Neo | Inv | Medit (Asia, Europe) | ♦ | ● |
| *Amaranthus hybridus* L. | Amaranthaceae | Neo | Inv | America | ♦ | ● |
| *Amaranthus hypochondriacus* L. | Amaranthaceae | Neo | Cas | N America | ♦ | |
| *Amaranthus muricatus* (Moq.) Hieron. | Amaranthaceae | Neo | Inv | S America | ♦ | ● |
| *Amaranthus polygonoides* L. | Amaranthaceae | Neo | Cas | N & C America | ♦ | ● |
| *Amaranthus powellii* S. Watson[2] | Amaranthaceae | Neo | Inv | USA & Mexico | ♦ | ● |
| *Amaranthus retroflexus* L. | Amaranthaceae | Neo | Inv | N America | ♦ | ● |
| *Amaranthus spinosus* L. | Amaranthaceae | Neo | Cas | America | ♦ | ● |
| *Amaranthus tricolor* L. | Amaranthaceae | Neo | Cas | Asia-Temp | ♦ | ● |
| *Amaranthus tuberculatus* (Moq.) J.D. Sauer[3]<br>♦ *Amaranthus tamariscinus* Nutt. | Amaranthaceae | Neo | Inv | Canada & USA | ♦ | |
| *Amaranthus viridis* L. | Amaranthaceae | Neo | Inv | S America | ♦ | ● |
| *Amaryllis bella-donna* L. | Amaryllidaceae | Neo | Nat | S Africa (Cape Province) | ♦ | |
| *Ambrosia artemisiifolia* L. | Asteraceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Ambrosia psilostachya* DC.<br>♦ *Ambrosia coronopifolia* Torr. & A. Gray<br>● *Ambrosia coronopifolia* Torr. et Gray | Asteraceae | Neo | Inv | N America | ♦ | ● |
| *Ambrosia tenuifolia* Spreng. | Asteraceae | Neo | Nat | S America | ♦ | ● |
| *Ambrosia trifida* L. | Asteraceae | Neo | Nat | N America | ♦ | ● |
| *Amelanchier lamarckii* F.G. Schroed. | Rosaceae | Neo | Nat | N America | ♦ | ● |
| *Ammannia auriculata* Willd.<br>● *Ammania auriculata* Willd. | Lythraceae | Neo | Cas | Tropics | ♦ | ● |
| *Ammannia baccifera* L.<br>♦ *Ammannia robusta* Heer & Regel | Lythraceae | Neo | Nr | Tropics | ♦ | |
| *Ammannia coccinea* Rottb.<br>● *Ammania coccinea* Rothb. | Lythraceae | Neo | Inv | N, C & S America | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Ammannia verticillata* (Ard.) Lam.<br>● *Ammania verticillata* (Ard.) Lam. | Lythraceae | Neo | Cas | Asia-Temp | ♦ | ● |
| *Amorpha fruticosa* L. | Fabaceae | Neo | Inv | N America | ♦ | ● |
| *Amphicarpaea comosa* (L.) G. Don ex Loudon | Fabaceae | Neo | Cas | Canada & USA | | |
| *Amsinckia lycopsoides* Lehm. | Boraginaceae | Neo | Cas | Canada & USA | | |
| *Anethum graveolens* L. | Apiaceae | Archaeo | Cas | Medit (Asia) | ♦ | ● |
| *Angelica archangelica* L. | Apiaceae | Archaeo | Cas | Europe, Caucasus, Siberia | ♦ | ● |
| *Annona cherimola* Mill. | Annonaceae | Neo | Cas | S America | | |
| *Anoda cristata* (L.) Schltdl. | Malvaceae | Neo | Cas | N, C & S America | | |
| *Anredera cordifolia* (Ten.) Steenis<br>♦ *Boussingaultia cordifolia* Ten. | Basellaceae | Neo | Nat | S America | ♦ | |
| *Anthemis ruthenica* M. Bieb. | Asteraceae | Neo | Cas | SE Europe, W Asia | | |
| *Anthistiria ciliata* L.f. | Poaceae | Neo | Nr | Indian Subcontinent | | |
| *Anthriscus cerefolium* (L.) Hoffm. | Apiaceae | Archaeo | Nat | Europe, W & C Asia | ♦ | ● |
| *Antirrhinum majus* L. subsp. *majus* | Plantaginaceae | Archaeo | Nat | SW Europe | ♦ | ● |
| *Apios americana* Medik. | Plantaginaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Arachis hypogaea* L. | Fabaceae | Neo | Cas | America | ♦ | ● |
| *Aralia spinosa* L. | Araliaceae | Neo | Cas | Soviet Far East, China, E Asia | | |
| *Araujia sericifera* Brot. | Apocynaceae | Neo | Inv | S America | ♦ | |
| *Arctotheca calendula* (L.) Levyns | Asteraceae | Neo | Nat | S Africa | | |
| *Argyranthemum frutescens* (L.) Sch. Bip. subsp. *frutescens* | Asteraceae | Neo | Cas | Canary Islands | ♦ | ● |
| *Arisaema triphyllum* (L.) Torr. | Araceae | Neo | Cas | Canada & USA | | |
| *Aristida longispica* Poir.<br>♦ ● *Aristida gracilis* Elliott | Poaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Armoracia rusticana* P. Gaertn., B. Mey. & Scherb. | Brassicaceae | Archaeo | Nat | SE Europe | ♦ | ● |
| *Artemisia abrotanum* L. | Asteraceae | Archaeo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Artemisia annua* L. | Asteraceae | Neo | Inv | E Europe, W & C Asia | ♦ | ● |
| *Artemisia biennis* Willd. | Asteraceae | Neo | Cas | W & C Asia, Indian Subcontinent | ♦ | ● |
| *Artemisia pontica* L. | Asteraceae | Archaeo | Nr | C, E & SE Europe, Siberia | ♦ | ● |
| *Artemisia scoparia* Waldst. & Kit. | Asteraceae | Neo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Artemisia tournefortiana* Rchb. | Asteraceae | Neo | Cas | Asia-Temp | ♦ | |
| *Artemisia verlotiorum* Lamotte<br>● *Artemisia verlotorum* Lamotte | Asteraceae | Neo | Inv | Asia-Temp | ♦ | ● |
| *Arundo donax* L. | Poaceae | Archaeo | Inv | Europe, Asia-Temp | ♦ | ● |
| *Asclepias curassavica* L. | Apocynaceae | Neo | Nat | S America | | |
| *Asclepias fruticosa* L.<br>♦ *Asclepias fruticosus* L.<br>● *Gomphocarpus fruticosus* (L.) Aiton fil. | Apocynaceae | Neo | Inv | Trop & S Africa, Madagascar | ♦ | ● |
| *Asclepias physocarpa* (E. Mey.) Schltr. | Apocynaceae | Neo | Nat | Trop & S Africa | | |
| *Asclepias syriaca* L. | Apocynaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Asparagus aethiopicus* L.[4] | Asparagaceae | Neo | Cas | S Africa | | |
| *Asparagus setaceus* (Kunth) Jessop | Asparagaceae | Neo | Nat | Trop & S Africa | | |
| *Astragalus odoratus* Lam. | Fabaceae | Neo | Nr | SE Europe, W & C Asia | | ● |
| *Atriplex hortensis* L. | Amaranthaceae | Archaeo | Nat | Asia-Temp | ♦ | ● |
| *Atriplex micrantha* Ledeb. | Amaranthaceae | Neo | Cas | Europe, Asia-Temp | ♦ | |
| *Aucuba japonica* Thunb. | Garryaceae | Neo | Cas | China & E Asia | | |
| *Austrocylindropuntia cylindrica* (Lam.) Backeb. | Cactaceae | Neo | Nat | S America | | |
| *Austrocylindropuntia subulata* (Muehlenpf.) Backeb. | Cactaceae | Neo | Nat | S America (Peru) | | |
| *Avena strigosa* Schreb. | Poaceae | Neo | Cas | Medit (Europe) | ♦ | ● |
| *Azolla filiculoides* Lam. | Azollaceae | Neo | Inv | America | ♦ | ● |
| *Baccharis halimifolia* L. | Asteraceae | Neo | Inv | USA & Mexico | | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Ballota pseudodictamnus* (L.) Benth. | Lamiaceae | Neo | Nat | Medit (Europe) | ♦ | ● |
| *Bambusa bambos* (L.) Voss | Poaceae | Neo | Cas | China, Indian Subcontinent, Indo-China | | |
| *Berberis bealei* Fortune | Berberidaceae | Neo | Nat | China | | |
| *Bergenia crassifolia* (L.) Fritsch | Saxifragaceae | Neo | Cas | Siberia, C Asia, Soviet Far East, China, E Asia | | |
| *Bidens aurea* (Aiton) Sherff | Asteraceae | Neo | Nat | N & C America | ♦ | ● |
| *Bidens bipinnata* L. | Asteraceae | Neo | Inv | N America | ♦ | ● |
| *Bidens connata* Muhl. ex Willd. | Asteraceae | Neo | Inv | wide distribution | ♦ | |
| *Bidens frondosa* L. | Asteraceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Bidens pilosa* L. | Asteraceae | Neo | Nat | Mexico, C & S America | ♦ | ● |
| *Bidens radiata* Thuill. | Asteraceae | Neo | Cas | N, C & S America | ♦ | |
| *Bidens subalternans* DC. | Asteraceae | Neo | Inv | S America | ♦ | |
| *Bidens vulgata* Greene | Asteraceae | Neo | Nat | Canada & USA | ♦ | |
| *Bletilla striata* (Thunb.) Rchb.f. | Orchidaceae | Neo | Cas | China & E Asia | | |
| *Blyxa japonica* (Miq.) Maxim. ex Asch. & Gürke | Hydrocharitaceae | Neo | Nr | Asia-Temp | ♦ | ● |
| *Boehmeria nivea* (L.) Gaudich. | Urticaceae | Neo | Nat | China & E Asia | ♦ | ● |
| *Boerhavia coccinea* Mill.<br>♦ ● *Boerhavia repens* L. subsp. *viscosa* (Choisy) Maire | Nyctaginaceae | Neo | Inv | wide distribution | ♦ | ● |
| *Boerhavia repens* L. subsp. *diandra* (L.) Maire & Weiller | Nyctaginaceae | Neo | Nr | Tropics (Africa, Asia) | ♦ | |
| *Bothriochloa laguroides* (DC.) Herter subsp. *laguroides* | Poaceae | Neo | Nat | N, C & S America | | |
| *Brachychiton populneus* (Schott & Endl.) R.Br. | Malvaceae | Neo | Cas | Australia | | |
| *Brassica elongata* Ehrh. subsp. *elongata* | Brassicaceae | Neo | Nr | C & SE Europe | ♦ | ● |
| *Brassica elongata* Ehrh. subsp. *integrifolia* (Boiss.) Breistr. | Brassicaceae | Neo | Cas | W & C Asia | ♦ | ● |
| *Brassica napus* L. subsp. *napus* | Brassicaceae | Archaeo | Nat | Uncertain | ♦ | ● |
| *Brassica oleracea* L. | Brassicaceae | Archaeo | Nat | Europe | ♦ | ● |
| *Bromus brachystachys* Hornung | Poaceae | Neo | Nr | W Asia | ♦ | ● |
| *Broussonetia papyrifera* (L.) Vent. | Moraceae | Neo | Inv | China & E Asia | ♦ | ● |
| *Brunnera macrophylla* (Adams) I.M. Johnston | Boraginaceae | Neo | Nat | W Asia & Caucasus | | |
| *Buddleja davidii* Franch. | Scrophulariaceae | Neo | Inv | China | ♦ | ● |
| *Bulbostylis cioniana* (Savi) Lye<br>♦ *Fimbristylis cioniana* Savi | Cyperaceae | Neo | Nr | N & Trop Africa | ♦ | |
| *Bunias orientalis* L. | Brassicaceae | Neo | Nat | Europe, W Asia, Caucasus, Siberia | ♦ | ● |
| *Bupleurum rotundifolium* L. | Apiaceae | Archaeo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Callistephus chinensis* (L.) Nees<br>♦ ● *Callistephus sinensis* (L.) Nees | Asteraceae | Neo | Cas | Mongolia, China & E Asia | ♦ | ● |
| *Callitropsis arizonica* (Greene) D.P. Little<br>● *Cupressus arizonica* Greene | Cupressaceae | Neo | Cas | USA & Mexico | | ● |
| *Callitropsis macrocarpa* (Hartw.) D.P. Little<br>● *Cupressus macrocarpa* Hartweg | Cupressaceae | Neo | Cas | USA | | ● |
| *Calocedrus decurrens* (Torr.) Florin | Cupressaceae | Neo | Cas | USA & Mexico | | |
| *Camelina rumelica* Velen. | Brassicaceae | Neo | Nr | Europe, W & C Asia, Indian Subcontinent | | ● |
| *Campanula carpatica* Jacq. | Campanulaceae | Neo | Cas | C, E & SE Europe (Carpathians) | | |
| *Campsis radicans* (L.) Bureau<br>● *Tecoma radicans* (L.) Juss. | Bignoniaceae | Neo | Cas | USA | ♦ | ● |
| *Canna indica* L. | Cannaceae | Neo | Nat | Mexico, C & S America | ♦ | ● |
| *Cannabis sativa* L. | Cannabaceae | Archaeo | Nat | W Asia | ♦ | ● |
| *Capsella grandiflora* (Fauché & Chaub.) Boiss. | Brassicaceae | Neo | Inv | SE Europe, W Asia | ♦ | ● |
| *Capsicum annuum* L. | Solanaceae | Neo | Cas | N, C & S America | ♦ | ● |
| *Cardiospermum grandiflorum* Sw. | Sapindaceae | Neo | Nat | C & S America | | |
| *Carex vulpinoidea* Michx. | Cyperaceae | Neo | Nat | N America | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Carpobrotus acinaciformis* (L.) L. Bolus | Aizoaceae | Neo | Inv | S Africa (Cape Province) | ♦ | ● |
| *Carpobrotus edulis* (L.) N.E.Br. | Aizoaceae | Neo | Inv | S Africa (Cape Province) | ♦ | ● |
| *Carthamus tinctorius* L. | Asteraceae | Archaeo | Cas | Asia-Temp | ♦ | ● |
| *Casuarina equisetifolia* L. | Casuarinaceae | Neo | Cas | Australia | | |
| *Catalpa bignonioides* Walter[5] | Bignoniaceae | Neo | Cas | USA | ♦ | ● |
| *Catalpa ovata* G. Don | Bignoniaceae | Neo | Nat | China | | |
| *Catalpa speciosa* (Warder) Engelm. | Bignoniaceae | Neo | Cas | USA | | |
| *Catharanthus roseus* (L.) G. Don | Apocynaceae | Neo | Cas | Madagascar | | |
| *Cedrus atlantica* (Endl.) Carrière | Pinaceae | Neo | Cas | N Africa | | ● |
| *Cedrus deodara* (Roxb.) G. Don | Pinaceae | Neo | Nat | W & C Asia, China, Indian Subcontinent | | ● |
| *Celosia argentea* L.<br>● *Celosia cristata* L. | Amaranthaceae | Neo | Cas | Asia-Trop | ♦ | ● |
| *Celtis occidentalis* L. | Cannabaceae | Neo | Cas | Canada & USA | ♦ | |
| *Cenchrus incertus* Curtis | Poaceae | Neo | Inv | N, C & S America | ♦ | ● |
| *Cenchrus longispinus* (Hack.) Fernald | Poaceae | Neo | Inv | N, C & S America | ♦ | ● |
| *Centaurea acaulis* L. | Asteraceae | Neo | Nat | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Centaurea diffusa* Lam. | Asteraceae | Neo | Cas | E & SE Europe, W Asia, Caucasus | ♦ | ● |
| *Centaurea diluta* Aiton | Asteraceae | Neo | Inv | Medit (Europe) | ♦ | |
| *Centaurea hyalolepis* Boiss. | Asteraceae | Neo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Centaurea iberica* Spreng. | Asteraceae | Neo | Nr | E & SE Europe, Asia-Temp, Indian Subcontinent | ♦ | ● |
| *Centaurea ragusina* L. | Asteraceae | Neo | Cas | SE Europe | ♦ | ● |
| *Centaurea salonitana* Vis. | Asteraceae | Neo | Nr | SE Europe, W Asia | | ● |
| *Centaurea tenuiflora* DC. | Asteraceae | Neo | Cas | Europe | ♦ | ● |
| *Centranthus macrosiphon* Boiss. | Valerianaceae | Neo | Nat | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Cephalaria syriaca* (L.) Roem. & Schult. | Dipsacaceae | Neo | Nr | Medit (Asia) | ♦ | ● |
| *Cephalotaxus fortunei* Hook. | Cephalotaxaceae | Neo | Cas | China | | |
| *Cerastium biebersteinii* DC. | Caryophyllaceae | Neo | Cas | E Europe | | |
| *Ceratochloa carinata* (Hook. & Arn.) Tutin | Poaceae | Neo | Nat | N & C America | ♦ | |
| *Ceratochloa cathartica* (Vahl) Herter<br>● *Bromus willdenovii* Kunth | Poaceae | Neo | Nat | S America | ♦ | ● |
| *Ceratostigma plumbaginoides* Bunge | Plumbaginaceae | Neo | Cas | China | ♦ | ● |
| *Cestrum parqui* L'Hér. | Solanaceae | Neo | Inv | S America | ♦ | ● |
| *Chaenomeles japonica* Lindl. ex Spach | Rosaceae | Neo | Cas | E Asia (Japan) | | |
| *Chaerophyllum bulbosum* L. | Apiaceae | Neo | Nat | Europe, W Asia, Caucasus | ♦ | ● |
| *Chaetopogon fasciculatus* (Link) Hayek | Poaceae | Neo | Cas | Europe | ♦ | ● |
| *Chamaecyparis lawsoniana* (A. Murray) Parl. | Cupressaceae | Neo | Cas | USA | | ● |
| *Chamaedorea elatior* Mart. | Arecaceae | Neo | Cas | Mexico | | |
| *Chamaemelum nobile* (L.) All. | Asteraceae | Neo | Cas | N & SW Europe | ♦ | ● |
| *Chamaesyce engelmannii* (Boiss.) Soják<br>● *Euphorbia engelmannii* Boiss. | Euphorbiaceae | Neo | Nr | Uncertain | | ● |
| *Chamaesyce glyptosperma* (Engelm.) Small | Euphorbiaceae | Neo | Nat | Canada & USA | ♦ | |
| *Chamaesyce humifusa* (Willd. ex Schlecht.) Prokh.<br>● *Euphorbia humifusa* Willd. | Euphorbiaceae | Neo | Nat | E Europe, Asia-Temp | ♦ | ● |
| *Chamaesyce hypericifolia* (L.) Millsp.<br>● *Euphorbia hypericifolia* (L.) | Euphorbiaceae | Neo | Cas | N, C & S America | ♦ | ● |
| *Chamaesyce maculata* (L.) Small<br>● *Euphorbia maculata* L. | Euphorbiaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Chamaesyce nutans* (Lag.) Small | Euphorbiaceae | Neo | Nat | Canada & USA | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| ● *Euphorbia nutans* Lag. | | | | | | |
| *Chamaesyce prostrata* (Aiton) Small<br>● *Euphorbia prostrata* Aiton | Euphorbiaceae | Neo | Inv | S America | ♦ | ● |
| *Chamaesyce serpens* (Kunth) Small<br>● *Euphorbia serpens* H.B.K. | Euphorbiaceae | Neo | Nat | N America | ♦ | ● |
| *Chasmanthe aethiopica* (L.) N.E.Br.<br>♦ ● *Antholyza aethiopica* L. | Iridaceae | Neo | Inv | S Africa (Cape Province) | ♦ | ● |
| *Chenopodium capitatum* (L.) Ambrosi | Amaranthaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Chenopodium hircinum* Schrad. | Amaranthaceae | Neo | Nr | S America | | |
| *Chenopodium probstii* Aellen | Amaranthaceae | Neo | Nat | N America | ♦ | |
| *Chlorophytum comosum* (Thunb.) Jacques | Anthericaceae | Neo | Cas | Trop & S Africa | | |
| *Chorispora tenella* (Pall.) DC. | Brassicaceae | Neo | Inv | Europe, Asia-Temp, Indian Subcontinent | ♦ | |
| *Christella dentata* (Forssk.) Brownsey & Jermy | Thelypteridaceae | Neo | Cas | Tropics (Africa, Asia) | ♦ | |
| *Chrysanthemoides monilifera* (L.) Norl. | Asteraceae | Neo | Nr | Trop & S Africa | ♦ | ● |
| *Cicer arietinum* L. | Fabaceae | Archaeo | Cas | Medit (Asia) | ♦ | ● |
| *Cinnamomum glanduliferum* (Wall.) Meisn. | Lauraceae | Neo | Cas | Asia-Temp, Asia-Trop | | |
| *Cistus ladanifer* L. | Cistaceae | Neo | Cas | Medit (Africa, Europe) | | ● |
| *Citrullus lanatus* (Thunb.) Matsum. & Nakai | Cucurbitaceae | Archaeo | Cas | Trop Africa | ♦ | ● |
| *Claytonia perfoliata* Donn ex Willd. | Montiaceae | Neo | Cas | N & C America | ♦ | |
| *Clematis tangutica* (Maxim.) Korsh. | Ranunculaceae | Neo | Nat | C Asia, China | ♦ | |
| *Cleome spinosa* Jacq. | Cleomaceae | Neo | Cas | S America | ♦ | ● |
| *Clerodendrum bungei* Steud. | Lamiaceae | Neo | Cas | China, E Asia, Indo-China | | |
| *Clerodendrum trichotomum* Thunb. | Lamiaceae | Neo | Cas | China, E Asia, Indian Subcontinent | ♦ | |
| *Cochlearia glastifolia* L. | Brassicaceae | Archaeo | Nat | Europe | ♦ | ● |
| *Cochlearia officinalis* L. subsp. *officinalis* | Brassicaceae | Archaeo | Nat | Europe | ♦ | ● |
| *Coix lacryma-jobi* L. | Poaceae | Neo | Nr | China, Indian Subcontinent, Indo-China | ♦ | ● |
| *Colletia hystrix* Clos | Rhamnaceae | Neo | Cas | S America | | |
| *Collinsia heterophylla* Buist ex Graham | Plantaginaceae | Neo | Nr | USA & Mexico | | |
| *Collomia linearis* Nutt. | Polemoniaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Colocasia esculenta* (L.) Schott<br>● *Colocasia antiquorum* Schott | Araceae | Archaeo | Cas | Indian Subcontinent | ♦ | ● |
| *Commelina communis* L. | Commelinaceae | Neo | Inv | C Asia, Soviet Far East, China, E Asia | ♦ | ● |
| *Commelina virginica* L. | Commelinaceae | Neo | Nat | USA | ♦ | ● |
| *Conringia orientalis* (L.) Andrz. ex DC. | Brassicaceae | Archaeo | Nat | Medit (Asia, Europe) | ♦ | ● |
| *Consolida hispanica* (Costa) Greuter & Burdet | Ranunculaceae | Archaeo | Cas | Europe, W & C Asia, Indian Subcontinent | ♦ | ● |
| *Convolvulus betonicifolius* Mill. | Convolvulaceae | Neo | Nr | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Convolvulus farinosus* L. | Convolvulaceae | Neo | Cas | N, Trop & S Africa | | |
| *Convolvulus tricolor* L. subsp. *tricolor* | Convolvulaceae | Neo | Cas | Medit (Europe) | ♦ | ● |
| *Coreopsis lanceolata* L. | Asteraceae | Neo | Cas | Canada & USA | ♦ | |
| *Coriandrum sativum* L. | Apiaceae | Archaeo | Nat | Medit (Africa, Europe) | ♦ | ● |
| *Corispermum marschallii* Steven | Amaranthaceae | Neo | Inv | Europe, Asia-Temp | ♦ | ● |
| *Cortaderia selloana* (Schult. & Schult.f.) Asch. & Graebn. | Poaceae | Neo | Inv | S America | ♦ | ● |
| *Corylus maxima* Mill. | Betulaceae | Neo | Cas | Europe, W Asia, Caucasus | ♦ | ● |
| *Cosmos bipinnatus* Cav. | Asteraceae | Neo | Cas | N & C America | ♦ | ● |
| *Cotoneaster coriaceus* Franch. | Rosaceae | Neo | Nat | China | | |
| *Cotoneaster dammeri* C.K. Schneid. | Rosaceae | Neo | Cas | China | | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Cotoneaster hjelmqvistii* Flinck & B. Hylmö | Rosaceae | Neo | Nat | Uncertain | | |
| *Cotoneaster horizontalis* Decne. | Rosaceae | Neo | Nat | China, E Asia, Indian Subcontinent | ♦ | ● |
| *Cotoneaster pannosus* Franch. | Rosaceae | Neo | Nat | China | | |
| *Cotoneaster salicifolius* Franch. | Rosaceae | Neo | Nat | China | | |
| *Cotula australis* (Sieber ex Spreng.) Hook.f. | Asteraceae | Neo | Nat | Australia & New Zealand | | |
| *Cotula coronopifolia* L. | Asteraceae | Neo | Inv | S Africa | ♦ | ● |
| *Cotyledon orbiculata* L. | Crassulaceae | Neo | Cas | Trop & S Africa | ♦ | |
| *Crassula lycopodioides* Lam. | Crassulaceae | Neo | Cas | S Africa | ♦ | |
| *Crassula ovata* (Mill.) Druce | Crassulaceae | Neo | Cas | Trop & S Africa | ♦ | |
| *Crassula tetragona* L. | Crassulaceae | Neo | Cas | S Africa (Cape Province) | ♦ | |
| *Crataegus azarolus* L. | Rosaceae | Archaeo | Nat | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Crataegus coccinea* L. | Rosaceae | Neo | Cas | Canada & USA | | |
| *Crataegus crus-galli* L. | Rosaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Crataegus prunifolia* (Poir.) Pers. | Rosaceae | Neo | Cas | Canada & USA | | |
| *Crataegus submollis* Sarg. | Rosaceae | Neo | Nat | Canada & USA | ♦ | |
| *Crepis dioscoridis* L. | Asteraceae | Neo | Nr | SE Europe, W Asia | ♦ | ● |
| *Cryptomeria japonica* (Thunb. ex L.f.) D. Don | Cupressaceae | Neo | Cas | E Asia (Japan) | | ● |
| *Cucumis melo* L. | Cucurbitaceae | Archaeo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Cucumis sativus* L. | Cucurbitaceae | Archaeo | Cas | Indian Subcontinent | ♦ | ● |
| *Cucurbita maxima* Duchesne | Cucurbitaceae | Neo | Cas | S America | ♦ | ● |
| *Cucurbita pepo* L. | Cucurbitaceae | Neo | Cas | USA | ♦ | ● |
| *Cullen americanum* (L.) Rydb.<br>● *Psoralea americana* L. | Fabaceae | Archaeo | Nr | Medit (Africa, Europe) | ♦ | ● |
| *Cupressus sempervirens* L. | Cupressaceae | Archaeo | Nat | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Cuscuta campestris* Yunck. | Convolvulaceae | Neo | Inv | N America & Caribbean | ♦ | ● |
| *Cuscuta epilinum* Weihe | Convolvulaceae | Archaeo | Nat | E Europe, Asia-Temp, Soviet Far East | ♦ | ● |
| *Cuscuta gronovii* Willd. ex Schult. | Convolvulaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Cuscuta suaveolens* Ser. | Convolvulaceae | Neo | Nat | S America | ♦ | ● |
| *Cyclanthera pedata* (L.) Schrad. | Cucurbitaceae | Neo | Nat | S America | ♦ | ● |
| *Cycloloma atriplicifolium* (Spreng.) J.M. Coult. | Amaranthaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Cyclospermum leptophyllum* (Pers.) Sprague ex Britton & P. Wilson<br>♦ ● *Apium leptophyllum* (Pers.) F. Muell. | Apiaceae | Neo | Nat | S America | ♦ | ● |
| *Cydonia oblonga* Mill. | Rosaceae | Archaeo | Nat | W & C Asia | ♦ | ● |
| *Cylindropuntia kleiniae* (DC.) F.M. Knuth | Cactaceae | Neo | Cas | USA & Mexico | | |
| *Cylindropuntia tunicata* (Lehm.) F.M. Knuth | Cactaceae | Neo | Cas | USA, Mexico & Caribbean | | |
| *Cyperus brevifolioides* Thieret & Delahouss.<br>♦ *Cyperus brevifolius* (Rottb.) Hassk. | Cyperaceae | Neo | Nat | Soviet Far East, China, E Asia, Indian Subcontinent | ♦ | |
| *Cyperus congestus* Vahl | Cyperaceae | Neo | Nat | S Africa | ♦ | ● |
| *Cyperus difformis* L. | Cyperaceae | Neo | Nat | wide distribution | ♦ | ● |
| *Cyperus eragrostis* Lam. | Cyperaceae | Neo | Nat | America | ♦ | ● |
| *Cyperus glomeratus* L. | Cyperaceae | Neo | Inv | Europe, Asia-Temp | ♦ | ● |
| *Cyperus hamulosus* M. Bieb. | Cyperaceae | Neo | Cas | Europe, Asia-Temp | ♦ | ● |
| *Cyperus involucratus* Rottb. | Cyperaceae | Neo | Nat | Trop & S Africa | ♦ | |
| *Cyperus microiria* Steud. | Cyperaceae | Neo | Inv | Asia-Temp | ♦ | ● |
| *Cyperus papyrus* L. subsp. *papyrus* | Cyperaceae | Archaeo | Nat | N Africa | ♦ | ● |
| *Cyperus serotinus* Rottb. | Cyperaceae | Archaeo | Inv | Europe, Asia-Temp, Asia-Trop | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Cyperus squarrosus* L.<br>● *Cyperus aristatus* Rottb. | Cyperaceae | Neo | Nat | Tropics | ♦ | ● |
| *Cyperus strigosus* L. | Cyperaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Cyrtomium falcatum* (L.f.) C. Presl | Dryopteridaceae | Neo | Nat | China, E Asia, Indo-China | ♦ | |
| *Cyrtomium fortunei* J. Sm. | Dryopteridaceae | Neo | Nat | China, E Asia, Indo-China | ♦ | ● |
| *Dactyloctenium aegyptium* (L.) Willd.<br>● *Dactyloctaenium aegyptium* (L.) Richter | Poaceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | ● |
| *Danaë racemosa* (L.) Moench | Ruscaceae | Neo | Cas | Caucasus | | |
| *Datura ferox* L. | Solanaceae | Neo | Nat | China | ♦ | ● |
| *Datura inoxia* Mill.<br>♦ *Datura innoxia* Mill.<br>● *Datura innoxia* Miller | Solanaceae | Neo | Inv | N, C & S America | ♦ | ● |
| *Datura quercifolia* Humb. & Kunth | Solanaceae | Neo | Cas | USA & Mexico | | |
| *Datura stramonium* L. subsp. *stramonium* | Solanaceae | Neo | Inv | USA & Mexico | ♦ | ● |
| *Deutzia gracilis* Siebold & Zucc. | Hydrangeaceae | Neo | Cas | E Asia | ♦ | |
| *Deutzia scabra* Thunb.[6] | Hydrangeaceae | Neo | Nat | E Asia (Japan) | ♦ | |
| *Dianthus plumarius* L. | Caryophyllaceae | Neo | Cas | C & SE Europe | ♦ | ● |
| *Dichanthelium acuminatum* (Sw.) Gould & C.A. Clark | Poaceae | Neo | Nat | America | ♦ | |
| *Dichanthium annulatum* (Forssk.) Stapf | Poaceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | |
| *Dichondra micrantha* Urb. | Convolvulaceae | Neo | Nat | Asia-Temp | ♦ | ● |
| *Dichrocephala integrifolia* (L.f.) Kuntze | Asteraceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | ● |
| *Digitaria ciliaris* (Retz.) Koeler | Poaceae | Neo | Nat | Tropics (Africa, America, Asia) | ♦ | ● |
| *Dinebra retroflexa* (Vahl) Panz. | Poaceae | Neo | Cas | Tropics (Africa, Asia) | ♦ | ● |
| *Diospyros lotus* L. | Ebenaceae | Neo | Nat | W & C Asia, China, E Asia, Indian Subcontinent | ♦ | ● |
| *Diplachne fascicularis* (Lam.) P. Beauv.<br>♦ *Leptochloa fusca* (L.) Kunth subsp. *fascicularis* (Lam.) | Poaceae | Neo | Nat | America | ♦ | |
| *Diplachne fusca* (L.) P. Beauv. ex Roem. & Schult.<br>♦ *Leptochloa fusca* (L.) Kunth s.l. | Poaceae | Neo | Nat | wide distribution | ♦ | |
| *Diplachne uninervia* (J. Presl) N. Snow Parodi<br>♦ *Leptochloa fusca* (L.) Kunth subsp. *uninervia* (J. Presl) N. Snow | Poaceae | Neo | Cas | N, C & S America | ♦ | |
| *Dipsacus laciniatus* L. | Dipsacaceae | Neo | Nat | Medit (Europe) | ♦ | ● |
| *Dracaena draco* L. | Ruscaceae | Neo | Nat | Macaronesia & N Africa | | |
| *Drosanthemum floribundum* (Haw.) Schwantes | Aizoaceae | Neo | Cas | S Africa (Cape Province) | | |
| *Drosanthemum hispidum* (L.) Schwantes<br>♦ *Mesembryanthemum hispidum* L. | Aizoaceae | Neo | Nr | S Africa | ♦ | |
| *Dysphania ambrosioides* (L.) Mosyakin & Clemants<br>♦ ● *Chenopodium ambrosioides* L. | Amaranthaceae | Neo | Inv | America | ♦ | ● |
| *Dysphania aristata* (L.) Mosyakin & Clemants<br>♦ ● *Chenopodium aristatum* L. | Amaranthaceae | Neo | Cas | E Europe, Asia-Temp | ♦ | ● |
| *Dysphania multifida* (L.) Mosyakin & Clemants<br>♦ ● *Chenopodium multifidum* L. | Amaranthaceae | Neo | Nat | S America | ♦ | ● |
| *Dysphania pumilio* (R.Br.) Mosyakin & Clemants | Amaranthaceae | Neo | Nat | Australia & New Zealand | | |
| *Echinochloa colona* (L.) Link<br>● *Echinochloa colonum* (L.) Link | Poaceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | ● |
| *Echinochloa hispidula* (Retz.) Nees ex Royle | Poaceae | Neo | Nat | Asia-Temp | ♦ | ● |
| *Echinochloa muricata* (P. Beauv.) Fernald subsp. *microstachya* (Wiegand) Jauzein | Poaceae | Neo | Nat | N America | ♦ | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Echinochloa oryzicola* (Vasinger) Vasinger<br>● *Echinochloa phyllopogon* (Stapf) Carv. Vasc. | Poaceae | Neo | Nat | Asia-Temp | ♦ | ● |
| *Echinochloa oryzoides* (Ard.) Fritsch<br>● *Echinochloa hostii* (Bieb.) Boros | Poaceae | Neo | Nat | wide distribution | ♦ | ● |
| *Echinocystis lobata* (Michx.) Torr. & A. Gray | Cucurbitaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Echium angustifolium* Lam. subsp. *sericeum* (Vahl) Klotz | Boraginaceae | Neo | Nr | Medit (Africa, Asia, Europe) | | |
| *Echium candicans* L.f. | Boraginaceae | Neo | Nat | Madeira Islands | ♦ | |
| *Echium longifolium* Delile | Boraginaceae | Neo | Nr | Medit (Africa, Asia, Europe) | | |
| *Eclipta prostrata* (L.) L. | Asteraceae | Neo | Nat | America | ♦ | ● |
| *Egeria densa* Planch.<br>● *Elodea densa* (Planchon) Caspary | Hydrocharitaceae | Neo | Nat | S America | ♦ | ● |
| *Ehrharta erecta* Lam. | Poaceae | Neo | Nat | Trop & S Africa | ♦ | ● |
| *Eichhornia crassipes* (Mart.) Solms<br>♦ ● *Eichornia crassipes* (Mart.) Solms | Pontederiaceae | Neo | Nat | S America | ♦ | ● |
| *Elaeagnus angustifolia* L. | Elaeagnaceae | Neo | Cas | E Europe, Asia-Temp, Indian Subcontinent | ♦ | ● |
| *Elaeagnus commutata* Bernh. ex Rydb. | Elaeagnaceae | Neo | Cas | Canada & USA | ♦ | |
| *Elaeagnus multiflora* Thunb. | Elaeagnaceae | Neo | Cas | China & E Asia | | |
| *Elaeagnus pungens* Thunb. | Elaeagnaceae | Neo | Nat | China & E Asia (Japan) | ♦ | |
| *Elaeagnus umbellata* Thunb. | Elaeagnaceae | Neo | Nat | W & C Asia, China, E Asia, Indian Subcontinent | | |
| *Elatine ambigua* Wight | Elatinaceae | Neo | Nat | Siberia, China, Indian Subcontinent, Malesia | ♦ | ● |
| *Eleocharis atropurpurea* (Retz.) J. Presl & C. Presl | Cyperaceae | Neo | Nat | Tropics | ♦ | ● |
| *Eleocharis flavescens* (Poir.) Urb. | Cyperaceae | Neo | Nat | America | ♦ | ● |
| *Eleocharis geniculata* (L.) Roem. & Schult.<br>● *Eleocharis caduca* Schultes | Cyperaceae | Neo | Cas | Tropics | ♦ | ● |
| *Eleocharis obtusa* (Willd.) Schult. | Cyperaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Eleusine coracana* (L.) Asch. & Graebn. | Poaceae | Neo | Cas | Tropics (Africa, Asia) | | ● |
| *Eleusine indica* (L.) Gaertn. subsp. *africana* (Kenn.-O'Byrne) S.M. Phillips | Poaceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | |
| *Eleusine indica* (L.) Gaertn. subsp. *indica* | Poaceae | Neo | Inv | Tropics (Africa, Asia) | ♦ | ● |
| *Eleusine tristachya* (Lam.) Lam. | Poaceae | Neo | Cas | S America | ♦ | ● |
| *Elide asparagoides* (L.) Kerguélen | Asparagaceae | Neo | Nat | S Africa | ♦ | |
| *Elodea canadensis* Michx. | Hydrocharitaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Elodea nuttallii* (Planch.) H. St. John | Hydrocharitaceae | Neo | Nat | N America | ♦ | |
| *Elsholtzia ciliata* (Thunb.) Hyl. | Lamiaceae | Neo | Cas | Asia-Temp, Asia-Trop | ♦ | |
| *Epilobium ciliatum* Raf. | Onagraceae | Neo | Nat | N America | ♦ | |
| *Eragrostis curvula* (Schrad.) Nees | Poaceae | Neo | Nat | Trop & S Africa | ♦ | |
| *Eragrostis frankii* C.A. Mey. ex Steud. | Poaceae | Neo | Nat | N America | ♦ | |
| *Eragrostis lugens* Nees | Poaceae | Neo | Cas | Mexico, C & S America | | |
| *Eragrostis mexicana* (Hornem.) Link subsp. *virescens* (J. Presl) S.D. Koch & Sánchez Vega | Poaceae | Neo | Nat | N, C & S America | ♦ | |
| *Eragrostis pectinacea* (Michx.) Nees[7] | Poaceae | Neo | Inv | N, C & S America | ♦ | ● |
| *Erica tetralix* L. | Ericaceae | Neo | Cas | Europe | ♦ | |
| *Erigeron annuus* (L.) Desf.[8] | Asteraceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Erigeron bonariensis* L.<br>● *Conyza bonariensis* (L.) Cronq. | Asteraceae | Neo | Inv | S America | ♦ | ● |
| *Erigeron canadensis* L.<br>● *Conyza canadensis* (L.) Cronq. | Asteraceae | Neo | Inv | N America | ♦ | ● |
| *Erigeron karvinskianus* DC. | Asteraceae | Neo | Inv | Mexico, C & S America | ♦ | ● |
| *Erigeron philadelphicus* L. | Asteraceae | Neo | Cas | Canada & USA | | |
| *Erigeron sumatrensis* Retz.<br>● *Conyza albida* Willd. | Asteraceae | Neo | Inv | S America | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Eriobotrya japonica* (Thunb.) Lindl. | Rosaceae | Neo | Nat | China & E Asia | ♦ | ● |
| *Eriocaulon cinereum* R.Br. | Eriocaulaceae | Neo | Cas | Tropics (Africa, Asia, Australasia) | ♦ | ● |
| *Eriocephalus africanus* L. | Asteraceae | Neo | Cas | S Africa | ♦ | |
| *Erodium glaucophyllum* (L.) L'Hér. | Geraniaceae | Neo | Nat | N Africa | ♦ | ● |
| *Erucaria hispanica* (L.) Druce | Brassicaceae | Neo | Nr | Europe, Asia-Temp | ♦ | ● |
| *Eryngium creticum* Lam. | Apiaceae | Neo | Nr | Medit (Asia, Europe) | ♦ | ● |
| *Erysimum cheiranthoides* L. | Brassicaceae | Archaeo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Erysimum cheiri* (L.) Crantz | Brassicaceae | Archaeo | Nat | Medit (Europe) | ♦ | ● |
| *Erysimum repandum* L. | Brassicaceae | Neo | Cas | Europe, Asia-Temp, Indian Subcontinent | ♦ | ● |
| *Erythrostemon gilliesii* (Wall. ex Hook.) Klotzsch | Fabaceae | Neo | Nat | S America | | |
| *Eschscholzia californica* Cham. | Papaveraceae | Neo | Cas | USA & Mexico | | ● |
| *Eucalyptus camaldulensis* Dehnh. | Myrtaceae | Neo | Nat | Australia | ♦ | ● |
| *Eucalyptus globulus* Labill. | Myrtaceae | Neo | Cas | Australia | | ● |
| *Eucalyptus occidentalis* Endl. | Myrtaceae | Neo | Cas | Australia | | |
| *Euclidium syriacum* (L.) R.Br. | Brassicaceae | Neo | Cas | Asia-Temp | ♦ | ● |
| *Euonymus japonicus* L.f. | Celastraceae | Neo | Cas | China, E Asia & Malesia | ♦ | ● |
| *Euonymus lucidus* D. Don | Celastraceae | Neo | Cas | Indian Subcontinent | | |
| *Euphorbia agraria* M. Bieb. | Euphorbiaceae | Neo | Cas | Europe | ♦ | |
| *Euphorbia dentata* Michx. | Euphorbiaceae | Neo | Cas | N & C America | ♦ | |
| *Euphorbia heterophylla* L. | Euphorbiaceae | Neo | Nr | Mexico, C & S America | | |
| *Euphorbia marginata* Pursh | Euphorbiaceae | Neo | Cas | USA | ♦ | ● |
| *Euphorbia oblongata* Griseb. | Euphorbiaceae | Neo | Nr | SE Europe, W Asia | | |
| *Euphorbia valerianifolia* Lam. | Euphorbiaceae | Neo | Nr | Medit (Africa, Asia, Europe) | | |
| *Euthamia graminifolia* (L.) Nutt. | Asteraceae | Neo | Nat | Canada & USA | ♦ | |
| *Fagopyrum esculentum* Moench | Polygonaceae | Archaeo | Cas | China | ♦ | ● |
| *Fagopyrum tataricum* (L.) Gaertn. | Polygonaceae | Archaeo | Nat | W & C Asia, Siberia, China, Indian Subcontinent | ♦ | ● |
| *Fallopia baldschuanica* (Regel) Holub<br>● *Fallopia aubertii* (L. Henry) Holub | Polygonaceae | Neo | Inv | W & C Asia, Indian Subcontinent | ♦ | ● |
| *Fallopia multiflora* (Thunb.) Haraldson | Polygonaceae | Neo | Nat | China | | |
| *Fatsia japonica* (Thunb.) Decne. & Planch. | Araliaceae | Neo | Cas | E Asia | | |
| *Ferraria crispa* Burm. | Iridaceae | Neo | Nat | S Africa (Cape Province) | | |
| *Ficus elastica* Roxb. | Moraceae | Neo | Cas | Indian Subcontinent, Indo-China, Malesia | | |
| *Ficus microcarpa* L. | Moraceae | Neo | Nat | China, E Asia, Asia-Trop | | |
| *Ficus pumila* L. | Moraceae | Neo | Cas | China, E Asia, Indo-China | | |
| *Ficus radicans* Desf. | Moraceae | Neo | Cas | Uncertain | | |
| *Ficus watkinsiana* F.M. Bailey | Moraceae | Neo | Nat | Australia | | |
| *Forsythia viridissima* Lindl. | Oleaceae | Neo | Cas | China | | ● |
| *Fragaria ananassa* (Duchesne) Rozier | Rosaceae | Neo | Cas | Canada & USA | | ● |
| *Fragaria virginiana* (Duchesne) Mill. | Rosaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Freesia alba* (G.L. Mey.) Gumbl. | Iridaceae | Neo | Nat | S Africa (Cape Province) | | |
| *Freesia refracta* (Jacq.) Eckl. ex Klatt | Iridaceae | Neo | Nat | S Africa (Cape Province) | ♦ | ● |
| *Fritillaria persica* L. | Liliaceae | Neo | Nr | W Asia | ♦ | ● |
| *Galinsoga parviflora* Cav. | Asteraceae | Neo | Inv | S America | ♦ | ● |
| *Galinsoga quadriradiata* Ruiz & Pav.<br>♦ *Galinsoga ciliata* (Raf.) S.F. Blake<br>● *Galinsoga ciliata* (Rafin.) Blake | Asteraceae | Neo | Inv | Mexico, C & S America | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Galium rubioides* L. | Rubiaceae | Neo | Cas | Europe | ♦ | ● |
| *Gamochaeta americana* (Mill.) Wedd.<br>♦ *Gnaphalium americanum* Mill. | Asteraceae | Neo | Cas | Mexico, C & S America | ♦ | |
| *Gamochaeta pensylvanica* (Willd.) Cabrera<br>♦ *Gnaphalium pensylvanicum* Willd. | Asteraceae | Neo | Nat | N, C & S America | ♦ | |
| *Gaura biennis* L. | Onagraceae | Neo | Cas | Canada & USA | ♦ | |
| *Gaura sinuata* Nutt. | Onagraceae | Neo | Cas | USA & Mexico | ♦ | ● |
| *Gazania linearis* (Thunb.) Druce | Asteraceae | Neo | Nat | S Africa | | |
| *Geranium sibiricum* L. | Geraniaceae | Neo | Nat | E Europe, Asia-Temp, Indian Subcontinent | ♦ | ● |
| *Ginkgo biloba* L. | Ginkgoaceae | Neo | Cas | China | | ● |
| *Glandularia hybrida* (Groenland & Rümpler) G.L. Nesom & Pruski | Verbenaceae | Neo | Cas | Hybrid | | |
| *Glandularia tenera* (Spreng.) Cabrera | Verbenaceae | Neo | Cas | S America | | |
| *Gleditsia triacanthos* L. | Fabaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Glinus lotoides* L. | Molluginaceae | Neo | Nat | wide distribution | ♦ | ● |
| *Glyceria striata* (Lam.) Hitchc. | Poaceae | Neo | Cas | N & C America | ♦ | |
| *Glycine max* (L.) Merr. | Fabaceae | Neo | Cas | Asia-Temp, Asia-Trop | | ● |
| *Glycyrrhiza echinata* L. | Fabaceae | Neo | Cas | Europe, W Asia, Siberia, Soviet Middle Asia | ♦ | ● |
| *Gomphrena globosa* L. | Amaranthaceae | Neo | Cas | Tropics | ♦ | ● |
| *Gossypium herbaceum* L. | Malvaceae | Archaeo | Cas | Trop & S Africa | ♦ | ● |
| *Gossypium hirsutum* L. | Malvaceae | Neo | Cas | N & C America | ♦ | ● |
| *Graptopetalum paraguayense* (N.E.Br.) Walther subsp. *paraguayense* | Crassulaceae | Neo | Cas | Mexico | ♦ | |
| *Guizotia abyssinica* (L.f.) Cass. | Asteraceae | Neo | Cas | Trop Africa (Ethiopia) | ♦ | ● |
| *Gymnocladus dioica* (L.) K. Koch | Fabaceae | Neo | Cas | Canada & USA | | |
| *Gypsophila elegans* M. Bieb. | Caryophyllaceae | Neo | Cas | E Europe, W Asia, Caucasus | | ● |
| *Gypsophila paniculata* L. | Caryophyllaceae | Neo | Cas | Europe, Asia-Temp | ♦ | ● |
| *Gypsophila porrigens* (L.) Boiss.<br>♦ *Gypsophila pilosa* Huds.<br>● *Gypsophila pilosa* Hudson | Caryophyllaceae | Neo | Cas | Asia-Temp, Asia-Trop | ♦ | ● |
| *Halogeton sativus* (L.) Moq. | Amaranthaceae | Neo | Cas | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Halophila stipulacea* (Forssk.) Asch. | Hydrocharitaceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | |
| *Hedera algeriensis* Hibberd | Araliaceae | Neo | Nat | N Africa | | |
| *Hedera canariensis* Willd. | Araliaceae | Neo | Cas | Macaronesia & N Africa | | |
| *Hedera helix* L. subsp. *hibernica* (G. Kirchn.) D.C. McClint. | Araliaceae | Neo | Nat | Medit (Asia, Europe) | | |
| *Hedera helix* L. subsp. *poëtarum* Nyman[9] | Araliaceae | Archaeo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Helianthus annuus* L. | Asteraceae | Neo | Nat | N America | ♦ | ● |
| *Helianthus debilis* Nutt. subsp. *cucumerifolius* (Torr. & A. Gray) Heiser | Asteraceae | Neo | Nr | USA | | |
| *Helianthus decapetalus* L. | Asteraceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Helianthus pauciflorus* Nutt. subsp. *pauciflorus*<br>● *Helianthus rigidus* (Cass.) Desf. | Asteraceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Helianthus tuberosus* L. | Asteraceae | Neo | Inv | USA | ♦ | ● |
| *Helianthus ×multiflorum* L.[10] | Asteraceae | Neo | Nat | Hybrid | ♦ | ● |
| *Heliotropium amplexicaule* Vahl | Heliotropiaceae | Neo | Nat | S America | ♦ | ● |
| *Heliotropium arborescens* L.<br>♦ *Heliotropium peruvianum* L. | Heliotropiaceae | Neo | Cas | S America (Peru) | ♦ | |
| *Heliotropium curassavicum* L. | Heliotropiaceae | Neo | Nat | N, C & S America | ♦ | ● |
| *Heliotropium suaveolens* M. Bieb. subsp. *suaveolens* | Heliotropiaceae | Neo | Cas | Asia-Temp | ♦ | |
| *Hemerocallis fulva* (L.) L. | Hemerocallidaceae | Neo | Nat | Asia-Temp, Asia-Trop | ♦ | ● |
| *Heracleum mantegazzianum* Sommier & Levier | Apiaceae | Neo | Inv | Caucasus | ♦ | ● |
| *Heteranthera limosa* (Sw.) Willd. | Pontederiaceae | Neo | Nat | N, C & S America | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Heteranthera reniformis* Ruiz & Pav. | Pontederiaceae | Neo | Inv | N & C America | ♦ | ● |
| *Heteranthera rotundifolia* (Kunth) Griseb. | Pontederiaceae | Neo | Nat | N, C & S America | ♦ | |
| *Heuchera sanguinea* Engelm. | Saxifragaceae | Neo | Cas | USA & Mexico | | |
| *Hibiscus syriacus* L. | Malvaceae | Neo | Cas | China & E Asia (Taiwan) | ♦ | ● |
| *Hibiscus trionum* L. | Malvaceae | Neo | Nat | wide distribution | ♦ | ● |
| *Honorius boucheanus* (Kunth) Holub<br>● *Ornithogalum boucheanum* (Kunth) Asch. | Hyacinthaceae | Neo | Nat | Europe | ♦ | ● |
| *Honorius nutans* (L.) Gray<br>● *Ornithogalum nutans* L. | Hyacinthaceae | Neo | Nat | Asia-Temp | ♦ | ● |
| *Hordeum jubatum* L. | Poaceae | Neo | Nat | wide distribution | ♦ | ● |
| *Hordeum vulgare* L. | Poaceae | Archaeo | Cas | W Asia | ♦ | ● |
| *Humulus japonicus* Siebold & Zucc.<br>● *Humulus scandens* (Lour.) Merrill | Cannabaceae | Neo | Inv | Soviet Far East, China, E Asia, Indo-China | ♦ | ● |
| *Hyacinthoides hispanica* (Mill.) Rothm.<br>● *Endimion hyspanicum* (Miller) P. Fourn. | Hyacinthaceae | Neo | Nat | Medit (Africa, Europe) | ♦ | ● |
| *Hyacinthoides non-scripta* (L.) Chouard ex Rothm.<br>● *Endimion non-scriptum* (L.) Garcke | Hyacinthaceae | Neo | Cas | N, C & SW Europe | ♦ | ● |
| *Hyacinthus orientalis* L. | Hyacinthaceae | Archaeo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Hydrocotyle bonariensis* Lam. | Araliaceae | Neo | Nr | N, C & S America | ♦ | ● |
| *Hydrocotyle ranunculoides* L.f. | Araliaceae | Neo | Inv | N, C & S America | ♦ | ● |
| *Hydrocotyle sibthorpioides* Lam. | Araliaceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | ● |
| *Hylocereus triangularis* (L.) Britton & Rose | Cactaceae | Neo | Cas | Caribbean | | |
| *Hypericum calycinum* L. | Hypericaceae | Neo | Nat | SE Europe, W Asia | ♦ | ● |
| *Hypericum mutilum* L. | Hypericaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Iberis amara* L. subsp. *amara* | Brassicaceae | Neo | Cas | Europe | ♦ | ● |
| *Impatiens balfourii* Hook.f. | Balsaminaceae | Neo | Inv | Indian Subcontinent | ♦ | ● |
| *Impatiens balsamina* L. | Balsaminaceae | Neo | Cas | Indian Subcontinent, Indo-China | ♦ | ● |
| *Impatiens glandulifera* Royle | Balsaminaceae | Neo | Inv | Indian Subcontinent | ♦ | ● |
| *Impatiens parviflora* DC. | Balsaminaceae | Neo | Inv | E Europe, Asia-Temp | ♦ | ● |
| *Inula germanica* L. | Asteraceae | Neo | Cas | Europe, W Asia | | |
| *Ipheion uniflorum* (Graham) Raf. | Alliaceae | Neo | Nat | S America | ♦ | |
| *Ipomoea indica* (Burm.) Merr.[11]<br>♦ *Ipomoea acuminata* (Vahl) Roem. & Schult.<br>● *Ipomoea acuminata* (Vahl) R. et S. | Convolvulaceae | Neo | Inv | S America | ♦ | ● |
| *Ipomoea purpurea* (L.) Roth | Convolvulaceae | Neo | Nat | America | ♦ | ● |
| *Ipomoea tricolor* Cav. | Convolvulaceae | Neo | Cas | S America | ♦ | |
| *Iris albicans* Lange | Iridaceae | Neo | Nat | Asia-Temp | ♦ | |
| *Iris japonica* Thunb. | Iridaceae | Neo | Cas | China, E Asia, Indo-China | ♦ | |
| *Iris lactea* Pall. | Iridaceae | Neo | Cas | Asia-Temp, Indian Subcontinent | | |
| *Iris sambucina* L. | Iridaceae | Neo | Nat | SE Europe | | ● |
| *Iris spuria* L. | Iridaceae | Neo | Cas | Europe | | ● |
| *Iris squalens* L. | Iridaceae | Neo | Cas | SE Europe | | ● |
| *Iris unguicularis* Poir. | Iridaceae | Neo | Nat | Medit (Africa, Asia, Europe) | | |
| *Iris variegata* L. | Iridaceae | Neo | Cas | C, E & SE Europe | | ● |
| *Isatis tinctoria* L. subsp. *tinctoria* | Brassicaceae | Archaeo | Inv | wide distribution | ♦ | ● |
| *Jacaranda ovalifolia* R.Br. | Bignoniaceae | Neo | Cas | S America | | |
| *Jarava caudata* (Trin.) Peñail<br>♦ *Achnatherum caudatum* (Trin.) S.W.L. Jacobs & Everett | Poaceae | Neo | Cas | S America | ♦ | |
| *Jasminum fruticans* L. | Oleaceae | Neo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Jasminum humile* L. | Oleaceae | Neo | Cas | W & C Asia, China, Indian Subcontinent | | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Jasminum mesnyi* Hance | Oleaceae | Neo | Nat | China | ♦ | |
| *Jasminum nudiflorum* Lindl. | Oleaceae | Neo | Nat | China | ♦ | ● |
| *Jasminum officinale* L. | Oleaceae | Archaeo | Nat | W & C Asia, China, Indian Subcontinent | ♦ | ● |
| *Jonopsidium acaule* (Desf.) Rchb. | Brassicaceae | Neo | Cas | SW Europe (Portugal) | ♦ | |
| *Juglans cinerea* L. | Juglandaceae | Neo | Cas | Canada & USA | ♦ | |
| *Juglans nigra* L. | Juglandaceae | Neo | Cas | Canada & USA | ♦ | |
| *Juncus tenuis* Willd. | Juncaceae | Neo | Inv | N, C & S America | ♦ | ● |
| *Juniperus virginiana* L. | Cupressaceae | Neo | Cas | Canada & USA | | ● |
| *Justicia adhatoda* L. | Acanthaceae | Neo | Nr | China, Asia-Trop | ♦ | ● |
| *Kalanchoë daigremontiana* Hamet & H. Perrier<br>♦ *Kalanchoe daigremontiana* Hamet & H. Perrier | Crassulaceae | Neo | Nat | Madagascar | ♦ | |
| *Kalanchoë tubiflora* (Harv.) Raym.-Hamet | Crassulaceae | Neo | Cas | Madagascar | | |
| *Kerria japonica* (L.) DC. | Rosaceae | Neo | Cas | China & E Asia (Japan) | ♦ | ● |
| *Kochia scoparia* (L.) Schrad.<br>♦ *Bassia scoparia* (L.) A.J. Scott subsp. *scoparia* | Amaranthaceae | Archaeo | Inv | Asia-Temp, Indian Subcontinent | ♦ | ● |
| *Koelreuteria paniculata* Laxm. | Sapindaceae | Neo | Cas | China | | ● |
| *Lablab purpureus* (L.) Sweet | Fabaceae | Neo | Cas | Trop & S Africa, Madagascar | | |
| *Lagarosiphon major* (Ridl.) Moss | Hydrocharitaceae | Neo | Inv | Trop & S Africa | ♦ | ● |
| *Lagenaria siceraria* (Molina) Standl. | Cucurbitaceae | Archaeo | Cas | Trop Africa | ♦ | ● |
| *Lamprocapnos spectabilis* (L.) Fukuhara | Papaveraceae | Neo | Cas | China & E Asia | | |
| *Landoltia punctata* (G. Mey.) Les & D.J. Crawford<br>♦ *Spirodela oligorrhiza* (Kurz) Hegelm.<br>● *Spirodela oligorrhiza* Kurz | Araceae | Neo | Nat | wide distribution | ♦ | ● |
| *Lantana camara* L. | Verbenaceae | Neo | Nat | Mexico, C & S America | ♦ | ● |
| *Larix kaempferi* (Lamb.) Carrière | Pinaceae | Neo | Cas | E Asia (Japan) | | ● |
| *Lavandula dentata* L. | Lamiaceae | Neo | Cas | Medit (Africa, Europe) | ♦ | ● |
| *Lemna aequinoctialis* Welw.<br>● *Lemna paucicostata* Hegelm. | Araceae | Neo | Nat | Tropics (Africa, America, Asia) | ♦ | ● |
| *Lemna minuta* Kunth | Araceae | Neo | Inv | Tropics (Africa, America, Asia) | ♦ | |
| *Lens culinaris* Medik. | Fabaceae | Archaeo | Cas | W Asia | ♦ | ● |
| *Leonurus cardiaca* L. | Lamiaceae | Archaeo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Lepidium bonariense* L. | Brassicaceae | Neo | Cas | S America | ♦ | ● |
| *Lepidium densiflorum* Schrad. | Brassicaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Lepidium didymum* L.<br>♦ ● *Coronopus didymus* (L.) Sm. | Brassicaceae | Neo | Nat | S America | ♦ | ● |
| *Lepidium neglectum* Thell. | Brassicaceae | Neo | Cas | N America | | ● |
| *Lepidium perfoliatum* L. | Brassicaceae | Neo | Nr | Europe, Asia-Temp, Asia-Trop | ♦ | ● |
| *Lepidium ruderale* L. | Brassicaceae | Neo | Nat | Europe, W & C Asia, China | ♦ | ● |
| *Lepidium sativum* L. subsp. *sativum* | Brassicaceae | Archaeo | Nat | W Asia, Indian Subcontinent | ♦ | ● |
| *Lepidium virginicum* L. | Brassicaceae | Neo | Inv | N & C America | ♦ | ● |
| *Leucanthemum ×superbum* (Bergmans ex J.W. Ingram) D.H. Kent[12] | Asteraceae | Neo | Cas | SW Europe (Pyrenees) | | |
| *Levisticum officinale* W.D.J. Koch | Apiaceae | Archaeo | Cas | W Asia | ♦ | ● |
| *Leycesteria formosa* Wall. | Caprifoliaceae | Neo | Nat | China, Indian Subcontinent, Indo-China | ♦ | |
| *Ligustrum japonicum* Thunb. | Oleaceae | Neo | Cas | E Asia | ♦ | |
| *Ligustrum lucidum* W.T. Aiton | Oleaceae | Neo | Nat | China | ♦ | ● |
| *Ligustrum ovalifolium* Hassk. | Oleaceae | Neo | Cas | E Asia | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Ligustrum sinense* Lour. | Oleaceae | Neo | Nat | China, E Asia, Indo-China | ♦ | |
| *Limnophila ×ludoviciana* Thieret | Plantaginaceae | Neo | Nat | Hybrid | | |
| *Lindernia dubia* (L.) Pennell[13] | Linderniaceae | Neo | Inv | America | ♦ | ● |
| *Liquidambar styraciflua* L. | Altingiaceae | Neo | Cas | N & C America | | |
| *Liriodendron tulipifera* L. | Magnoliaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Lobelia laxiflora* Kunth | Campanulaceae | Neo | Cas | N, C & S America | | |
| *Lobivia silvestrii* (Speg.) G.D. Rowley | Cactaceae | Neo | Cas | S America | | |
| *Lolium remotum* Schrank | Poaceae | Neo | Cas | Medit (Europe) | ♦ | ● |
| *Lomelosia prolifera* (L.) Greuter & Burdet | Dipsacaceae | Neo | Nr | W Asia | ♦ | |
| *Lonicera japonica* Thunb. | Caprifoliaceae | Neo | Inv | China & E Asia | ♦ | ● |
| *Lonicera pileata* Oliv. | Caprifoliaceae | Neo | Nat | China | | |
| *Lotus drepanocarpus* Durieu | Fabaceae | Neo | Cas | Medit (Africa) | ♦ | ● |
| *Ludwigia hexapetala* (Hook. & Arn.) Zardini, H.Y. Gu & P.H. Raven[14] | Onagraceae | Neo | Nat | America | | |
| *Ludwigia peploides* (Kunth) P.H. Raven subsp. *montevidensis* (Spreng.) P.H. Raven | Onagraceae | Neo | Inv | N, C & S America | | |
| *Lupinus albus* L. subsp. *albus* | Fabaceae | Archaeo | Cas | SE Europe, W Asia | ♦ | ● |
| *Lupinus polyphyllus* Lindl. | Fabaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Lychnis chalcedonica* L. | Caryophyllaceae | Neo | Nr | Siberia, Soviet Middle Asia, Mongolia, China | | ● |
| *Lycium afrum* L. | Solanaceae | Neo | Cas | S Africa (Cape Province) | ♦ | ● |
| *Lycium barbarum* L. | Solanaceae | Neo | Nat | China | ♦ | ● |
| *Lycium chinense* Mill. | Solanaceae | Neo | Cas | Mongolia, China, E Asia, Indo-China | ♦ | ● |
| *Lycium intricatum* Boiss. | Solanaceae | Neo | Nat | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Lycopodiella cernua* (L.) Pic. Serm. | Lycopodiaceae | Neo | Cas | Tropics (Africa, Asia) | | |
| *Lycopsis orientalis* L. | Boraginaceae | Neo | Cas | Asia-Temp | | |
| *Maclura pomifera* (Raf.) C.K. Schneid. | Moraceae | Neo | Nat | USA | ♦ | ● |
| *Mahonia aquifolium* (Pursh) Nutt. | Berberidaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Malcolmia africana* (L.) R.Br. | Brassicaceae | Neo | Nr | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Malephora crocea* (Jacq.) Schwantes | Aizoaceae | Neo | Cas | S Africa (Cape Province) | | |
| *Malephora lutea* Schwantes | Aizoaceae | Neo | Cas | S Africa | | |
| *Malephora uitenhagensis* (L. Bol.) Jacobsen & Schwantes | Aizoaceae | Neo | Cas | S Africa | | |
| *Malus domestica* (Borkh.) Borkh. | Rosaceae | Archaeo | Nat | W Asia | ♦ | ● |
| *Malva verticillata* L. | Malvaceae | Neo | Cas | China | ♦ | ● |
| *Marrubium peregrinum* L. | Lamiaceae | Neo | Cas | Europe, W Asia, Caucasus | ♦ | ● |
| *Matricaria discoidea* DC. | Asteraceae | Neo | Inv | Soviet Far East, E Asia (Japan) | ♦ | ● |
| *Mazus miquelii* Makino | Phrymaceae | Neo | Nat | E Asia (Japan) | ♦ | |
| *Mazus pumilus* (Burm.f.) Steenis | Phrymaceae | Neo | Cas | China, E Asia, Asia-Trop | | |
| *Melia azedarach* L. | Meliaceae | Neo | Nat | China, E Asia, Indian Subcontinent, Malesia | | ● |
| *Melica altissima* L. | Poaceae | Neo | Nat | Europe, W & C Asia | ♦ | ● |
| *Melilotus dentatus* (Waldst. & Kit.) Desf. | Fabaceae | Neo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Mesembryanthemum cordifolium* L.f.<br>♦ *Aptenia cordifolia* (L. f.) Schwantes<br>● *Aptenia cordifolia* (L.fil.) N.E.Br. | Aizoaceae | Neo | Inv | S Africa | ♦ | ● |
| *Mimulus guttatus* DC. | Phrymaceae | Neo | Nat | N America | ♦ | ● |
| *Mimulus moschatus* Douglas ex Lindl. | Phrymaceae | Neo | Cas | USA | ♦ | ● |
| *Mirabilis jalapa* L. | Nyctaginaceae | Neo | Inv | S America | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Mirabilis longiflora* L. | Nyctaginaceae | Neo | Nat | N & C America | ♦ | ● |
| *Mirabilis nyctaginea* (Michx.) MacMill.<br>♦ ● *Oxybaphus nyctagineus* (Michx.) Sweet | Nyctaginaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Miscanthus sinensis* Andersson | Poaceae | Neo | Nat | Soviet Far East, China, E Asia, Malesia | ♦ | ● |
| *Mollugo cerviana* (L.) Ser. | Molluginaceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | ● |
| *Mollugo verticillata* L. | Molluginaceae | Neo | Inv | S America | ♦ | ● |
| *Monochoria korsakowii* Regel & Maack | Pontederiaceae | Neo | Cas | Asia-Temp, Asia-Trop | ♦ | |
| *Morus alba* L. | Moraceae | Archaeo | Nat | China | ♦ | ● |
| *Morus nigra* L. | Moraceae | Archaeo | Nat | W Asia | ♦ | ● |
| *Muhlenbergia frondosa* (Poir.) Fernald | Poaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Muhlenbergia schreberi* J.F. Gmel. | Poaceae | Neo | Inv | N America | ♦ | ● |
| *Murdannia keisak* (Hassk.) Hand.-Mazz. | Commelinaceae | Neo | Inv | China, E Asia, Indian Subcontinent, Indo-China | ♦ | ● |
| *Muscari armeniacum* Leichtlin ex Baker | Hyacinthaceae | Neo | Cas | SE Europe, W Asia, Caucasus | ♦ | |
| *Muscarimia macrocarpa* (Sweet) Garbari | Hyacinthaceae | Archaeo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Myoporum tenuifolium* G. Forst. | Scrophulariaceae | Neo | Inv | Australia | ♦ | ● |
| *Myriophyllum aquaticum* (Vell.) Verdc. | Haloragaceae | Neo | Nat | S America | ♦ | |
| *Najas gracillima* (A. Braun ex Engelm.) Magnus | Hydrocharitaceae | Neo | Nat | N America | ♦ | ● |
| *Najas graminea* Delile | Hydrocharitaceae | Neo | Nat | Tropics (Africa, Asia, Australasia) | ♦ | ● |
| *Narcissus jonquilla* L. | Amaryllidaceae | Neo | Cas | SW Europe (France) | ♦ | ● |
| *Narcissus odorus* L. | Amaryllidaceae | Neo | Cas | Europe | ♦ | ● |
| *Narcissus polyanthos* Loisel. | Amaryllidaceae | Neo | Cas | SW Europe (France) | | ● |
| *Narcissus pseudonarcissus* L. | Amaryllidaceae | Archaeo | Nat | Europe | ♦ | ● |
| *Narcissus ×incomparabilis* Mill. | Amaryllidaceae | Neo | Nat | SW Europe (France) | ♦ | ● |
| *Narcissus ×medioluteus* Mill. | Amaryllidaceae | Neo | Nat | Europe | ♦ | |
| *Nassella neesiana* (Trin.& Rupr.) Barkworth<br>♦ *Nassella mucronata* (Kunth) R.W. Pohl<br>● *Stipa setigera* Presl | Poaceae | Neo | Cas | S America | ♦ | ● |
| *Nassella trichotoma* (Nees) Hack.<br>● *Stipa trichotoma* Nees. | Poaceae | Neo | Nat | S America | ♦ | ● |
| *Nectaroscilla hyacinthoides* (L.) Parl. | Hyacinthaceae | Neo | Cas | Europe, W Asia | ♦ | ● |
| *Nelumbo nucifera* Gaertn. | Nelumbonaceae | Neo | Inv | Tropics (Africa, Asia) | ♦ | ● |
| *Nephrolepis cordifolia* C. Presl | Davalliaceae | Neo | Cas | Tropics (Asia, Australasia) | ♦ | |
| *Nicandra physalodes* (L.) Gaertn. | Solanaceae | Neo | Nat | S America (Peru) | ♦ | ● |
| *Nicotiana glauca* Graham | Solanaceae | Neo | Inv | S America | ♦ | ● |
| *Nicotiana rustica* L. | Solanaceae | Neo | Cas | S America | | ● |
| *Nicotiana tabacum* L. | Solanaceae | Neo | Cas | S America | ♦ | ● |
| *Nigella sativa* L. | Ranunculaceae | Archaeo | Nr | W Asia | ♦ | ● |
| *Nonea lutea* (Desr.) DC. | Boraginaceae | Neo | Nat | W Asia & Caucasus | ♦ | ● |
| *Nonea obtusifolia* (Willd.) DC. | Boraginaceae | Neo | Nr | SE Europe, W Asia | ♦ | ● |
| *Nonea pulla* (L.) DC. subsp. *pulla* | Boraginaceae | Neo | Inv | Europe | ♦ | ● |
| *Nopalea dejecta* Salm-Dyck | Cactaceae | Neo | Nat | C America | | |
| *Nothoscordum borbonicum* Kunth[15]<br>● *Nothoscordum inodorum* (Aiton) Nicholson | Alliaceae | Neo | Nat | S America | | ● |
| *Nymphaea mexicana* Zuccarini | Nymphaeaceae | Neo | Cas | USA & Mexico | ♦ | |
| *Ocimum basilicum* L. | Lamiaceae | Archaeo | Cas | Trop Africa | ♦ | ● |
| *Oenanthe javanica* (Blume) DC. | Apiaceae | Neo | Nat | China, E Asia, Asia-Trop | ♦ | |
| *Oenothera adriatica* Soldano | Onagraceae | Neo | Inv | Hybrid | ♦ | |
| *Oenothera biennis* L. | Onagraceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Oenothera chicaginensis* de Vries ex Renner & Cleland<br>● *Oenothera chicagoensis* Renner | Onagraceae | Neo | Nat | Uncertain | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Oenothera depressa* Green | Onagraceae | Neo | Cas | N America | ♦ | |
| *Oenothera fallacoides* Soldano & Rostanski | Onagraceae | Neo | Nat | Uncertain | ♦ | |
| *Oenothera glazioviana* Micheli | Onagraceae | Neo | Inv | Hybrid | ♦ | ● |
| *Oenothera grandiflora* L'Hér. | Onagraceae | Neo | Cas | Hybrid | ♦ | |
| *Oenothera issleri* Rostanski | Onagraceae | Neo | Cas | Uncertain | | |
| *Oenothera italica* Rostanski & Soldano | Onagraceae | Neo | Cas | Hybrid | ♦ | |
| *Oenothera laciniata* Hill<br>● *Oenothera sinuata* L. | Onagraceae | Neo | Cas | USA & Mexico | ♦ | ● |
| *Oenothera marinellae* Soldano | Onagraceae | Neo | Cas | Uncertain | ♦ | |
| *Oenothera oakesiana* (A. Gray) Robbins ex S. Watson & J.M. Coult. | Onagraceae | Neo | Inv | Canada & USA | ♦ | |
| *Oenothera oehlkersi* Kappus ex Rostanski | Onagraceae | Neo | Nat | Hybrid | ♦ | ● |
| *Oenothera parviflora* L. | Onagraceae | Neo | Nat | Canada & USA | | ● |
| *Oenothera pedemontana* Soldano | Onagraceae | Neo | Nat | Uncertain | ♦ | |
| *Oenothera pellegrini* Soldano | Onagraceae | Neo | Cas | Uncertain | ♦ | |
| *Oenothera rosea* L'Hér. ex Aiton | Onagraceae | Neo | Cas | N, C & S America | ♦ | ● |
| *Oenothera royfraseri* R.R. Gates | Onagraceae | Neo | Nat | Uncertain | ♦ | |
| *Oenothera sesitensis* Soldano | Onagraceae | Neo | Inv | Uncertain | ♦ | ● |
| *Oenothera stricta* Link | Onagraceae | Neo | Nat | S America | ♦ | ● |
| *Oenothera stucchii* Soldano | Onagraceae | Neo | Inv | Hybrid | ♦ | ● |
| *Oenothera suaveolens* Desf. ex Pers. | Onagraceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Ophiopogon japonicus* (L.f.) Ker Gawl. | Ruscaceae | Neo | Cas | China, E Asia, Malesia | | ● |
| *Opuntia amyclaea* Ten. | Cactaceae | Neo | Inv | Mexico | ♦ | |
| *Opuntia chlorotica* Engelm. & J.M. Bigelow | Cactaceae | Neo | Cas | USA & Mexico | | |
| *Opuntia dillenii* (Ker Gawl.) Haw. | Cactaceae | Neo | Nat | America | ♦ | |
| *Opuntia elatior* Mill. | Cactaceae | Neo | Cas | C & S America | ♦ | |
| *Opuntia engelmannii* Salm-Dyck ex Engelm. subsp. *engelmannii* | Cactaceae | Neo | Cas | USA & Mexico | | |
| *Opuntia engelmannii* Salm-Dyck ex Engelm. subsp. *lindheimeri* (Engelm.) U. Guzman & Mandujano | Cactaceae | Neo | Cas | USA | | |
| *Opuntia ficus-indica* (L.) Mill. | Cactaceae | Neo | Inv | Mexico | ♦ | ● |
| *Opuntia humifusa* (Raf.) Raf.<br>● *Opuntia compressa* (Salisb.) Mcbride | Cactaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Opuntia jamaicensis* Britton & Harris | Cactaceae | Neo | Nat | America | | |
| *Opuntia leucotricha* DC. | Cactaceae | Neo | Cas | Mexico | | |
| *Opuntia macrorhiza* Engelm. | Cactaceae | Neo | Cas | USA & Mexico | | |
| *Opuntia microdasys* (Lehm.) Pfeiff. | Cactaceae | Neo | Cas | Mexico | | |
| *Opuntia monacantha* (Willd.) Haw. | Cactaceae | Neo | Cas | S America | ♦ | ● |
| *Opuntia phaeacantha* Engelm. | Cactaceae | Neo | Cas | USA & Mexico | | |
| *Opuntia robusta* J.C. Wendl. | Cactaceae | Neo | Nat | Mexico | ♦ | |
| *Opuntia scheeri* F.A.C. Weber | Cactaceae | Neo | Nat | Mexico | ♦ | |
| *Opuntia spinulifera* Salm-Dyck | Cactaceae | Neo | Cas | Mexico | | |
| *Opuntia stricta* (Haw.) Haw. | Cactaceae | Neo | Nat | America | ♦ | |
| *Opuntia tomentosa* Salm-Dyck | Cactaceae | Neo | Cas | Mexico & C America | | |
| *Origanum majorana* L. | Lamiaceae | Archaeo | Nat | W Asia | ♦ | ● |
| *Oryza sativa* L. | Poaceae | Archaeo | Inv | Asia-Temp, Asia-Trop | ♦ | ● |
| *Osteospermum barberiae* (Harv.) Norl. | Asteraceae | Neo | Cas | S Africa | | |
| *Osteospermum ecklonis* (DC.) Norl. | Asteraceae | Neo | Cas | S Africa (Cape Province) | | |
| *Othocallis amoena* (L.) Speta<br>● *Scilla amoena* L. | Hyacinthaceae | Neo | Cas | Uncertain | | ● |
| *Ottelia alismoides* (L.) Pers. | Hydrocharitaceae | Neo | Nat | Tropics (Asia, Australasia) | ♦ | ● |
| *Oxalis articulata* Savigny | Oxalidaceae | Neo | Inv | S America | ♦ | ● |
| *Oxalis corymbosa* DC.[16]<br>♦ *Oxalis debilis* Kunth | Oxalidaceae | Neo | Inv | S America | ♦ | ● |
| *Oxalis latifolia* Kunth[17] | Oxalidaceae | Neo | Nat | N, C & S America | ♦ | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Oxalis pes-caprae* L. | Oxalidaceae | Neo | Inv | S Africa | ♦ | ● |
| *Oxalis purpurata* Jacq. | Oxalidaceae | Neo | Nat | S Africa | ♦ | ● |
| *Oxalis purpurea* L.[18] | Oxalidaceae | Neo | Nat | S Africa (Cape Province) | ♦ | ● |
| *Oxalis stricta* L.[19] | Oxalidaceae | Neo | Inv | Canada & USA | ♦ | |
| *Oxalis violacea* L. non Thunb.[20] | Oxalidaceae | Neo | Cas | Uncertain | ♦ | ● |
| *Paeonia suffruticosa* Andrews | Paeoniaceae | Neo | Nr | China | | |
| *Panicum capillare* L. | Poaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Panicum dichotomiflorum* Michx. | Poaceae | Neo | Inv | N, C & S America | ♦ | ● |
| *Panicum miliaceum* L. | Poaceae | Archaeo | Nat | W & C Asia, Siberia, Mongolia, China | ♦ | ● |
| *Panicum philadelphicum* Bernh. ex Trin.<br>♦ *Panicum gattingeri* Nash | Poaceae | Neo | Nat | Canada & USA | ♦ | |
| *Papaver atlanticum* (Ball) Cosson subsp. *atlanticum* | Papaveraceae | Archaeo | Nat | N Africa | ♦ | |
| *Papaver lecoqii* Lamotte | Papaveraceae | Archaeo | Cas | wide distribution | | ● |
| *Paraserianthes lophantha* (Willd.) I.C. Nielsen | Fabaceae | Neo | Nat | Australia | | |
| *Parkinsonia aculeata* L. | Fabaceae | Neo | Inv | America | ♦ | ● |
| *Parthenocissus quinquefolia* (L.) Planch.[21] | Vitaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Parthenocissus tricuspidata* (Siebold & Zucc.) Planch. | Vitaceae | Neo | Nat | China & E Asia | ♦ | ● |
| *Paspalum dilatatum* Poir. | Poaceae | Neo | Inv | S America | ♦ | ● |
| *Paspalum distichum* L.<br>● *Paspalum paspaloides* (Michx.) Scribner | Poaceae | Neo | Inv | Tropics (Africa, America, Asia) | ♦ | ● |
| *Paspalum exaltatum* J. Presl & C. Presl. | Poaceae | Neo | Cas | S America | | |
| *Paspalum quadrifarium* Lam. | Poaceae | Neo | Cas | S America | ♦ | ● |
| *Paspalum vaginatum* Sw. | Poaceae | Neo | Nat | USA & Caribbean | ♦ | ● |
| *Passiflora caerulea* L.<br>♦ ● *Passiflora coerulea* L. | Passifloraceae | Neo | Nat | S America | ♦ | ● |
| *Passiflora incarnata* L. | Passifloraceae | Neo | Cas | USA | | |
| *Paulownia tomentosa* (Thunb.) Steud. | Paulowniaceae | Neo | Nat | China & E Asia (Japan) | ♦ | ● |
| *Pelargonium cucullatum* (L.) L'Hér. | Geraniaceae | Neo | Cas | S Africa (Cape Province) | | |
| *Pelargonium inquinans* (L.) L'Hér. ex Aiton | Geraniaceae | Neo | Cas | S Africa | | ● |
| *Pelargonium zonale* (L.) L'Hér. | Geraniaceae | Neo | Cas | S Africa (Cape Province) | | ● |
| *Pennisetum setaceum* (Forssk.) Chiov. | Poaceae | Neo | Inv | N & Trop Africa | ♦ | ● |
| *Pennisetum villosum* R.Br. | Poaceae | Neo | Nat | Trop Africa | ♦ | ● |
| *Pentaglottis sempervirens* (L.) Tausch ex L.H. Bailey | Boraginaceae | Neo | Nat | SE Europe | ♦ | ● |
| *Perilla frutescens* (L.) Britton | Lamiaceae | Neo | Cas | China, E Asia, Indian Subcontinent, Indo-China | ♦ | ● |
| *Persea indica* (L.) Spreng. | Lauraceae | Neo | Nr | Macaronesia | | |
| *Persicaria bungeana* (Turcz.) Nakai | Polygonaceae | Neo | Cas | Soviet Far East, China, E Asia | | |
| *Persicaria capitata* (Buch.-Ham. ex D. Don.) H. Gross | Polygonaceae | Neo | Nat | China, Asia-Trop | ♦ | |
| *Persicaria filiformis* (Thunb.) Nakai | Polygonaceae | Neo | Inv | Soviet Far East, China, E Asia, Indian Subcontinent, Indo-China | | |
| *Persicaria longiseta* (Bruijn) Kitag. | Polygonaceae | Neo | Nat | Asia-Temp, Asia-Trop | | |
| *Persicaria nepalensis* (Meisn.) H. Gross<br>● *Polygonum nepalense* Meisn. | Polygonaceae | Neo | Inv | Asia-Temp, Asia-Trop | ♦ | ● |
| *Persicaria orientalis* (L.) Spach<br>● *Polygonum orientale* L. | Polygonaceae | Neo | Nat | Asia-Temp, Asia-Trop | ♦ | ● |
| *Persicaria pensylvanica* (L.) M. Gómez | Polygonaceae | Neo | Nat | Canada & USA | ♦ | |
| *Persicaria virginiana* (L.) Gaertn. | Polygonaceae | Neo | Inv | Canada & USA | ♦ | |
| *Petrorhagia glumacea* (Chaub. & Bory) P.W. Ball & Heywood | Caryophyllaceae | Neo | Nr | Europe | | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Petroselinum crispum* (Mill.) Fuss | Apiaceae | Archaeo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Petunia hybrida* (Hook.) Vilm. | Solanaceae | Neo | Cas | Hybrid | ♦ | ● |
| *Phacelia tanacetifolia* Benth. | Boraginaceae | Neo | Nat | USA & Mexico | ♦ | ● |
| *Phalaris canariensis* L. | Poaceae | Neo | Nat | Macaronesia & N Africa | ♦ | ● |
| *Phaseolus vulgaris* L. | Fabaceae | Neo | Cas | Mexico, C & S America | | ● |
| *Phedimus spurius* (M.Bieb.) 't Hart<br>● *Sedum spurium* Bieb. | Crassulaceae | Neo | Nat | W Asia & Caucasus | ♦ | ● |
| *Phlox paniculata* L. | Polemoniaceae | Neo | Cas | USA | | |
| *Phoenix canariensis* Chabaud | Arecaceae | Neo | Nat | Canary Islands | ♦ | ● |
| *Phoenix dactylifera* L. | Arecaceae | Neo | Cas | Asia-Temp | | ● |
| *Phoenix sylvestris* (L.) Roxb. | Arecaceae | Neo | Cas | Indian Subcontinent | | |
| *Photinia serratifolia* (Desf.) Kalkman | Rosaceae | Neo | Cas | China, E Asia, Indian Subcontinent, Malesia | | |
| *Phyla canescens* (Kunth) Greene[22]<br>● *Lippia canescens* (Kunth) | Verbenaceae | Neo | Cas | S America | ♦ | ● |
| *Phyla nodiflora* (L.) Greene<br>● *Lippia nodiflora* (L.) Michx. | Verbenaceae | Neo | Nat | Tropics (Africa, America, Asia) | ♦ | ● |
| *Phyllostachys aurea* Carrière ex Rivière & C. Rivière | Poaceae | Neo | Cas | China | ♦ | |
| *Phyllostachys bambusoides* Siebold & Zucc. | Poaceae | Neo | Cas | China | ♦ | ● |
| *Phyllostachys edulis* (Carrière) J. Houz. | Poaceae | Neo | Cas | China | ♦ | |
| *Phyllostachys nigra* (Lodd.) Munro | Poaceae | Neo | Cas | China | ♦ | ● |
| *Phyllostachys sulphurea* (Carrière) Rivière & C. Rivière | Poaceae | Neo | Cas | China | ♦ | |
| *Phyllostachys viridiglaucescens* (Carrière) Rivière & C. Rivière | Poaceae | Neo | Cas | China | ♦ | |
| *Physalis angulata* L. | Solanaceae | Neo | Cas | America | ♦ | ● |
| *Physalis ixocarpa* Brot. ex Hornem. | Solanaceae | Neo | Cas | Mexico & C America | | |
| *Physalis nicandroides* Schltdl. | Solanaceae | Neo | Cas | Mexico & C America | | |
| *Physalis peruviana* L. | Solanaceae | Neo | Nat | S America | ♦ | ● |
| *Physalis pubescens* L. | Solanaceae | Neo | Cas | N, C & S America | ♦ | ● |
| *Physalis viscosa* L. | Solanaceae | Neo | Cas | S America | | |
| *Physocarpus opulifolius* (L.) Maxim. | Rosaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Physostegia virginiana* (L.) Benth. | Lamiaceae | Neo | Cas | N America | | |
| *Phytolacca acinosa* Roxb. | Phytolaccaceae | Neo | Cas | China & E Asia | | |
| *Phytolacca americana* L. | Phytolaccaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Phytolacca dioica* L. | Phytolaccaceae | Neo | Cas | S America | ♦ | ● |
| *Picea orientalis* (L.) Link | Pinaceae | Neo | Cas | W Asia, Caucasus | | |
| *Picris rhagadioloides* (L.) Desf.<br>● *Picris altissima* Delile | Asteraceae | Neo | Cas | Europe | ♦ | ● |
| *Pimpinella anisum* L. | Apiaceae | Archaeo | Cas | Asia-Temp | ♦ | ● |
| *Pinus canariensis* C. Sm. | Pinaceae | Neo | Cas | Canary Islands | | ● |
| *Pinus rigida* Mill. | Pinaceae | Neo | Nat | Canada & USA | | |
| *Pinus strobus* L. | Pinaceae | Neo | Nat | N America | ♦ | ● |
| *Pinus wallichiana* A.B. Jacks. | Pinaceae | Neo | Cas | W Asia, Indian Subcontinent, Indo-China | | ● |
| *Pistacia vera* L. | Anacardiaceae | Archaeo | Nr | Medit (Asia, Europe) | ♦ | ● |
| *Pistia stratiotes* L. | Araceae | Neo | Cas | Tropics (Africa, America, Asia) | ♦ | |
| *Pisum sativum* L. subsp. *sativum* | Fabaceae | Archaeo | Nat | SE Europe, W Asia | ♦ | ● |
| *Pittosporum tobira* (Thunb.) W.T. Aiton | Pittosporaceae | Neo | Nat | China & E Asia | ♦ | ● |
| *Pittosporum undulatum* Vent. | Pittosporaceae | Neo | Cas | Australia | ♦ | |
| *Plantago virginica* L. | Plantaginaceae | Neo | Cas | USA & Mexico | ♦ | |
| *Platanus hispanica* Mill. ex Münchh.<br>● *Platanus hybrida* Brot. | Platanaceae | Neo | Nat | Hybrid | ♦ | ● |
| *Platycladus orientalis* (L.) Franco<br>● *Thuja orientalis* L. | Cupressaceae | Neo | Nat | China & E Asia (Korea) | | ● |

**Appendix 1.** ***(Continued)***

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Plectranthus scutellarioides* (L.) R.Br. | Lamiaceae | Neo | Cas | China, E Asia, Indian Subcontinent, Malesia | | |
| *Plumbago auriculata* Lam. | Plumbaginaceae | Neo | Nat | Trop & S Africa | | |
| *Polanisia trachysperma* Torr. & A. Gray<br>● *Polanisia dodecandra* (L.) DC. subsp. *trachysperma* | Cleomaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Polygala myrtifolia* L. | Polygalaceae | Neo | Nat | S Africa | ♦ | ● |
| *Pontederia cordata* L. | Pontederiaceae | Neo | Nat | N, C & S America | ♦ | ● |
| *Populus balsamifera* L. | Salicaceae | Neo | Nat | Canada & USA | | |
| *Populus canadensis* Moench | Salicaceae | Neo | Nat | Hybrid | ♦ | ● |
| *Populus deltoides* Marshall | Salicaceae | Neo | Cas | N America | ♦ | ● |
| *Portulaca grandiflora* Hook. | Portulacaceae | Neo | Cas | S America | ♦ | ● |
| *Portulaca pilosa* L. | Portulacaceae | Neo | Cas | S America | | |
| *Potentilla indica* (Andrews) Th. Wolf<br>● *Duchesnea indica* (Andrews) Focke | Rosaceae | Neo | Inv | Asia-Temp, Asia-Trop | ♦ | ● |
| *Potentilla intermedia* L. | Rosaceae | Neo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Potentilla norvegica* L. | Rosaceae | Neo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Poteridium annuum* (Nutt. ex Hook.) Spach<br>♦ *Sanguisorba annua* (Nutt. ex Hook.) Torr. & Gray | Rosaceae | Neo | Cas | Canada & USA | ♦ | |
| *Prunus armeniaca* L. | Rosaceae | Archaeo | Cas | C Asia, China | ♦ | ● |
| *Prunus cerasifera* Ehrh. | Rosaceae | Archaeo | Nat | SE Europe, Asia-Temp, Indian Subcontinent | ♦ | ● |
| *Prunus cerasus* L. | Rosaceae | Archaeo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Prunus domestica* L. s.l. | Rosaceae | Archaeo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Prunus laurocerasus* L. | Rosaceae | Neo | Inv | SE Europe, W Asia, Caucasus | ♦ | ● |
| *Prunus persica* (L.) Batsch | Rosaceae | Archaeo | Nat | China | ♦ | ● |
| *Prunus serotina* Ehrh. | Rosaceae | Neo | Inv | N & C America | ♦ | ● |
| *Psathyrostachys juncea* (Fisch.) Nevski | Poaceae | Neo | Nat | E Europe, Asia-Temp | ♦ | |
| *Pseudognaphalium undulatum* (L.) Hilliard & B.L. Burtt | Asteraceae | Neo | Nat | Trop & S Africa | ♦ | ● |
| *Pseudosasa japonica* (Siebold & Zucc. ex Steud.) Makino ex Nakai<br>● *Arundinaria japonica* Makino | Poaceae | Neo | Nat | E Asia | ♦ | ● |
| *Pseudotsuga menziesii* (Mirb.) Franco | Pinaceae | Neo | Cas | N America | | |
| *Pteris multifida* Poir. | Pteridaceae | Neo | Cas | China, E Asia, Indo-China, Malesia | ♦ | ● |
| *Pterocarya fraxinifolia* (Lam.) Spach | Juglandaceae | Neo | Cas | Caucasus | | |
| *Pterocephalus plumosus* (L.) Coult. | Dipsacaceae | Neo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Pueraria lobata* (Willd.) Ohwi[23] | Fabaceae | Neo | Inv | China & E Asia | ♦ | |
| *Punica granatum* L. | Lythraceae | Archaeo | Nat | SE Europe, W Asia | ♦ | ● |
| *Pyracantha crenulata* (D. Don) M. Roem. | Rosaceae | Neo | Nat | China, Indian Subcontinent, Indo-China | | |
| *Quercus rubra* L. | Fagaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Quercus shumardii* Buckley | Fagaceae | Neo | Cas | Canada & USA | | |
| *Ranunculus asiaticus* L. | Ranunculaceae | Neo | Cas | W Asia | ♦ | ● |
| *Raphanus sativus* L. | Brassicaceae | Archaeo | Nat | Medit (Asia, Europe) | ♦ | ● |
| *Rapistrum perenne* (L.) All. | Brassicaceae | Archaeo | Cas | Europe, Asia-Temp | ♦ | ● |
| *Ratibida pinnata* (Vent.) Barnhart<br>♦ ● *Rudbeckia pinnata* Vent. | Asteraceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Reseda odorata* L. | Resedaceae | Neo | Cas | Medit (Africa, Europe) | ♦ | ● |
| *Retama monosperma* (L.) Boiss. | Fabaceae | Neo | Cas | Medit (Africa, Europe) | ♦ | ● |
| *Reynoutria japonica* Houtt.[24]<br>♦ *Fallopia japonica* (Houtt.) Ronse Decr. | Polygonaceae | Neo | Inv | China & E Asia | ♦ | ● |
| *Reynoutria sachalinensis* (F. Schmidt) Nakai<br>♦ *Fallopia sachalinensis* (F. Schmidt) Ronse Decr. | Polygonaceae | Neo | Inv | Soviet Far East, E Asia (Japan) | ♦ | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Reynoutria ×bohemica* Chrtek & Chrtková | Polygonaceae | Neo | Inv | Hybrid | | |
| *Rhaponticum repens* (L.) Hidalgo | Asteraceae | Neo | Cas | E Europe, W & C Asia | | |
| *Rheum palmatum* L. | Polygonaceae | Neo | Nat | China | ♦ | ● |
| *Rhus chinensis* Mill. | Anacardiaceae | Neo | Cas | China, E Asia, Asia-Trop | | |
| *Rhus typhina* L. | Anacardiaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Ribes aureum* Pursh | Grossulariaceae | Neo | Cas | Canada & USA | ♦ | |
| *Ribes nigrum* L. | Grossulariaceae | Neo | Cas | Europe, Asia-Temp | ♦ | ● |
| *Ribes spicatum* Robson | Grossulariaceae | Neo | Cas | Europe, Asia-Temp | | |
| *Ricinus communis* L. | Euphorbiaceae | Archaeo | Inv | Trop Africa | ♦ | ● |
| *Robinia hispida* L. | Fabaceae | Neo | Cas | USA | | |
| *Robinia neomexicana* A. Gray | Fabaceae | Neo | Cas | USA & Mexico | | ● |
| *Robinia pseudoacacia* L.<br>♦ *Robinia pseudacacia* L. | Fabaceae | Neo | Inv | USA | ♦ | ● |
| *Robinia viscosa* Vent. | Fabaceae | Neo | Cas | USA | | |
| *Roemeria hybrida* (L.) DC. subsp. *hybrida* | Papaveraceae | Neo | Cas | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Rorippa armoracioides* (Tausch) Fuss | Brassicaceae | Neo | Nat | Hybrid | | |
| *Rorippa austriaca* (Crantz) Besser | Brassicaceae | Neo | Nat | Europe, W & C Asia | ♦ | ● |
| *Rosa banksiae* W.T. Aiton | Rosaceae | Neo | Cas | China | | |
| *Rosa foetida* Herrm. | Rosaceae | Neo | Cas | W & C Asia | ♦ | ● |
| *Rosa microphylla* Roxb. | Rosaceae | Neo | Nr | China & E Asia (Japan) | | |
| *Rosa moschata* Herrm. | Rosaceae | Neo | Cas | Asia-Temp | ♦ | ● |
| *Rosa multiflora* Thunb. | Rosaceae | Neo | Nat | China & E Asia | ♦ | |
| *Rosa rugosa* Thunb. | Rosaceae | Neo | Cas | Soviet Far East, China, E Asia | | |
| *Rosa virginiana* Herrm. | Rosaceae | Neo | Cas | N America | | |
| *Rotala densiflora* (Roem. & Schult.) Koehne | Lythraceae | Neo | Nat | Tropics | ♦ | ● |
| *Rotala filiformis* (Bellardi) Hiern | Lythraceae | Neo | Nat | Trop & S Africa | ♦ | ● |
| *Rotala indica* (Willd.) Koehne | Lythraceae | Neo | Nat | Indian Subcontinent, Malesia | ♦ | ● |
| *Rotala ramosior* (L.) Koehne | Lythraceae | Neo | Nat | Tropics | ♦ | ● |
| *Rubia tinctorum* L. | Rubiaceae | Archaeo | Nat | Europe, W & C Asia | ♦ | ● |
| *Rubus armeniacus* Focke | Rosaceae | Neo | Nat | Caucasus | ♦ | |
| *Rubus phoenicolasius* Maxim. | Rosaceae | Neo | Inv | China & E Asia | ♦ | ● |
| *Rudbeckia hirta* L. | Asteraceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Rudbeckia laciniata* L. | Asteraceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Rumex kerneri* Borbás<br>♦ *Rumex cristatus* DC. subsp. *kerneri* (Borbás) Akeroyd<br>● *Rumex cristatus* DC. | Polygonaceae | Neo | Nat | Medit (Europe) | ♦ | ● |
| *Rumex longifolius* DC. | Polygonaceae | Neo | Cas | Europe, Asia-Temp | ♦ | |
| *Rumex lunaria* L. | Polygonaceae | Neo | Nat | Canary Islands | ♦ | ● |
| *Rumex patientia* L. subsp. *patientia* | Polygonaceae | Neo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Rumex triangulivalvis* (Danser) Rech.f.[25] | Polygonaceae | Neo | Nat | USA & Mexico | | |
| *Ruschia tumidula* (Haw.) Schwantes | Aizoaceae | Neo | Nat | S Africa | | |
| *Sagittaria latifolia* Willd. | Alismataceae | Neo | Nat | N, C & S America | ♦ | ● |
| *Sagittaria platyphylla* (Engelm.) J.G. Sm. | Alismataceae | Neo | Nat | N & C America | ♦ | ● |
| *Salix babylonica* L. | Salicaceae | Neo | Cas | China | ♦ | ● |
| *Salpichroa origanifolia* (Lam.) Thell. | Solanaceae | Neo | Nat | S America | ♦ | ● |
| *Salvia amplexicaulis* Lam. | Lamiaceae | Neo | Nr | SE Europe, W Asia | | |
| *Salvia canariensis* L. | Lamiaceae | Neo | Cas | Canary Islands | ♦ | ● |
| *Salvia grahamii* Benth. | Lamiaceae | Neo | Cas | Mexico | ♦ | ● |
| *Salvia pinnata* L. | Lamiaceae | Neo | Nr | Medit (Europe) | ♦ | ● |
| *Salvia splendens* Sellow ex Wied-Neuw. | Lamiaceae | Neo | Cas | Brazil | | ● |
| *Salvinia molesta* D.S. Mitch. | Salviniaceae | Neo | Inv | Brazil | ♦ | |
| *Santolina virens* Mill. | Asteraceae | Neo | Nat | Medit (Europe) | ♦ | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Satureja hortensis* L. | Lamiaceae | Archaeo | Nat | Medit (Asia, Europe) | ♦ | ● |
| *Saururus cernuus* L. | Saururaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Saxifraga stolonifera* Curtis | Saxifragaceae | Neo | Cas | China & E Asia | | ● |
| *Saxifraga umbrosa* L. | Saxifragaceae | Neo | Nat | SW Europe (Pyrenees) | ♦ | ● |
| *Schinus molle* L. | Anacardiaceae | Neo | Nat | S America | ♦ | ● |
| *Schoenoplectiella juncoides* (Roxb.) Lye<br>♦ *Schoenoplectus juncoides* (Roxb.) V.I. Krecz. | Cyperaceae | Neo | Cas | Asia-Temp, Asia-Trop | ♦ | |
| *Scilla luciliae* (Boiss.) Speta | Hyacinthaceae | Neo | Cas | W Asia (Turkey) | | |
| *Scirpus atrovirens* Willd. | Cyperaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Scirpus georgianus* R.M. Harper | Cyperaceae | Neo | Cas | Canada & USA | | |
| *Secale cereale* L. | Poaceae | Archaeo | Cas | W Asia & Caucasus | ♦ | ● |
| *Sechium edule* (Jacq.) Sw. | Cucurbitaceae | Neo | Cas | Mexico | ♦ | ● |
| *Sedum nussbaumerianum* Bitter | Crassulaceae | Neo | Cas | Mexico | ♦ | |
| *Sedum palmeri* S. Watson | Crassulaceae | Neo | Cas | Mexico | ♦ | |
| *Sedum praealtum* DC. | Crassulaceae | Neo | Cas | N America | ♦ | ● |
| *Sedum sarmentosum* Bunge | Crassulaceae | Neo | Nat | China, E Asia, Indo-China | ♦ | |
| *Selaginella kraussiana* (Kunze) A. Braun | Selaginellaceae | Neo | Cas | Macaronesia, Trop Africa & S Africa | | |
| *Senecio andryaloides* DC. | Asteraceae | Neo | Nr | Uncertain | | |
| *Senecio angulatus* L.f.[26] | Asteraceae | Neo | Inv | S Africa (Cape Province) | ♦ | ● |
| *Senecio deltoideus* Less. | Asteraceae | Neo | Cas | Trop Africa | ♦ | |
| *Senecio grisebachii* Baker | Asteraceae | Neo | Nat | S America | ♦ | |
| *Senecio inaequidens* DC. | Asteraceae | Neo | Inv | S Africa | ♦ | ● |
| *Senecio mikanioides* Otto ex Walp.[27] | Asteraceae | Neo | Cas | S Africa | ♦ | ● |
| *Senecio petasitis* (Sims) DC.[28] | Asteraceae | Neo | Cas | Mexico & C America | ♦ | ● |
| *Senecio vernalis* Waldst. & Kit. | Asteraceae | Neo | Cas | Europe, W & C Asia | | |
| *Sesamum indicum* L. | Pedaliaceae | Archaeo | Nat | Trop Africa | | ● |
| *Sesbania punicea* (Cav.) Benth. | Fabaceae | Neo | Cas | S America | | |
| *Setaria faberi* F. Herm. | Poaceae | Neo | Nat | Soviet Far East, China, E Asia | ♦ | |
| *Setaria italica* (L.) P. Beauv. | Poaceae | Archaeo | Inv | Tropics (Africa, Asia) | ♦ | ● |
| *Setaria parviflora* (Poir.) Kerguélen<br>● *Setaria geniculata* (Lam.) Beauv. | Poaceae | Neo | Nat | S America | ♦ | ● |
| *Setaria pycnocoma* (Steud.) Henrard ex Nakai[29]<br>♦ *Setaria viridis* (L.) P. Beauv. subsp. *pycnocoma* (Steud.) | Poaceae | Neo | Inv | Asia-Temp | ♦ | |
| *Sicyos angulatus* L. | Cucurbitaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Sida spinosa* L. | Malvaceae | Neo | Cas | Tropics | | |
| *Sigesbeckia orientalis* L.<br>♦ ● *Siegesbeckia orientalis* L. | Asteraceae | Neo | Nat | wide distribution | ♦ | ● |
| *Silene gallinyi* Heuff. ex Rchb. | Caryophyllaceae | Neo | Cas | Europe, Asia-Temp | | |
| *Silene graeca* Boiss. & Spruner | Caryophyllaceae | Neo | Nr | Europe, Asia-Temp | | |
| *Silene heldreichii* Boiss. | Caryophyllaceae | Neo | Nr | Europe, Asia-Temp | | |
| *Silphium perfoliatum* L. | Asteraceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Sisymbrium loeselii* L. | Brassicaceae | Neo | Nat | Europe, Asia-Temp, Indian Subcontinent | ♦ | ● |
| *Sisyrinchium montanum* Greene[30]<br>♦ *Sisyrinchium angustifolium* Mill. | Iridaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Sium sisarum* L. | Apiaceae | Archaeo | Nr | Europe, W & C Asia | ♦ | ● |
| *Solanum aviculare* G. Forst. | Solanaceae | Neo | Cas | Australia & New Zealand | ♦ | |
| *Solanum bonariense* L. | Solanaceae | Neo | Nat | S America | ♦ | ● |
| *Solanum carolinense* L. | Solanaceae | Neo | Nat | N America | ♦ | |
| *Solanum chenopodioides* Lam. | Solanaceae | Neo | Nat | S America | ♦ | |
| *Solanum elaeagnifolium* Cav. | Solanaceae | Neo | Nat | USA & Mexico | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Solanum heterodoxum* Dunal ex DC. | Solanaceae | Neo | Cas | USA & Mexico | ♦ | |
| *Solanum linnaeanum* Hepper & P.-M.L. Jaeger | Solanaceae | Neo | Inv | Trop & S Africa | ♦ | ● |
| ♦ ● *Solanum sodomaeum* L. | | | | | | |
| *Solanum lycopersicum* L. | Solanaceae | Neo | Cas | Mexico, C & S America | ♦ | ● |
| ● *Lycopersicum esculentum* Miller | | | | | | |
| *Solanum melongena* L. | Solanaceae | Archaeo | Cas | Asia-Trop | ♦ | ● |
| *Solanum physalifolium* Rusby | Solanaceae | Neo | Nat | S America | | |
| *Solanum pseudocapsicum* L. | Solanaceae | Neo | Cas | Mexico, C & S America | | |
| *Solanum rostratum* Dunal | Solanaceae | Neo | Nat | USA & Mexico | ♦ | ● |
| *Solanum sarrachoides* Sendtn. | Solanaceae | Neo | Cas | S America | ♦ | |
| *Solanum sisymbrifolium* Lam. | Solanaceae | Neo | Inv | S America | ♦ | ● |
| *Solanum tenuifolium* Dunal | Solanaceae | Neo | Nat | Uncertain | | |
| *Solanum torvum* Sw. | Solanaceae | Neo | Nat | Mexico, C & S America | ♦ | ● |
| ● *Solanum ferrugineum* Jacq. | | | | | | |
| *Solanum tuberosum* L. | Solanaceae | Neo | Cas | S America | ♦ | ● |
| *Solidago canadensis* L. | Asteraceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Solidago gigantea* Aiton | Asteraceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Soliva sessilis* Ruiz & Pav.[31] | Asteraceae | Neo | Cas | S America | | |
| *Sollya heterophylla* Lindl. | Pittosporaceae | Neo | Cas | Australia | | |
| *Sorbaria sorbifolia* (L.) A. Braun | Rosaceae | Neo | Nat | Siberia, Soviet Far East, China, E Asia | ♦ | ● |
| *Sorbaria tomentosa* (Lindl.) Rehd.[32] | Rosaceae | Neo | Nat | W & C Asia, Indian Subcontinent | ♦ | |
| ♦ *Sorbaria lindleyana* (Wall. ex Lindley) Maxim. | | | | | | |
| *Sorghum bicolor* (L.) Moench | Poaceae | Archaeo | Cas | Trop & S Africa | ♦ | ● |
| *Sorghum halepense* (L.) Pers. | Poaceae | Archaeo | Inv | Tropics (Africa, Asia) | ♦ | ● |
| *Spartina ×townsendii* Groves & J. Groves | Poaceae | Neo | Inv | Hybrid | ♦ | |
| *Sphagneticola calendulacea* (L.) Pruski | Asteraceae | Neo | Nr | Asia-Temp | | |
| *Spinacia oleracea* L. | Amaranthaceae | Archaeo | Cas | W Asia | ♦ | ● |
| *Spiraea cantoniensis* Lour. | Rosaceae | Neo | Cas | Hybrid | | |
| *Spiraea hypericifolia* L. subsp. *obovata* (Waldst. & Kit. ex Willd.) H. Huber | Rosaceae | Neo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Spiraea japonica* L.f. | Rosaceae | Neo | Inv | China, E Asia | ♦ | ● |
| *Spiraea salicifolia* L. | Rosaceae | Neo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Spiraea ×vanhouttei* (Briot) Carrière | Rosaceae | Neo | Cas | Hybrid | | |
| *Sporobolus indicus* (L.) R.Br. | Poaceae | Neo | Nat | S Africa | ♦ | ● |
| ● *Sporobulus poiretii* (R. Et s.) Hitchc. | | | | | | |
| *Sporobolus neglectus* Nash | Poaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Sporobolus vaginiflorus* (Torr. ex A.Gray) Alph. Wood | Poaceae | Neo | Inv | Canada & USA | ♦ | ● |
| *Stenotaphrum secundatum* (Walt.) Kuntze | Poaceae | Neo | Cas | Tropics (Africa, America, Asia) | | ● |
| *Styphnolobium japonicum* (L.) Schott | Fabaceae | Neo | Cas | China | ♦ | ● |
| ♦ ● *Sophora japonica* L. | | | | | | |
| *Symphoricarpos albus* (L.) S.F. Blake | Caprifoliaceae | Neo | Nat | Canada & USA | ♦ | ● |
| ● *Symphoricarpos rivularis* Sudsk. | | | | | | |
| *Symphyotrichum ericoides* (L.) G.L. Nesom | Asteraceae | Neo | Cas | N America | ♦ | |
| *Symphyotrichum laeve* (L.) Á. Löve & D. Löve | Asteraceae | Neo | Cas | N America | | |
| *Symphyotrichum lanceolatum* (Willd.) G.L. Nesom | Asteraceae | Neo | Inv | N America | ♦ | ● |
| ● *Aster lanceolatus* Willd. | | | | | | |
| *Symphyotrichum lateriflorum* (L.) Á. Löve & D. Löve | Asteraceae | Neo | Nat | N America | ♦ | ● |
| ● *Aster vimineus* Lam. | | | | | | |
| *Symphyotrichum novae-angliae* (L.) G.L. Nesom | Asteraceae | Neo | Nat | Canada & USA | ♦ | ● |
| ● *Aster novae-angliae* L. | | | | | | |
| *Symphyotrichum novi-belgii* (L.) G.L. Nesom | Asteraceae | Neo | Nat | Canada & USA | ♦ | ● |
| ● *Aster novi-belgii* L. | | | | | | |
| *Symphyotrichum parviflorum* (Nees) Greuter | Asteraceae | Neo | Cas | N & C America | | |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Symphyotrichum squamatum* (Spreng.) G.L. Nesom<br>● *Aster squamatus* (Spreng.) Hieron | Asteraceae | Neo | Inv | S America | ♦ | ● |
| *Symphyotrichum ×salignum* (Willd.) G.L. Nesom<br>● *Aster salignus* Willd. | Asteraceae | Neo | Cas | E Europe, Soviet Middle Asia, Siberia | ♦ | ● |
| *Symphyotrichum ×versicolor* (Willd.) G.L. Nesom<br>● *Aster versicolor* Willd. | Asteraceae | Neo | Cas | Hybrid | | ● |
| *Symphytum asperum* Lepech. | Boraginaceae | Neo | Cas | W Asia & Caucasus | ♦ | ● |
| *Symphytum orientale* L. | Boraginaceae | Neo | Cas | W Asia | ♦ | ● |
| *Syringa vulgaris* L. | Oleaceae | Neo | Nat | SE Europe | ♦ | ● |
| *Tagetes erecta* L. | Asteraceae | Neo | Cas | Mexico | ♦ | |
| *Tagetes minuta* L. | Asteraceae | Neo | Nat | S America | ♦ | ● |
| *Tagetes patula* L. | Asteraceae | Neo | Cas | America | ♦ | ● |
| *Tamarix parviflora* DC. | Tamaricaceae | Neo | Nat | Medit (Africa, Asia, Europe) | ♦ | ● |
| *Tanacetum balsamita* L. | Asteraceae | Archaeo | Nat | W Asia & Caucasus | ♦ | ● |
| *Tanacetum cinerariifolium* (Trevir.) Sch.Bip. | Asteraceae | Neo | Cas | SE Europe | ♦ | ● |
| *Taxodium distichum* (L.) Rich. | Cupressaceae | Neo | Cas | USA | | ● |
| *Tecomaria capensis* (Thunb.) Spach | Bignoniaceae | Neo | Cas | Trop & S Africa | | |
| *Telekia speciosa* (Schreb.) Baumg. | Asteraceae | Neo | Cas | Europe, W Asia, Caucasus | ♦ | ● |
| *Tetragonia tetragonoides* (Pall.) Kuntze | Aizoaceae | Neo | Cas | Australia & New Zealand | ♦ | ● |
| *Teucrium arduini* L. | Lamiaceae | Neo | Nr | SE Europe | | ● |
| *Thuja occidentalis* L. | Cupressaceae | Neo | Cas | Canada & USA | | ● |
| *Thujopsis dolabrata* (Thunb. ex L.f.) Siebold & Zucc. | Cupressaceae | Neo | Cas | E Asia (Japan) | | |
| *Tilia americana* L. | Malvaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Tilia tomentosa* Moench | Malvaceae | Neo | Cas | Europe, W Asia | ♦ | ● |
| *Tillaea campestris* (Eckl. & Zeyh.) Brullo, Giusso & Siracusa | Crassulaceae | Neo | Nat | S Africa | ♦ | |
| *Toxicodendron pubescens* Mill.<br>● *Rhus toxicodendron* L. | Anacardiaceae | Neo | Nat | USA | | ● |
| *Trachycarpus fortunei* (Hook.) H. Wendl. | Arecaceae | Neo | Inv | China & E Asia (Japan) | ♦ | ● |
| *Tradescantia fluminensis* Vell. | Commelinaceae | Neo | Inv | S America | ♦ | ● |
| *Tradescantia virginiana* L. | Commelinaceae | Neo | Cas | Canada & USA | ♦ | ● |
| *Trichocereus spachianus* (Lem.) Riccob. | Cactaceae | Neo | Cas | S America (Argentina) | | |
| *Trifolium dalmaticum* Vis. | Fabaceae | Neo | Nr | SE Europe | | |
| *Trigonella caerulea* (L.) Ser. | Fabaceae | Archaeo | Cas | Medit (Asia, Europe) | ♦ | ● |
| *Trigonella foenum-graecum* L. | Fabaceae | Archaeo | Nat | E Europe, C Asia | ♦ | ● |
| *Trigonella lilacina* Boiss. | Fabaceae | Neo | Nr | Asia-Temp | | |
| *Trisetaria canariensis* (Parl. ex Webb & Berth.) Pignatti | Poaceae | Neo | Cas | Medit (Europe) | | ● |
| *Triticum aestivum* L. | Poaceae | Archaeo | Nat | W Asia & Caucasus | ♦ | ● |
| *Triticum cylindricum* (Host) Ces., Pass. & Gibelli<br>● *Aegilops cylindrica* Host | Poaceae | Archaeo | Nat | Europe, W & C Asia, Indian Subcontinent | ♦ | ● |
| *Triticum durum* Desf. | Poaceae | Archaeo | Cas | W Asia | | ● |
| *Tropaeolum majus* L. | Tropaeolaceae | Neo | Nat | S America | ♦ | ● |
| *Tulipa agenensis* DC. | Liliaceae | Neo | Nat | Medit (Asia) | ♦ | ● |
| *Tulipa clusiana* DC. | Liliaceae | Neo | Nat | W Asia, Indian Subcontinent | ♦ | ● |
| *Tulipa gesneriana* L. | Liliaceae | Neo | Cas | Asia-Temp | | ● |
| *Tulipa raddii* Reboul<br>♦ ● *Tulipa praecox* Ten. | Liliaceae | Neo | Nat | Asia-Temp | ♦ | ● |
| *Tulipa saxatilis* Sieber ex Spreng. | Liliaceae | Neo | Cas | Medit (Europe) | ♦ | ● |
| *Ulmus laevis* Pall. | Ulmaceae | Neo | Nat | Europe, W Asia, Caucasus | ♦ | ● |

**Appendix 1. (*Continued*)**

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Ulmus pumila* L. | Ulmaceae | Neo | Nat | Siberia, C Asia, Soviet Far East, China, E Asia | ♦ | ● |
| *Vachellia farnesiana* (L.) Wight & Arn.<br>● *Acacia farnesiana* (L.) Willd. | Fabaceae | Neo | Cas | S America | | ● |
| *Vachellia karroo* (Hayne) Banfi & Galasso<br>♦ ● *Acacia karroo* Hayne | Fabaceae | Neo | Nat | S Africa | ♦ | ● |
| *Valeriana phu* L. | Valerianaceae | Neo | Nr | Caucasus | | ● |
| *Verbascum virgatum* Stokes | Scrophulariaceae | Neo | Cas | N & SW Europe (France) | ♦ | ● |
| *Verbena bonariensis* L. | Verbenaceae | Neo | Nat | S America | ♦ | |
| *Verbena litoralis* Kunth[33]<br>♦ *Verbena brasiliensis* Vell. | Verbenaceae | Neo | Nat | Mexico, C & S America | ♦ | |
| *Verbena teucrioides* Gillies & Hook. | Verbenaceae | Neo | Nr | S America | | |
| *Veronica filiformis* Sm. | Plantaginaceae | Neo | Nat | E Europe, W Asia, Caucasus | ♦ | ● |
| *Veronica peregrina* L. | Plantaginaceae | Neo | Nat | USA | ♦ | ● |
| *Veronica persica* Poir. | Plantaginaceae | Neo | Inv | W Asia | ♦ | ● |
| *Viburnum carlesii* Hemsl. | Adoxaceae | Neo | Cas | E Asia | | |
| *Viburnum rhytidophyllum* Hemsl. | Adoxaceae | Neo | Cas | China | | |
| *Vicia ervilia* (L.) Willd. | Fabaceae | Archaeo | Nat | W Asia | ♦ | ● |
| *Vigna unguiculata* (L.) Walp. | Fabaceae | Archaeo | Cas | Trop & S Africa | | ● |
| *Viola cucullata* Aiton<br>♦ ● *Viola obliqua* Hill | Violaceae | Neo | Nat | Canada & USA | ♦ | ● |
| *Viola wittrockiana* Gams<br>● *Viola ×wittrochiana* Gams | Violaceae | Neo | Cas | Hybrid | | ● |
| *Vitis labrusca* L.[34] | Vitaceae | Neo | Cas | USA | ♦ | ● |
| *Vitis riparia* Michx. | Vitaceae | Neo | Inv | Canada & USA | ♦ | |
| *Vitis rupestris* Scheele | Vitaceae | Neo | Nat | USA | | |
| *Washingtonia filifera* (Linden ex André) H. Wendl. ex de Bary | Arecaceae | Neo | Nat | USA & Mexico | | ● |
| *Washingtonia robusta* H. Wendl. | Arecaceae | Neo | Cas | Mexico | | ● |
| *Weigela florida* (Bunge) A.DC. | Diervillaceae | Neo | Cas | China & E Asia | ♦ | ● |
| *Wigandia caracasana* Kunth | Boraginaceae | Neo | Cas | Mexico, C & S America | ♦ | ● |
| *Wigandia urens* (Ruiz & Pav.) Kunth | Boraginaceae | Neo | Cas | Mexico, C & S America | | |
| *Wisteria floribunda* (Willd.) DC. | Fabaceae | Neo | Cas | E Asia (Japan) | | ● |
| *Wisteria sinensis* (Sims) Sweet | Fabaceae | Neo | Cas | China | ♦ | ● |
| *Withania somnifera* (L.) Dunal subsp. *somnifera* | Solanaceae | Archaeo | Nat | Europe, Asia-Temp | ♦ | ● |
| *Wolffia arrhiza* (L.) Horkel ex Wimm. | Araceae | Neo | Nat | Tropics (Africa, Asia) | ♦ | ● |
| *Xanthium ambrosioides* Hook. & Arn. | Asteraceae | Neo | Nr | Uncertain | | |
| *Xanthium orientale* L. subsp. *italicum* (Moretti) Greuter | Asteraceae | Neo | Inv | N America | ♦ | ● |
| *Xanthium spinosum* L. | Asteraceae | Neo | Inv | S America | ♦ | ● |
| *Xeranthemum annuum* L. | Asteraceae | Neo | Cas | Europe, W Asia, Caucasus | ♦ | ● |
| *Yucca aloifolia* L. | Agavaceae | Neo | Nat | N & C America | ♦ | ● |
| *Yucca gloriosa* L. | Agavaceae | Neo | Nat | USA | ♦ | ● |
| *Zantedeschia aethiopica* (L.) Spreng. | Araceae | Neo | Nat | S Africa | ♦ | ● |
| *Zea mays* L. | Poaceae | Neo | Cas | Mexico | ♦ | ● |
| *Zephyranthes candida* (Lindl.) Herb. | Amaryllidaceae | Neo | Cas | S America | | |
| *Zephyranthes carinata* Herb. | Amaryllidaceae | Neo | Cas | Mexico | | |
| *Zinnia violacea* Cav.[35]<br>♦ ● *Zinnia elegans* Jacq. | Asteraceae | Neo | Cas | Mexico | ♦ | ● |
| *Ziziphora capitata* L. subsp. *capitata* | Lamiaceae | Neo | Cas | Europe, Asia-Temp | ♦ | ● |
| *Ziziphus zizyphus* (L.) H. Karst. | Rhamnaceae | Archaeo | Nat | Asia-Temp | ♦ | ● |
| *Zoysia matrella* (L.) Merr. | Poaceae | Neo | Cas | China, E Asia, Indo-China, Malesia | ♦ | |

## Appendix 1. (*Continued*)

| Taxon | Family | Residence time | Invasion status | Native range | C | P |
|---|---|---|---|---|---|---|
| *Zygophyllum fabago* L. | Zygophyllaceae | Neo | Cas | E & SE Europe, Asia-Temp, Indian Subcontinent | ♦ | ● |

**Appendix 1 notes**

1. *Amaranthus cruentus* L.: Since this species is a culton, records regarding this species will need to be verified.
2. *Amaranthus powellii* S. Watson = *Amaranthus bouchonii* Thell. = *Amaranthus chlorostachys* auct., non Willd. = *Amaranthus hybridus* auct., non L. = *Amaranthus hypochondriacus* auct., non L.
3. *Amaranthus tuberculatus* (Moq.) J.D. Sauer = *Amaranthus rudis* J.D. Sauer = *Amaranthus tamariscunus* auct., non Nutt.
4. *Asparagus aethiopicus* L. = *Asparagus densiflorus* auct., non (Kunth) Jessop = *Asparagus sprengeri* Regel.
5. *Catalpa bignonioides* Walter: Italian records of this species need to be checked because it may have been mistaken for *Catalpa speciosa*, a congeneric species that is native to the north-eastern USA and characterized by leaves without an unpleasant odour.
6. *Deutzia scabra* Thunb.: Determination of this species will have to be reassessed using recent Japanese flora since it might correspond to *Deutzia crenata* Siebold & Zucc.
7. *Eragrostis pectinacea* (Michx.) Nees = *Eragrostis caroliniana* (Biehler) Scribn. = *Eragrostis diffusa* Buckley.
8. *Erigeron annuus* (L.) Desf. = *E. annuus* (L.) Desf. subsp. *septentrionalis* (Fernald & Wieg.) Wagenitz = *Erigeron strigosus* auct., non Mühl. ex Willd. = *Erigeron annuus* (L.) Desf. subsp. *strigosus* auct., non (Mühl. ex Willd.) Wagenitz.
9. *Hedera helix* L. subsp. *poëtarum* Nymam: Taxon of dubious value that has recently been reduced to *H. helix*.
10. *Helianthus ×multiflorus* L. = *Helianthus annuus* L. × *Helianthus decapetalus* L.: Sterile hybrid that spreads in gardens exclusively by rhizome.
11. *Ipomoea indica* (Burm.) Merr. = *Ipomoea mutabilis* Lindl.
12. *Leucanthemum ×superbum* (Bergmans ex J.W. Ingram) D.H. Ken = *Leucanthemum lacustre* (Brot.) Samp. × *Leucanthemum maximum* (Ramond) DC. = *Leucanthemum maximum* auct., non (Ramond) DC.
13. *Lindernia dubia* (L.) Pennell = *Lindernia anagallidea* (Michx.) Pennell.
14. *Ludwigia hexapetala* (Hook. & Arn.) Zardini, H.Y. Gu & P.H. Raven = *Ludwigia grandiflora* auct., non (Michx.) Greuter & Burdet.
15. *Nothoscordum borbonicum* Kunth = *Allium inodorum* auct., non Aiton = *Nothoscordum gracile* auct., non (Aiton) Stearn.
16. *Oxalis corymbosa* DC. = *Oxalis debilis* Kunth subsp. *corymbosa* (DC.) O. Bolòs & Vigo = *O. debilis* Kunth var. *corymbosa* (DC.) Lourteig = *Oxalis martiana* Zucc.
17. *Oxalis latifolia* Kunth = *Oxalis violacea* auct., non L.
18. *Oxalis purpurea* L. = *Oxalis amoena* Salisb.
19. *Oxalis stricta* L.: To be separated from *Oxalis dillenii*.
20. *Oxalis violacea* L. non Thunb.: To be included in *Oxalis latifolia*.
21. *Parthenocissus quinquefolia* (L.) Planch. = *Parthenocissus inserta* (A. Kerner) Fritsch.
22. *Phyla canescens* (Kunth) Greene: Some authors believe that the species recorded in Italy is *Phyla filiformis*.
23. *Pueraria lobata* (Willd.) Ohwi = *Pueraria montana* (Lour.) Merr. var. *lobata* (Willd.) Maesen & S.M. Almeida ex Sanjappa & Pradeep = *P. montana* auct., non (Lour.) Merr.
24. *Reynoutria japonica* Houtt.: *R. japonica* Houtt. var. compacta has also been recorded as casual in Lombardy.
25. *Rumex triangulivalvis* (Danser) Rech.f. = *Rumex salicifolius* auct., non Wienm. = *R. salicifolius* Wienm. subsp. *triangulivalvis* Danser.
26. *Senecio angulatus* L. f.: this species should be transferred to the *Curio* genus.
27. *Senecio mikanioides* Otto ex Walp.: To be included in the *Delairea* genus = *Delairea odorata*.
28. *Senecio petasitis* (Sims) DC.: To be included in the *Roldana* genus = *Roldana petasitis.*
29. *Setaria pycnocoma* (Steud.) Henrard ex Nakai = *Setaria viridis* (L.) P. Beauv. subsp. *pycnocoma* (Steud.) Tzvelev.
30. *Sisyrinchium montanum* Greene = *Sisyrinchium angustifolium* auct., non Mill. = *Sisyrinchium bermudiana* auct., non L.: *S. montanum* differs from *S. angustifolium* insofar as its stem is unbranched.
31. *Soliva sessilis* Ruiz & Pav. = *Soliva pterosperma* (Juss.) Less.
32. *Sorbaria tomentosa* (Lindl.) Rehder = *Sorbaria lindleyana* (Wall. ex Lindl.) Maxim.
33. *Verbena litoralis* Kunth = *Verbena brasiliensis* Vell. = *V. litoralis* Kunth var. *brevibracteata* (Kuntze) N. O'Leary = *V. litoralis* Kunth var. *brasiliensis* (Vell.) Briq. ex Munir.
34. *Vitis* ssp.: American species of *Vitis* genus, which were introduced mainly for grafting purposes and are naturalized in many Italian regions, have not yet been included in floristic lists or have been confused with *Vitis vinifera* s.l. or *Vitis labrusca* L.
35. *Zinnia violacea* Cav.: Conservation of the name *Zinnia elegans* Jacq. has recently been requested for this species.

## Appendix 2. List of the doubtful alien species of the vascular flora of Italy (see Table I for definitions)

Each species and subspecies is listed together with its family. C = presence in the latest checklist of the Italian flora (Conti et al. 2005a); P = presence in the latest Italian flora (Pignatti 1982). Should the current binomial differ, the name as it is found in Conti et al. (2005) and Pignatti (1982) is listed under the current one. Previous names which differ from the current ones only in authorship are not shown.

| Taxon | Family | C | P |
|---|---|---|---|
| *Acanthus mollis* L. subsp. *mollis* | Acanthaceae | ♦ | ● |
| *Agrostemma githago* L. | Caryophyllaceae | ♦ | ● |
| *Anemone pavonina* Lam. | Ranuncolaceae | ♦ | ● |
| *Aurinia saxatilis* (L.) Desv. subsp. *saxatilis* | Brassicaceae | ♦ | ● |
| *Brassica juncea* (L.) Czern. | Brassicaceae | ♦ | ● |
| *Brassica nigra* (L.) W.D.J. Koch | Brassicaceae | | |
| *Camelina sativa* (L.) Crantz | Brassicaceae | ♦ | ● |
| *Centaurea benedicta* (L.) L. | Asteraceae | ♦ | ● |
| ● *Cnicus benedictus* L. | | | |
| ♦ *Cnicus benedictus* L. | | | |
| *Centaurea pullata* L. | Asteraceae | ♦ | ● |
| *Consolida ajacis* (L.) Schur | Ranuncolaceae | ♦ | ● |
| *Consolida regalis* Gray | Ranuncolaceae | ♦ | ● |
| *Crepis sancta* (L.) Bornm. subsp. *nemausensis* (Gouan) Babc. | Asteraceae | | |
| *Cuscuta cesattiana* Bertol. | Convolvulaceae | ♦ | ● |
| ● *Cuscuta cesatiana* Bertol. | | | |
| ♦ *Cuscuta scandens* Brot. subsp. *cesattiana* (Bertol.) Greuter | | | |
| *Cuscuta scandens* Brot. | Convolvulaceae | ♦ | ● |
| *Cyperus esculentus* L. | Cyperaceae | | |
| *Cyperus rotundus* L. | Cyperaceae | | |
| *Elatine hexandra* (Lapierre) DC. | Elatinaceae | ♦ | ● |
| *Fontanesia phillyreoides* Labill. | Oleaceae | ♦ | ● |
| ● *Fontanesia phillyraeoides* Labill. | | | |
| ♦ *Fontanesia phillyraeoides* Labill. | | | |
| *Galega officinalis* L. | Fabaceae | ♦ | ● |
| *Lactuca macrophylla* (Willd.) A. Gray subsp. *uralensis* (Rouy) N. Kilian & Greuter | Asteraceae | | |
| *Medicago sativa* L. | Fabaceae | ♦ | ● |
| *Melissa officinalis* L. subsp. *officinalis* | Lamiaceae | ♦ | ● |
| *Mespilus germanica* L. | Rosaceae | ♦ | ● |
| *Narcissus papyraceus* Ker Gawl. | Amaryllidaceae | ♦ | ● |
| *Nepeta cataria* L. | Lamiaceae | ♦ | ● |
| *Papaver argemone* L. | Papaveraceae | | |
| *Papaver dubium* L. | Papaveraceae | ♦ | ● |
| *Papaver hybridum* L. | Papaveraceae | ♦ | ● |
| *Papaver rhoeas* L. | Papaveraceae | ♦ | ● |
| *Papaver somniferum* L. | Papaveraceae | | |
| *Prunus dulcis* (Mill.) D.A. Webb | Rosaceae | ♦ | ● |
| *Rhus coriaria* L. | Anacardiaceae | | |
| *Rubus laciniatus* Willd. | Rosaceae | | |
| *Silene conoidea* L. | Caryophyllaceae | | |
| *Sisymbrium orientale* L. subsp. *orientale* | Brassicaceae | ♦ | ● |
| *Sixalix atropurpurea* (L.) Greuter & Burdet subsp. *atropurpurea* | Dipsacaceae | | |
| *Stachys byzantina* K. Koch | Lamiaceae | | |
| *Trifolium alexandrinum* L. | Fabaceae | | |
| *Vicia faba* L. | Fabaceae | ♦ | ● |
| *Xanthium orientale* L. subsp. *orientale* | Asteraceae | ♦ | ● |

## Appendix 3. List of the over-represented families in the non-native flora of Italy

The families which are significantly over-represented in the non-native flora compared to their proportion in the total Italian flora are: Agavaceae, Aizoaceae, Amaranthaceae, Araliaceae, Arecaceae, Balsaminaceae, Bignoniaceae, Cactaceae, Commelinaceae, Cucurbitaceae, Cupressaceae, Elaeagnaceae, Heliotropiaceae, Hydrocharitaceae, Juglandaceae, Lythraceae, Malvaceae, Moraceae, Nyctaginaceae, Oleaceae, Onagraceae, Oxalidaceae, Phrymaceae, Pontederiaceae, Sapindaceae, Solanaceae, Verbenaceae, Vitaceae.