A second update to the checklist of the vascular flora alien to Italy

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Abstract
Critical and updated alien species inventories are crucial to properly manage and contrast biological invasions. After six years, a second update to the inventory of the vascular flora alien to Italy is presented. It provides details on the occurrence at administrative regional level and, for the first time, floristic data for San Marino. The checklist includes 1,782 taxa (1,673 species, 28 subspecies, 69 hybrids, and 12 cultivar groups not attributable to a specific binomial), distributed in 786 genera and 159 families; 2 taxa are lycophytes, 13 ferns and fern allies, 37 gymnosperms, and 1,730 angiosperms. Among these, 154 taxa are archaeophytes and 1,628 neophytes. The alien taxa currently established in Italy are 899 (649 naturalized and 250 invasive), while 796 taxa are casual aliens, 1 are not assessed, 38 have not been confirmed in recent times, 4 are considered extinct or possibly extinct in the country, 40 are doubtfully occurring in Italy, 4 are of unknown regional distribution, and 110 are reported by mistake and to be excluded at national level. This checklist allows to establish an up-to-date number (10,023) of taxa currently constituting the whole (either native or alien) Italian flora.

Keywords: IAS, inventory, Mediterranean, non-native flora, plant invasion, systematics, taxonomy

Introduction

Critical and updated alien species inventories are crucial to properly manage and contrast biological invasions (Pyšek et al. 2018). Moreover, naturalization of alien plants threatens uniqueness of regional floras (Yang et al. 2021). Concerning vascular flora, such checklists are continuously being published at global (van Kleunen et al. 2018), continental (Martín-Forés et al. 2023; Rojas-Sandoval et al. 2023), or national (Ansong et al. 2019; El-Beheiry et al. 2020; Meddour et al. 2020; Omer et al. 2021; Pant et al. 2021; Chang-Yang et al. 2022; Borokini et al. 2023; Csiky et al. 2023; Holmes et al. 2023; Khapugin et al. 2023; Patzelt et al. 2023; Sohrabi et al. 2023; Sennikov and Lazkov 2024) levels. Checklists at national level, in particular, are useful to governative national agencies in charge of environmental protection (Pagad et al. 2018).
After the publication of the first checklist of the Italian vascular flora (Conti et al. 2005), two separate updated inventories for native and alien taxa were published (Bartolucci et al. 2018; Galasso et al.

2018, see also Peruzzi 2018), and made available online (Martellos et al. 2020, http://dryades.units.it/floritaly). Now time has come for a second update, for which we followed the same approach. Accordingly, this checklist of alien species growing wild in Italy complements that of the native flora (Bartolucci et al. 2024). A further update was necessary on the basis of the new floristic, systematic and taxonomic studies published in the meantime.

The aim of this contribution is to provide an updated inventory of the non-native vascular flora of Italy (including the enclave Republic of San Marino), to serve as a taxonomic and nomenclatural standard reference for botanical research, and to promote new floristic investigations and biosystematic studies.

Materials and methods

In order to recognize the taxa as alien to Italy, we used the national standardized system followed by Galasso et al. (2018), based on the definitions provided by Pyšek et al. (2004) for: alien, casual alien, naturalized alien, invasive alien, archaeophytes, neophytes.

The systematic order and taxonomic circumscription of the families follow the classification proposed by PPG I (2016) for lycophytes, ferns and fern allies, by Christenhusz et al. (2011) for gymnosperms and by APG IV (2016) for angiosperms, with the exception of Dipsacales (Reveal 2011), Caryophyllales (Hernández-Ledesma et al. 2015), Boraginales (Luebert et al. 2016), and Celastrales (Simmons et al. 2023). The disputed family Chenopodiaceae was included in Amaranthaceae based on the recent molecular study by Morales-Briones et al. (2020).

Author citation of plant names was standardized according to Rec. 46A of the International Code of Nomenclature for algae, fungi, and plants (Turland et al. 2018; hereafter ICN), i.e. IPNI (2023 onwards). The checklist includes also hybrids, while taxa at varietal rank were not considered. Cultivars or cultivar groups are considered only if they are not attributable to any species or subspecies; their nomenclature follows the International Code of Nomenclature for Cultivated Plants (Brickell et al. 2016).

The distribution of specific and subspecific taxa at regional scale was updated based on new data published in the period 2018–2023 in the series "Notulae to the Italian alien vascular Flora" (e.g., Galasso et al. 2023a, 2023b), on the second edition of "Flora d'Italia" (Pignatti et al. 2017a, 2017b, 2018, 2019), on floristic contributions and taxonomic reviews, as well as regional inventories or national updates (e.g., Arrigoni 2016, 2017, 2018a, 2018b, 2019a, 2019b, 2020, 2021a, 2021b; Carta et al. 2018; Argenti et al. 2019; Prosser et al. 2019; Musarella et al. 2020; Rosati et al. 2020; Stinca et al. 2021; Alessandrini et al. 2022; Mariotti and Zappa 2022; Spampinato et al. 2022; Capuano and Caruso 2023; Conti and Giacanelli 2023; Martini et al. 2023).

The distribution data (see Appendix S1) provided for each of the 20 administrative regions of Italy and for San Marino (Alessandrini et al. 2022) are coded as follows (see also Bartolucci et al. 2018; Galasso et al. 2018): VDA (Valle d'Aosta), PIE (Piemonte), LOM (Lombardia), TAA (Trentino-Alto Adige), VEN (Veneto), FVG (Friuli Venezia Giulia), LIG (Liguria), EMR (Emilia-Romagna), TOS (Toscana), MAR (Marche), UMB (Umbria), LAZ (Lazio), ABR (Abruzzo), MOL (Molise), PUG (Puglia), CAM (Campania), BAS (Basilicata), CAL (Calabria), SIC (Sicilia), SAR (Sardegna), RSM (San Marino). The Vatican City State was not considered. If the information concerning the distribution of a given subspecies for a region was missing, only the occurrence at species level was reported (Appendix S1).

For each region, the occurrence status of each taxon is provided by using the following categories:

-occurring as a casual alien: "CAS" in the main text, "A CAS" in Appendix S1;

-occurring with an undefined invasion status, possibly as casual alien: "CAS?" in the main text, "CAS?" (whole Italy) or "P A" (regional level) in Appendix S1;

-occurring as a naturalized alien: "NAT" in the main text, "P A NAT" in Appendix S1;

-occurring as an invasive alien: "INV" in the main text, "P A INV" in Appendix S1;

-no longer recorded (reliable historical record; unclear alien status): “NC” in the main text, “NC A” in Appendix S1;
-extinct or possibly extinct: “EX” in the main text, “EX A” in Appendix S1;
-data deficient (unknown regional distribution; unknown alien status): “DD” in the main text, “DD A” in Appendix S1;
-doubtfully occurring: “D” in the main text, “D A” in Appendix S1;
-recorded by mistake: “NP”.
Other abbreviations or symbols used in the list before the species/subspecies name are:
-taxonomically doubtful: “T”;
-archaeophyte: “A”;
-neophyte: “N”.
Taxa involved in former domestication processes have been distinguished in two categories (Galasso et al. 2018):
-culton (Hetterscheid and Brandenburg 1995): “CLT”;
-feral: “FER”.
The origin of each culton and feral is explained as follows:
-“Directly domesticated from”: when the crop selection took place from a single crop wild relative, without collateral genomic contributions. In this case, when available, the subspecies rank was used according to Harlan and de Wet (1971), Banfi et al. (2017), Banfi and Galasso (2021), and Del Guacchio and Caputo (2022);
-“Parentage”: when more than one wild taxon is involved during the crop selection processes. The parentage is also indicated for all hybrids.

Within each major taxonomic group, the families are alphabetically ordered. The same applies to genera within families, and to species and subspecies within genera. The taxa doubtfully occurring in Italy are indicated in italics only (not in bold italics). Taxonomic references concerning genera are added below the families. Notes on taxonomy, nomenclature and distribution are included in the list below each taxon. The lists of synonyms, misapplied and included names (Appendix S2), along with the list of taxa to be excluded at national level (Appendix S3) are available as supplementary material.

Results

The checklist includes 1,782 species, subspecies, hybrids, cultivars, and cultivar groups (hereafter species), belonging to 786 genera and 159 families. The lycophytes are represented by 2 families, 2 genera, 2 species, while ferns and fern allies by 5 families, 9 genera and 13 species. Gymnosperms are represented by 6 families, 20 genera, and 37 species. Angiosperms include 1,730 species grouped in 754 genera, and 146 families. The most represented families (≥ 50 taxa) and genera (≥ 20 taxa) are respectively (Table 1): Asteraceae (183), Poaceae (168), Fabaceae and Rosaceae (83), Amaranthaceae (63), and Solanaceae (60); *Oenothera* (31), *Amaranthus* (30), *Opuntia* (23), *Solanum* (22), and *Cyperus* (20).

The taxa currently established in Italy are 899 (649 naturalized, 250 invasive), 796 are casual, one are not assessed (possibly casual; *Melica altissima* L.), 4 are data deficient (unknown regional distribution, possibly casual: *Bambusa multiplex* (Lour.) Raeusch. ex Schult. & Schult.f., *Saxifraga hirsuta* L. subsp. *hirsuta*, *Tradescantia zebrine* hort. ex Bosse, *Triticum aestivum* subsp. *compactum* (Host) Mac Key). While 38 species have not been confirmed in recent times, 4 are possibly extinct (*Petrorhagia obcordata* (Margot & Reut.) Greuter & Burdet, *Plantago patagonica* Jacq., *Sagittaria platyphylla* (Engelm.) J.G.Sm., *Themeda triandra* Forssk.), and 40 are doubtfully occurring in the country (Table 2), 32 species are taxonomically doubtful, and 110 were recorded by mistake (Appendix S3). Looking at the species involved in past domestication processes, 114 are culta, 62 are ferals, while one additional species is regarded as doubtful culton. Archaeophytes are 154, while neophytes are 1,628 (Table 3).

Out of the 40 alien species of Union concern (Regulation [EU] 1143/2014, Commission Implementing Regulations [EU] 2016/1141, 2017/1263, 2019/1262, and 2022/1203), 22 (*Pistia*

stratioides L. in force from 2 august 2024) occur in Italy, of which 18 are invasive at national level, while 3 (*Asclepias syriaca* L., *Cardiospermum grandiflorum* Sw. and *Koenigia polystachya* (Wall. ex Meisn.) T.M.Schust. & Reveal) are naturalized and one (*Salvinia molesta* D.S.Mitch.) is possibly eradicated.

The administrative regions showing the highest number of alien taxa are Lombardia (839, of which 390 established), Toscana (687, 315 established), Veneto (675, 279 established), Trentino-Alto Adige (648, 189 established), Emilia-Romagna (620, 272 established), and Piemonte (600, 333 established) (Table 2). Aliens of Union concern mostly occur in Toscana (16), Lombardia (15), Veneto (14), Emilia-Romagna (13), Piemonte (12), Friuli Venezia Giulia and Lazio (11), and Trentino-Alto Adige (10).

Checklist of the vascular flora alien to Italy

Lycophytes

Lycopodiaceae

N CAS ***Lycopodiella cernua*** (L.) Pic.Serm.

Selaginellaceae

N CAS ***Selaginella kraussiana*** (Kunze) A.Braun

Ferns and fern allies

Dryopteridaceae

N NAT ***Cyrtomium falcatum*** (L.f.) C.Presl

N NAT ***Cyrtomium laetevirens*** (Hiyama) Nakaike

N NAT ***Dryopteris cycadina*** (Franch. & Sav.) C.Chr.

N NAT ***Polystichum polyblepharum*** (Roem. ex Kunze) C.Presl

Nephrolepidaceae

N NAT ***Nephrolepis cordifolia*** (L.) C.Presl

Pteridaceae

N CAS ***Onichia japonicum*** (Thunb.) Kunze

N CAS ***Pteris multifida*** Poir.

N CAS ***Pteris nipponica*** W.C.Shieh
Note: For the systematics of this species, see Jaruwattanaphan et al. (2013).

Salviniaceae
Taxonomic references: *Azolla* Lam. (Lastrucci et al. 2019; Brusa and Bona 2020).

N NAT ***Azolla cristata*** Kaulf.

N INV ***Azolla filiculoides*** Lam.

N CAS ***Salvinia minima*** Baker

N NC ***Salvinia molesta*** D.S.Mitch.
Note: De la Sota (1995) pointed out that the earlier name *S. adnata* Desv. should replace *S. molesta* D.S.Mitch. However, Moran and Smith (1999) argued that *S. adnata* is of uncertain application, possibly pertaining to either *S. biloba* Raddi or *S. molesta*. Although Desvaux's type specimen is vegetative, de la Sota (2001) provided some hints for distinguishing *S.*

biloba and *S. molesta* also from vegetative parts, demonstrating that the name *S. adnata* should be applied to the plants formerly known as *S. molesta*. Schwartsburd and Miranda (2017) proposed to reject this name, and their proposal was recommended by the Nomenclature Committee for Vascular Plants (Applequist 2019) and by the General Committee (Wilson 2022).

Thelypteridaceae
Taxonomic references: Fawcett and Smith (2021).

N CAS ***Christella dentata*** (Forssk.) Brownsey & Jermy

Gymnosperms

Cupressaceae

N NAT ***Calocedrus decurrens*** (Torr.) Florin
N CAS ***Chamaecyparis lawsoniana*** (A.Murray) Parl.
N NAT ***Cryptomeria japonica*** (L.f.) D.Don
A NAT ***Cupressus sempervirens*** L.
N NAT ***Hesperocyparis arizonica*** (Greene) Bartel
N NAT ***Hesperocyparis glabra*** (Sudw.) Bartel
N NAT ***Hesperocyparis macrocarpa*** (Hartw. ex Gordon) Bartel
N CAS ***Juniperus chinensis*** L.
N CAS ***Juniperus virginiana*** L.
N NAT ***Platycladus orientalis*** (L.) Franco
N NAT ***Sequoia sempervirens*** (D.Don) Endl.
N NAT ***Taxodium distichum*** (L.) Rich.
N CAS ***Thuja occidentalis*** L.
N CAS ***Thuja plicata*** Donn ex D.Don
N CAS ***Thujopsis dolabrata*** (Thunb. ex L.f.) Siebold & Zucc.

Cycadaceae

N CAS ***Cycas revoluta*** Thunb.

Ephedraceae

N NAT ***Ephedra altissima*** Desf.

Ginkgoaceae

N CAS ***Ginkgo biloba*** L.

Pinaceae

N INV ***Abies cephalonica*** Loudon
N CAS ***Abies grandis*** (Douglas ex D.Don) Lindl.
N CAS ***Abies nordmanniana*** (Steven) Spach subsp. ***nordmanniana***
N NAT ***Cedrus atlantica*** (Endl.) G.Manetti ex Carrière
N NAT ***Cedrus deodara*** (Roxb. ex D.Don) G.Don
N CAS ***Larix kaempferi*** (Lamb.) Carrière
Note: In Veneto this species is only cultivated for reforestation.
N CAS ***Larix* ×*marschlinsii*** Coaz
Parentage: *L. decidua* Mill. × *L. kaempferi* (Lamb.) Carrière.
N CAS ***Cedrus libani*** A.Rich. subsp. ***libani***

N CAS	***Picea orientalis*** (L.) Peterm.
N NAT	***Pinus canariensis*** C.Sm. ex DC.
N CAS	***Pinus elliottii*** Engelm.
N NAT	***Pinus halepensis*** Mill. subsp. ***brutia*** (Ten.) Holmboe
A NAT	***Pinus pinea*** L. Note: This species has been found to be genetically depauperate, putatively due to a population bottleneck in a local refugium during the Last Glacial Maximum in southern Iberia, and a possibly anthropic range expansion during Holocene (Mutke et al. 2019).
N NAT	***Pinus radiata*** D.Don
N NAT	***Pinus rigida*** Mill.
N NAT	***Pinus strobus*** L.
N CAS	***Pinus wallichiana*** A.B.Jacks.
N CAS	***Pseudotsuga menziesii*** (Mirb.) Franco Note: In Friuli Venezia Giulia this species is only cultivated for reforestation (Poldini et al. 2001).
	Taxaceae
N CAS	***Cephalotaxus harringtonia*** (Knight ex J.Forbes) K.Koch
	Angiosperms
	Acanthaceae
N CAS	***Acanthus arboreus*** Forssk.
N CAS	***Dicliptera squarrosa*** Nees
N D	*Justicia adhatoda* L.
N CAS	***Ruellia simplex*** C.Wright
	Acoraceae
A NAT	***Acorus calamus*** L.
	Actinidiaceae
N CAS	***Actinidia deliciosa*** (A.Chev.) C.F.Liang & A.R.Ferguson
	Aizoaceae Taxonomic references: Hartmann (2017).
N INV	***Carpobrotus acinaciformis*** (L.) L.Bolus
N NAT	***Carpobrotus aequilaterus*** (Haw.) N.E.Br.
N INV	***Carpobrotus edulis*** (L.) N.E.Br.
N NAT	***Delosperma cooperi*** (Hook.f.) L.Bolus
N CAS	***Drosanthemum candens*** (Haw.) Schwantes
N NAT	***Drosanthemum floribundum*** (Haw.) Schwantes
N CAS	***Drosanthemum hispidum*** (L.) Schwantes
N CAS	***Lampranthus deltoides*** (L.) Glen ex Wijnands
N INV	***Lampranthus elegans*** (Jacq.) Schwantes
N D	*Lampranthus falcatus* (L.) N.E.Br.
T N CAS	***Lampranthus roseus*** (Willd.) Schwantes
N INV	***Malephora crocea*** (Jacq.) Schwantes
N NAT	***Malephora lutea*** (Haw.) Schwantes

N CAS	***Malephora purpurocrocea*** (Haw.) Schwantes
N CAS	***Malephora uitenhagensis*** (L.Bolus) H.Jacobsen & Schwantes
N INV	***Mesembryanthemum cordifolium*** L.f.
N NAT FER	***Mesembryanthemum* ×*vascosilvae*** (Gideon F.Sm., E.Laguna, Verloove & P.P.Ferrer) L.Sáez & Aymerich Parentage: *M. cordifolium* L.f. × *M. haeckelianum* A.Berger (Smith et al. 2020).
N NAT	***Ruschia tumidula*** (Haw.) Schwantes
N NAT	***Tetragonia tetragonoides*** (Pall.) Kuntze
	Alismataceae
N INV	***Sagittaria latifolia*** Willd.
N EX	***Sagittaria platyphylla*** (Engelm.) J.G.Sm.
	Altingiaceae
N CAS	***Liquidambar orientalis*** Mill.
N CAS	***Liquidambar styraciflua*** L.
	Amaranthaceae Taxonomic references: *Alternanthera* Forssk. (Sánchez-del Pino et al. 2012; Iamonico and Sánchez-del Pino 2015); *Amaranthus* L. (Iamonico 2015; Iamonico and Galasso 2018); *Salsola* L. (Rilke 1999; Kadereit et al. 2005; Mosyakin 2017).
N NAT	***Achyranthes aspera*** L.
T N CAS	***Alternanthera maritima*** (Mart.) A.St.-Hil. Note: This species is doubtfully distinct from *A. littoralis* P.Beauv.
T N CAS	***Alternanthera paronychioides*** A.St.-Hil. subsp. ***paronychioides*** Note: This species is doubtfully distinct from *A. ficoidea* (L.) P.Beauv.
N INV	***Alternanthera philoxeroides*** (Mart.) Griseb.
N CAS	***Alternanthera pungens*** Kunth
N CAS	***Alternanthera tenella*** Colla
N CAS	***Amaranthus acutilobus*** Uline & W.L.Bray
N CAS	***Amaranthus* ×*aellenii*** Cacciato nothosubsp. ***aellenii*** Parentage: *A. cacciatoi* (Aellen ex Cacciato) Iamonico × *A. hybridus* L. subsp. *cruentus* (L.) Thell.
N CAS	***Amaranthus* ×*aellenii*** Cacciato nothosubsp. ***monteluccii*** (Cacciato) Iamonico & Galasso Parentage: *A. cacciatoi* (Aellen ex Cacciato) Iamonico × *A. hybridus* L. subsp. *hybridus*.
N INV	***Amaranthus albus*** L.
N INV	***Amaranthus blitoides*** S.Watson
T N INV	***Amaranthus bouchonii*** Thell. Note: This species is doubtfully distinct from *A. powellii* S.Watson.
T N NAT	***Amaranthus cacciatoi*** (Aellen ex Cacciato) Iamonico Note: This species, known only for the S-SE area of Rome (C-Italy) (Iamonico 2012), is doubtfully distinct from *A. powellii* S.Watson.
N D	*Amaranthus crassipes* Schltdl. subsp. *crassipes*
N INV	***Amaranthus crispus*** (Lesp. & Thévenau) A.Braun ex S.Watson & J.M.Coult.
N INV	***Amaranthus deflexus*** L.

T N NAT ***Amaranthus emarginatus*** Salzm. ex Uline & W.L.Bray subsp. ***emarginatus***
Note: This species is doubtfully distinct from *A. blitum* L.

N CAS CLT ***Amaranthus hybridus*** L. subsp. ***caudatus*** (L.) Iamonico & Galasso
Parentage: *A. hybridus* L. subsp. *hybridus*, possibly with additional involvement of *A. hybridus* L. subsp. *quitensis* (Kunth) Costea & Carretero (S-America) (Stetter and Schmid 2017).

N INV FER ***Amaranthus hybridus*** L. subsp. ***cruentus*** (L.) Thell.
Note: Feral and culton of *A. hybridus* L. subsp. *hybridus* (C-America) (Stetter and Schmid 2017).

N INV ***Amaranthus hybridus*** L. subsp. ***hybridus***

N NAT FER ***Amaranthus hybridus*** L. subsp. ***hypochondriacus*** (L.) Thell.
Note: Feral and culton of *A. hybridus* L. subsp. *hybridus* (C-America) (Stetter and Schmid 2017).

N CAS ***Amaranthus*** ×***mauritii*** Sennen
Parentage: *A. deflexus* L. × *A. viridis* L.

N INV ***Amaranthus muricatus*** (Moq.) Gillies ex Hieron.

N CAS ***Amaranthus*** ×***ozanonii*** Thell. nothosubsp. ***ozanonii***
Parentage: *A. hybridus* L. subsp. *hybridus* × *A. retroflexus* L.

N CAS ***Amaranthus*** ×***ozanonii*** Thell. nothosubsp. ***romanus*** (Iamonico) Iamonico & Galasso
Parentage: *A. hybridus* L. subsp. *cruentus* (L.) Thell. × *A. retroflexus* L.

N NAT ***Amaranthus palmeri*** S.Watson

N CAS ***Amaranthus polygonoides*** L.

N INV ***Amaranthus powellii*** S.Watson

N CAS ***Amaranthus*** ×***pyxidatus*** (Contré) Iamonico
Parentage: *A. cacciatoi* (Aellen ex Cacciato) Iamonico × *A. retroflexus* L.

N INV ***Amaranthus retroflexus*** L.

N CAS ***Amaranthus*** ×***soproniensis*** Priszter & Kárpáti
Parentage: *A. powellii* S.Watson × *A. retroflexus* L.

N CAS ***Amaranthus spinosus*** L.

N NAT ***Amaranthus tamariscinus*** Nutt.

N CAS CLT ***Amaranthus tricolor*** L.
Parentage: Unknown.

N INV ***Amaranthus tuberculatus*** (Moq.) J.D.Sauer

N INV ***Amaranthus viridis*** L.

A NAT FER ***Atriplex hortensis*** L. subsp. ***hortensis***
Note: Feral of the same taxon, *A. hortensis* L. subsp. *hortensis*, in turn directly domesticated from *A. hortensis* L. subsp. *nitens* E.Pons (SE-Europe, SW-Asia).

A NAT ***Atriplex hortensis*** L. subsp. ***nitens*** E.Pons

N CAS ***Atriplex micrantha*** Ledeb. subsp. ***micrantha***

N D *Atriplex oblongifolia* Waldst. & Kit.

N INV ***Bassia scoparia*** (L.) Voss

N NAT ***Beta trigyna*** Waldst. & Kit.

A NAT FER ***Beta vulgaris*** L. subsp. ***vulgaris***
Note: Feral of the same taxon, *Beta vulgaris* L. subsp. *vulgaris*, in turn directly domesticated from *B. vulgaris* L. subsp. *maritima* (L.) Arcang. (Mesopotamia).

N CAS ***Blitum capitatum*** L.

N CAS ***Celosia argentea*** L.

Note: *Celosia cristata* L. is considered as a cultivar group derived from the selection of *C. argentea*, known only in cultivation or as casual alien (Clemants 2006).

N CAS ***Chenopodium giganteum*** D.Don
Note: For the nomenclature of this species, see Applequist (2023).

N CAS ***Chenopodium hircinum*** Schrad.

N NC ***Chenopodium pratericola*** Rydb.

N CAS ***Chenopodium probstii*** Aellen

N NAT ***Corispermum marschallii*** Steven

N INV ***Dysphania ambrosioides*** (L.) Mosyakin & Clemants

N NAT ***Dysphania anthelmintica*** (L.) Mosyakin & Clemants

N INV ***Dysphania atriplicifolia*** (Spreng.) G.Kadereit, Sukhor. & Uotila

N NAT ***Dysphania multifida*** (L.) Mosyakin & Clemants

N INV ***Dysphania pumilio*** (R.Br.) Mosyakin & Clemants

N CAS ***Dysphania schraderiana*** (Schult.) Mosyakin & Clemants

N NAT ***Enchylaena tomentosa*** R.Br.

N NAT ***Froelichia gracilis*** (Hook.) Moq.

N CAS CLT? ***Gomphrena globosa*** L.

N CAS ***Halogeton sativus*** (L.) Moq.

N NC ***Salsola kali*** L.

A CAS CLT ***Spinacia oleracea*** L. subsp. ***oleracea***
Note: Directly domesticated from *S. oleracea* L. subsp. *turkestanica* (Iljin) Del Guacchio & P.Caputo (Transcaspian Region) (Xu et al. 2017; Gyawali et al. 2021; She et al. 2022).

N CAS ***Teloxys aristata*** (L.) Moq.

Amaryllidaceae
Taxonomic references: cultivar groups of *Narcissus* L. (The Daffodil Society 2023 onwards).

N CAS ***Agapanthus praecox*** Willd. subsp. ***orientalis*** (F.M.Leight.) F.M.Leight.

N NAT ***Allium ampeloprasum*** L.

A CAS CLT ***Allium cepa*** L.
Note: Directly domesticated from *A. vavilovii* Popov & Vved. (Transcaspian Region). The name *A. ascalonicum* L., traditionally misapplied to the shallot (*A. cepa* L. Aggregatum Group), is the priority name for *A. hierocontinum* Boiss., an eastern Mediterranean species.

A CAS CLT ***Allium fistulosum*** L.
Note: Directly domesticated from *A. altaicum* Pall. (Transcaspian Region).

N CAS ***Allium giganteum*** Regel

N D *Allium moly* L.

A CAS CLT ***Allium porrum*** L.
Note: Domesticated from within *A. ampeloprasum* complex (Egypt/Mesopotamia).

A CAS CLT ***Allium sativum*** L.
Note: Directly domesticated from *A. longicuspis* Regel (Transcaspian Region).

A NAT ***Allium scorodoprasum*** L.

N NAT ***Allium tuberosum*** Rottler ex Spreng.

N NAT ***Amaryllis belladonna*** L.

N NAT ***Galanthus elwesii*** Hook.f. subsp. ***elwesii***

T N CAS ***Galanthus woronowii*** Losinsk.
Note: This species is doubtfully distinct from *G. ikariae* Baker.

N NAT ***Ipheion uniflorum*** (Lindl.) Raf.

N NAT FER ***Narcissus*** Cyclamineus Daffodil Group (Division 6)
Note: Feral of the same cultivar group, *Narcissus* Cyclamineus Daffodil Group (Division 6). *Narcissus* 'Cotinga' was recorded in Calabria (Laface et al. 2020). Parentage: Unknown, but surely including *N. cyclamineus* DC.; horticultural origin.

N CAS CLT ***Narcissus*** ×***cyclazetta*** Chater & Stace
Parentage: (*N. cyclamineus* DC. × *N. tazetta* L. subp. *tazetta*) × *N. tazetta* subsp. *tazetta*.

N NAT FER ***Narcissus*** Double Daffodil Group (Division 4)
Note: Feral of the same cultivar group, *Narcissus* Double Daffodil Group (Division 4). Parentage: Unknown, horticultural origin.

N CAS CLT ***Narcissus*** Jonquilla and Apodanthus Daffodil Group (Division 7)
Parentage: Unknown, but surely including species of *N.* sect. *Jonquilla* DC. or *N.* sect. *Apodanthi* A.Fern.; horticultural origin.

N CAS ***Narcissus jonquilla*** L. subsp. ***jonquilla***

N NAT FER ***Narcissus*** Large-cupped Daffodil Group (Division 2)
Note: Feral of the same cultivar group, *Narcissus* Large-cupped Daffodil Group (Division 2). Parentage: Unknown, horticultural origin.

N CAS ***Narcissus*** ×***odorus*** L. nothosubsp. ***odorus***
Parentage: *N. jonquilla* L. × *N. pseudonarcissus* L. subsp. *pseudonarcissus*.

A NAT ***Narcissus papyraceus*** Ker Gawl.

N CAS CLT ***Narcissus*** Poëticus Daffodil Group (Division 9)
Parentage: Unknown, but surely including species of the *N. poëticus* L. aggregate; horticultural origin.

N CAS CLT ***Narcissus*** Small-cupped Daffodil Group (Division 3)
Parentage: Unknown, horticultural origin.

N CAS CLT ***Narcissus*** Tazetta Daffodil Group (Division 8)
Parentage: Unknown, but surely including species of the *N. tazetta* L. aggregate; horticultural origin.

N CAS CLT ***Narcissus*** Triandrus Daffodil Group (Division 5)
Parentage: Unknown, but surely including *N. triandrus* L.; horticultural origin.

N NAT FER ***Narcissus*** Trumpet Daffodil Group (Division 1)
Note: Feral of the same cultivar group, *Narcissus* Trumpet Daffodil Group (Division 1). Parentage: Unknown, horticultural origin.

N CAS ***Nerine bowdenii*** W.Watson subsp. ***bowdenii***

N NAT ***Nothoscordum borbonicum*** Kunth

N INV ***Nothoscordum gracile*** (Aiton) Stearn
Note: In some localities, this species could have been confused with *N. borbonicum* Kunth (see also Ravenna 1991).

N CAS ***Tulbaghia violacea*** Harv.

N CAS ***Zephyranthes candida*** (Lindl.) Herb.

N CAS ***Zephyranthes carinata*** Herb.
Note: This species may deserve separation into a distinct genus (Meerow et al. 2000).

Anacardiaceae
Taxonomic references: *Schinus* L. (Zona 2015).

N CAS	***Rhus chinensis*** Mill.
N CAS	***Rhus laevigata*** L.
N NAT	***Rhus typhina*** L.
N NAT	***Schinus molle*** L.
N CAS	***Schinus terebinthifolia*** Raddi
N CAS	***Searsia pallens*** (Eckl. & Zeyh.) Moffett
N CAS	***Toxicodendron pubescens*** Mill.
N NAT	***Toxicodendron radicans*** (L.) Kuntze subsp. ***radicans***
	Annonaceae
N CAS	***Annona cherimola*** Mill.
N CAS	***Asimina triloba*** (L.) Dunal
	Apiaceae
	Taxonomic references: *Pastinaca* L. (Anzalone 1988).
A CAS	***Anethum graveolens*** L.
A CAS	***Angelica archangelica*** L. subsp. ***archangelica***
A NAT	***Anthriscus cerefolium*** (L.) Hoffm.
A NAT	***Bupleurum rotundifolium*** L.
A CAS	***Chaerophyllum aromaticum*** L.
N NAT	***Chaerophyllum bulbosum*** L. subsp. ***bulbosum***
A NAT	***Coriandrum sativum*** L.
N NAT	***Cyclospermum leptophyllum*** (Pers.) Sprague ex Britton & P.Wilson
A CAS CLT	***Daucus carota*** L. subsp. ***sativus*** (Hoffm.) Schübl. & G.Martens Note: Directly domesticated from *D. carota* L. subsp. *carota* (E-Mediterranean).
N NC	***Eryngium creticum*** Lam.
N CAS	***Eryngium planum*** L.
N INV	***Heracleum mantegazzianum*** Sommier & Levier
A CAS	***Levisticum officinale*** W.D.J.Koch
N CAS	***Microsciadium minutum*** (d'Urv.) Briq.
N NAT	***Oenanthe javanica*** (Blume) DC. subsp. ***javanica***
N D	*Pastinaca kochii* Duby subsp. *latifolia* (Duby) Reduron Note: There is a specimen collected by Lanza in 1958 in the Apuan Alps (Toscana), but probably imported and cultivated (Arrigoni 2021b). According to Anzalone (1988), *P. kochii* s.l. was repeatedly reported by mistake in Sardegna (as *P. divaricata* Desf. ex DC.). Hence, cultivated and escaped plants reported by Arrigoni (2013) may have been confused with *P. sativa* L. subsp. *sativa*.
A NAT	***Petroselinum crispum*** (Mill.) Fuss
A CAS	***Pimpinella anisum*** L.
N NC	***Scandix australis*** L. subsp. ***grandiflora*** (L.) Thell.
A CAS	***Sium sisarum*** L.
N CAS	***Torilis ucranica*** Spreng.
	Apocynaceae
N NAT	***Amsonia tabernaemontana*** Walter
N INV	***Araujia sericifera*** Brot. Note: For the nomenclature of this species, see Forster and Bruyns (1992).
N NAT	***Asclepias curassavica*** L.

N INV	***Asclepias fruticosa*** L.
N NAT	***Asclepias physocarpa*** (E.Mey.) Schltr.
N NAT	***Asclepias syriaca*** L.
N CAS	***Asclepias tuberosa*** L.
N NAT	***Carissa macrocarpa*** (Eckl.) A.DC.
N NAT	***Cascabela thevetia*** (L.) Lippold
N NAT	***Catharanthus roseus*** (L.) G.Don
N CAS	***Trachelospermum jasminoides*** (Lindl.) Lem.
	Araceae
A NAT	***Colocasia esculenta*** (L.) Schott
N NAT	***Landoltia punctata*** (G.Mey.) Les & D.J.Crawford
N NAT	***Lemna aequinoctialis*** Welw.
N INV	***Lemna minuta*** Kunth
N CAS	***Lemna valdiviana*** Phil.
N CAS	***Pinellia ternata*** (Thunb.) Ten. ex Breitenb.
N INV	***Pistia stratiotes*** L.
N NAT	***Wolffia columbiana*** H.Karst.
N INV	***Zantedeschia aethiopica*** (L.) Spreng.
	Araliaceae Taxonomic references: *Hedera* L. (McAllister and Rutherford 1997; Ackerfield and Wen 2002; Marshall et al. 2017).
N CAS	***Aralia spinosa*** L.
N CAS	***Fatsia japonica*** (Thunb.) Decne. & Planch.
N NAT	***Hedera algeriensis*** Rantonnet ex C.Morren
N NAT	***Hedera canariensis*** Willd.
N NAT	***Hedera hibernica*** (G.Kirchn.) Bean
N NAT	***Hedera ×sepulcralis*** R.H.Marshall & McAll. Parentage: *H. algeriensis* Rantonnet ex C.Morren × *H. hibernica* (G.Kirchn.) Bean.
N CAS	***Heptapleurum arboricola*** Hayata
N CAS	***Hydrocotyle bonariensis*** Comm. ex Lam.
N INV	***Hydrocotyle ranunculoides*** L.f.
N NAT	***Hydrocotyle sibthorpioides*** Lam.
N CAS	***Tetrapanax papyrifer*** (Hook.) K.Koch
	Arecaceae
N CAS	***Brahea armata*** S.Watson
N CAS	***Chamaedorea elatior*** Mart.
N NAT	***Phoenix canariensis*** H.Wildpret Note: *Phoenix canariensis* H.Wildpret is a conserved name against *P. cycadifolia* Regel.
A CAS CLT	***Phoenix dactylifera*** L. Note: Directly domesticated from the same species, *P. dactylifera* L., along two domestication agrolineages: western and eastern chlorotype with a W-E gradient from Mauritania to Oman (Pintaud et al. 2013).
N CAS	***Phoenix roebelenii*** O'Brien
N CAS	***Raphia farinifera*** (Gaertn.) Hyl.
N CAS	***Syagrus romanzoffiana*** (Cham.) Glassman

N INV FER	***Trachycarpus fortunei*** (Hook.) H.Wendl. Note: Feral and culton of the same species (China).
N NAT	***Washingtonia filifera*** (Gloner ex Kerch., Burv., Pynaert, Rodigas & Hull) de Bary
T N NAT	***Washingtonia robusta*** H.Wendl. Note: This species is doubtfully distinct from *W. filifera* (Gloner ex Kerch., Burv., Pynaert, Rodigas & Hull) de Bary (Villanueva-Almanza et al. 2018, 2021).
	Asparagaceae Taxonomic references: *Agave* L. (Hochstätter 2015; Verloove et al. 2019); *Hyacinthoides* Heist. ex Fabr. (Geerinck 1997).
N INV FER	***Agave americana*** L. subsp. ***americana*** Note: Feral of the same taxon, in turn directly domesticated from *A. americana* L. subsp. *protamericana* Gentry (Mexico).
N NAT	***Agave angustifolia*** Haw. subsp. ***angustifolia***
N NAT	***Agave attenuata*** Salm-Dyck subsp. ***attenuata***
N CAS	***Agave filifera*** Salm-Dyck
N INV FER	***Agave fourcroydes*** Lem. Note: Feral of the same taxon, it is a sterile clone in turn probably directly domesticated from *A. angustifolia* Haw. (Verloove et al. 2019).
N CAS FER	***Agave franzosinii*** (Sprenger) Sewell Note: Feral of the same taxon of horticultural origin and unknown in the wild, related to the widely cultivated *A. americana* L. s.l. (Thiede 2017).
N INV	***Agave ingens*** A.Berger
N INV	***Agave salmiana*** Otto ex Salm-Dyck subsp. ***ferox*** (K.Koch) Hochstätter
N NAT FER	***Agave sisalana*** Perrine Note: Feral of the same taxon, it is a sterile pentaploid clone in turn probably directly domesticated from *A. angustifolia* Haw. s.l. (Yucatan Peninsula, Mexico; Trejo-Torres et al. 2018; Verloove et al. 2019).
N NAT	***Albuca canadensis*** (L.) F.M.Leight.
N CAS	***Asparagus aethiopicus*** L. Note: Some authors segregate the genera *Elide* Medik. and *Protasparagus* Oberm. from *Asparagus* L. (Fukuda et al. 2005).
N NAT	***Asparagus asparagoides*** (L.) Druce
N CAS	***Asparagus falcatus*** L.
N NAT	***Asparagus setaceus*** (Kunth) Jessop
N CAS	***Aspidistra elatior*** Blume
N NAT	***Chlorophytum comosum*** (Thunb.) Jacques
N CAS	***Cordyline australis*** (G.Forst.) Endl.
N CAS	***Danaë racemosa*** (L.) Moench
N NAT	***Dracaena draco*** (L.) L. subsp. ***draco***
N NAT	***Honorius boucheanus*** (Kunth) Holub
N NAT	***Honorius nutans*** (L.) Gray
N CAS	***Hosta plantaginea*** (Lam.) Asch.
N NAT	***Hosta ventricosa*** Stearn
N CAS	***Hosta venusta*** F.Maek.
N NAT	***Hyacinthoides hispanica*** (Mill.) Rothm.
N CAS	***Hyacinthoides ×massartiana*** Geerinck

	Parentage: *H. hispanica* (Mill.) Rothm. × *H. non-scripta* (L.) Chouard ex Rothm.
N NAT	***Hyacinthoides non-scripta*** (L.) Chouard ex Rothm.
A CAS	***Hyacinthus orientalis*** L.
N NAT	***Liriope spicata*** (Thunb.) Lour.
N NAT	***Muscari armeniacum*** Leichtlin ex Baker
N NC	***Muscari macrocarpum*** Sweet
N D	*Muscari racemosum* (L.) Mill.
N NAT	***Nectaroscilla hyacinthoides*** (L.) Parl.
N CAS	***Oncostema peruvianum*** (L.) Speta
N CAS	***Ophiopogon japonicus*** (L.f.) Ker Gawl.
N CAS	***Othocallis amoena*** (L.) Trávn.
N CAS	***Othocallis siberica*** (Haw.) Speta
N CAS	***Reineckea carnea*** (Andrews) Kunth
N CAS	***Ruscus* ×*microglossus*** Bertol.
	Parentage: *R. hypoglossum* L. × *R. hypophyllum* L.
N CAS	***Scilla luciliae*** (Boiss.) Speta
N NAT	***Stellarioides longibracteata*** (Jacq.) Speta
N CAS	***Triteleia laxa*** Benth.
N NAT	***Yucca aloifolia*** L.
N CAS	***Yucca filamentosa*** L.
N CAS	***Yucca gigantea*** Lem.
N INV	***Yucca gloriosa*** L.
T N NAT	***Yucca recurvifolia*** Salisb.
	Note: This species is doubtfully distinct from *Y. gloriosa* L. (Hess and Robbins 2002).
	Asphodelaceae
	Taxonomic references: *Aloë* L. s.str. and *Aloiampelos* Klopper & Gideon F.Sm. (Grace et al. 2013).
N CAS	***Aloë africana*** Mill.
N NAT	***Aloë arborescens*** Mill.
N CAS	***Aloë brachystachys*** Baker
N NAT FER	***Aloë* ×*caesia*** Salm-Dyck
	Parentage: *A. arborescens* Mill. × *A. ferox* Mill.
N CAS	***Aloë humilis*** (L.) Mill.
N NAT	***Aloë maculata*** All. subsp. ***maculata***
N NAT	***Aloë perfoliata*** L.
N NAT	***Aloë reynoldsii*** Letty
N CAS	***Aloë striata*** Haw. subsp. ***striata***
N CAS	***Aloë striatula*** Haw.
A NAT	***Aloë vera*** (L.) Burm.f.
N CAS	***Aloiampelos ciliaris*** (Haw.) Klopper & Gideon F.Sm.
N CAS	***Bulbine asphodeloides*** (L.) Spreng.
N CAS	***Gasteria carinata*** (Mill.) Duval
N NAT	***Hemerocallis fulva*** (L.) L.
N CAS	***Kniphofia uvaria*** (L.) Oken
N CAS	***Phormium tenax*** J.R.Forst. & G.Forst.
	Asteraceae

Taxonomic references: *Bidens* L. (incl. *Coreopsis* L. and *Cosmos* Cav.) (Banfi et al. 2018); *Euthamia* (Nesom 2021); *Erigeron annuus* s.l. and *E. lilacinus* (Sennikov and Kurtto 2019; Sennikov et al. 2020); *Gamochaeta* Wedd. (Urtubey et al. 2016; Freire et al. 2021; Nesom 2022; Verloove et al. 2023); *Gnaphalium* L. (incl. *Pseudognaphalium* Kirp.) (Nie et al. 2015); *Helichrysum* Mill. (incl. *Anaphalis* DC. and *Laphangium* (Hilliard & B.L.Burtt) Tzvelev) (Galbany-Casals et al. 2014; Nie et al. 2016); *Pentanema* (Gutiérrez-Larruscain et al. 2018); *Soliva* Ruiz & Pav. (Webb 1986; Watson 2006).

N CAS ***Achillea crithmifolia*** Waldst. & Kit.

N NAT ***Achillea filipendulina*** Lam.

N NAT ***Ageratina adenophora*** (Spreng.) R.M.King & H.Rob.

N NAT ***Ageratina altissima*** (L.) R.M.King & H.Rob.

N CAS ***Ageratina havanensis*** (Kunth) R.M.King & H.Rob.

N CAS ***Ageratina ligustrina*** (DC.) R.M.King & H.Rob.

N CAS ***Ageratum conyzoides*** L.

N CAS ***Ageratum houstonianum*** Mill.

N INV ***Ambrosia artemisiifolia*** L.

N INV ***Ambrosia psilostachya*** DC.

N NAT ***Ambrosia tenuifolia*** Spreng.

N INV ***Ambrosia trifida*** L.

N CAS ***Anthemis ruthenica*** M.Bieb.

N INV ***Arctotheca calendula*** (L.) Levyns

N CAS ***Arctotheca prostrata*** (Salisb.) Britten

N CAS ***Argyranthemum frutescens*** (L.) Sch.Bip. subsp. ***frutescens***

N CAS ***Argyranthemum pinnatifidum*** (L.f.) Webb

A CAS ***Artemisia abrotanum*** L.

N INV ***Artemisia annua*** L.

N CAS ***Artemisia austriaca*** Jacq.

N CAS ***Artemisia biennis*** Willd.

A CAS ***Artemisia dracunculus*** L.

A CAS ***Artemisia pontica*** L.

N NAT ***Artemisia scoparia*** Waldst. & Kit.

N CAS ***Artemisia tournefortiana*** Rchb.

N INV ***Artemisia verlotiorum*** Lamotte

N CAS ***Aster ageratoides*** Turcz.

Note: For the taxonomy of this species, see Ito and Soejima (1995).

N INV ***Baccharis halimifolia*** L.

Note: This species has been completely eradicated in Liguria (Mariotti and Zappa 2022).

N INV ***Bidens aurea*** (Aiton) Sherff

N INV ***Bidens bipinnata*** L.

N INV ***Bidens connata*** Muhl. ex Willd.

N CAS ***Bidens formosa*** (Bonato) Sch.Bip.

N INV ***Bidens frondosa*** L.

N NAT ***Bidens lanceolata*** (L.) Banfi, Galasso & Bartolucci

N NAT ***Bidens pilosa*** L.

N CAS ***Bidens radiata*** Thuill.

N INV ***Bidens subalternans*** DC.

N CAS ***Bidens sulphurea*** (Cav.) Sch.Bip.

N CAS	***Bidens tinctoria*** (Nutt.) Baill. ex Sennikov
N CAS	***Bidens triplinervia*** Kunth
N INV	***Bidens vulgata*** Greene
A NAT FER	***Calendula officinalis*** L. Note: Feral of the same species, *C. officinalis* L., in turn directly domesticated from *C. suffruticosa* Vahl subsp. *fulgida* (Raf.) Guadagno (N-Africa).
N CAS	***Callistephus chinensis*** (L.) Nees
N CAS	***Carduus hamulosus*** Ehrh. subsp. ***hamulosus***
A CAS	***Carthamus tinctorius*** L.
N NAT	***Centaurea acaulis*** L.
N D	*Centaurea babylonica* (L.) L.
A NAT	***Centaurea cyanus*** L.
N NAT	***Centaurea decipiens*** Thuill.
N NC	***Centaurea depressa*** M.Bieb.
N CAS	***Centaurea diffusa*** Lam.
N INV	***Centaurea diluta*** Aiton
N CAS	***Centaurea hyalolepis*** Boiss. subsp. ***hyalolepis***
N NC	***Centaurea iberica*** Trevir. ex Spreng. subsp. ***iberica***
N NC	***Centaurea kanitziana*** Janka ex D.Brândză
N CAS	***Centaurea macrocephala*** Muss.Puschk. ex Willd.
N CAS	***Centaurea orientalis*** L.
N NC	***Centaurea phrygia*** L. subsp. ***phrygia***
N CAS	***Centaurea pullata*** L. subsp. ***pullata***
N NC	***Centaurea ragusina*** L. subsp. ***ragusina***
N CAS	***Centaurea salonitana*** Vis.
N CAS	***Chamaemelum nobile*** (L.) All.
N CAS CLT	***Chrysanthemum morifolium*** (Ramat.) Hemsl. Parentage: Under this species there is an enormous hybrid complex developed in China over many centuries from multiple hybridizations involving several paternal species (including *C. indicum* L.), with an extinct species and its subsequent cultivars serving as the maternal parents (Ma et al. 2020).
A CAS CLT	***Cichorium endivia*** L. subsp. ***endivia*** Note: Directly domesticated from *C. endivia* L. subsp. *pumilum* (Jacq.) Cout. (Egypt-Middle East).
N NAT	***Cota austriaca*** (Jacq.) Sch.Bip.
N NAT	***Cotula australis*** (Sieber ex Spreng.) Hook.f.
N INV	***Cotula coronopifolia*** L.
N D	*Crepis aspera* L.
N NAT	***Crepis dioscoridis*** L.
N INV	***Crepis sancta*** (L.) Bornm. subsp. ***nemausensis*** (P.Fourn.) Babc.
N CAS	***Curio talinoides*** (DC.) P.V.Heath
N CAS	***Dahlia imperialis*** Roezl ex Ortgies
N NAT	***Delairea odorata*** Lem.
N NAT	***Dichrocephala integrifolia*** (L.f.) Kuntze
N D	*Dimorphotheca barberae* Harv.
N CAS	***Dimorphotheca ecklonis*** DC.
N CAS	***Dimorphotheca fruticosa*** (L.) Less.
N CAS	***Echinacea purpurea*** (L.) Moench

N CAS	***Echinops strigosus*** L.
N INV	***Eclipta prostrata*** (L.) L.
N NAT	***Erechtites hieraciifolius*** (L.) Raf. ex DC.
N INV	***Erigeron annuus*** (L.) Desf. subsp. ***annuus*** Note: According to Sennikov and Kurtto (2019), *E. annuus* subsp. *septentrionalis* (Fernald & Wiegand) Wagenitz corresponds to *E. annuus* subsp. *annuus*.
N NAT	***Erigeron annuus*** (L.) Desf. subsp. ***strigosus*** (Muhl. ex Willd.) Wagenitz
N INV	***Erigeron bonariensis*** L.
N INV	***Erigeron canadensis*** L.
T N CAS	***Erigeron floribundus*** (Kunth) Sch.Bip.
N INV	***Erigeron karvinskianus*** DC.
N NAT	***Erigeron lilacinus*** (Sennikov & Kurtto) Sennikov
N INV	***Erigeron philadelphicus*** L.
N INV	***Erigeron sumatrensis*** Retz.
N CAS	***Eriocephalus africanus*** L.
N NAT	***Euthamia lanceolata*** (L.) G.L.Nesom
N CAS CLT	***Gaillardia* ×*grandiflora*** Van Houtte Parentage: *G. aristata* Pursh × *G. pulchella* Foug.
N INV	***Galinsoga parviflora*** Cav.
N INV	***Galinsoga quadriradiata*** Ruiz & Pav.
N NAT	***Gamochaeta americana*** (Mill.) Wedd. Note: Recently *Gamochaeta impatiens* G.L.Nesom has been distinguished from *G. americana* (= *G. coarctata* (Willd.) Kerguélen) (Nesom 2022), so that the records referred to this species should be further studied.
N NAT	***Gamochaeta antillana*** (Urb.) Anderb.
T N NAT	***Gamochaeta argyrinea*** G.L.Nesom Note: This species is doubtfully distinct from *G. americana* (Mill.) Wedd. (Freire et al. 2021).
N NAT	***Gamochaeta pensylvanica*** (Willd.) Cabrera
N CAS CLT	***Gazania*** Hybrida Group Parentage: Unknown.
N CAS	***Gazania linearis*** (Thunb.) Druce
N NAT	***Gazania rigens*** (L.) Gaertn.
N NAT FER	***Gazania* ×*splendens*** Hend. & Andr.Hend. Parentage: Possibly *G. krebsiana* Less. × *G. linearis* (Thunb.) Druce × *G. rigens* (L.) Gaertn.
N NAT	***Gnaphalium undulatum*** L.
N CAS	***Grindelia ciliata*** (Nutt.) Spreng.
N CAS	***Grindelia hirsutula*** Hook. & Arn.
N CAS	***Grindelia squarrosa*** (Pursh) Dunal
N NAT	***Guizotia abyssinica*** (L.f.) Cass.
N INV	***Gymnocoronis spilanthoides*** (D.Don ex Hook. & Arn.) DC.
N CAS	***Helenium amarum*** (Raf.) H.Rock
N CAS CLT	***Helianthus annuus*** L. subsp. ***annuus*** Note: Directly domesticated from *H. annuus* L. subsp. *petiolaris* (Nutt.) Anashch. (central E-USA).
N D	*Helianthus debilis* Nutt. subsp. *cucumerifolius* (Torr. & A.Gray) Heiser
N CAS	***Helianthus decapetalus*** L.
N D	***Helianthus giganteus*** L.

N NAT	***Helianthus* ×*laetiflorus*** Pers. Parentage: *H. tuberosus* L. × *H. pauciflorus* Nutt.
N D	*Helianthus* ×*multiflorus* L. nothosubsp. *multiflorus* Parentage: *H. annuus* L. subsp. *annuus* × *H. decapetalus* L.
N NAT	***Helianthus pauciflorus*** Nutt.
N INV	***Helianthus tuberosus*** L.
N CAS	***Helichrysum margaritaceum*** (L.) Moench
T N CAS	***Heliopsis helianthoides*** (L.) Sweet subsp. ***scabra*** (Dunal) T.R.Fisher Note: This subspecies is doubtfully distinct from *H. helianthoides* (L.) Sweet subsp. *helianthoides*.
N CAS	***Hertia cheirifolia*** (L.) Kuntze
N CAS	***Kleinia anteuphorbium*** (L.) Haw.
N CAS	***Kleinia neriifolia*** Haw.
T N CAS	***Lactuca macrophylla*** (Willd.) A.Gray
A CAS CLT	***Lactuca sativa*** L. subsp. ***sativa*** Note: Directly domesticated from *L. sativa* L. subsp. *serriola* (L.) Galasso, Banfi, Bartolucci & Ardenghi (Caucasus, ca. 4,000 BC) (Wei et al. 2021).
N NAT	***Lapsana communis*** L. subsp. ***intermedia*** (M.Bieb.) Hayek
N CAS	***Leucanthemella serotina*** (L.) Tzvelev
N NAT FER	***Leucanthemum* ×*superbum*** (Bergmans ex J.W.Ingram) D.H.Kent Parentage: *L.* cf. *ircutianum* DC. (Europe) × *L. maximum* (Ramond) DC. (Europe) → *L. lacustre* (Brot.) Samp. (W-Europe) → *L. nipponicum* Franch. ex Maxim. (≡ *Nipponanthemum nipponicum* (Franch. ex Maxim.) Kitam., Japan).
N INV	***Matricaria discoidea*** DC. subsp. ***discoidea***
N CAS	***Mauranthemum paludosum*** (Poir.) Vogt & Oberpr. subsp. ***paludosum*** Note: Recorded by Adolphi and Nowack (1992).
N CAS	***Montanoa bipinnatifida*** (Kunth) K.Koch
N NAT	***Osteospermum moniliferum*** L. subsp. ***moniliferum***
N NAT	***Pascalia glauca*** Ortega
N CAS	***Pentanema germanicum*** (L.) D.Gut.Larr., Santos-Vicente, Anderb., E.Rico & M.M.Mart.Ort.
N CAS	***Picris rhagadioloides*** (L.) Desf.
N CAS	***Ratibida pinnata*** (Vent.) Barnhart
N CAS	***Rhaponticum repens*** (L.) Hidalgo
N NAT	***Roldana petasitis*** (Sims) H.Rob. & Brettell
N NAT	***Rudbeckia fulgida*** Aiton
N NAT	***Rudbeckia hirta*** L.
N NAT	***Rudbeckia laciniata*** L.
N NAT	***Rudbeckia triloba*** L.
N NAT	***Santolina chamaecyparissus*** L.
N NAT	***Santolina virens*** Mill.
N INV	***Senecio angulatus*** L.f.
N CAS	***Senecio crassiflorus*** (Poir.) DC.
N INV	***Senecio deltoideus*** Less.
N INV	***Senecio inaequidens*** DC.
N CAS	***Senecio leucanthemifolius*** Poir. subsp. ***vernalis*** (Waldst. & Kit.) Greuter
N CAS	***Senecio linifolius*** L. Note: This species was confused with *S. inaequidens* DC. in Abruzzo (Viegi et al. 1990).

N INV	***Senecio pterophorus*** DC. Note: For the identification of this species, see Verloove et al. (2007).
N NAT	***Sigesbeckia orientalis*** L.
N NAT	***Silphium perfoliatum*** L.
N INV	***Solidago canadensis*** L.
N INV	***Solidago gigantea*** Aiton
N CAS	***Solidago ×niederederi*** Khek nothosubsp. ***niederederi*** Parentage: *S. canadensis* L. × *S. virgaurea* L. subsp. *virgaurea*.
N NAT	***Soliva sessilis*** Ruiz & Pav.
N NAT	***Soliva stolonifera*** (Brot.) Loudon
N CAS	***Stevia rebaudiana*** (Bertoni) Bertoni
N CAS	***Symphyotrichum ericoides*** (L.) G.L.Nesom
N CAS	***Symphyotrichum laeve*** (L.) Á.Löve & D.Löve
N INV	***Symphyotrichum lanceolatum*** (Willd.) G.L.Nesom
N NAT	***Symphyotrichum lateriflorum*** (L.) Á.Löve & D.Löve
N NAT	***Symphyotrichum novae-angliae*** (L.) G.L.Nesom
N NAT	***Symphyotrichum novi-belgii*** (L.) G.L.Nesom
N D	*Symphyotrichum ontarionis* (Wiegand) G.L.Nesom Note: According to Dirkse et al. (2014), the name *S. parviflorum* (Nees) Greuter, neither cited in Flora of North America (Brouillet et al. 2006) nor yet typified, is a synonym of *S. ontarionis*.
N INV	***Symphyotrichum pilosum*** (Willd.) G.L.Nesom
T N NAT	***Symphyotrichum ×salignum*** (Willd.) G.L.Nesom Parentage: *S. lanceolatum* (Willd.) G.L.Nesom × *S. novi-belgii* (L.) G.L.Nesom.
N INV	***Symphyotrichum squamatum*** (Spreng.) G.L.Nesom
N NAT	***Symphyotrichum ×versicolor*** (Willd.) G.L.Nesom Parentage: *S. laeve* (L.) Á.Löve & D.Löve × *S. novi-belgii* (L.) G.L.Nesom.
N CAS	***Tagetes erecta*** L.
N NAT	***Tagetes minuta*** L.
A CAS	***Tanacetum balsamita*** L.
N CAS	***Tanacetum cinerariifolium*** (Trevir.) Sch.Bip.
N CAS	***Tanacetum macrophyllum*** (Waldst. & Kit.) Sch.Bip.
N NAT	***Telekia speciosa*** (Schreb.) Baumg.
T N NC	***Xanthium ambrosioides*** Hook. & Arn. Note: This species is doubtfully distinct from *X. spinosum* L.
N INV	***Xanthium orientale*** L. Note: For the circumscription of this variable species see Tomasello (2018).
N INV	***Xanthium spinosum*** L.
N CAS	***Xeranthemum annuum*** L.
N CAS	***Xerochrysum bracteatum*** (Vent.) Tzvelev
N CAS	***Youngia japonica*** (L.) DC. subsp. ***japonica***
N CAS	***Zinnia elegans*** Jacq.
	Balsaminaceae
N INV	***Impatiens balfourii*** Hook.f.
N CAS	***Impatiens balsamina*** L.
N INV	***Impatiens glandulifera*** Royle
N INV	***Impatiens parviflora*** DC.

N NAT	***Impatiens tricornis*** Lindl.
N CAS	***Impatiens walleriana*** Hook.f.
	Basellaceae
N INV	***Anredera cordifolia*** (Ten.) Steenis
	Begoniaceae
N NAT	***Begonia grandis*** Dryand. subsp. ***grandis***
N CAS CLT	***Begonia*** Semperflorens Cultorum Group Parentage: A complex of horticultural hybrids involving *B. cucullata* Willd. (southern America) and *B. subvillosa* Klotzsch (= *B. schmidtiana* Regel) (Brazil) as parental species.
	Berberidaceae
N CAS	***Berberis julianae*** C.K.Schneid.
N CAS	***Berberis thunbergii*** DC.
N NAT	***Mahonia aquifolium*** (Pursh) Nutt.
N NAT	***Mahonia bealei*** (Fortune) Carrière
N CAS	***Nandina domestica*** Thunb.
	Betulaceae
N CAS	***Corylus colurna*** L.
N CAS	***Corylus maxima*** Mill.
	Bignoniaceae
N CAS	***Bignonia capreolata*** L.
N NAT	***Campsis radicans*** (L.) Bureau
N NAT	***Catalpa bignonioides*** Walter Note: This species is often confused with *Catalpa speciosa* Teas and *C. ovata* G.Don.
N NAT	***Catalpa ovata*** G.Don
T N NAT	***Catalpa speciosa*** Teas Note: This species is doubtfully distinct from *C. bignonioides* Walter.
N NAT	***Dolichandra unguis-cati*** (L.) L.G.Lohmann
N CAS	***Handroanthus heptaphyllus*** (Vell.) Mattos
N CAS	***Jacaranda mimosifolia*** D.Don
N CAS	***Tecoma stans*** (L.) Juss. ex Kunth
N CAS	***Tecomaria capensis*** (Thunb.) Spach
	Boraginaceae Taxonomic references: *Adelocaryum* Brand and *Cynoglossum* L. (Hilger et al. 2015); *Iberodes* M.Serrano, R.Carbajal & S.Ortiz (Serrano et al. 2016).
N NC	***Adelocaryum coelestinum*** (Lindl.) Brand
N CAS	***Amsinckia calycina*** (Moris) Chater
N CAS	***Amsinckia lycopsoides*** (Lehm.) Lehm.
N CAS	***Amsinckia menziesii*** (Lehm.) A.Nelson & J.F.Macbr.
N NC	***Anchusa ochroleuca*** M.Bieb.
N NAT	***Brunnera macrophylla*** (Adams) I.M.Johnst.
N CAS	***Cynoglossum amabile*** Stapf & J.R.Drumm.
N NAT	***Echium candicans*** L.f.

N CAS	***Iberodes linifolia*** (L.) M.Serrano, R.Carbajal & S.Ortiz
N CAS	***Lappula patula*** (Lehm.) Menyh. Note: The historical occurrence in Sicilia is based on a specimen kept in FI collected in 1907 (L. Cecchi and F. Selvi, pers. comm.).
N NAT	***Lycopsis orientalis*** L.
N NC	***Melanortocarya obtusifolia*** (Willd.) Selvi, Bigazzi, Hilger & Papini
N NAT	***Nonea lutea*** (Desr.) DC.
N INV	***Nonea pulla*** (L.) DC.
N NAT	***Pentaglottis sempervirens*** (L.) Tausch ex L.H.Bailey
N NAT	***Symphytum asperum*** Lepech.
N NAT	***Symphytum orientale*** L.
N NAT	***Symphytum* ×*uplandicum*** Nyman Parentage: *S. asperum* Lepech. × *S. officinale* L.
N CAS	***Trachystemon orientalis*** (L.) G.Don Note: The historical occurrence in Toscana is based on a specimen kept FI collected in 1938 (L. Cecchi and F. Selvi, pers. comm.).
	Brassicaceae Taxonomic references: *Aubrieta* Adans. (Koch et al. 2016); *Cochlearia* L. and *Ionopsidium* Rchb. (Koch 2012).
N CAS	***Alyssum fulvescens*** Sm.
A NAT	***Armoracia rusticana*** G.Gaertn., B.Mey. & Scherb.
N NAT	***Aubrieta deltoidea*** (L.) DC.
N NAT	***Aurinia saxatilis*** (L.) Desv. subsp. ***saxatilis*** Note: For the systematics of this species, see Rešetnik et al. (2022).
N NC	***Brassica elongata*** Ehrh. subsp. ***elongata***
N CAS	***Brassica elongata*** Ehrh. subsp. ***integrifolia*** (Boiss.) Breistr.
A NAT	***Brassica juncea*** (L.) Czern. Note: According to Bosi et al. (2014), there are archaeobotanical remains of this species dating back to fourteenth-fifteenth century.
A NAT	***Brassica napus*** L.
A NAT FER	***Brassica oleracea*** L. Putative parentage: *B. cretica* Lam. → *B. incana* Ten. → *B. montana* Pourr. (eastern Mediterranean Region).
A CAS CLT	***Brassica rapa*** L. subsp. ***rapa*** Note: Directly domesticated from *B. rapa* L. subsp. *campestris* (L.) A.R.Clapham (Mesopotamia).
N NAT	***Bunias orientalis*** L.
N CAS	***Camelina rumelica*** Velen.
A NAT FER	***Camelina sativa*** (L.) Crantz subsp. ***sativa*** Note: Feral of the same taxon, in turn directly domesticated from *C. sativa* (L.) Crantz. subsp. *microcarpa* (Andrz. ex DC.) Bonnier (E-Turkey) (Zohary and Hopf 2000; Brock et al. 2018).
N INV	***Capsella grandiflora*** (Fauché & Chaub.) Boiss.
N NAT	***Cardamine occulta*** Hornem. Note: For the nomenclature of this species, see Marhold et al. (2016).
N INV	***Chorispora tenella*** (Pall.) DC.
N CAS	***Cochlearia officinalis*** L. subsp. ***officinalis*** Note: This species was recorded in Marche only within the Botanical Garden of Urbino.

A NAT	***Conringia orientalis*** (L.) Andrz. ex DC.
N D	*Crambe maritima* L.
N NC	***Erucaria hispanica*** (L.) Druce
A NAT	***Erysimum cheiranthoides*** L.
A NAT FER	***Erysimum cheiri*** (L.) Crantz Parentage: Unknown.
N CAS	***Erysimum repandum*** L.
N CAS	***Euclidium syriacum*** (L.) W.T.Aiton
N CAS	***Iberis amara*** L.
N CAS	***Ionopsidium acaule*** (Desf.) Rchb. Note: For the nomenclature of this species, see Koch (2012) and Al-Shebhaz (2012).
N NAT	***Ionopsidium glastifolium*** (L.) M.Koch
A INV	***Isatis tinctoria*** L. subsp. ***tinctoria***
N CAS	***Lepidium bonariense*** L.
N NAT	***Lepidium densiflorum*** Schrad.
N CAS	***Lepidium densiflorum*** Schrad. × ***Lepidium virginicum*** L. subsp. ***virginicum*** Note: On the origin of this hybrid, see Al-Shehbaz and Gaskin (2010).
N NAT	***Lepidium didymum*** L.
N NAT	***Lepidium heterophyllum*** Benth.
N CAS	***Lepidium perfoliatum*** L.
A NAT	***Lepidium sativum*** L. subsp. ***sativum***
N INV	***Lepidium virginicum*** L. subsp. ***virginicum***
N CAS	***Matthiola longipetala*** (Vent.) DC. subsp. ***bicornis*** (Sibth. & Sm.) PW.Ball
N NC	***Ochthodium aegyptiacum*** (L.) DC.
N D	*Odontarrhena muralis* (Waldst. & Kit.) Endl.
A CAS CLT	***Raphanus raphanistrum*** L. subsp. ***sativus*** (L.) Schmalh. Note: Directly domesticated from *R. raphanistrum* L. subsp. *raphanistrum* (eastern Mediterranean Region).
A CAS	***Rapistrum perenne*** (L.) All.
N NAT	***Rorippa armoracioides*** (Tausch) Fuss
N NAT	***Rorippa austriaca*** (Crantz) Besser
N NAT	***Sisymbrium loeselii*** L.
N NAT	***Sisymbrium volgense*** M.Bieb. ex E.Fourn.
	Buxaceae
N CAS CLT	***Buxus microphylla*** Siebold & Zucc. Note: Probably directly domesticated from *B. microphylla* Siebold & Zucc. var. *japonica* (Müll.Arg.) Rehder & E.H.Wilson (Japan; Ohba 1999).
N NAT	***Pachysandra terminalis*** Siebold & Zucc.
N CAS CLT	***Sarcococca confusa*** Sealy
	Cactaceae Taxonomic references: Guiggi (2008, 2010, 2014); Hernández-Ledesma et al. (2015); Korotkova et al. (2021); *Opuntia* Mill. (incl. *Nopalea* Salm-Dyck) (Majure et al. 2012; Majure and Puente 2014; Guiggi and Mariotti 2022).
N NAT	***Austrocylindropuntia cylindrica*** (Lam.) Backeb.
N INV	***Austrocylindropuntia subulata*** (Muehlenpf.) Backeb.

N NAT ***Cereus hildmannianus*** K.Schum. subsp. ***hildmannianus***

N CAS ***Chamaecereus silvestrii*** (Speg.) Britton & Rose

N CAS ***Cleistocactus strausii*** (Heese) Backeb.
Note: We do not agree with Hernández-Ledesma et al. (2015) in maintaining a large paraphyletic *Echinopsis* Zucc.

N CAS ***Consolea falcata*** (Ekman & Werderm.) F.M.Knuth

N NAT ***Cylindropuntia imbricata*** (Haw.) F.M.Knuth subsp. ***spinosior*** (Engelm.) M.A.Baker, Cloud-H. & Majure

N CAS ***Cylindropuntia kleiniae*** (DC.) F.M.Knuth

N CAS ***Cylindropuntia tunicata*** (Lehm.) F.M.Knuth

N CAS ***Echinopsis oxygona*** (Link) Pfeiff. & Otto

N CAS ***Mammillaria bocasana*** Poselg.

N NAT ***Mammillaria elongata*** DC. subsp. ***elongata***

N CAS ***Mammillaria polythele*** Mart. subsp. ***polythele***

N CAS ***Opuntia anacantha*** Speg.

N CAS ***Opuntia chlorotica*** Engelm. & J.M.Bigelow

N NAT ***Opuntia dejecta*** Salm-Dyck

N NAT ***Opuntia elata*** hort. Berol. ex Salm-Dyck subsp. ***bonaerensis*** (Speg.) Guiggi

N NAT ***Opuntia elata*** hort. Berol. ex Salm-Dyck subsp. ***elata***
Note: This subspecies was confused in Piemonte with *O. elata* subsp. *bonaerensis* (Speg.) Guiggi (Aymerich and Font 2023).

N INV ***Opuntia elatior*** Mill.

N NAT ***Opuntia engelmannii*** Salm-Dyck ex Engelm.
Note: The new record from Piemonte in based on the following datum: Bussoleno (Torino) (WGS84: 45.147598°N, 7.141565°E ± 50 m), 570 m, May 2021, photo S. Carfagno, det. A. Guiggi.

N INV FER ***Opuntia ficus-indica*** (L.) Mill.
Note: Possibly feral and culton of a spiny morphotype of this species, described as *O. amyclaea* Ten. (Mexico).

N INV ***Opuntia humifusa*** (Raf.) Raf.

N NAT ***Opuntia leucotricha*** DC.

N NAT ***Opuntia lindheimeri*** Engelm.

N NAT ***Opuntia microdasys*** (Lehm.) Pfeiff.

N NAT ***Opuntia monacantha*** Haw.

N INV ***Opuntia phaeacantha*** Engelm.

N CAS ***Opuntia pilifera*** F.A.C.Weber

N CAS ***Opuntia polyacantha*** Haw.

N NAT ***Opuntia robusta*** H.L.Wendl. ex Pfeiff.

N NAT ***Opuntia scheeri*** F.A.C.Weber

N NAT ***Opuntia spinulifera*** Salm-Dyck

N NAT ***Opuntia streptacantha*** Lem.

N INV ***Opuntia stricta*** (Haw.) Haw.

N NAT ***Opuntia tomentosa*** Salm-Dyck

N NAT ***Opuntia tuna*** (L.) Mill.
Note: In the past, this name was misapplied to plants currently known as *O. engelmannii* Salm-Dyck ex Engelm.

N CAS ***Selenicereus triangularis*** (L.) D.R.Hunt

N NAT FER ***Selenicereus undatus*** (Haw.) D.R.Hunt
Note: Feral and culton of the same species (Mexico).

N CAS	***Soehrensia candicans*** (Gillies ex Salm-Dyck) Schlumpb.
N CAS	***Soehrensia spachiana*** (Lem.) Schlumpb.
	Calycanthaceae
N CAS	***Calycanthus floridus*** L.
N CAS	***Chimonanthus praecox*** (L.) Link
	Campanulaceae
N CAS	***Campanula carpatica*** Jacq.
N NAT	***Campanula grandis*** Fisch. & C.A.Mey.
N NAT	***Campanula grandis*** Fisch. & C.A.Mey. subsp. ***grandis***
N NAT	***Campanula portenschlagiana*** Schult.
N NAT	***Campanula poscharskyana*** Degen
N NAT	***Campanula ramosissima*** Sm.
N NAT	***Campanula ramosissima*** Sm. subsp. ***ramosissima***
N CAS	***Lobelia erinus*** L.
N CAS	***Lobelia laxiflora*** Kunth subsp. ***laxiflora***
N CAS	***Platycodon grandiflorus*** (Jacq.) A.DC.
N INV	***Trachelium caeruleum*** L.
	Cannabaceae
A CAS CLT	***Cannabis sativa*** L. Note: Directly domesticated from the same species (E-Asia, ca. 12,000 years ago) (Ren et al. 2021).
N NAT	***Celtis occidentalis*** L.
N INV	***Humulus japonicus*** Siebold & Zucc.
	Cannaceae
N CAS	***Canna glauca*** L.
N CAS CLT	***Canna*** ×***hybrida*** Rodigas Parentage: Horticultural hybrid between *C. indica* L. and *C. glauca* L. or *C. iridiflora* Ruiz & Pav. (Kress and Prince 2000).
N NAT	***Canna indica*** L.
	Caprifoliaceae
N NAT	***Leycesteria formosa*** Wall.
N D	*Lonicera biflora* Desf.
N NAT	***Lonicera fragrantissima*** Lindl. & Paxton
N CAS	***Lonicera involucrata*** (Richardson) Banks ex Spreng.
N INV	***Lonicera japonica*** Thunb.
N NAT	***Lonicera ligustrina*** Wall. subsp. ***yunnanensis*** (Franch.) P.S.Hsu & H.J.Wang
N NAT	***Lonicera pileata*** Oliv.
N CAS	***Lonicera tatarica*** L.
N NAT	***Symphoricarpos albus*** (L.) S.F.Blake
N CAS	***Triosteum pinnatifidum*** Maxim.
	Caryophyllaceae
A NAT	***Agrostemma githago*** L. subsp. ***githago***

Note: This species is extinct in Trentino-Alto Adige and Friuli Venezia Giulia, but some casual alien plants escaped from cultivation may be found.

N CAS ***Cerastium biebersteinii*** DC.
N CAS ***Dianthus giganteus*** d'Urv. subsp. ***giganteus***
N NC ***Dianthus plumarius*** L. subsp. ***plumarius***
N CAS ***Dianthus pontederae*** A.Kern. subsp. ***pontederae***
N CAS ***Gypsophila collina*** Steven ex Ser.
N CAS ***Gypsophila elegans*** M.Bieb.
N CAS ***Gypsophila paniculata*** L.
N CAS ***Gypsophila perfoliata*** L.
N CAS ***Gypsophila pilosa*** Huds.
N CAS ***Lychnis chalcedonica*** L.
N D *Ortegia hispanica* L.
N CAS ***Petrorhagia glumacea*** (Chaub. & Bory) P.W.Ball & Heywood
N EX ***Petrorhagia obcordata*** (Margot & Reut.) Greuter & Burdet
N CAS ***Silene conoidea*** L.
N CAS ***Silene flavescens*** Waldst. & Kit. subsp. ***flavescens***
N CAS ***Silene graeca*** Boiss. & Spruner
N CAS ***Silene heldreichii*** Boiss.
N CAS ***Silene viscosa*** (L.) Pers.

Casuarinaceae

N CAS ***Allocasuarina verticillata*** (Lam.) L.A.S.Johnson
N CAS ***Casuarina cunninghamiana*** Miq. subsp. ***cunninghamiana***
N NAT ***Casuarina equisetifolia*** L. subsp. ***equisetifolia***

Celastraceae

N CAS ***Elaeodendron croceum*** (Thunb.) DC.
N CAS ***Euonymus americanus*** L.
N NAT ***Euonymus fortunei*** (Turcz.) Hand.-Mazz.
N NAT ***Euonymus japonicus*** Thunb.
N CAS ***Euonymus lucidus*** D.Don

Cistaceae

N CAS ***Cistus ladanifer*** L. subsp. ***ladanifer***
N CAS ***Cistus* ×*purpureus*** Lam. nothosubsp. ***purpureus***
Parentage: *C. creticus* L. subsp. *creticus* × *C. ladanifer* L. subsp. *ladanifer*.

Cleomaceae

Taxonomic references: *Tarenaya* Raf. (Iltis and Cochrane 2014; Soares Neto et al. 2022).

N NAT ***Polanisia dodecandra*** (L.) DC. subsp. ***trachysperma*** (Torr. & A.Gray) Iltis
N CAS ***Tarenaya houtteana*** (Schltdl.) Soares Neto & Roalson
N CAS ***Tarenaya spinosa*** (Jacq.) Raf.

Colchicaceae

Taxonomic references: *Colchicum* L. (Persson 2007).

N NC ***Colchicum cilicicum*** (Boiss.) Dammer

Commelinaceae

N CAS ***Commelina benghalensis*** L.

N INV ***Commelina communis*** L.

N CAS ***Commelina erecta*** L.

N CAS ***Gibasis pellucida*** (M.Martens & Galeotti) D.R.Hunt

N INV ***Murdannia keisak*** (Hassk.) Hand.-Mazz.

N CAS ***Tradescantia cerinthoides*** Kunth

N INV ***Tradescantia fluminensis*** Vell.
Note: Some authors consider *T. albiflora* Kunth (recorded for Liguria and Toscana) as an independent taxon.

N CAS ***Tradescantia pallida*** (Rose) D.R.Hunt

N CAS ***Tradescantia sillamontana*** Matuda

N CAS ***Tradescantia virginiana*** L.

N DD ***Tradescantia zebrina*** hort. ex Bosse
Note: This species was reported for Italy, without distribution, by Pignatti (1982) and Pignatti et al. (2017a).

Convolvulaceae
Taxonomic references: *Convolvulus* L. (Wood et al. 2015); *Convolvulus sabatius* complex (Carine and Robba 2010); *Ipomoea* L. (Wood et al. 2020).

N CAS ***Convolvulus betonicifolius*** Mill. subsp. ***betonicifolius***

N NAT ***Convolvulus dubius*** J.L.Gilbert

N CAS ***Convolvulus farinosus*** L.

N NAT ***Convolvulus sabatius*** Viv. subsp. ***mauritanicus*** (Boiss.) Murb.

N CAS ***Convolvulus tricolor*** L. subsp. ***tricolor***

N CAS ***Convolvulus wallichianus*** Spreng.

N INV ***Cuscuta campestris*** Yunck.
Note: For the taxonomy of this species, see Campanile (1926).

A NAT ***Cuscuta epilinum*** Weihe

N CAS ***Dichondra argentea*** Humb. & Bonpl. ex Willd.

N NAT ***Dichondra micrantha*** Urb.

N CAS CLT ***Ipomoea batatas*** (L.) Lam.
Note: Directly domesticated from the same species, which is a natural autohexaploid arisen naturally in pre-human times in tropical America from diploid *I. trifida* (Kunth) G.Don (Hirst 2016; Muñoz-Rodríguez et al. 2018; Wood et al. 2020).

N NAT ***Ipomoea cairica*** (L.) Sweet

N CAS ***Ipomoea coccinea*** L.

N CAS ***Ipomoea hederacea*** Jacq.

N INV ***Ipomoea indica*** (Burm.) Merr.

N CAS ***Ipomoea pandurata*** (L.) G.Mey.

N NAT ***Ipomoea purpurea*** (L.) Roth

N CAS ***Ipomoea setosa*** Ker Gawl. subsp. ***pavonii*** (Hallier f.) J.R.I.Wood & Scotland

N CAS ***Ipomoea tricolor*** Cav.

N CAS ***Ipomoea triloba*** L.

Cornaceae

N CAS	***Cornus sericea*** L.
	Crassulaceae
A NAT	***Aeonium arboreum*** (L.) Webb & Berthel.
N NAT	***Aeonium decorum*** Webb ex Bolle
N CAS	***Aeonium gomerense*** (Praeger) Praeger
N NAT	***Aeonium haworthii*** Webb & Berthel.
N CAS CLT	***Aeonium* ×*hybridum*** (Haw.) G.D.Rowley Parentage: *A. simsii* (Sweet) Stearn × *A. spathulatum* (Hornem.) Praeger.
N CAS	***Aeonium lancerottense*** (Praeger) Praeger
N CAS	***Aeonium simsii*** (Sweet) Stearn
N CAS	***Cotyledon orbiculata*** L.
N NAT	***Crassula campestris*** (Eckl. & Zeyh.) Endl. ex Walp. subsp. ***campestris***
N D	*Crassula helmsii* (Kirk) Cockayne
N D	*Crassula multicava* Lem. subsp. *multicava*
N INV	***Crassula muscosa*** L.
N CAS	***Crassula ovata*** (Mill.) Druce
N CAS	***Crassula tetragona*** L. subsp. ***robusta*** (Toelken) Toelken
N CAS	***Graptopetalum paraguayense*** (N.E.Br.) Walther subsp. ***paraguayense***
N CAS CLT	×***Graptosedum*** sp. Parentage: *Graptopetalum* Rose × *Sedum* L. Note: The record of ×*Graptosedum* Rose from Lombardia (Ardenghi 2018) possibly refers to ×*Graptosedum* 'Darley Sunshine'.
N CAS	***Hylotelephium spectabile*** (Boreau) H.Ohba
N CAS	***Hylotelephium telephium*** (L.) H.Ohba subsp. ***telephium***
N CAS	***Kalanchoë blossfeldiana*** Poelln.
N NAT	***Kalanchoë daigremontiana*** Raym.-Hamet & H.Perrier Note: This species is often confused with the hybrid *K.* ×*houghtonii* D.B.Ward.
N CAS	***Kalanchoë delagoënsis*** Eckl. & Zeyh.
N INV FER	***Kalanchoë* ×*houghtonii*** D.B.Ward Parentage: *K. daigremontiana* Raym.-Hamet & H.Perrier × *K. delagoensis* Eckl. & Zeyh.
N CAS	***Kalanchoë laxiflora*** Baker
N CAS	***Phedimus kamtschaticus*** (Fisch.) 't Hart
N NAT	***Phedimus spurius*** (M.Bieb.) 't Hart subsp. ***spurius***
N NAT FER	×***Sedeveria mauroi*** L.Gallo, Merli & Jankalski Parentage: *Echeveria agavoides* Lem. × *Sedum* cf. *pachyphyllum* Rose (Gallo et al. 2020).
N CAS	***Sedum multiceps*** Coss. & Durieu
N CAS	***Sedum nussbaumerianum*** Bitter
N NAT	***Sedum pallidum*** M.Bieb.
N NAT	***Sedum palmeri*** S.Watson
N NAT	***Sedum praealtum*** A.DC.
N CAS CLT	***Sedum rubrotinctum*** R.T.Clausen Parentage: Horticultural hybrid, possibly *S. stahlii* Solms × *S. pachyphyllum* Rose, both native to Mexico.
N NAT	***Sedum sarmentosum*** Bunge
N CAS	***Sedum spathulifolium*** Hook. subsp. ***spathulifolium***

Cucurbitaceae

Taxonomic references: Nesom (2011).

N CAS ***Citrullus amarus*** Schrad.

A CAS CLT ***Citrullus lanatus*** (Thunb.) Matsum. & Nakai subsp. ***lanatus***
Note: Directly domesticated from *Citrullus lanatus* subsp. *kordophanus* Ter-Avan. (Sudan) (Chomicki and Renner 2014; Renner et al. 2017).

A CAS CLT ***Cucumis melo*** L. subsp. ***melo***
Note: Directly domesticated from *C. melo* subsp. *agrestis* (Naudin) Pangalo (India).

A CAS CLT ***Cucumis sativus*** L. subsp. ***sativus***
Note: Directly domesticated from *C. sativus* subsp. *hardwickii* (Royle) Banfi & Galasso (India) (de Wilde and Duyfjes 2008; Sebastian et al. 2010; Nesom 2011; Qi et al. 2013; Liu et al. 2015).

N CAS ***Cucurbita ficifolia*** Bouché

N CAS CLT ***Cucurbita maxima*** Duchesne subsp. ***maxima***
Note: Directly domesticated from *C. maxima* subsp. *andreana* (Naudin) Filov (Argentine).

N CAS CLT ***Cucurbita melopepo*** L. subsp. ***melopepo***
Note: Directly domesticated from *C. melopepo* subsp. *texana* (Scheele) G.L.Nesom (southwestern N-America).

N CAS CLT ***Cucurbita moschata*** Duchesne
Note: Directly domesticated from the same species, *C. moschata* Duchesne (Bolivia and Colombia).

N CAS CLT ***Cucurbita pepo*** L. subsp. ***pepo***
Note: Directly domesticated from *C. pepo* subsp. *gumala* Teppner (Guatemala).

N CAS ***Cyclanthera pedata*** (L.) Schrad.

N NAT ***Echinocystis lobata*** (Michx.) Torr. & A.Gray

A CAS ***Lagenaria siceraria*** (Molina) Standl.

N CAS ***Luffa aegyptiaca*** Mill.

N CAS ***Momordica charantia*** L.

N INV ***Sicyos angulatus*** L.

N CAS CLT ***Sicyos edulis*** Jacq.
Note: Possibly directly domesticated from the same species (southern Mexico and Guatemala).

N CAS ***Thladiantha dubia*** Bunge

Cyperaceae

Taxonomic references: *Cyperus* L. (Verloove 2014); *Eleocharis* R.Br. (Verloove 2010); *Schoenoplectiella* Lye (Lye 2003; Shiels et al. 2014; Glon et al. 2017).

N CAS ***Carex muskingumensis*** Schwein.

N NAT ***Carex tribuloides*** Wahlenb.

N INV ***Carex vulpinoidea*** Michx.

N INV ***Cyperus alternifolius*** L. subsp. ***flabelliformis*** Kük.

N CAS ***Cyperus alternifolius*** L. subsp. ***textilis*** (Thunb.) Verloove

N NAT ***Cyperus brevifolioides*** Thieret & Delahouss.

N CAS ***Cyperus compressus*** L.

N NAT ***Cyperus congestus*** Vahl

N INV ***Cyperus difformis*** L.

N INV ***Cyperus eragrostis*** Lam.
N INV ***Cyperus erythrorhizos*** Muhl.
A INV ***Cyperus esculentus*** L.
N NAT ***Cyperus exaltatus*** Retz.
N CAS ***Cyperus hamulosus*** M.Bieb.
N NAT ***Cyperus lupulinus*** (Spreng.) Marcks
N INV ***Cyperus microiria*** Steud.
N INV ***Cyperus odoratus*** L.
A NAT ***Cyperus papyrus*** L.
N CAS ***Cyperus rigens*** J.Presl & C.Presl
N NAT ***Cyperus schweinitzii*** Torr.
A INV ***Cyperus serotinus*** Rottb.
N NAT ***Cyperus squarrosus*** L.
N NAT ***Cyperus strigosus*** L.
N NAT ***Eleocharis atropurpurea*** (Retz.) J.Presl & C.Presl
N INV ***Eleocharis obtusa*** (Willd.) Schult.
N NAT ***Eleocharis olivacea*** Torr.
Note: This name has been synonymized with *E. flavescens* (Poir.) Urb. (Jiménez Mejías and Luceño 2007) or treated as a variety of the latter species (Smith et al. 2002). We consider this taxon at species rank, as an alien. On the contrary, we regard *E. caduca* (Delile) Schult. as a native plant (Bartolucci et al. 2024). Verloove and Soldano (2011) reported another species, namely *E. flavescens*, as a weed in the hethlands of Piemonte. However, in a sample of these hethland plants, we detected the typical features of *E. olivacea*. However, the global taxonomic treatment of this group is confusing: Old and New World plants assigned to *E. flavescens* or *E. caduca* are poorly distinct and the type materials of *E. caduca* and *E. flavescens* are virtually undistinguishable. Also the putative geographical separation of these two taxa (Old vs. New World) is a weak argument, since a number of tropical and subtropical Cyperaceae show a circumglobal distribution. Additional biosystematic studies, including DNA sequences, may clarify the taxonomic relationships within this complex.
N NAT ***Eleocharis pellucida*** J.Presl & C.Presl
N CAS ***Schoenoplectiella juncoides*** (Roxb.) Lye

Didiereaceae
N CAS ***Portulacaria afra*** Jacq.

Diervillaceae
N CAS ***Weigela florida*** (Bunge) A.DC.

Dipsacaceae
N NAT ***Cephalaria gigantea*** (Ledeb.) Bobrov
N NAT ***Cephalaria syriaca*** (L.) Roem. & Schult.
A CAS CLT ***Dipsacus fullonum*** L. subsp. ***sativus*** (L.) Thell.
Note: Directly domesticated from *D. fullonum* L. subsp. *fullonum*.
N NAT ***Dipsacus laciniatus*** L.
N NC ***Lomelosia prolifera*** (L.) Greuter & Burdet
N NAT ***Pterocephalus plumosus*** (L.) Coult.

	Ebenaceae
N NAT	***Diospyros kaki*** Thunb.
N NAT	***Diospyros lotus*** L.
N NAT	***Diospyros virginiana*** L.
	Elaeagnaceae
N NAT	***Elaeagnus angustifolia*** L.
N CAS	***Elaeagnus commutata*** Bernh. ex Rydb.
N INV	***Elaeagnus pungens*** Thunb.
N CAS CLT	***Elaeagnus*** ×***submacrophylla*** Servett. Parentage: *E. macrophylla* Thunb. × *E. pungens* Thunb.
N NAT	***Elaeagnus umbellata*** Thunb.
	Elatinaceae
T N D	*Elatine ambigua* Wight Note: According to Sramkó et al. (2016), *E. ambigua* would not occur in Europe. However, we cannot exclude that this name could even be treated as a heterotypic synonym of the native *E. triandra* Schkuhr.
	Ericaceae
N CAS	***Erica tetralix*** L.
	Eriocaulaceae
N CAS	***Eriocaulon cinereum*** R.Br.
	Euphorbiaceae Taxonomic references: *Euphorbia* sect. *Anisophyllum* Roep. (Mugnai et al. 2021).
N NAT	***Acalypha australis*** L.
N CAS	***Acalypha ostryifolia*** Riddell ex J.M.Coult.
N NAT	***Acalypha rhomboidea*** Raf.
N INV	***Acalypha virginica*** L.
N CAS	***Euphorbia agraria*** M.Bieb.
N INV	***Euphorbia davidii*** Subils Note: For the identification of this species, see Banfi and Galasso (2010).
N CAS	***Euphorbia epithymoides*** L.
N NAT	***Euphorbia glyptosperma*** Engelm.
N NAT	***Euphorbia graminea*** Jacq.
N CAS	***Euphorbia heterophylla*** L.
N NAT	***Euphorbia humifusa*** Willd.
N NAT	***Euphorbia hypericifolia*** L.
A NAT	***Euphorbia lathyris*** L.
N INV	***Euphorbia maculata*** L.
N CAS	***Euphorbia marginata*** Pursh
N INV	***Euphorbia nutans*** Lag.
N D	*Euphorbia oblongata* Griseb. Note: In Toscana this species was found as a casual alien only within the Botanical Garden of Siena.
N CAS	***Euphorbia ophthalmica*** Pers.

N INV	***Euphorbia prostrata*** Aiton
N CAS	***Euphorbia pulcherrima*** Willd. ex Klotzsch
N D	*Euphorbia serpens* Kunth subsp. *fissistipula* (Thell.) Verloove & Lambinon
N NAT	***Euphorbia serpens*** Kunth subsp. ***serpens***
N NC	***Euphorbia valerianifolia*** Lam.
N CAS CLT	***Manihot esculenta*** Crantz subsp. ***esculenta*** Note: Directly domesticated from *M. esculenta* Crantz subsp. *flabellifolia* (Pohl) Cif. (CW-Brasil).
N NAT	***Manihot grahamii*** Hook.
A INV	***Ricinus communis*** L.
	Fabaceae Taxonomic references: *Ervilia* Link, *Lathyrus* L. (incl. *Pisum* L.), *Vicia* L. (incl. *Lens* Mill.) (Schaefer et al. 2012); *Erythrostemon* Klotzsch, *Tara* Molina (Gagnon et al. 2016); *Parasenegalia* Seigler & Ebinger (Seigler et al. 2017); *Styphnolobium* Schott (Sousa and Rudd 1993); *Trigonella* L. (incl. *Melilotus* Mill.) (Bena 2001).
N CAS	***Acacia cultriformis*** A.Cunn. ex G.Don
N NAT	***Acacia cyclops*** A.Cunn. ex G.Don
N INV	***Acacia dealbata*** Link
N NAT	***Acacia longifolia*** (Andrews) Willd. Note: It is unclear whether the autonymic subspecies or *A. longifolia* (Andrews) Willd. subsp. *sophorae* (Labill.) Court. occurs in Italy.
N INV	***Acacia mearnsii*** De Wild.
N NAT	***Acacia melanoxylon*** R.Br.
N INV	***Acacia provincialis*** A.Camus Note: For the taxonomy of this species, see O'Leary (2007).
N INV	***Acacia pycnantha*** Benth.
N INV	***Acacia saligna*** (Labill.) H.L.Wendl.
N CAS	***Albizia julibrissin*** Durazz.
N INV	***Amorpha fruticosa*** L.
N NAT	***Amphicarpaea comosa*** (L.) G.Don ex Loudon
N D	*Anthyllis vulneraria* L. subsp. *vulneraria*
N INV	***Apios americana*** Medik.
N CAS CLT	***Arachis hypogaea*** L. Parentage: *A. duranensis* Krapov. & W.C.Greg. × *A. ipaensis* Krapov. & W.C.Greg. (SE-Bolivia/NW-Argentine).
N NC	***Astragalus odoratus*** Lam.
N CAS	***Camptosema rubicundum*** Hook. & Arn.
N CAS	***Caragana arborescens*** Lam.
A CAS CLT	***Cicer arietinum*** L. subsp. ***arietinum*** Note: Directly domesticated from *C. arietinum* subsp. *reticulatum* (Ladiz.) Moreno & Cubero ex Del Guacchio & P.Caputo (NW-Syria) (Nguyen et al. 2004; Gupta et al. 2017; Toker et al. 2021).
N CAS	***Cladrastis platycarpa*** (Maxim.) Makino
N NC	***Cullen americanum*** (L.) Rydb.
N CAS	***Cytisus prolifer*** L.f. subsp. ***prolifer***
N NAT	***Cytisus striatus*** (Hill) Rothm.
N NAT	***Denisophytum bessac*** (Chiov.) Gagnon & G.P.Lewis

N CAS	***Dipogon lignosus*** (L.) Verdc.
A NAT	***Ervilia sativa*** Link
N NAT	***Erythrostemon gilliesii*** (Wall. ex Hook.) Klotzsch
A NAT	***Galega officinalis*** L.
N NAT	***Gleditsia triacanthos*** L.
N CAS CLT	***Glycine max*** (L.) Merr. subsp. ***max*** Note: Directly domesticated from *G. max* subsp. *soja* (Siebold & Zucc.) H.Ohashi (NE-China).
N NAT	***Glycyrrhiza echinata*** L.
N CAS	***Gymnocladus dioicus*** (L.) K.Koch
N CAS	***Indigofera heterantha*** Wall. ex Brandis
N CAS	***Indigofera splendens*** Ficalho & Hiern
N NAT FER	***Lablab purpureus*** (L.) Sweet Note: Feral of the same taxon, in turn directly domesticated from a biotype bearing 2-seeded pods (Ethiopia).
A CAS CLT	***Lathyrus oleraceus*** Lam. subsp. ***oleraceus*** Note: Directly domesticated from *L. oleraceus* subsp. *biflorus* (Raf.) H.Schaef., Coulot & Rabaute (Middle East).
A NAT FER	***Lathyrus sativus*** L. Note: Feral of the same species, in turn possibly directly domesticated from *L. cicera* L. (Turkey/Iraq or S-Balkans).
N NAT	***Leucaena leucocephala*** (Lam.) de Wit subsp. ***glabrata*** (Rose) Zárate
N CAS	***Lotus drepanocarpus*** Durieu
A NAT FER	***Lupinus albus*** L. subsp. ***albus*** Note: Feral of the same taxon, in turn directly domesticated from *L. albus* subsp. *graecus* (Boiss. & Spruner) Franco & P.Silva (Greece and Asia Minor).
N NAT FER	***Lupinus polyphyllus*** Lindl. Note: Feral and culton of the same species (N-America).
N CAS	***Medicago blancheana*** Boiss.
N CAS	***Medicago granadensis*** Willd.
N CAS	***Medicago monantha*** (C.A.Mey.) Trautv.
A NAT FER	***Medicago sativa*** L. Note: Feral and culton of the same species (Iran).
A NAT	***Medicago*** ×***varia*** Martyn Parentage: *M. falcata* L. × *M. sativa* L. Note: Most likely this nothospecies is much more widespread than currently recorded.
N CAS	***Ornithopus sativus*** Brot. subsp. ***sativus***
N NAT	***Parasenegalia visco*** (Lorentz ex Griseb.) Seigler & Ebinger
N NAT	***Paraserianthes lophantha*** (Willd.) I.C.Nielsen subsp. ***lophantha***
N INV	***Parkinsonia aculeata*** L.
N CAS CLT	***Phaseolus coccineus*** L. Note: Directly domesticated from the same species (Mexico; Guerra-García et al. 2017).
N CAS CLT	***Phaseolus vulgaris*** L. subsp. ***vulgaris*** Note: Directly domesticated from *P. vulgaris* subsp. *aborigineus* (Burkart) Burkart & Bruecker (Andes).
N INV	***Pueraria lobata*** (Willd.) Ohwi Note: For the taxonomy of this species, see Sun et al. (2005) and Banfi and Galasso (2010).

N CAS	***Retama monosperma*** (L.) Boiss. subsp. ***monosperma***
N NAT	***Robinia hispida*** L.
N CAS	***Robinia neomexicana*** A.Gray
N INV	***Robinia pseudoacacia*** L.
N INV	***Robinia viscosa*** Vent.
N CAS	***Senna corymbosa*** (Lam.) H.S.Irwin & Barneby
N INV	***Sesbania punicea*** (Cav.) Benth.
N CAS	***Styphnolobium japonicum*** (L.) Schott
N CAS	***Tara spinosa*** (Feuillée ex Molina) Britton & Rose
N NAT FER	***Trifolium alexandrinum*** L. Parentage: *T. salmoneum* Mouterde → *T. berytheum* Boiss. & C.I.Blanche (Middle East).
N CAS	***Trifolium apertum*** Bobrov
N CAS	***Trifolium cinctum*** DC.
N D	*Trifolium clypeatum* L.
N CAS	***Trifolium constantinopolitanum*** Ser.
N CAS	***Trifolium dalmaticum*** Vis.
A NAT FER	***Trifolium incarnatum*** L. subsp. ***incarnatum*** Note: Feral and culton of *T. incarnatum* L. subsp. *molinerii* (Balb. ex Hornem.) Ces.
N NAT	***Trifolium mutabile*** Port. subsp. ***mutabile***
N CAS	***Trifolium retusum*** L.
A CAS	***Trigonella caerulea*** (L.) Ser.
N NAT	***Trigonella dentata*** (Waldst. & Kit.) Coulot & Rabaute
A NAT	***Trigonella foenum-graecum*** L.
N NC	***Trigonella lilacina*** Boiss.
N CAS	***Vachellia caven*** (Molina) Seigler & Ebinger
N CAS	***Vachellia farnesiana*** (L.) Wight & Arn.
N INV	***Vachellia karroo*** (Hayne) Banfi & Galasso
A CAS CLT	***Vicia faba*** L. Note: Directly domesticated from an extinct unit (Middle East).
A CAS CLT	***Vicia lens*** (L.) Coss. & Germ. subsp. ***lens*** Note: Directly domesticated from *V. lens* (L.) Coss. & Germ. subsp. *orientalis* (Boiss.) Galasso, Banfi, Bartolucci & J.-M.Tison (Middle East).
A CAS CLT	***Vigna unguiculata*** (L.) Walp. subsp. ***unguiculata*** Note: Directly domesticated from *V. unguiculata* subsp. *dekindtiana* (Harms) Verdc. (Zuluaga et al. 2021) (W-Africa, Kintampo tribe, 4,000–5,000 years ago).
N CAS	***Wisteria floribunda*** (Willd.) DC.
N NAT	***Wisteria sinensis*** (Sims) DC.
	Fagaceae
N NAT	***Quercus palustris*** Münchh.
N NAT	***Quercus phellos*** L.
N INV	***Quercus rubra*** L.
N CAS	***Quercus shumardii*** Buckley
	Garryaceae
N CAS	***Aucuba japonica*** Thunb.

	Geraniaceae
	Taxonomic references: *Pelargonium* L'Hér. (Miller 1996).
N NAT	***Erodium glaucophyllum*** (L.) L'Hér.
N CAS CLT	***Erodium*** ×***variabile*** A.C.Leslie
	Parentage: *E. corsicum* Léman × *E. reichardii* (Murray) DC.
N INV	***Geranium sibiricum*** L.
N CAS	***Pelargonium capitatum*** (L.) L'Hér.
N CAS	***Pelargonium cucullatum*** (L.) L'Hér.
N CAS	***Pelargonium graveolens*** (Thunb.) L'Hér.
N CAS CLT	***Pelargonium*** ×***hortorum*** L.H.Bailey
	Parentage: *P. inquinans* (L.) L'Hér. × *P. zonale* (L.) L'Hér. Note: According to Miller (1996), all the forms attributed in Europe to *P. inquinans* or to *P. zonale* should be referred to *P.* ×*hortorum*, given that the presence or absence of the leaf colored band are variable in a heterozygous gene pool.
N CAS	***Pelargonium peltatum*** (L.) L'Hér.
	Gesneriaceae
N CAS	***Haberlea rhodopensis*** Friv.
	Grossulariaceae
N CAS	***Ribes aureum*** Pursh
N CAS	***Ribes nigrum*** L.
N CAS	***Ribes spicatum*** E.Robson subsp. ***spicatum***
	Haemodoraceae
N CAS	***Anigozanthos flavidus*** Redouté
	Haloragaceae
N INV	***Myriophyllum aquaticum*** (Vell.) Verdc.
	According to Reg. (EU) No. 1143/2014, this species was eradicated in Piemonte (A. Selvaggi, pers. comm.).
	Hamamelidaceae
N CAS	***Parrotia persica*** (DC.) C.A.Mey.
	Heliotropiaceae
N NAT	***Heliotropium amplexicaule*** Vahl
N CAS	***Heliotropium arborescens*** L.
	Note: For the nomenclature and the identification of this species, see Luebert et al. (2010). In Friuli Venezia Giulia it was only cultivated.
N NAT	***Heliotropium curassavicum*** L.
	Hydrangeaceae
N NAT	***Deutzia crenata*** Siebold & Zucc.
	Note: For the identification of this species, see Ohba and Niu (2001).
N CAS	***Deutzia gracilis*** Siebold & Zucc.
N NAT	***Hydrangea macrophylla*** (Thunb.) Ser.
N NAT	***Hydrangea quercifolia*** W.Bartram

Hydrocharitaceae

Taxonomic references: *Hydrilla* Rich. (Cook and Lüönd 1982); *Najas* L. (Triest 1988; Ito et al. 2017).

N CAS ***Blyxa japonica*** (Miq.) Maxim. ex Asch. & Gürke

N INV ***Egeria densa*** Planch.

N INV ***Elodea canadensis*** Michx.

N INV ***Elodea nuttallii*** (Planch.) H.St.John

N INV ***Halophila stipulacea*** (Forssk.) Asch.

N CAS ***Hydrilla verticillata*** (L.f.) Royle

N INV ***Lagarosiphon major*** (Ridl.) Moss

N NAT ***Najas chinensis*** N.Z.Wang

Note: For the European distribution of this species, see Ito et al. (2017).

N NAT ***Najas gracillima*** (A.Braun ex Engelm.) Magnus

N NAT ***Najas graminea*** Delile

N NAT ***Ottelia alismoides*** (L.) Pers.

N NAT ***Vallisneria americana*** Michx.

Hydrophyllaceae

N NAT ***Phacelia tanacetifolia*** Benth.

Hypericaceae

N D *Hypericum balearicum* L.

Note: The locality cited for Liguria is the result of a past introduction (Robson 1985). According to Burnat (1896) and Fiori (1898), the Ligurian population recorded by Parlatore (1875) was almost certainly cultivated.

N NAT ***Hypericum calycinum*** L.

N NAT ***Hypericum majus*** (A.Gray) Britton

N NAT ***Hypericum mutilum*** L. subsp. ***mutilum***

Iridaceae

Taxonomic references: *Chamaeiris* Medik., *Eremiris* (Spach) Rodion, *Evansia* (Alef.) Salisb. ex Decne., *Iris* L. s.str., *Siphonostylys* Wern.Schulze, and *Tectiris* M.B.Crespo, Mart.Azorín & Mavrodiev (Peruzzi et al. 2014; Crespo et al. 2015).

N NAT ***Chamaeiris orientalis*** (Mill.) M.B.Crespo

N CAS ***Chamaeiris spuria*** (L.) Medik.

N INV ***Chasmanthe aethiopica*** (L.) N.E.Br.

Note: Some records of this species could refer to *C. floribunda* (Salisb.) N.E.Br. (Grandis 2016).

N NAT ***Chasmanthe bicolor*** (Gasp.) N.E.Br.

N INV ***Chasmanthe floribunda*** (Salisb.) N.E.Br.

N NAT FER ***Crocosmia crocosmiiflora*** (Lemoine) N.E.Br.

Parentage: *C. aurea* (Pappe ex Hook.) Planch. × *C. pottsii* (Baker) N.E.Br. (S-Africa).

N CAS CLT ***Crocus*** ×***luteus*** Lam.

Parentage: *C. angustifolius* Weston × *C. flavus* Weston. Note: The plants observed in Emilia-Romagna are possibly cultivated.

A CAS CLT ***Crocus sativus*** L.

Note: Directly domesticated from *C. cartwrightianus* Herb. (Greece) (Nemati et al. 2018).

N NAT ***Crocus tommasinianus*** Herb.
N NC ***Eremiris lactea*** (Pall.) Rodion.
N NAT ***Evansia japonica*** (Thunb.) Klatt
N NAT ***Ferraria crispa*** Burm. subsp. ***crispa***
N CAS CLT ***Freesia*** ×***kewensis*** J.Wright bis nothosubsp. ***kewensis***
Parentage: *F. corymbosa* (Burm.f.) N.E.Br. × *F. leichtlinii* Klatt subsp. *alba* (G.L.Mey.) J.C.Manning & Goldblatt.
N NAT ***Freesia leichtlinii*** Klatt subsp. ***alba*** (G.L.Mey.) J.C.Manning & Goldblatt
N CAS ***Iridodictyum reticulatum*** (M.Bieb.) Rodion.
A NAT ***Iris florentina*** L.
Note: For the taxonomy and nomenclature of this species, see Martini and Viciani (2018).
A NAT FER ***Iris germanica*** L.
Parentage: *I. pallida* Lam. × *I. variegata* L. (eastern Mediterranean Region).
A NAT ***Iris pallida*** Lam.
N CAS ***Iris variegata*** L.
N CAS ***Melasphaerula ramosa*** (L.) Klatt
N NAT ***Romulea rosea*** (L.) Eckl.
T N CAS ***Siphonostylis cretensis*** (Janka) Wern.Schulze
Note: This species is doubtfully distinct from *S. unguicularis* (Poir.) Wern.Schulze (Boltenkov and Mesterházy 2022).
N NAT ***Siphonostylis unguicularis*** (Poir.) Wern.Schulze
N NAT ***Sisyrinchium micranthum*** Cav.
Note: For the taxonomy of this species, see Weakley et al. (2023).
N NAT ***Sisyrinchium montanum*** Greene
Note: For the taxonomy of this species, see Banfi and Galasso (2010).
N CAS ***Sparaxis bulbifera*** (L.) Ker Gawl.
N CAS ***Sparaxis tricolor*** (Schneev.) Ker Gawl.
N NAT ***Tectiris tectorum*** (Maxim.) M.B.Crespo, Mart.-Azorín & Mavrodiev

Juglandaceae
Taxonomic references: *Juglans* (Marazzi et al. 2021).
N CAS ***Carya illinoinensis*** (Wangenh.) K.Koch
T N NAT ***Juglans ailantifolia*** Carrière
Note: This species is doubtfully distinct from *J. mandshurica* Maxim. (Marazzi et al. 2021).
N CAS ***Juglans cinerea*** L.
Note: This species was confused with *J. ailantifolia* Carrière in Piemonte and Lombardia (Marazzi et al. 2021; Selvaggi et al. 2022). Also the record of the species in Veneto (Argenti et al. 2019) should be verified.
N INV ***Juglans nigra*** L.
N NAT ***Pterocarya fraxinifolia*** (Lam.) Spach

Juncaceae
N NAT ***Juncus dichotomus*** Elliott
N CAS ***Juncus ensifolius*** Wikstr.
N NAT ***Juncus marginatus*** Rostk.
N INV ***Juncus tenuis*** Willd.

	Lamiaceae
	Taxonomic references: *Coleus* Lour. (Paton et al. 2019); *Salvia* L. (incl. *Perovskia* Kar.) (Drew et al. 2017); *Stachys* L. (incl. *Sideritis* L.) (Bartolucci et al. 2014; Galasso et al. 2016).
N CAS	***Ajuga dictyocarpa*** Hayata
N CAS CLT	***Caryopteris* ×*clandonensis*** A.Simmonds ex C.H.Curtis
	Parentage: *C. incana* (Thunb. ex Houtt.) Miq. × *C. mongholica* Bunge (Great Britain).
N CAS	***Clerodendrum bungei*** Steud.
N CAS	***Clerodendrum trichotomum*** Thunb.
N CAS	***Coleus scutellarioides*** (L.) Benth.
N CAS	***Dracocephalum moldavica*** L.
N CAS	***Dracocephalum parviflorum*** Nutt.
N NAT	***Elsholtzia ciliata*** (Thunb.) Hyl.
N CAS	***Elsholtzia stauntonii*** Benth.
N NAT	***Lamium galeobdolon*** (L.) L. subsp. ***argentatum*** (Smejkal) J.Duvign.
N CAS	***Lavandula dentata*** L.
	Note: The occurrence of this species in Toscana is based on an observation in 2018 in Massa (D. Marchetti, pers. comm.).
A NAT	***Leonurus cardiaca*** L.
N NAT	***Leonurus quinquelobatus*** Gilib.
N NAT	***Lycopus lucidus*** Turcz. ex Benth.
N CAS	***Marrubium peregrinum*** L.
N CAS	***Nepeta* ×*faassenii*** Bergmans ex Stearn nothosubsp. ***faassenii***
	Parentage: *N. nepetella* L. subsp. *nepetella* × *N. racemosa* Lam. subsp. *racemosa*.
N CAS	***Nepeta racemosa*** Lam. subsp. ***racemosa***
A CAS	***Ocimum basilicum*** L.
N D	*Origanum dictamnus* L.
A NAT	***Origanum majorana*** L.
N CAS	***Perilla frutescens*** (L.) Britton
N NAT	***Physostegia virginiana*** (L.) Benth.
N NAT	***Pseudodictamnus mediterraneus*** Salmaki & Siadati subsp. ***mediterraneus***
	Note: For the nomenclature of this species, see Siadati et al. (2018).
N CAS	***Salvia amplexicaulis*** Lam.
N CAS	***Salvia canariensis*** L.
A CAS	***Salvia farinacea*** Benth.
N CAS	***Salvia* ×*floriferior*** Dolat. & Ziel.
	Parentage: *S. abrotanoides* (Kar.) Sytsma × *S. yangii* B.T.Drew.
N NAT	***Salvia hispanica*** L.
N NAT	***Salvia leucantha*** Cav.
N CAS	***Salvia microphylla*** Kunth
N NC	***Salvia napifolia*** Jacq.
A CAS	***Salvia officinalis*** L. subsp. ***lavandulifolia*** (Vahl) Gams
N NC	***Salvia pinnata*** L.
N CAS	***Salvia reflexa*** Hornem.
N CAS	***Salvia splendens*** Sellow ex Wied-Neuw.
A NAT	***Satureja hortensis*** L.
N CAS	***Scutellaria albida*** L. subsp. ***albida***
N NAT	***Stachys byzantina*** K.Koch

N NC	***Stachys perfoliata*** (L.) Peruzzi, Bartolucci & Soldano
N CAS	***Stachys talbotii*** Bartolucci & Galasso
N CAS	***Teucrium hircanicum*** L.
N NAT	***Ziziphora capitata*** L. subsp. ***capitata***
	Lardizabalaceae
N NAT	***Akebia ×pentaphylla*** (Makino) Makino Parentage: *A. quinata* (Thunm. ex Houtt.) Decne. × *A. trifoliata* (Thunb.) Koidz.
N CAS	***Akebia quinata*** (Thunm. ex Houtt.) Decne.
	Lauraceae Taxonomic references: *Camphora* Fabr. (Huang et al. 2016; Rohde et al. 2017; Trofimov and Rohwer 2020).
N NAT	***Camphora glandulifera*** (Wall.) Nees
N CAS	***Persea americana*** Mill.
N NC	***Persea indica*** (L.) Spreng.
	Lentibulariaceae
N NAT	***Utricularia gibba*** L.
	Liliaceae
N CAS	***Fritillaria imperialis*** L.
N NC	***Fritillaria persica*** L.
A NAT	***Lilium candidum*** L.
N D	*Lilium chalcedonicum* L.
N NAT	***Tulipa agenensis*** Redouté
N NAT	***Tulipa clusiana*** Redouté
N CAS CLT	***Tulipa gesneriana*** L. subsp. ***gesneriana*** Note: Directly domesticated from *T. gesneriana* L. subsp. *schrenkii* (Regel) Nyman (≡ *T. schrenkii* Regel = *T. suaveolens* Roth) (Crimea; Kritskaya et al. 2020).
T N NAT	***Tulipa raddii*** Reboul Note: According to Christenhusz et al. (2013), this species would be a heterotypic synonym of *T. agenensis* Redouté. However, we prefer to provisionally consider them as distinct species.
N NAT	***Tulipa saxatilis*** Sieber ex Spreng.
	Linaceae
N NAT	***Linum austriacum*** L.
N CAS	***Linum grandiflorum*** Desf.
A CAS CLT	***Linum usitatissimum*** L. subsp. ***usitatissimum*** Note: Directly domesticated from *L. usitatissimum* subsp. *angustifolium* (Huds.) Thell. (Middle East).
	Linderniaceae
N INV	***Lindernia dubia*** (L.) Pennell Note: For the taxonomy of this species, see Lewis (2000).
	Linnaeaceae

N CAS	***Kolkwitzia amabilis*** Graebn.
	Lythraceae
	Taxonomic references: *Ammannia* L. (Graham 1979, 1985; Banfi and Galasso 2010; Ardenghi and Galasso 2013); *Rotala* L. (Cook 1979).
N NC	***Ammannia baccifera*** L.
N INV	***Ammannia coccinea*** Rottb.
N NAT	***Ammannia robusta*** Heer & Regel
N CAS	***Ammannia senegalensis*** Lam.
N NAT	***Ammannia verticillata*** (Ard.) Lam.
N CAS	***Cuphea hyssopifolia*** Kunth
N CAS	***Lagerstroemia indica*** L.
A NAT FER	***Punica granatum*** L.
	Note: Feral and culton of the same species.
N NAT	***Rotala densiflora*** (Roth) Koehne
N NAT	***Rotala filiformis*** (Bellardi) Hiern
N NAT	***Rotala indica*** (Willd.) Koehne
N NAT	***Rotala ramosior*** (L.) Koehne
	Magnoliaceae
N CAS	***Liriodendron tulipifera*** L.
N CAS	***Magnolia grandiflora*** L.
N CAS	***Magnolia kobus*** DC.
	Malvaceae
A INV	***Abutilon theophrasti*** Medik.
N NAT	***Alcea biennis*** Winterl subsp. ***biennis***
A NAT FER	***Alcea rosea*** L.
	Parentage: Unknown (Tang et al. 2007).
N NAT	***Alcea setosa*** (Boiss.) Alef.
N CAS CLT	***Anisodontea*** ×***hypomadara*** (Sprague) D.M.Bates
	Parentage: Unknown.
N CAS	***Anoda cristata*** (L.) Schltdl.
N CAS	***Brachychiton discolor*** F.Muell.
N CAS	***Brachychiton diversifolius*** R.Br. subsp. ***diversifolius***
N CAS	***Brachychiton populneus*** (Schott & Endl.) R.Br.
N CAS	***Callianthe peruviana*** (Lam.) Dorr
N CAS	***Ceiba speciosa*** (A.St.-Hil., A.Juss. & Cambess.) Ravenna
N CAS	***Firmiana simplex*** (L.) W.Wight
A CAS CLT	***Gossypium herbaceum*** L. subsp. ***herbaceum***
	Note: Directly domesticated from *G. herbaceum* subsp. *africanum* (G.Watt) Vollesen (NE-Africa).
N CAS CLT	***Gossypium hirsutum*** L.
	Note: Directly domesticated from the same species (Gulf of Mexico, coastal area).
N NAT	***Hibiscus moscheutos*** L. subsp. ***moscheutos***
	Note: For the taxonomy of this species, see Blanchard (2008).
N CAS CLT	***Hibiscus rosa-sinensis*** L.
	Parentage: Unknown (China).
N CAS	***Hibiscus syriacus*** L.

N NAT	***Hibiscus trionum*** L.
N CAS	***Lagunaria patersonia*** (Andrews) G.Don
N CAS	***Malva verticillata*** L.
N NAT	***Modiola caroliniana*** (L.) G.Don
N CAS	***Pavonia hastata*** Cav.
N NAT	***Sida rhombifolia*** L. subsp. ***rhombifolia***
N CAS	***Sida spinosa*** L.
N CAS	***Sphaeralcea bonariensis*** (Cav.) Griseb.
N CAS	***Tilia americana*** L.
N NAT	***Tilia tomentosa*** Moench
	Martyniaceae
N CAS	***Ibicella lutea*** (Lindl.) Van Eselt.
N CAS	***Proboscidea louisiana*** (Mill.) Thell.
	Mazaceae
N NAT	***Mazus miquelii*** Makino
N NAT	***Mazus pumilus*** (Burm.f.) Steenis
	Meliaceae
N NAT	***Melia azedarach*** L.
	Menispermaceae
N NAT	***Cocculus laurifolius*** DC.
	Molluginaceae
	Taxonomic references: Thulin et al. (2016).
N INV	***Glinus lotoides*** L.
N CAS	***Hypertelis cerviana*** (L.) Thulin
N INV	***Mollugo verticillata*** L.
	Montiaceae
N CAS	***Claytonia perfoliata*** Donn ex Willd.
	Moraceae
N INV	***Broussonetia papyrifera*** (L.) Vent.
N CAS	***Fatoua villosa*** (Thunb.) Nakai
N CAS	***Ficus elastica*** Roxb. ex Hornem.
N CAS	***Ficus macrophylla*** Pers. subsp. ***columnaris*** (C.Moore) P.S.Green
N NAT	***Ficus microcarpa*** L.f.
N CAS	***Ficus pumila*** L.
N CAS	***Ficus rubiginosa*** Desf. ex Vent.
N CAS	***Ficus sagittata*** Vahl
N NAT	***Ficus watkinsiana*** F.M.Bailey
N NAT	***Maclura pomifera*** (Raf.) C.K.Schneid.
A NAT	***Morus alba*** L.
N CAS	***Morus indica*** L.
T N CAS	***Morus kagayamae*** Koidz.

	Note: This species is doubtfully distinct from *M. indica* L. (Nepal and Purintun 2021; Yang et al. 2023).
A NAT	***Morus nigra*** L.
	Musaceae
N NAT	***Musa basjoo*** Siebold & Zucc. ex Iinuma
N CAS CLT	***Musa* ×*paradisiaca*** L. Parentage: *M. acuminata* Colla × *M. balbisiana* Colla (Malaya).
	Myrtaceae
N CAS	***Eucalyptus astringens*** (Maiden) Maiden subsp. ***astringens***
N CAS	***Eucalyptus botryoides*** Sm.
N INV	***Eucalyptus camaldulensis*** Dehnh. subsp. ***camaldulensis***
N NAT	***Eucalyptus globulus*** Labill. subsp. ***globulus***
N CAS	***Eucalyptus globulus*** Labill. subsp. ***maidenii*** (F.Muell.) J.B.Kirkp.
N CAS	***Eucalyptus gomphocephala*** DC.
N CAS	***Eucalyptus leucoxylon*** F.Muell. subsp. ***leucoxylon***
N NAT	***Eucalyptus occidentalis*** Endl.
N CAS	***Eucalyptus polyanthemos*** Schauer subsp. ***polyanthemos***
N CAS	***Eucalyptus propinqua*** H.Deane & Maiden
N CAS	***Eucalyptus robusta*** Sm.
N CAS	***Eucalyptus rudis*** Endl. subsp. ***rudis***
N CAS	***Eucalyptus sideroxylon*** A.Cunn. ex Woolls
N CAS	***Eucalyptus tereticornis*** Sm.
N CAS	***Eucalyptus* ×*trabutii*** H.Vilm. nothosubsp. ***trabutii*** Parentage: *E. botryoides* Sm. × *E. camaldulensis* Dehnh. subsp. *camaldulensis*.
N CAS	***Eucalyptus viminalis*** Labill. subsp. ***viminalis***
N CAS	***Feijoa sellowiana*** (O.Berg) O.Berg
N CAS	***Metrosideros excelsa*** Sol. ex Gaertn.
	Namaceae Taxonomic references: Cecchi and Selvi (2014).
N NAT	***Wigandia caracasana*** Kunth
N NAT	***Wigandia kunthii*** Choisy
	Nelumbonaceae
N INV	***Nelumbo nucifera*** Gaertn.
	Nyctaginaceae Taxonomic references: *Boerhavia* L. (Struwig and Siebert 2013).
T N INV	***Boerhavia coccinea*** Mill.
T N CAS	***Boerhavia repens*** L. subsp. ***diandra*** (L.) Maire & Weiller
N CAS	***Bougainvillea glabra*** Choisy
N CAS	***Bougainvillea spectabilis*** Willd.
N INV	***Mirabilis jalapa*** L.
N NAT	***Mirabilis longiflora*** L.
N NAT	***Mirabilis nyctaginea*** (Michx.) MacMill.

Nymphaeaceae

N NAT FER ***Nymphaea* ×*marliacea*** Lat.-Marl.
Putative parentage: *N. alba* L. (Europe) × *N. mexicana* Zucc. (Neotropic Region) × *N. odorata* Aiton var. *rosea* Pursh (N-America). Note: Author citation according to Dana et al. (2017).

N INV ***Nymphaea mexicana*** Zucc.

N CAS ***Nymphaea* ×*thiona*** D.B.Ward nothosubsp. ***thiona***
Parentage: *N. mexicana* Zucc. × *N. odorata* Aiton subsp. *odorata*.

Oleaceae
Taxonomic references: *Chrysojasminum* Banfi (Banfi 2014).

N NAT ***Chrysojasminum humile*** (L.) Banfi

N NAT ***Fontanesia phillyreoides*** Labill.

N CAS ***Forsythia intermedia*** Zabel
Note: Contrary to what is usually reported, it is not a hybrid (*F. suspensa* (Thunb.) Vahl × *F. viridissima* Lindl.), but a distinct species whose origin is still to be investigated (Kim and Kim 2011).

N CAS ***Forsythia suspensa*** (Thunb.) Vahl

N CAS ***Forsythia viridissima*** Lindl.

N CAS ***Fraxinus pennsylvanica*** Marshall

N NAT ***Jasminum mesnyi*** Hance

N NAT ***Jasminum nudiflorum*** Lindl.

A NAT ***Jasminum officinale*** L.

N CAS ***Jasminum polyanthum*** Franch.

N CAS ***Ligustrum japonicum*** Thunb.

N INV ***Ligustrum lucidum*** W.T.Aiton

N INV ***Ligustrum ovalifolium*** Hassk.

N INV ***Ligustrum sinense*** Lour.

N NAT ***Syringa vulgaris*** L.

Onagraceae
Taxonomic references: *Ludwigia* L. (Galasso 2007); *Oenothera* L. (Soldano 1993).

N NAT ***Epilobium brachycarpum*** C.Presl

N NAT ***Epilobium ciliatum*** Raf.

N CAS ***Epilobium nummularifolium*** R.Cunn. ex A.Cunn.

N INV ***Ludwigia hexapetala*** (Hook. & Arn.) Zardini, H.Y.Gu & P.H.Raven
Note: According to Reg. (EU) No. 1143/2014, after the discovery and reporting the presence of the species in Piemonte (Antonietti et al. 2023) a project to eradicate the species has been undertaken. This species is to be considered invasive in Lombardia (L. Gariboldi, pers. comm.).

N INV ***Ludwigia peploides*** (Kunth) P.H.Raven subsp. ***montevidensis*** (Spreng.) P.H.Raven
This species is to be considered invasive in Piemonte (A. Selvaggi, pers. comm.).

T N INV ***Oenothera adriatica*** Soldano
Note: According to Hassler (2020), this species could be a heterotypic synonym of *O. drawertii* Renner ex Rostański.

N NAT ***Oenothera biennis*** L.

T N NAT ***Oenothera chicaginensis*** de Vries ex Renner & Cleland

Note: According to Rostański et al. (2010), and Rostański and Verloove (2015), this species would be a heterotypic synonym of *O. pycnocarpa* G.F.Atk. & Bartlett, but we prefer to provisionally consider them as distinct species (Soldano 1993).

N CAS ***Oenothera deflexa*** R.R.Gates
N CAS ***Oenothera depressa*** Greene
N NAT ***Oenothera fallacoides*** Soldano & Rostański
N CAS ***Oenothera fruticosa*** L. subsp. ***tetragona*** (Roth) W.L.Wagner
N NAT ***Oenothera gaura*** W.L.Wagner & Hoch
N INV ***Oenothera glazioviana*** Micheli
N CAS ***Oenothera grandiflora*** L'Hér.
N NAT ***Oenothera indecora*** Cambess.
N NAT ***Oenothera italica*** Rostański & Soldano
N CAS ***Oenothera laciniata*** Hill
N INV ***Oenothera latipetala*** (Soldano) Soldano
N NAT ***Oenothera lindheimeri*** (Engelm. & A.Gray) W.L.Wagner & Hoch
N NAT ***Oenothera marinellae*** Soldano
N INV ***Oenothera oakesiana*** (A.Gray) J.W.Robbins ex S.Watson
N NAT ***Oenothera odorata*** Jacq.
N NAT ***Oenothera oehlkersii*** Kappus ex Rostański
N CAS ***Oenothera parviflora*** L.
N NAT ***Oenothera pedemontana*** Soldano
N NAT ***Oenothera pellegrinii*** Soldano
N CAS ***Oenothera pilosella*** Raf. subsp. ***pilosella***
N NAT ***Oenothera rosea*** L'Hér. ex Aiton
N NAT ***Oenothera royfraseri*** R.R.Gates
N INV ***Oenothera sesitensis*** Soldano
N CAS ***Oenothera sinuosa*** W.L.Wagner & Hoch
N NAT ***Oenothera speciosa*** Nutt.
N NAT ***Oenothera stricta*** Ledeb. ex Link subsp. ***stricta***
Note: The specific epithet was published as "*striata*", but it is a typographical error to be corrected in "*stricta*", according to the name published later by Ledebour (1822) (Art. 60.1 of ICN).
N INV ***Oenothera stucchii*** Soldano
N NAT ***Oenothera suaveolens*** Desf. ex Pers.

Orchidaceae
N CAS ***Bletilla striata*** (Thunb.) Rchb.f.

Orobanchaceae
N NAT ***Leptorhabdos parviflora*** (Benth.) Benth.

Oxalidaceae
N INV ***Oxalis articulata*** Savigny
N NAT ***Oxalis bowiei*** W.T.Aiton ex G.Don
N CAS ***Oxalis brasiliensis*** Lodd., G.Lodd. & W.Lodd. ex Drapiez
N NAT ***Oxalis debilis*** Kunth
N INV ***Oxalis dillenii*** Jacq.
N CAS ***Oxalis incarnata*** L.

N NAT	***Oxalis latifolia*** Kunth
N CAS	***Oxalis megalorrhiza*** Jacq.
N INV	***Oxalis pes-caprae*** L.
N NAT	***Oxalis purpurata*** Jacq. Note: The record for Emilia-Romagna should be referred to *O. articulata* (A. Stinca, pers. comm.).
N NAT	***Oxalis purpurea*** L.
N INV	***Oxalis stricta*** L.
N CAS	***Oxalis tetraphylla*** Cav.
N NAT	***Oxalis violacea*** L.
	Paeoniaceae
N NC	***Paeonia suffruticosa*** Andrews subsp. ***suffruticosa***
	Papaveraceae Taxonomic references: *Oreomecon* Banfi, Bartolucci, J.-M.Tison & Galasso, *Papaver* L., and *Roemeria* Medik. (Banfi et al. 2022b).
N CAS	***Eschscholzia californica*** Cham. subsp. ***californica***
N NAT	***Fumaria kralikii*** Jord.
N D	*Fumaria rostellata* Knaf
N CAS	***Hypecoum pendulum*** L.
N CAS	***Lamprocapnos spectabilis*** (L.) Fukuhara
T N CAS	***Oreomecon crocea*** (Ledeb.) Banfi, Bartolucci, J.-M.Tison & Galasso Note: *Oreomecon crocea* is a species native to southern Siberia, central Asia, and northern China, and has for more than 200 years been cultivated as ornamental (Siberian poppy) and erroneously traded as *O. nudicaulis* (L.) Banfi, Bartolucci, J.-M.Tison & Galasso (Elven et al. 2020 onwards). However, according to several authors (e.g., Zhang and Grey-Wilson 2008), it would fall within the variability of a highly polymorphic *O. nudicaulis*.
N NAT	***Papaver atlanticum*** (Ball) Coss. subsp. ***atlanticum***
N CAS	***Papaver cambricum*** L.
A NAT	***Papaver lecoqii*** Lamotte
N CAS	***Papaver orientale*** L.
A NAT	***Papaver somniferum*** L.
N CAS	***Roemeria hybrida*** (L.) DC. subsp. ***hybrida***
	Passifloraceae
N NAT	***Passiflora caerulea*** L.
N CAS	***Passiflora incarnata*** L.
N NAT	***Passiflora morifolia*** Mast.
	Paulowniaceae
N INV	***Paulownia tomentosa*** (Thunb.) Steud.
	Pedaliaceae
A CAS CLT	***Sesamum indicum*** L. Note: Directly domesticated from *S. mulayanum* N.C.Nair (India-SE-Asia).

Phrymaceae
Taxonomic references: *Erythranthe* Spach (Barker et al. 2012).

N NAT ***Erythranthe cuprea*** (J.Veitch & J.J.Veitch ex Dombrain) G.L.Nesom

N NAT ***Erythranthe guttata*** (DC.) G.L.Nesom

N CAS ***Erythranthe moschata*** (Douglas ex Lindl.) G.L.Nesom
Note: For the taxonomy of this species, see Nesom (2017).

N CAS ***Mimulus ringens*** L.

Phyllanthaceae
Taxonomic references: *Moeroris* (Bouman et al. 2022).

N NAT ***Moeroris tenella*** (Roxb.) R.W.Bouman

Phytolaccaceae

N CAS ***Phytolacca acinosa*** Roxb.

N INV ***Phytolacca americana*** L.

N NAT ***Phytolacca dioica*** L.

Pittosporaceae

N CAS ***Pittosporum crassifolium*** Banks & Sol.

N NAT ***Pittosporum tobira*** (Thunb.) W.T.Aiton

N NAT ***Pittosporum undulatum*** Vent.

N CAS ***Pittosporum venulosum*** F.Muell.

N NAT ***Sollya heterophylla*** Lindl.

Plantaginaceae

A NAT ***Antirrhinum majus*** L.

N CAS ***Collinsia heterophylla*** Buist ex Graham

N CAS ***Digitalis lanata*** Ehrh. subsp. ***lanata***

N NAT ***Limnophila ludoviciana*** Thieret

N NAT ***Linaria maroccana*** Hook.f.

N CAS ***Maurandya barclayana*** Lindl.

N CAS ***Mecardonia procumbens*** (Mill.) Small
Note: The recorded plants can be referred to *M. procumbens* (Mill.) Small var. *tenella* (Cham. & Schltdl.) V.C.Souza (Alessandrini et al. 2020).

N D *Plantago loeflingii* L.

N EX ***Plantago patagonica*** Jacq.

N CAS ***Plantago virginica*** L.

N CAS ***Russelia equisetiformis*** Schltdl. & Cham.

N INV ***Veronica filiformis*** Sm.

N NAT ***Veronica peregrina*** L.

N INV ***Veronica persica*** Poir.

Platanaceae

N INV FER ***Platanus hispanica*** Mill. ex Münchh.
Parentage: *P. occidentalis* L. × *P. orientalis* L. The hybrid origin of this species is now definitely proven (Grimm and Denk 2008).

Plumbaginaceae

N CAS ***Ceratostigma plumbaginoides*** Bunge

N CAS	***Goniolimon tataricum*** (L.) Boiss. subsp. ***tataricum***
N CAS	***Limonium bonduellei*** (T.Lestib.) Kuntze
N NAT	***Plumbago auriculata*** Lam.
N CAS	***Plumbago zeylanica*** L.
	Poaceae Taxonomic references: *Ceratochloa* DC. & P.Beauv. (Verloove 2012); *Diplachne* P.Beauv. (Snow et al. 2018); genera mostly follow the phylogenetic classification by Soreng et al. (2022).
N NAT	***Agropyron desertorum*** (Fisch. ex Link) Schult.
N NAT	***Amelichloa caudata*** (Trin.) Arriaga & Barkworth
N NAT	***Aristida longispica*** Poir.
A INV	***Arundo donax*** L.
A NAT	***Avena atherantha*** C.Presl
A NAT FER	***Avena fatua*** L. Note: Feral of *A. sativa* L. s.l. (Europe).
A INV	***Avena ludoviciana*** Durieu
A CAS CLT	***Avena sativa*** L. subsp. ***byzantina*** (K.Koch) Romero Zarco Note: Directly domesticated from *A. sterilis* L., weed of the culton (Vavilov mimicry) between E-Europe and Middle East.
A CAS CLT	***Avena sativa*** L. subsp. ***macrantha*** (Hack.) Rocha Afonso Note: Domestication as in *A. sativa* subsp. *byzantina* (K.Koch) Romero Zarco.
A CAS CLT	***Avena sativa*** L. subsp. ***nuda*** (L.) Gillet & Magne Note: Domestication as in *A. sativa* subsp. *byzantina* (K.Koch) Romero Zarco.
A CAS CLT	***Avena sativa*** L. subsp. ***praegravis*** (Malzev) Mordv. Note: Domestication as in *A. sativa* subsp. *byzantina* (K.Koch) Romero Zarco.
A CAS CLT	***Avena sativa*** L. subsp. ***sativa*** Note: Domestication as in *A. sativa* subsp. *byzantina* (K.Koch) Romero Zarco.
N CAS	***Avena*** ×***scholzii*** Tzvelev Parentage: *A. fatua* L. × *A. ludoviciana* Durieu.
A NAT	***Avena sterilis*** L.
N CAS CLT	***Avena strigosa*** Schreb. Note: Directly domesticated from *A. atlantica* B.R.Baum & Fedak (Morocco). Note: *Avena brevis* Roth is interpreted as a cultivar group derived from the selection of the culton *A. strigosa*, known only in cultivation or as casual alien (Sicilia).
N CAS	***Bambusa bambos*** (L.) Voss
N DD	***Bambusa multiplex*** (Lour.) Raeusch. ex Schult. & Schult.f.
N CAS	***Beckmannia syzigachne*** (Steud.) Fernald
N NAT	***Bothriochloa laguroides*** (DC.) Herter
N NAT	***Bothriochloa pertusa*** (L.) A.Camus
N NAT	***Bothriochloa saccharoides*** (Sw.) Rydb. subsp. ***saccharoides*** Note: This species was confused in Liguria with *B. laguroides* (DC.) Herter.
N INV	***Bromopsis inermis*** (Leyss.) Holub subsp. ***inermis*** Note: According to Goiran (1906), this taxon is considered as non-native.

N NAT	***Bromopsis riparia*** (Rehmann) Holub subsp. ***riparia***
N NC	***Bromus brachystachys*** Hornung
N CAS	***Bromus japonicus*** Thunb. subsp. ***anatolicus*** (Boiss. & Heldr.) Pénzes
N CAS	***Cenchrus clandestinus*** (Hochst. ex Chiov.) Morrone
N CAS	***Cenchrus flaccidus*** (Griseb.) Morrone
N INV	***Cenchrus longisetus*** M.C.Johnst.
N INV	***Cenchrus longispinus*** (Hack.) Fernald
N CAS	***Cenchrus purpurascens*** Thunb.
N CAS	***Cenchrus purpureus*** (Schumach.) Morrone
N INV	***Cenchrus setaceus*** (Forssk.) Morrone
N INV	***Cenchrus spinifex*** Cav.
N NAT	***Ceratochloa carinata*** (Hook. & Arn.) Tutin Note: Several records from the Alps may refer to *C. sitchensis* (Trin.) Cope & Ryves.
N NAT	***Ceratochloa cathartica*** (Vahl) Herter
N NAT	***Ceratochloa sitchensis*** (Trin.) Cope & Ryves
N CAS	***Chloris gayana*** Kunth
N CAS	***Chloris pycnothrix*** Trin.
N CAS	***Chloris truncata*** R.Br.
N CAS	***Chloris virgata*** Sw.
N CAS	***Coix lacryma-jobi*** L.
N INV	***Cortaderia selloana*** (Schult. & Schult.f.) Asch. & Graebn.
N INV	***Dactyloctenium aegyptium*** (L.) Willd.
N NC	***Desmazeria philistaea*** (Boiss.) H.Scholz subsp. ***philistaea***
N NAT	***Dichanthelium clandestinum*** (L.) Gould
N NAT	***Dichanthelium implicatum*** (Scribn.) Kerguélen Note: The correct identity of the taxon naturalized in Europe needs to be further investigated (Thomas 2015).
N INV	***Digitaria ciliaris*** (Retz.) Koeler
T N NAT	***Digitaria violascens*** Link Note: This species is doubtfully distinct from *D. ischaemum* (Schreb.) Muhl. subsp. *ischaemum*.
N CAS	***Dinebra retroflexa*** (Vahl) Panz.
N NAT	***Diplachne fusca*** (L.) P.Beauv. ex Roem. & Schult. subsp. ***fascicularis*** (Lam.) P.M.Peterson & N.Snow
N NAT	***Diplachne fusca*** (L.) P.Beauv. ex Roem. & Schult. subsp. ***fusca***
N NAT	***Diplachne fusca*** (L.) P.Beauv. ex Roem. & Schult. subsp. ***uninervia*** (J.Presl) P.M.Peterson & N.Snow
N NAT	***Echinochloa colonum*** (L.) Link subsp. ***colonum***
N CAS CLT	***Echinochloa colonum*** (L.) Link subsp. ***edulis*** (Honda) Banfi & Galasso Note: Directly domesticated from *E. colonum* (L.) Link subsp. *colonum* (India).
N NAT	***Echinochloa oryzicola*** (Vasinger) Vasinger
T N NAT	***Echinochloa oryzoides*** (Ard.) Fritsch Note: This species is doubtfully distinct from *E. crus-galli* (L.) P.Beauv. subsp. *crus-galli*.
N NAT	***Ehrharta erecta*** Lam.
N CAS	***Ehrharta longiflora*** Sm.
N NAT	***Eleusine coracana*** (L.) Asch. & Graebn. subsp. ***africana*** (Kenn.-O'Byrne) Hilu & de Wet

N CAS CLT	***Eleusine coracana*** (L.) Asch. & Graebn. subsp. ***coracana*** Note: Directly domesticated from *E. coracana* (L.) Gaertn. subsp. *africana* (Kenn.-O'Byrne) Hilu & de Wet (W-Africa).
N INV	***Eleusine indica*** (L.) Gaertn.
N NAT	***Eleusine tristachya*** (Lam.) Lam.
N CAS	***Eragrostis capillaris*** (L.) Nees
N NAT	***Eragrostis curvula*** (Schrad.) Nees
N NAT	***Eragrostis frankii*** (Fisch., C.A.Mey. & Avé-Lall.) Steud.
N CAS	***Eragrostis lugens*** Nees
N INV	***Eragrostis pectinacea*** (Michx.) Nees
N NAT	***Eragrostis virescens*** J.Presl
N CAS	***Festuca pulchra*** Schur
N CAS	***Glyceria grandis*** S.Watson
N NAT	***Glyceria striata*** (Lam.) Hitchc.
N NC	***Hackelochloa granularis*** (L.) Kuntze
N CAS	×***Haynaldoticum sardoum*** Meletti & Onnis nothosubsp. ***sardoum*** Putative prentage: *Dasypyrum villosum* (L.) P.Candargy × *Triticum turgidum* L. subsp. *durum* (Desf.) Husn. Note: The parental names used in the condensed formula of this nothogenus are not those that are now accepted for the parental genera (*Dasypyrum* (Coss. & Durieu) T.Durand and *Triticum* L.) (Art. H.8.1 of ICN).
N NAT	***Hordeum jubatum*** L.
A CAS CLT	***Hordeum vulgare*** L. subsp. ***vulgare*** Note: Directly domesticated from *H. vulgare* L. subsp. *spontaneum* (K.Koch) Thell. (SE-Turkey).
A NAT	***Lolium remotum*** Schrank
A NAT	***Lolium temulentum*** L.
N NAT	***Megathyrsus maximus*** (Jacq.) B.K.Simon & S.W.L.Jacobs Note: Both *Megathyrsus maximus* var. *maximus* and *M. maximus* var. *pubiglumis* (K.Schum.) B.K.Simon & S.W.L.Jacobs (= *M. bivonanus* (Brullo, Miniss., Scelsi & Spamp.) Verloove) were recorded in Sicilia (Banfi et al. 2022a).
N CAS?	***Melica altissima*** L.
N INV	***Melinis repens*** (Willd.) Zizka subsp. ***repens***
N CAS	***Miscanthus floridulus*** (Labill.) Warb. ex K.Schum. & Lauterb.
N CAS	***Miscanthus*** ×***longiberbis*** (Hack.) Nakai Parentage: *M. sacchariflorus* (Maxim.) Benth. & Hook.f. ex Franch. × *M. sinensis* Andersson.
N NAT	***Miscanthus sinensis*** Andersson
N NAT	***Muhlenbergia frondosa*** (Poir.) Fernald
N CAS	***Muhlenbergia mexicana*** (L.) Trin.
N INV	***Muhlenbergia schreberi*** J.F.Gmel.
N CAS	***Nassella formicarum*** (Delile) Barkworth
N CAS	***Nassella hyalina*** (Nees) Barkworth
N NAT	***Nassella neesiana*** (Trin. & Rupr.) Barkworth
N CAS	***Nassella tenuissima*** (Trin.) Barkworth
N NAT	***Nassella trichotoma*** (Nees) Hack. ex Arechav.
A INV FER	***Oryza sativa*** L. subsp. ***sativa*** Note: Feral of the same taxon, in turn directly domesticated from *O. sativa* L. subsp. *rufipogon* (Griff.) de Wet (SE-Asia).

N INV	***Panicum capillare*** L.
N INV	***Panicum dichotomiflorum*** Michx.
N D	*Panicum hillmanii* Chase
A NAT FER	***Panicum miliaceum*** L. Note: Feral and directly domesticated from the same species (China and Mongolia, northern steppes).
N INV	***Panicum philadelphicum*** Bernh. ex Trin.
N CAS	***Panicum virgatum*** L.
N NAT	***Paspalum dasypleurum*** Kunze ex É.Desv.
N NAT	***Paspalum denticulatum*** Trin.
N INV	***Paspalum dilatatum*** Poir.
N INV	***Paspalum distichum*** L.
N CAS	***Paspalum exaltatum*** J.Presl
N CAS	***Paspalum notatum*** Flüggé
N NAT	***Paspalum quadrifarium*** Lam.
N NAT	***Paspalum thunbergii*** Kunth ex Steud.
N NAT	***Paspalum vaginatum*** Sw.
N INV	***Phalaris canariensis*** L.
N NAT	***Phyllostachys aurea*** Carrière ex Rivière & C.Rivière
N CAS	***Phyllostachys aureosulcata*** McClure
N CAS	***Phyllostachys bissetii*** McClure
N NAT	***Phyllostachys edulis*** (Carrière) J.Houz.
N NAT	***Phyllostachys flexuosa*** Rivière & C.Rivière
N NAT	***Phyllostachys nigra*** (Lodd. ex Lindl.) Munro
N NAT	***Phyllostachys reticulata*** (Rupr.) K.Koch
N CAS	***Phyllostachys sulphurea*** (Carrière) Rivière & C.Rivière
N NAT	***Phyllostachys violascens*** (Carrière) Rivière & C. Rivière
N NAT	***Phyllostachys viridiglaucescens*** (Carrière) Rivière & C.Rivière
N NAT	***Phyllostachys viridis*** (R.A.Young) McClure
N CAS	***Phyllostachys vivax*** McClure
N NAT FER	***Piptatherum holciforme*** (M.Bieb.) Roem. & Schult. subsp. ***holciforme*** Note: Feral of the same taxon, in turn directly domesticated from *P. holciforme* subsp. *holciforme* var. *blancheanum* (É.Desv. ex Boiss.) Boiss. (archaeological site Ohalo II, Lake Tiberias, Israel, dated to 23,000 years ago).
N CAS	***Pleioblastus pygmaeus*** (Miq.) Nakai
N NAT	***Pleioblastus viridistriatus*** (Regel) Makino
N D	*Polypogon fugax* Nees ex Steud.
N NAT	***Psathyrostachys juncea*** (Fisch.) Nevski
N NAT	***Pseudosasa japonica*** (Siebold & Zucc. ex Steud.) Makino ex Nakai
N NAT	***Saccharum biflorum*** Forssk.
A CAS CLT	***Saccharum officinarum*** L. Note: Directly domesticated from *S. robustum* E.W.Brandes & Jeswiet ex Grassl (New Guinea).
A CAS CLT	***Secale cereale*** L. subsp. ***cereale*** Note: Directly domesticated in eastern Europe from *S. cereale* subsp. *ancestrale* Zhuk. (SE-Turkey), a former weed of cereal fields (Vavilov mimicry).
N NAT	***Semiarundinaria fastuosa*** (Lat.-Marl. ex Mitford) Makino
N NAT	***Setaria adhaerens*** (Forssk.) Chiov.

N NAT ***Setaria faberi*** R.A.W.Herrm.

A CAS CLT ***Setaria italica*** (L.) P.Beauv. subsp. ***italica***
Note: Directly domesticated from *S. italica* subsp. *viridis* (L.) Thell. (China). Note: Experimental fields of *S. italica* (L.) P.Beauv. subsp. *moharia* (Alef.) R.A.W.Herrm. (= *S. germanica* (Mill.) P.Beauv.) can be found in Lombardia.

N NAT FER ***Setaria italica*** (L.) P.Beauv. subsp. ***pycnocoma*** (Steud.) de Wet
Note: Feral of *S. italica* subsp. *italica*, in turn directly domesticated from *S. italica* subsp. *viridis* (L.) Thell.

N NAT ***Setaria parviflora*** (Poir.) Kerguélen

A CAS CLT ***Sorghum bicolor*** (L.) Moench subsp. ***bicolor***
Note: Directly domesticated from *S. bicolor* subsp. *verticilliflorum* (Steud.) de Wet ex Wiersema & J.Dahlb. (W-Africa).

A INV FER ***Sorghum halepense*** (L.) Pers.
Parentage: *S. drummondii* (Steud.) Nees ex Millsp. & Chase (derived from *S. bicolor* (L.) Moench subsp. bicolor × *S. bicolor* subsp. *arundinaceum* (Desv.) de Wet & J.R.Harlan ex Davidse) × *S. propinquum* (Kunth) Hitchc. (SE-Asia).

N NC ***Sporobolus alterniflorus*** (Loisel.) P.M.Peterson & Saarela

N INV ***Sporobolus anglicus*** (C.E.Hubb.) P.M.Peterson & Saarela
Parentage: Allohexaploid originating from a hybrid *S. alterniflorus* (Loisel.) P.M.Peterson & Saarela × *S. maritimus* (Curtis) P.M.Peterson & Saarela.

N NAT ***Sporobolus cryptandrus*** (Torr.) A.Gray

N NAT ***Sporobolus indicus*** (L.) R.Br.

N CAS ***Sporobolus michauxianus*** (Hitchc.) P.M.Peterson & Saarela

N INV ***Sporobolus neglectus*** Nash

N INV ***Sporobolus pumilus*** (Roth) P.M.Peterson & Saarela

N INV ***Sporobolus*** ×***townsendii*** (H.Groves & J.Groves) P.M.Peterson & Saarela
Parentage: *S. alterniflorus* (Loisel.) P.M.Peterson & Saarela × *S. maritimus* (Curtis) P.M.Peterson & Saarela.

N INV ***Sporobolus vaginiflorus*** (Torr. ex A.Gray) Alph.Wood

N NAT ***Stenotaphrum secundatum*** (Walter) Kuntze

N EX ***Themeda triandra*** Forssk.

N NAT ***Thinopyrum obtusiflorum*** (DC.) Banfi

N CAS CLT ×***Triticosecale neoblaringhemii*** A.Camus nothosubsp. ***neoblaringhemii***
Parentage: *Secale cereale* L. subsp. *cereale* × *Triticum turgidum* L. subsp. *durum* (Desf.) Husn. Note: The record of ×*Triticosecale* Wittm. ex A.Camus from Lombardia (Ardenghi and Polani 2016) is to be referred to this nothosubspecies (E. Banfi and N.M.G. Ardenghi, pers. comm.).

A CAS CLT ***Triticum aestivum*** L. subsp. ***aestivum***
Parentage: *T. tauschii* (Coss.) Schmalh. × *T. turgidum* L. subsp. *dicoccon* (Schrank ex Schübl.) Thell. (W-Fertile Crescent).

A DD CLT ***Triticum aestivum*** L. subsp. ***compactum*** (Host) Mac Key
Parentage: As in *T. aestivum* L. subsp. *aestivum*.

A CAS CLT ***Triticum aestivum*** L. subsp. ***spelta*** (L.) Thell.
Parentage: As in *T. aestivum* L. subsp. *aestivum*.

N CAS ***Triticum caudatum*** (L.) Raspail

A NAT ***Triticum cylindricum*** (Host) Ces., Pass. & Gibelli

A CAS CLT ***Triticum monococcum*** L. subsp. ***monococcum***

	Note: Directly domesticated from *T. monococcum* subsp. *aegilopoides* (Link) Thell. (SE-Turkey, Karaca Dağ mountains).
N NC	***Triticum peregrinum*** Hack. subsp. ***peregrinum***
A CAS	***Triticum* ×*requienii*** Ces., Pass. & Gibelli nothosubsp. ***requienii***
	Parentage: *T. aestivum* L. subsp. *aestivum* × *T. vagans* (Jord. & Fourr.) Greuter.
N CAS	***Triticum speltoides*** (Tausch) Gren. subsp. ***ligusticum*** (Savign.) Chennav.
N CAS	***Triticum speltoides*** (Tausch) Gren. subsp. ***speltoides***
A CAS CLT	***Triticum turgidum*** L. subsp. ***dicoccon*** (Schrank ex Schübl.) Thell.
	Note: Directly domesticated from *T. turgidum* subsp. *dicoccoides* (Körn. ex Asch. & Graebn.) Thell. [*T. speltoides* (Tausch) Gren. × *T. urartu* Tumanian ex Gandiljan] (Fertile Crescent).
A CAS CLT	***Triticum turgidum*** L. subsp. ***durum*** (Desf.) Husn.
	Note: Domestication as in *T. turgidum* subsp. *dicoccon* (Schrank ex Schübl.) Thell.
N CAS CLT	***Triticum turgidum*** L. subsp. ***turanicum*** (Jakubz.) Á.Löve & D.Löve
	Note: Domestication as in *T. turgidum* subsp. *dicoccon* (Schrank ex Schübl.) Thell. Note: Traded under the name of "Kamut" (*T. turgidum* subsp. *turanicum* 'QK-77 Montana').
A CAS CLT	***Triticum turgidum*** L. subsp. ***turgidum***
	Note: Domestication as in *T. turgidum* subsp. *dicoccon* (Schrank ex Schübl.) Thell.
N CAS CLT	***Zea mays*** L. subsp. ***mays***
	Parentage: *Z. mays* subsp. *parviglumis* Iltis & Doebley (Mexico: Michoacán, Balsas River valley) → *Z. mays* subsp. *mexicana* (Schrad.) Iltis (Mexico: Zacatecas, volcanic plateau).
N CAS	***Zizania latifolia*** (Griseb.) Hance ex F.Muell.
N CAS	***Zoysia japonica*** Steud.
N CAS	***Zoysia matrella*** (L.) Merr.
	Polemoniaceae
N NAT	***Collomia linearis*** Nutt.
N CAS	***Phlox caespitosa*** Nutt.
N CAS	***Phlox paniculata*** L.
	Polygalaceae
N CAS	***Polygala myrtifolia*** L.
	Polygonaceae
	Taxonomic references: *Koenigia* L. (Schuster et al. 2015); *Persicaria* (L.) Mill. (Galasso et al. 2014); *Pleuropterus* Turcz. and *Reynoutria* Houtt. (Padula et al. 2008; Galasso et al. 2009).
N NAT	***Fagopyrum dibotrys*** (D.Don) H.Hara
N NAT	***Fagopyrum esculentum*** Moench
N CAS	***Fagopyrum tataricum*** (L.) Gaertn.
N INV	***Fallopia baldschuanica*** (Regel) Holub
N NAT	***Koenigia polystachya*** (Wall. ex Meisn.) T.M.Schust. & Reveal
N NAT	***Muehlenbeckia sagittifolia*** (Ortega) Meisn.
N NAT	***Persicaria bungeana*** (Turcz.) Nakai
N NAT	***Persicaria capitata*** (Buch.-Ham. ex D.Don.) H.Gross

N INV	***Persicaria filiformis*** (Thunb.) Nakai
N NAT	***Persicaria longiseta*** (Bruijn) Kitag.
N INV	***Persicaria nepalensis*** (Meisn.) H.Gross
N NAT	***Persicaria orientalis*** (L.) Spach
N INV	***Persicaria pensylvanica*** (L.) M.Gómez
N NAT	***Persicaria senegalensis*** (Meisn.) Soják
N INV	***Persicaria virginiana*** (L.) Gaertn.
N INV	***Pleuropterus multiflorus*** (Thunb.) Nakai
N D	*Polygonum arenarium* Waldst. & Kit. subsp. *arenarium*
N CAS	×***Reyllopia conollyana*** (J.P.Bailey) Galasso Parentage: *Fallopia baldschuanica* (Regel) Holub × *Reynoutria japonica* Houtt.
N INV	***Reynoutria bohemica*** Chrtek & Chrtková Parentage: *R. japonica* Houtt. × *R. sachalinensis* (F.Schmidt) Nakai.
N CAS	***Reynoutria compacta*** (Hook.f.) Nakai
N INV	***Reynoutria japonica*** Houtt.
N INV	***Reynoutria sachalinensis*** (F.Schmidt) Nakai
N NAT	***Rheum officinale*** L.
N CAS	***Rheum palmatum*** L.
N CAS	***Rheum rhabarbarum*** L.
N NAT	***Rumex kerneri*** Borbás
N CAS	***Rumex longifolius*** DC.
N NAT	***Rumex lunaria*** L.
A NAT	***Rumex patientia*** L. subsp. ***patientia***
N CAS CLT	***Rumex rugosus*** Campd. Parentage: *R. thyrsiflorus* Fingerh., with possible involvement of another unknown species.
N CAS	***Rumex stenophyllus*** Ledeb.
N NAT	***Rumex thyrsiflorus*** Fingerh.
N NAT	***Rumex triangulivalvis*** (Danser) Rech.f.
N D	*Rumex vesicarius* L.
	Pontederiaceae Taxonomic references: *Heteranthera* Ruiz. & Pav. (Soldano 1992); *Pontederia* L. (Pellegrini et al. 2018).
N NAT	***Heteranthera limosa*** (Sw.) Willd.
N INV	***Heteranthera reniformis*** Ruiz & Pav.
N NAT	***Heteranthera rotundifolia*** (Kunth) Griseb.
N NAT	***Pontederia cordata*** L.
N INV	***Pontederia crassipes*** Mart.
N CAS	***Pontederia korsakowii*** (Regel & Maack) M.Pell. & C.N.Horn
	Portulacaceae
N NAT	***Portulaca grandiflora*** Hook.
N CAS	***Portulaca umbraticola*** Kunth
	Primulaceae
N NAT	***Cyclamen persicum*** Mill. Note: The occurrence of this species in Toscana is based on an observation in 2018 in Massa (D. Marchetti, pers. comm.).

N D	*Lysimachia maritima* (L.) Galasso, Banfi & Soldano
N CAS	***Primula florindae*** Kingdon-Ward
N CAS	***Primula vulgaris*** Huds. subsp. ***rubra*** (Sm.) Arcang.
	Proteaceae
N CAS	***Grevillea robusta*** A.Cunn. ex R.Br.
	Ranunculaceae
N CAS CLT	***Aconitum*** ×***cammarum*** L. Parentage: *A. napellus* L. group × *A. variegatum* L. s.l.
N NAT	***Anemone blanda*** Schott & Kotschy
N NAT	***Anemone pavonina*** Lam.
N CAS	***Aquilegia coerulea*** E.James
N NAT FER	***Aquilegia*** cv. Parentage: Unknown. Note: The plants found in Lombardia (Ardenghi and Polani 2016) are a selection of hybrids between *A. canadensis* L. (eastern N-America), *A. chrysantha* A.Gray (southwestern N-America), *A. coerulea* E.James (western N-America), and *A. saximontana* Rydb. (Colorado).
N CAS	***Clematis armandii*** Franch.
N NAT	***Clematis tangutica*** (Maxim.) Korsh.
N NAT	***Delphinium hispanicum*** Willk. ex Costa
N D	*Garidella nigellastrum* L.
N CAS	***Helleborus orientalis*** Lam.
A CAS	***Nigella sativa*** L.
N CAS	***Ranunculus asiaticus*** L.
	Resedaceae
N CAS	***Reseda odorata*** L.
	Rhamnaceae Taxonomic references: *Colletia* Comm. ex Juss. (Tortosa 1989; Galasso 2013).
N CAS	***Colletia spinosissima*** J.F.Gmel.
A NAT	***Ziziphus jujuba*** Mill.
	Rosaceae Taxonomic references: *Cotoneaster* Medik. (Fryer and Hylmö 2009); *Crataegus* L. (Phipps 2015); *Mespilus* L. (Phipps 2016a, 2016b); *Sorbus* L. (Bartolucci et al. 2018, 2024).
N D	*Agrimonia repens* L.
N CAS	***Alchemilla mollis*** (Buser) Rothm.
N NAT	***Amelanchier lamarckii*** F.G.Schroed. Note: For the identification of this species, see Schroeder (1972).
N CAS	***Chaenomeles japonica*** (Thunb.) Lindl. ex Spach
N CAS	***Chaenomeles speciosa*** (Sweet) Nakai
N CAS	***Cotoneaster acutifolius*** Turcz.
N CAS	***Cotoneaster apiculatus*** Rehder & E.H.Wilson
N NAT	***Cotoneaster bullatus*** Bois
N NAT	***Cotoneaster dammeri*** C.K.Schneid. subsp. ***dammeri***

N NAT ***Cotoneaster dielsianus*** E.Pritz. ex Diels

N CAS ***Cotoneaster divaricatus*** Rehder & E.H.Wilson
Note: This species was confused in Piemonte with *C. simonsii* Baker.

N INV ***Cotoneaster franchetii*** Bois

N CAS ***Cotoneaster hissaricus*** Pojark.

N NAT ***Cotoneaster hjelmqvistii*** Flinck & B.Hylmö

N INV ***Cotoneaster horizontalis*** Decne.

N NAT ***Cotoneaster lacteus*** W.W.Sm.

N CAS ***Cotoneaster nitens*** Rehder & E.H.Wilson

N NAT ***Cotoneaster pannosus*** Franch.

N NAT ***Cotoneaster salicifolius*** Franch.

N NAT ***Cotoneaster simonsii*** Baker
Note: For the nomenclature of this species, see Fryer and Zika (2014).

A NAT ***Crataegus azarolus*** L.

N NAT ***Crataegus coccinea*** L.

N CAS ***Crataegus crus-galli*** L.

N CAS ***Crataegus mexicana*** Moc. & Sessé ex DC.

N CAS ***Crataegus persimilis*** Sarg.

N NAT ***Crataegus submollis*** Sarg.

A NAT ***Cydonia oblonga*** Mill.

N CAS CLT ***Fragaria ananassa*** (Weston) Rozier
Parentage: Allooctoploid originating from the hybrid *F. chiloensis* (L.) Mill. × *F. virginiana* Mill.

N CAS ***Fragaria virginiana*** Mill.

N NAT FER ***Kerria japonica*** (L.) DC.
Note: Feral and culton of the same species (Japan). The escaped plants correspond to the cultivar Flore Pleno.

A NAT FER ***Malus domestica*** (Suckow) Borkh.
Parentage: *M. sieversii* (Ledeb.) M.Roem. (Transcaspian Region) → *M. sylvestris* (L.) Mill. (Europe).

N NAT ***Malus hupehensis*** (Pamp.) Rehder

N CAS ***Malus* ×*robusta*** (Carrière) Rehder
Parentage: *M. baccata* (L.) Borkh. × *M. prunifolia* (Willd.) Borkh.

A NAT ***Mespilus germanica*** L.

N CAS ***Photinia serratifolia*** (Desf.) Kalkman

N NAT ***Physocarpus opulifolius*** (L.) Maxim.

N CAS ***Potentilla atrosanguinea*** Lodd., G.Lodd. & W.Lodd. ex D.Don

N INV ***Potentilla indica*** (Andrews) Th.Wolf

N NAT ***Potentilla intermedia*** L.

N NAT ***Potentilla norvegica*** L.

N CAS ***Poteridium annuum*** (Nutt.) Spach

A CAS CLT ***Prunus armeniaca*** L.
Note: Directly domesticated from the same species (Transcaspian Region: Kazakhstan/China, Tien Shan mountains).

A NAT FER ***Prunus cerasifera*** Ehrh.
Note: Feral and culton of the same species (Asia Minor).

A NAT FER ***Prunus cerasus*** L.
Note: Feral of the same species, in turn directly domesticated from *P. fruticosa* Pall. (Balkan Region).

A NAT FER ***Prunus domestica*** L.

	Parentage: *P. cerasifera* Ehrh. (Pontic Turkey) × *P. microcarpa* C.A.Mey. (Hyrcanic Region, Caspian Sea) → *P. spinosa* L. (Europe).
A NAT FER	***Prunus dulcis*** (Mill.) D.A.Webb Note: Feral of the same species, in turn directly domesticated from *P. fenzliana* Fritsch (Turkey).
N CAS CLT	***Prunus* ×*hybrida*** (Schmidt) Galasso, Banfi & Bartolucci Parentage: *P. dulcis* (Mill.) D.A.Webb ♀ × *P. persica* (L.) Batsch ♂. Note: For the nomenclature of this species, see Banfi et al. (2018). Under the Art. H.10.2 of ICN, the names '*amygdalo-persica*', '*communi-persica*', and '*persico-amygdala*' (see Rehder 1922) are considered to be formulae and not true epithets.
N INV	***Prunus laurocerasus*** L.
A NAT FER	***Prunus persica*** (L.) Batsch Note: Feral and culton of the same species (China).
N INV	***Prunus serotina*** Ehrh.
N CAS	***Pyracantha angustifolia*** (Franch.) C.K.Schneid.
T N NAT	***Pyracantha crenatoserrata*** (Hance) Rehder Note: This species is doubtfully distinct from *P. crenulata* (D.Don) M.Roem., and it is sometimes improperly named *P. fortuneana* (Maxim.) H.L.Li (e.g., Gu and Spongberg 2003). However, the type of the latter taxon material does not belong to the genus *Pyracantha* M.Roem., but to *Photinia* Lindl. (Webb et al. 1988; Clement 2012).
N NAT	***Pyracantha crenulata*** (D.Don) M.Roem.
N CAS	***Pyracantha koidzumii*** (Hayata) Rehder
N CAS	***Pyrus betulifolia*** Bunge
N CAS	***Pyrus calleryana*** Decne.
A CAS CLT	***Pyrus communis*** L. subsp. ***communis*** Note: Directly domesticated from *P. communis* subsp. *pyraster* (L.) Ehrh.
N NAT	***Rhaphiolepis bibas*** (Lour.) Galasso & Banfi
N CAS	***Rhaphiolepis umbellata*** (Thunb.) Makino
N CAS CLT	***Rosa alba*** L.
N NAT	***Rosa banksiae*** W.T.Aiton
N CAS	***Rosa blanda*** Aiton
N NAT	***Rosa bracteata*** J.C.Wendl.
N NAT	***Rosa brunonii*** Lindl.
A CAS CLT	***Rosa centifolia*** L. Putative parentage: *R.* ×*damascena* L. × *Rosa* sp.
N CAS CLT	***Rosa chinensis*** Jacq. Note: Directly domesticated from *R. chinensis* var. *spontanea* (Rehder & E.H.Wilson) T.T.Yu & T.C.Ku (China). This species in Toscana is possibly cultivated.
N CAS	***Rosa foetida*** Herrm.
N CAS	***Rosa moschata*** Herrm.
N INV	***Rosa multiflora*** Thunb.
N CAS	***Rosa roxburghii*** Tratt.
N NAT	***Rosa rugosa*** Thunb.
N CAS	***Rosa virginiana*** Mill.
N NAT	***Rubus armeniacus*** Focke
N NAT	***Rubus laciniatus*** Weston
N CAS	***Rubus odoratus*** L.

N INV ***Rubus phoenicolasius*** Maxim.

N CAS ***Sorbaria sorbifolia*** (L.) A.Braun
Note: This species may have been confused with *S. tomentosa* (Lindl.) Rehder, marked by glabrous carpels and follicles (Rahn 1989; Tomaszewski 2001).

N NAT ***Sorbaria tomentosa*** (Lindl.) Rehder

N D *Sorbus hybrida* (L.) L.
Note: The records from Abruzzo and Lombardia have to be referred to *S.* ×*thuringiaca* (Nyman) Fritsch nothosubsp. *thuringiaca*, a native hybrid between *S. aria* (L.) Crantz and *S. aucuparia* L. subsp. *aucuparia*.

N CAS ***Spiraea cantoniensis*** Lour.

N INV ***Spiraea japonica*** L.f.

N NAT ***Spiraea salicifolia*** L.

N CAS CLT ***Spiraea*** ×***vanhouttei*** (Briot) Carrière
Parentage: *S. cantoniensis* Lour. × *S. trilobata* L.

Rubiaceae

N CAS ***Coprosma repens*** A.Rich.

N CAS ***Galium humifusum*** M.Bieb.

N NAT ***Galium rubioides*** L. subsp. ***rubioides***

N NAT ***Galium saxatile*** L.

A NAT ***Rubia tinctorum*** L.

Rutaceae
Taxonomic references: *Citrus* L. (incl. *Poncirus* Raf.) (Bayer et al. 2009; Penjor et al. 2013).

N CAS ***Choisya ternata*** Kunth

A CAS CLT ***Citrus*** ×***aurantium*** L.
Parentage: *C. maxima* (Burnm.) Merr. × *C. reticulata* Blanco. Note: For the nomenclature of this hybrid, see Mabberley (1997, 2004).

A CAS CLT ***Citrus*** ×***limon*** (L.) Osbeck
Parentage: *C.* ×*aurantium* L. × *C. medica* L. Note: For the nomenclature of this hybrid, see Mabberley (1997, 2004).

N CAS ***Citrus trifoliata*** L.

N CAS ***Ptelea trifoliata*** L.

N CAS ***Tetradium daniellii*** (Benn.) T.G.Hartley

N NAT ***Zanthoxylum armatum*** DC.

Salicaceae
Taxonomic references: *Salix* L. (Skvortsov 1999).

N NAT ***Populus balsamifera*** L.

N INV FER ***Populus*** ×***canadensis*** Moench nothosubsp. ***canadensis***
Parentage: *P. deltoides* W.Bartram ex Marshall subsp. *deltoides* × *P. nigra* L. subsp. *nigra*.

N NAT ***Populus deltoides*** W.Bartram ex Marshall subsp. ***deltoides***

N CAS CLT ***Salix babylonica*** L.
Note: Directly domesticated from the same species (E-Asia). Most of the records for this species could refer to *S.* ×*pendulina* Wender.

N CAS ***Salix dasyclados*** Wimm.

N NAT ***Salix eriocephala*** Michx.

A CAS	***Salix euxina*** I.V.Belyaeva Note: Marchenko and Kuzovkina (2022) recommended the conservation of the name *S. ×fragilis* L. with a new type to preserve the traditional usage of the name. Waiting for a formal nomenclatural act, we continue to follow the nomenclature proposed by Belyaeva (2009).
A NAT	***Salix ×fragilis*** L. Parentage: *S. alba* L. × *S. euxina* I.V.Belyaeva. Note: See the note to *Salix euxina* I.V.Belyaeva.
N CAS CLT	***Salix ×pendulina*** Wender. Parentage: *S. alba* L. × *S. babylonica* L. × *S. euxina* I.V.Belyaeva (Belyaeva et al. 2018).
A NAT	***Salix viminalis*** L.
	Santalaceae
N NAT	***Thesium ramosum*** Hayne
	Sapindaceae
N CAS	***Acer buergerianum*** Miq. subsp. ***buergerianum***
N INV	***Acer negundo*** L.
N CAS	***Acer palmatum*** Thunb.
N CAS	***Acer pensylvanicum*** L.
N CAS	***Acer rubrum*** L.
N NAT	***Acer saccharinum*** L.
N NAT	***Acer tataricum*** L. subsp. ***ginnala*** (Maxim.) Wesm.
N CAS	***Acer tataricum*** L. subsp. ***tataricum***
N CAS CLT	***Aesculus carnea*** J.Zeyh. Parentage: Allotetraploid originating from the hybrid *A. hippocastanum* L. (Balkan Peninsula) × *A. pavia* L. (N-America).
N CAS	***Aesculus hippocastanum*** L.
N CAS	***Alectryon tomentosus*** (F.Muell.) Radlk.
N NAT	***Cardiospermum grandiflorum*** Sw.
N NAT	***Cardiospermum halicacabum*** L.
N CAS	***Koelreuteria bipinnata*** Franch.
N NAT	***Koelreuteria paniculata*** Laxm.
	Saururaceae
N NAT	***Houttuynia cordata*** Thunb.
N NAT	***Saururus cernuus*** L.
	Saxifragaceae
N CAS	***Astilbe japonica*** (C.Morren & Decne.) A.Gray
N CAS CLT	***Astilbe ×rosea*** G.Van Wav. & Kruijff Note: For the nomenclature of this hybrid, see Powo (2023 onwards), however it is not certain that the name is validly published. Parentage: *A. chinensis* (Maxim.) Franch. & Sav. × *A. japonica* (C.Morren & Decne.) A.Gray.
N CAS	***Bergenia crassifolia*** (L.) Fritsch
N CAS	***Heuchera sanguinea*** Engelm.
N D	*Saxifraga ×geum* L. nothosubsp. *geum*

Parentage: *S. hirsuta* L. subsp. *hirsuta* × *S. umbrosa* L. Note: this nothospecies was generically reported for northern Italy, without distribution, by Pignatti et al. (2017a). This record could refer to *S. hirsuta* L. subsp. *hirsuta*.

N DD ***Saxifraga hirsuta*** L. subsp. ***hirsuta***
Note: This species was generically reported for northern Italy, without distribution, by Pignatti et al. (2017a).

N CAS ***Saxifraga stolonifera*** Curtis

N NAT ***Saxifraga umbrosa*** L.

Scrophulariaceae
Taxonomic references: *Buddleja* L. (Chau et al. 2017); *Myoporum* Sol. ex G.Forst. (Chinnock 2007).

N INV ***Buddleja davidii*** Franch.

N CAS ***Buddleja madagascariensis*** Lam.

N CAS ***Chaenostoma cordatum*** (Thunb.) Benth.

N INV ***Myoporum insulare*** R.Br.

N NAT ***Myoporum laetum*** G.Forst.

N NAT ***Myoporum tetrandrum*** (Labill.) Domin

N CAS ***Verbascum speciosum*** Schrad. subsp. ***speciosum***

N NAT ***Verbascum virgatum*** Stokes

Simaroubaceae

N INV ***Ailanthus altissima*** (Mill.) Swingle

Solanaceae
Taxonomic references: *Solanum* L. (Vorontsova and Knapp 2016; Sarkinen et al. 2018; Aubriot and Knapp 2022; Knapp et al. 2023).

N CAS ***Brugmansia aurea*** Lagerh.

N CAS ***Brugmansia suaveolens*** (Humb. & Bonpl. ex Willd.) Sweet

N CAS CLT ***Capsicum annuum*** L.
Note: Directly domesticated from *C. annuum* var. *glabriusculum* (Dunal) Heiser & Pickersgill (Barboza et al. 2022) (Mexico).

N INV ***Cestrum parqui*** L'Hér.

N NAT ***Datura ferox*** L.

N INV ***Datura innoxia*** Mill.

N CAS ***Datura quercifolia*** Kunth

N INV ***Datura stramonium*** L.

N INV ***Datura wrightii*** Regel
Note: For the taxonomy of this species, see Verloove et al. (2010).

N INV ***Jaborosa integrifolia*** Lam.

N NAT ***Lycianthes rantonnetii*** (Carrière) Bitter

N CAS ***Lycium afrum*** L.

N NAT ***Lycium barbarum*** L.

N NAT ***Lycium boerhaviifolium*** L.f.

N NAT ***Lycium chinense*** Mill.

N NAT ***Lycium ferocissimum*** Miers

A CAS ***Mandragora officinarum*** L.

N NAT ***Nicandra physalodes*** (L.) Gaertn.

N CAS ***Nicotiana alata*** Link & Otto

N INV ***Nicotiana glauca*** Graham

N CAS ***Nicotiana rustica*** L.

N CAS CLT ***Nicotiana* ×*sanderae*** W.Watson
Parentage: *N. alata* Link & Otto × *N. forgetiana* Hemsl. (Clarkson et al. 2004).

N CAS ***Nicotiana suaveolens*** Lehm.

N CAS ***Nicotiana sylvestris*** Speg.

N CAS CLT ***Nicotiana tabacum*** L.
Parentage: *N. sylvestris* Speg. × *N. tomentosiformis* Goodsp. (Clarkson et al. 2004) (SE-Bolivia/NW-Argentine).

N NAT FER ***Petunia atkinsiana*** (Sweet) D.Don ex W.H.Baxter
Parentage: *P. axillaris* (Lam.) Britton, Sterns & Poggenb. × *P. inflata* R.E.Fr. (*P. integrifolia* clade) (Bombarely et al. 2016).

N CAS ***Petunia axillaris*** (Lam.) Britton, Sterns & Poggenb.

N NAT ***Physalis angulata*** L.

N CAS ***Physalis ixocarpa*** Brot. ex Hornem.

N NAT ***Physalis longifolia*** Nutt.
Note: *P. longifolia* is an accepted name, not a synonym of *P. virginiana* Mill. (Pretz and Deanna 2020).

N CAS ***Physalis nicandroides*** Schltdl.

N NAT ***Physalis peruviana*** L.

N CAS ***Physalis philadelphica*** Lam.

N NAT ***Physalis pubescens*** L.

N CAS ***Physalis viscosa*** L.

N INV ***Salpichroa origanifolia*** (Lam.) Baill.

N CAS ***Solandra maxima*** (Sessé & Moc.) P.S.Green

N CAS ***Solanum abutiloides*** (Griseb.) Bitter & Lillo

N CAS ***Solanum aviculare*** G.Forst.

N NAT ***Solanum bonariense*** L.

N INV ***Solanum carolinense*** L.

N INV ***Solanum chenopodioides*** Lam.

N CAS ***Solanum citrullifolium*** A.Braun
Note: This species was recorded as spontaneous in Lombardia only within the Botanical Garden of Pavia.

N INV ***Solanum elaeagnifolium*** Cav.

N CAS ***Solanum heterodoxum*** Dunal

N NAT ***Solanum laciniatum*** Aiton

N NAT ***Solanum lanceolatum*** Cav.
Note: For the taxonomy of this species, see Cambria et al. (2015).

N INV ***Solanum linnaeanum*** Hepper & P.-M.L.Jaeger

N CAS CLT ***Solanum lycopersicum*** L.
Note: Directly domesticated from *S. lycopersicum* L. var. *cerasiforme* Alef. (Mexico) with some contributions from *S. pimpinellifoilum* L. (Razifard et al. 2020).

N CAS ***Solanum mauritianum*** Scop.

A CAS CLT ***Solanum melongena*** L. subsp. ***melongena***
Note: Directly domesticated from *S. melongena* subsp. *insanum* (L.) Banfi, Galasso & Bartolucci (SE-Asia) (Knapp et al. 2013).

N NAT ***Solanum nitidibaccatum*** Bitter

N NAT ***Solanum pseudocapsicum*** L.

N NAT ***Solanum rostratum*** Dunal
N NAT ***Solanum seaforthianum*** Andrews
N INV ***Solanum sisymbriifolium*** Lam.
N CAS ***Solanum torvum*** Sw.
Note: This species was confused in Sicilia with *S. lanceolatum* Cav.
N CAS ***Solanum triflorum*** Nutt.
N CAS CLT ***Solanum tuberosum*** L.
Note: This is a complex of South American landraces and tetraploid modern cultivars, possibly derived in the Andes from *S. candolleanum* Berthault (= *S. bukasovii* Juz. ex Rybin) (Hardigan et al. 2017; Tang et al. 2022).
A NAT ***Withania somnifera*** (L.) Dunal

Strelitziaceae
N CAS ***Strelitzia nicolai*** Regel & Körn.

Talinaceae
N CAS ***Talinum paniculatum*** (Jacq.) Gaertn.

Tamaricaceae
N CAS ***Tamarix chinensis*** Lour.
N NAT ***Tamarix macrocarpa*** (Ehrenb.) Bunge
N CAS ***Tamarix mascatensis*** Bunge
T N NAT ***Tamarix meyeri*** Boiss.
Note: This species is doubtfully distinct from *T. tetragyna* Ehrenb.
N D *Tamarix nilotica* (Ehrenb.) Bunge
N NAT ***Tamarix parviflora*** DC.
N NAT ***Tamarix passerinoides*** Delile ex Desv.
T N NAT ***Tamarix rosea*** Bunge
Note: This species is doubtfully distinct from *T. hampeana* Boiss. & Heldr.
N CAS ***Tamarix tetrandra*** Pall. ex M.Bieb.

Tropaeolaceae
N INV ***Tropaeolum majus*** L.
N CAS ***Tropaeolum pentaphyllum*** Lam.

Ulmaceae
N INV ***Ulmus pumila*** L.

Urticaceae
N NAT ***Boehmeria nivea*** (L.) Gaudich.
N CAS ***Pilea microphylla*** (L.) Liebm.

Valerianaceae
N NAT ***Centranthus macrosiphon*** Boiss.
N CAS ***Valeriana phu*** L.

Verbenaceae
Taxonomic references: *Lantana* L. (Sanders 2012); *Verbena* L. (Nesom 2010; Verloove 2011).

N CAS ***Aloysia citrodora*** Paláu

N CAS ***Glandularia bipinnatifida*** (Schauer) Nutt.

N CAS CLT ***Glandularia hybrida*** (Groenland & Rümpler) G.L.Nesom & Pruski
Parentage: Unknown.

N CAS ***Glandularia platensis*** (Spreng.) Schnack & Covas

N CAS ***Glandularia tenera*** (Spreng.) Cabrera

N CAS CLT ***Lantana*** Callowiana Hybrid Group
Parentage: This is a poutatively horticultural hybrid complex between a tetraploid cultivar of *L. depressa* Small var. *depressa* (endemic to Florida) and *L. strigocamara* R.W.Sanders (this latter, in turn, a complex hybrid of cultivated origin; Sanders 2006).

N NAT ***Lantana camara*** L. subsp. ***aculeata*** (L.) R.W.Sanders

N CAS ***Lantana camara*** L. subsp. ***camara***

N CAS ***Lantana camara*** L. subsp. ***glandulosissima*** (Hayek) R.W.Sanders

N CAS ***Lantana depressa*** Small
Note: Possibly, records of this species could refer to *Lantana* Callowiana Hybrid Group. A re-examination of the pertinent specimens would be desirable (Del Guacchio et al. 2020).

N CAS ***Lantana montevidensis*** (Spreng.) Briq.

N CAS ***Lippia alba*** (Mill.) N.E.Br. ex Britton & P.Wilson

N NAT ***Phyla canescens*** (Kunth) Greene

N NAT ***Phyla nodiflora*** (L.) Greene

N NAT ***Verbena bonariensis*** L.

N NAT ***Verbena brasiliensis*** Vell.

N NAT ***Verbena incompta*** P.W.Michael

N CAS ***Verbena rigida*** Spreng.

Viburnaceae

N CAS ***Viburnum carlesii*** Hemsl.

N CAS ***Viburnum rhytidophyllum*** Hemsl.

Violaceae
Taxonomic references: *Viola* L. (Gil-Ad 1997; McKinney and Russell 2002; Little and McKinney 2015).

N CAS ***Viola adunca*** Sm.

N NAT ***Viola cornuta*** L.

N CAS ***Viola palmata*** L.

N INV ***Viola sororia*** Willd.
Note: Past records of *Viola cucullata* Aiton should be likely attributed to *V. sororia*.

N CAS CLT ***Viola wittrockiana*** Gams ex Nauenb. & Buttler
Parentage: *V. altaica* Ker Gawl. (W-Siberia) × *V. lutea* Huds. (CW-Europe) → *V. tricolor* L. (Eurasia).

Vitaceae
Taxonomic references: *Vitis* L. (Ardenghi et al. 2014, 2015a, 2015b; Vázquez Pardo and García Alonso 2017).

N NAT ***Ampelopsis glandulosa*** (Wall.) Momiy.

T N INV ***Parthenocissus inserta*** (A.Kern.) Fritsch

	Note: This name is sometimes regarded as a heterotypic synonym of *P. quinquefolia* (L.) Planch., but it seems well distinct on molecular grounds (Lu et al. 2012). The distribution area remains to be defined; this species is possibly more spread and invasive than *P. quinquefolia*.
N INV	***Parthenocissus quinquefolia*** (L.) Planch. Note: This species is often confused with *P. inserta* (A.Kern.) Fritsch; the occurrence in the wild of hybrids between the two species is also possible.
N NAT	***Parthenocissus tricuspidata*** (Siebold & Zucc.) Planch.
N NAT FER	***Vitis*** ×***bacoi*** Ardenghi, Galasso & Banfi Parentage: *V. riparia* Michx. × *V. vinifera* L. Note: In some areas (e.g., Lombardia), complex hybrids possibly involving also *V. aestivalis* Michx., have been recorded as naturalized (Ardenghi et al. 2015b; Ardenghi and Polani 2016).
N NAT FER	***Vitis*** ×***gallica*** F.M.Vázquez Parentage: *V. berlandieri* Planch. × *V. vinifera* L.
N NAT FER	***Vitis*** ×***goliath*** Ardenghi, Galasso & Banfi Parentage: *V. riparia* Michx. × *V. rupestris* Scheele × *V. vinifera* L.
N INV FER	***Vitis*** ×***instabilis*** Ardenghi, Galasso, Banfi & Lastrucci Parentage: *V. riparia* Michx. × *V. rupestris* Scheele.
N INV FER	***Vitis*** ×***koberi*** Ardenghi, Galasso, Banfi & Lastrucci Parentage: *V. berlandieri* Planch. × *V. riparia* Michx.
N NAT FER	***Vitis labrusca*** L. Note: Feral and culton of the same species (N-America).
N NAT FER	***Vitis*** ×***novae-angliae*** Fernald Parentage: *V. labrusca* L. × *V. riparia* Michx.
N INV	***Vitis riparia*** Michx.
N INV FER	***Vitis*** ×***ruggerii*** Ardenghi, Galasso, Banfi & Lastrucci Parentage: *V. berlandieri* Planch. × *V. rupestris* Scheele.
N INV	***Vitis rupestris*** Scheele
	Zygophyllaceae
N NAT	***Zygophyllum fabago*** L.

Discussion

The alien flora of Italy includes 1,782 species, subspecies and hybrids (1,628 neophytes and 154 archaeophytes: Table 3), 185 (11.58%) more than the previously published checklist (Galasso et al. 2018). This different value is partly due to updates in name applications, but mostly to new records, especially of casual aliens. These numbers unfortunately confirm Italy as one of the European countries showing the highest number of aliens in Europe, after Belgium and Great Britain (Galasso et al. 2018), albeit a proper Species-Area Relationship at European level should be carried out, to compare alien floristic richness among countries (for a recent study focused on Italy, see D'Antraccoli et al. 2024).

By comparing the different categories of alien species documented in the last 15 years (Table 4), a continuous and strong increase is obvious, especially for casual and naturalized aliens. This confirms that the spread of alien species is a highly dynamic and complex phenomenon, and urgent measures are necessary to limit or counteract this problem. Many of these taxa were introduced in Italy through accidental escapes from ornamental and horticultural activities, which is indeed the main primary introduction pathway of alien plants in Europe (Arianoutsou et al. 2021).

The neophytes constitute 91.31% of the Italian alien flora, and more than half of the invasive alien species of Union concern (22 out of 40) occur in Italy, most of which are invasive at national scale. Recently, a species distribution modelling study was carried out for 14 of these species (Lozano

et al. 2023), highlighting that the distribution of these plants varies across biogeographic regions and realms and unevenly threatens protected areas, because of propagule pressure and biotic filters. A similar study considering also the remaining 8 species (*Acacia saligna*, *Ailanthus altissima*, *Cardiospermum grandiflorum*, *Gymnocoronis spilanthoides*, *Humulus scandens*, *Koenigia polystachya*, *Pistia stratioides*, and *Salvinia molesta*) would be desirable. An interesting new accessible method to easily monitor showy invasive plants was recently proposed by Pinzani and Ceschin (2023). Also social networks and citizen science initiatives could be used to obtain valuable information and early warning on these species (Marcenò et al. 2021a, 2021b). Although national and local studies demonstrated that some habitats are more prone than others to be invaded by alien species (Malavasi et al. 2018; Guarino et al. 2021; Campagnaro et al. 2022), alien plant invasions in Italy need to be explored with more focused research, also to implement the legislation (Brundu et al. 2020). The critical update achieved so far will greatly contribute to the global knowledge and management of alien plants (van Kleunen et al. 2018; Pagad et al. 2018), allowing to design surveillance programs (Sandercock et al. 2023) and eradication measures (Lorenzo and Morais 2023).

Finally, by considering the native taxa reported by Bartolucci et al. (2024), we can state that the whole Italian flora includes 10,023 (8,241 native, 1,782 alien) taxa. Accordingly, alien flora a a whole represent 21.62% of native flora, while established aliens (899) are 10.91% of native flora. These numbers will be further updated in the future by publishing the data in the columns "Notulae to the Italian native vascular flora" and "Notulae to the Italian alien vascular flora", published every six months in the journal Italian Botanist and then stored in FlorItaly (Martellos et al. 2020).

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Table 1. Most represented families (≥ 30 taxa) and genera (≥ 10 taxa) of the vascular flora alien to Italy and San Marino.

Families	**Taxa**	**Genera**	**Taxa**
Asteraceae	183	*Oenothera*	31
Poaceae	168	*Amaranthus*	30
Fabaceae	83	*Opuntia*	23
Rosaceae	83	*Solanum*	22
Amaranthaceae	63	*Cyperus*	20
Solanaceae	60	*Euphorbia*	19
Asparagaceae	47	*Centaurea*	16
Brassicaceae	45	*Eucalyptus*	16
Lamiaceae	42	*Cotoneaster*	15
Cactaceae	40	*Oxalis*	14
Onagraceae	36	*Triticum*	14
Crassulaceae	34	*Bidens*	13
Polygonaceae	34	*Narcissus*	13
Amaryllidaceae	33	*Rosa*	13
		Phyllostachys	12
		Salvia	12
		Aloë	11
		Avena	11
		Symphyotrichum	11
		Ipomoea	10
		Vitis	10

Table 2. Invasion status of taxa alien to Italy in each of the 20 administrative regions and San Marino. VDA (Valle d'Aosta), PIE (Piemonte), LOM (Lombardia), TAA (Trentino-Alto Adige), VEN (Veneto), FVG (Friuli Venezia Giulia), LIG (Liguria), EMR (Emilia-Romagna), TOS (Toscana), MAR (Marche), UMB (Umbria), LAZ (Lazio), ABR (Abruzzo), MOL (Molise), PUG (Puglia), CAM (Campania), BAS (Basilicata), CAL (Calabria), SIC (Sicilia), SAR (Sardegna), RSM (San Marino). CAS: casual alien, CAS?: possibly casual alien, DD: data deficient, NAT: naturalized alien, INV: invasive alien, NC: no longer recorded, EX: extinct or possibly extinct, D: doubtfully occurring.

	CAS	CAS?	DD	NAT	INV	NC	EX	D	Total
LOM	434	1	0	274	116	1	4	9	839
TOS	307	5	0	247	68	29	1	31	687
VEN	360	2	0	205	74	24	1	8	675
TAA	433	7	0	149	40	4	3	15	648
EMR	307	10	0	241	31	16	5	10	620
PIE	223	0	0	262	71	15	16	13	600
FVG	289	3	0	180	45	19	6	17	560
SAR	315	2	0	147	80	2	0	14	559
LIG	313	0	0	175	24	31	2	9	554
SIC	254	3	0	236	20	16	0	15	544
LAZ	308	1	0	160	44	16	0	11	539
CAM	262	0	0	140	48	1	4	18	473
MAR	228	4	0	113	41	22	2	8	418
PUG	246	0	0	124	20	13	1	10	413
CAL	237	1	0	120	49	0	0	1	412
ABR	221	0	0	131	35	5	0	4	397
UMB	198	6	0	88	15	1	0	11	319
BAS	144	0	0	81	20	4	0	6	255
MOL	101	2	0	74	26	0	0	4	207
VDA	75	1	0	62	21	8	1	8	176
RSM	28	6	0	42	5	17	0	0	97
ITA	**796**	**1**	**4**	**649**	**250**	**38**	**4**	**40**	**1,782**

Table 3. Number of neophytes and archaeophytes, casual aliens included, recorded for the 20 Italian administrative regions and San Marino. VDA (Valle d'Aosta), PIE (Piemonte), LOM (Lombardia), TAA (Trentino-Alto Adige), VEN (Veneto), FVG (Friuli Venezia Giulia), LIG (Liguria), EMR (Emilia-Romagna), TOS (Toscana), MAR (Marche), UMB (Umbria), LAZ (Lazio), ABR (Abruzzo), MOL (Molise), PUG (Puglia), CAM (Campania), BAS (Basilicata), CAL (Calabria), SIC (Sicilia), SAR (Sardegna), RSM (San Marino).

	Neophytes	Archaeophytes	TOT
LOM	713	126	839
TOS	561	126	687
VEN	564	111	675
TAA	539	109	648
EMR	503	117	620
PIE	499	101	600
FVG	451	109	560
SAR	450	109	559
LIG	468	86	554
SIC	456	88	544
LAZ	441	98	539
CAM	373	100	473
MAR	321	97	418
PUG	330	83	413
CAL	333	79	412
ABR	295	102	397
UMB	221	98	319
BAS	172	83	255
MOL	138	69	207
VDA	137	39	176
RSM	58	39	97
ITA	**1,628**	**154**	**1,782**

Table 4. Increase in the number of alien species in Italy in the last 15 years: 2008 (Celesti-Grapow et al. 2009), 2017 (Galasso et al. 2018), 2020 (Bartolucci et al. 2021), 2021 (Bartolucci et al. 2023), and 2023 (this paper). CAS: casual aliens, including in this case not assessed and no longer recorded species; NAT: naturalized aliens; INV: invasive species. Data deficient, extinct, and doubtfully occurring species, not treated by Celesti et al. (2009), are not considered.

	2008	**2017**		**2020**		**2021**		**2023**	
	n°	n°	variation with respect to 2008	n°	variation with respect to 2017	n°	variation with respect to 2020	n°	variation with respect to 2021
CAS	499	756	+257	795	+39	808	+13	835	+27
NAT	361	570	+209	593	+23	602	+9	649	+47
INV	163	221	+58	227	+6	243	+16	250	+7