

# The flora of the Batumi landfill (Adjara, Georgia)

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**Abstract.** Results of floristic research conducted within the territory of the Batumi landfill (Adjara, Georgia) are presented. The total area of the site is about 20 hectares, of which 10 hectares are active and the remaining part was closed in the beginning of the 21<sup>st</sup> century. In the closed area, the processes of formation of stabilized plant communities and spontaneous vegetation successions are going on. As a result of the survey, we revealed 244 species of vascular plants belonging to 163 genera of 59 families. Among them, 86 species are considered native and 158 species are alien. Among the listed species, 94 are representatives of the ruderal flora and others are species characteristic for various other habitats.

**Keywords:** Adjara, alien flora, Batumi, landfill, life forms, ruderal species

**Supplementary Material.** Electronic Supplement (Table E1, e1–e7) is available in the online version of this article at: <https://ukrbotj.co.ua/archive/77/6/428>

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**Реферат.** Представлено результати флористичних досліджень, проведених на території сміттєзвалища м. Батумі (Аджарія, Грузія). Загальна площа ділянки становить близько 20 га, з них 10 га займає діючий об'єкт, решта території була закрита на початку XXI століття. У закритій зоні триває формування стійких рослинних угруповань, а також відбуваються стихійні сукцесійні процеси в рослинному покриві. Внаслідок проведених спостережень ми виявили 244 види судинних рослин, що належать до 163 родів із 59 родин. Серед них 86 видів вважаються аборигенними, а 158 видів – чужорідними. З наведених видів 94 є представниками рудеральної флори, решта – види, характерні для інших типів оселищ.

**Ключові слова:** Аджарія, Батумі, звалище, життєві форми, рудеральні види, чужорідна флора

## Introduction

There are no present-day local floras in the world that have not been exposed to at least some, direct or indirect, anthropogenic impact. The anthropogenic transformation of vegetation covers all territories where human activities are manifested even to a minimal extent. As a result of the global anthropogenic impact, technogenic ecotopes are formed; those ecotopes have no natural analogues and they are often results of urbanization and include urban landscapes inhabited by species of the urban flora, ruderal flora, etc.

The urbanization index in Georgia is currently 53%. Among the cities and towns of Georgia, the city of Batumi is characterized by the fast urban growth and development.

In the middle of the 20<sup>th</sup> century the population of Batumi, according to the official data, was only slightly more than 82 thousand inhabitants. However, at the beginning of the 21<sup>st</sup> century it reached 120 thousand, and by 2018 the current estimate is ca. 163 thousand people or, according to unofficial data, even more. With the increase of its population, the city area was growing as well.

From the beginning of the 21<sup>st</sup> century, various construction activities, settlement and urban development of new territories continued in the Adjara seaside, accompanied by establishment, reconstruction and/or development of parks, gardens, and recreational places. For construction of residential buildings, shore protection works, other infrastructural and development projects, the construction materials are usually transported from one to another district of the city; the materials and goods are also imported from foreign countries. Most of ornamental plants (including their seeds and other planting material) are imported from abroad, which often results in unintentional introduction of alien weedy species, many of which are potential invaders. All of this adds to import of plants by the horticulturalists and plant lovers or the entrepreneurs for ornamental or production purposes; those plants spread in natural, disturbed, and artificial habitats, such as abandoned construction areas, roadsides, streams and canals, and so on.

The city of Batumi and its adjacent areas play an important role in the processes of immigration and spread of alien plants in the region. The city is an open gateway between the eastern and western countries. It is a trade and transportation hub between Europe and Asia, from where different goods are carried in and through Georgia. The famous Batumi Botanical Garden, established in the 1880s and officially opened in 1912, is the major horticultural and plant research center of the Caucasus; it also played and continues to play an exceptionally important role in both deliberate and unintentional plant introduction, acclimation and naturalization in the region.

Other areas contributing to the alien plants diversity in the Batumi area is the Batumi Boulevard stretching along the Black Sea shore; it is a green area with the century-long history and rich introduced flora; together with other parks and green areas it also contributes to immigration and alien plants.

All those factors mentioned above promote intentional or unintentional spread of alien plants in the city territory and beyond. Many of those plants eventually find their way to the Batumi landfill territory with its peculiar transformed plant communities. In this area alien species often survive, proliferate, and form stable populations, in turn enriching the surrounding areas with unwanted aliens. Thus, our objective for the present research was to study the vegetation in the inactive, closed landfill area and its adjacent territory.

## Materials and methods

The study site is located in the southwestern part of Georgia, in the floristic region of Adjara, 10–12 km from Batumi, on the right bank of the Chorokhi River, mainly at elevations of 1–5 m above sea level, between 41° 36.022'N and 41° 35.298'E. The total area of the Batumi landfill is about 20 hectares, of which 10 hectares are occupied by the actively used area, while other areas are now closed for waste dumping; that results in ongoing processes of formation of stabilized plant communities (Fig. 1, 2).

The landfill has been operating since the last century (officially established in the study site in 1965). Initially, the waste was only from the territory of Batumi, but during recent years other municipalities of Adjara have been added as customers of the landfill services. Almost all types of waste are found in this area, including household, construction, industrial waste, etc.

The climate of the study area is characterized by specific features and spatial variability. Seaside Adjara in general has a humid subtropical climate. During most of the year, western humid winds are dominant and only in winter months inland winds occurrences increase. The average annual temperature is +13°–15° C, while the coldest month's average temperature being +5.9–7.5 °C. Absolute temperatures rarely drop below –8°. In the warmest months (July–August), the average temperature is +22–23 °C, the highest temperature reaching +39–40 °C. The average air humidity is 80–87% (Javakhishvili, 1926; Kordzakhia, 1961; Maruashvili, 1964; Nijaradze, 1978).

Investigation of the landfill flora was conducted during the period of 2015–2018. The main research method was the traditional route survey, which included plant description, photography, plant sampling, and laboratory processing, identification and herbarium preparation and curation. Laboratory activities were conducted in the Shota Rustaveli State University of Batumi, the Institute of Phytopathology and Biodiversity in Kobuleti.

Various floras and plant identification manuals and other scientific literature were used for identification of species: the identification manual of the Adjara flora (Dmitrieva, 1990a.); manuals of the Georgian flora (Field guide..., 1964, 1969; Fischer et al., 2018) and contributions on the alien flora of Adjara (Davitadze, 2001, 2002; Kikodze et al., 2010; Mikeladze, 2013, 2017; Sharabidze et al., 2018). Online resources and databases on invasive species worldwide were also used (Elpel, 2013; GBD, 2007–onward). The classification

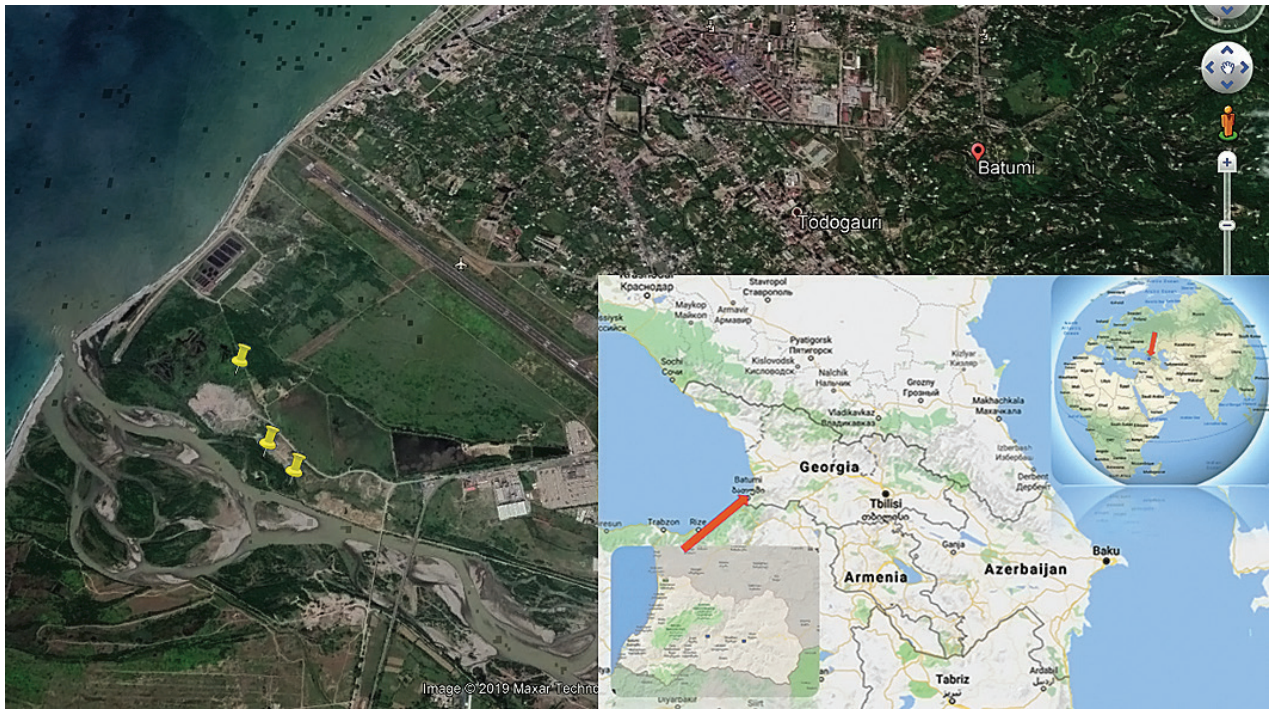


Fig. 1. Geographical position of the study site (investigated area)



Fig. 2. Typical plant communities in the closed area of the Batumi landfill

was checked according to the online databases of world plants (POWO, 2020–onward; WFO, 2020–onward). Life forms of plants were determined according to the Raunkiaer system (Raunkiaer, 1934). The origin of plant species is given following the flora of the Caucasus and other published and Internet resources (Takhtajan, 2003, 2006; etc.).

The time of the initial collection (first records) of non-native plants in the Adjara floristic district was determined following the herbarium specimens deposited in the Batumi Botanical Garden (BATU) and from various publications (Davitadze, 2001, 2002; Kikodze et al., 2010; Mikeladze, 2013, 2017; Sharabidze et al., 2018).

## Results and discussion

After identification of the plant samples collected in the Batumi landfill, we registered totally 244 species of vascular plants that represent 59 families and 163 genera (Table E1). Cryptogamic vascular plants are represented by three species of horsetails (*Equisetum arvense* L., *E. palustre* L., *E. ramosissimum* L.). Naturalized ferns and gymnosperms have not been observed during the study period. Among angiosperms, monocotyledons are represented by 43 species (17.62%) belonging to eight families and 28 genera, while dicotyledonous plants contain 198 species (81.14%) of 50 families and 134 genera.

Among the 59 families reported, 11 families are represented by five or more species each (totally 63.86%, 156 species). These families are listed in Table 1.

The remaining 48 families are represented collectively by 88 species; these families are *Convolvulaceae*, *Euphorbiaceae*, *Juncaceae*, *Malvaceae*, *Plantaginaceae*, *Rubiaceae* – each with four species; *Apiaceae*, *Commelinaceae*, *Equisetaceae*, *Onagraceae*, *Plantaginaceae*, *Scrophulariaceae*, *Typhaceae* – each with three species; *Adoxaceae*, *Araliaceae*, *Boraginaceae*, *Gentianaceae*, *Juglandaceae*, *Moraceae*, *Ranunculaceae*, *Salicaceae*, *Simaroubaceae*, *Violaceae*, *Verbenaceae* – each with two species. The families *Araceae*, *Balsaminaceae*, *Betulaceae*, *Caprifoliaceae*, *Cleomaceae*, *Cornaceae*, *Elaeagnaceae*, *Gentianaceae*, *Geraniaceae*, *Hypericaceae*, *Iridaceae*, *Lythraceae*, *Nyctaginaceae*, *Orobanchaceae*, *Papaveraceae*, *Phytolaccaceae*, *Platanaceae*, *Portulacaceae*, *Primulaceae*, *Sapindaceae*, *Saxifragaceae*, *Smilacaceae*, *Urticaceae*, *Vitaceae* are represented each by one species.

Table 1. Families represented in the area by more than five species each

No	Families	Number of species	Species, %
1	<i>Asteraceae/Compositae</i>	43	17.62
2	<i>Poaceae/Gramineae</i>	22	9.01
3	<i>Fabaceae/Leguminosae</i>	18	7.37
4	<i>Lamiaceae/Labiatae</i>	13	5.32
5	<i>Polygonaceae</i>	12	4.91
6	<i>Rosaceae</i>	10	4.09
7	<i>Cyperaceae</i>	10	4.09
8	<i>Amaranthaceae</i>	9	3.68
9	<i>Solanaceae</i>	7	2.86
10	<i>Brassicaceae</i>	7	2.86
11	<i>Caryophyllaceae</i>	5	2.05
Total in 11 families		156 species	63.86

The best represented genera by their species number are: *Persicaria* Mill. (7 species); *Amaranthus* L., *Solanum* L., *Trifolium* L. (each with 5 species); *Artemisia* L., *Carex* L., *Rubus* L. (each with 4 species); *Cyperus* L., *Equisetum* L., *Erigeron* L., *Euphorbia* L., *Galium* L., *Juncus* L., *Mentha* L., *Poa* L., *Rumex* L., *Senecio* L., *Stellaria* L., *Veronica* L., *Xanthium* L. (each with 3 species).

Of the species registered in the Batumi landfill, 86 species (35.25%) are considered native and 158 species (64.75%) are aliens (introduced). Among aliens, 48 species are of East Asian origin, 34 species originated in Europe, 1 species is Australian, 13 – South American, 29 – North American, and 33 are Mediterranean ones (Fig. 3).

Our phytogeographical analysis demonstrated the largest number of East Asian species, which is due to many factors. In particular, those factors include similar climatic conditions (including high humidity, precipitation, favorable temperatures during the whole year, fertile soils, etc.). Also, it reflects the history of introduction of taxa for cultivation, as well as their associated weeds. For example, it is known that East Asia was considered among highest geographical priorities for introduction of plants in the Batumi Botanical Garden since its establishment. The species of the Mediterranean and European origin follow by their number, which is also partly determined by the phytogeographic structure of the Adjara flora.

The analysis of life forms of the Batumi landfill flora demonstrated the predominance of therophytes and hemicryptophytes. Therophytes (herbaceous annuals) are represented by 108 (44.26%) species. The second

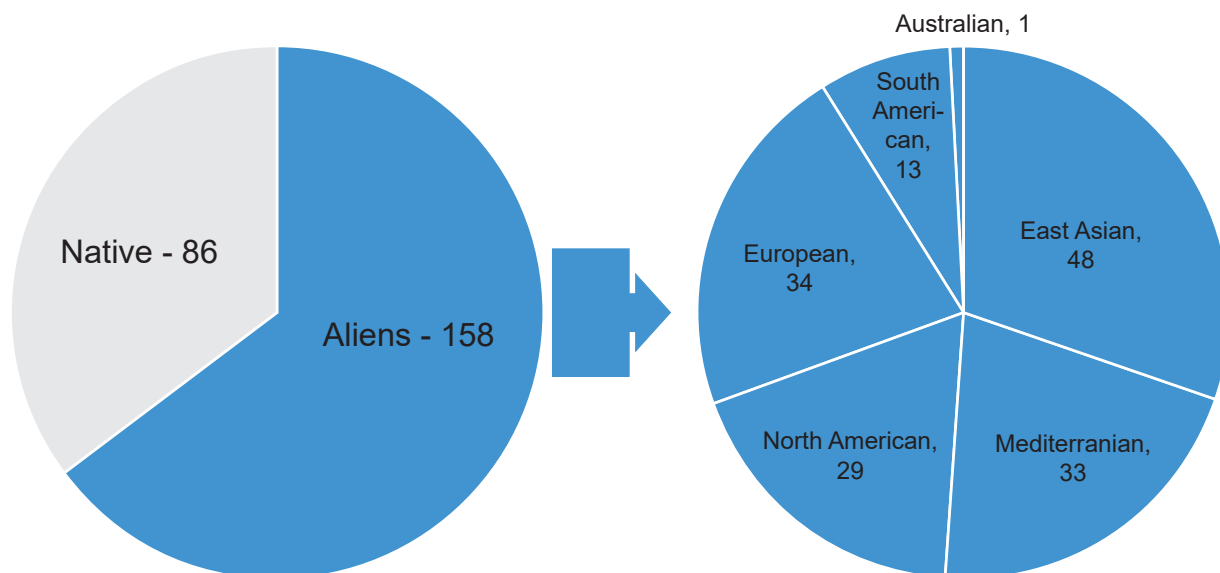


Fig. 3. Groups of Batumi landfill plants by their origin

place is occupied by hemicryptophytes with 60 species (26.10%) of mainly biennial and perennial herbaceous plants (Table 2).

The dominant positions of therophytes and hemicryptophytes are related to the peculiarities of the species composition of the local ruderal flora. Phanerophytes are quite diverse, out of 33 species 14 are local and 19 are of alien origin.

In the study area, phanerophytes usually flower, bear fruit, establish seedlings normally, and thus they are characterized by a complete cycle of development; sometimes they dominate in local plant communities.

Besides the typical ruderal species recorded in the Batumi landfill (inactive or closed area) we came across the species characteristic for various habitats, such as – forests, moist meadows, low and high mountain zones, etc. Out of 244 species, 94 are representatives of the ruderal flora (Tabl. E1).

Furthermore, a number of sub-spontaneously distributed cultivated species (occasional escapes, such as maize, beans, tomato, pumpkin, watermelon, melon and other crop plants) were also found. Usually such garden escapes or agricultural crops are only of ephemeral occurrence, not forming stable populations.

## Conclusions

Among 244 species of 163 genera and 59 families registered to date in the Batumi landfill area, we have

Table 2. Life forms of plants in the Batumi landfill flora

No	Life Form	Number of species	Species, %
1	Therophytes	108	44.26
2	Hemicryptophytes	63	26.10
3	Phanerophytes	33	13.52
4	Cryptophytes	25	10.49
5	Chamaephytes	13	5.35
Total		244	100

met species which are characteristic for different habitat of the region of Adjara. 94 species of plants (38.52% of the total species list) are species characteristic for ruderal habitats.

Cryptogamic plants are represented by 3 species of horsetails. Dicotyledonous plants are represented by 198 species and monocotyledons – by 43 species. Families represented by more than 10 species each are *Asteraceae/Compositae*, *Poaceae/Gramineae*, *Fabaceae/Leguminosae*, *Lamiaceae/Labiatae*, *Polygonaceae*, and *Rosaceae*.

The analysis of plants life forms registered in the on Batumi landfill demonstrated that therophytes form the dominant group (44.26%), followed by hemicryptophytes (63 species or 26.10%). The dominant positions of therophytes and hemicryptophytes are in accordance with their position in other ruderal floras.

Among the species, 86 are considered native and 158 are aliens. Among aliens, the largest group (in terms of the number of species) is comprised by plants of East Asian origin (48 species). That is due to similar climatic

conditions of Adjara and many East Asian regions (including high humidity and precipitation, favorable temperatures during the whole year, fertile soils, etc.).

We understand that the list of species reliably registered to date in the Batumi landfill area is not complete and additional species (both alien and native ones) will be registered there in the future. Because of that we are planning to continue our surveys of the landfill flora, especially for monitoring invasive and potentially invasive species. The species list presented here will serve as a reference checklist reflecting the present state of our knowledge of the local flora; it will be amended and improved during the future research.

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Table E1. A checklist of the Batumi landfill flora

Life form: Ph – Phanerophyte, Th – Therophyte, He – Hemicytophyte, Cr – Cryptophyte, Ch – Chamaephyte; Class: Eu – Eudicots, Mo – Monocots, S – spore-bearing plants; Ecological group: R – ruderal, F – forest plant, P – lowland and pioneer plant, G – grassland, scrub and rock plant, H – marsh and wet meadow plant, M – mountain plant); First recorded time in the Adjara floristic region (FRT): AnT – ancient times, XX beg. – beginning of the twentieth century

No	Species	Families	Class	Origin	Ecological group	Life form	FRT
1	<i>Abutilon theophrasti</i> Medik.	<i>Malvaceae</i>	Eu	Mediterranean	R	Th	1940
2	<i>Acacia dealbata</i> Link	<i>Leguminosae</i>	Eu	Australia	F	Ph	2010
3	<i>Acalypha australis</i> L.	<i>Euphorbiaceae</i>	Eu	East Asia	R	Th	1926
4	<i>Acer negundo</i> L.	<i>Sapindaceae</i>	Eu	North America	R	Ph	2007
5	<i>Ailanthus altissima</i> (Mill.) Swingle	<i>Simaroubaceae</i>	Eu	East Asia	P	Ph	1927
6	<i>Aira elegans</i> Willd. ex Gaudin / <i>Molineriella laevis</i> (Brot.) Rouy.	<i>Poaceae</i>	Mo	Mediterranean	F	Th	1917
7	<i>Ajuga reptans</i> L.	<i>Lamiaceae</i>	Eu	Native	P	He	-
8	<i>Alnus glutinosa</i> subsp. <i>barbata</i> (C.A.Mey.) Yalt. ( <i>Alnus barbata</i> C.A.Mey.)	<i>Betulaceae</i>	Eu	Native	F	Ph	-
9	<i>Alocasia macrorrhizos</i> (L.) G.Don	<i>Araceae</i>	Mo	East Asia	G	Cr	2017
10	<i>Amaranthus albus</i> L.	<i>Amaranthaceae</i>	Eu	North America	R	Th	1941
11	<i>Amaranthus caudatus</i> L.	<i>Amaranthaceae</i>	Eu	South America	R	Th	1917
12	<i>Amaranthus deflexus</i> L.	<i>Amaranthaceae</i>	Eu	South America	R	Th	1941
13	<i>Amaranthus blitum</i> L. ( <i>A. lividus</i> L.)	<i>Amaranthaceae</i>	Eu	South America	R	Th	1938
14	<i>Amaranthus retroflexus</i> L.	<i>Amaranthaceae</i>	Eu	North America	R	Th	1941
15	<i>Ambrosia artemisiifolia</i> L.	<i>Compositae</i>	Eu	North America	R	Th	1938
16	<i>Ammi visnaga</i> (L.) Lam. / <i>Visnaga daucooides</i> Gaertn.	<i>Apiaceae</i>	Eu	Mediterranean	F	Th	1969
17	<i>Amorpha fruticosa</i> L.	<i>Leguminosae</i>	Eu	North America	F	Ph	1955
18	<i>Angelica sylvestris</i> L.	<i>Apiaceae</i>	Eu	Native	F	Cr	-
19	<i>Anthemis cotula</i> L.	<i>Compositae</i>	Eu	Europe	R	Th	1917
20	<i>Arabis nova</i> Vill. ( <i>A. auriculata</i> Lam.)	<i>Brassicaceae</i>	Eu	Native	R	Th	-
21	<i>Arctium lappa</i> L.	<i>Compositae</i>	Eu	Europe	R	Th	1952
22	<i>Artemisia absinthium</i> L.	<i>Compositae</i>	Eu	Native	R	He	1920
23	<i>Artemisia annua</i> L.	<i>Compositae</i>	Eu	Mediterranean	R	Th	1960
24	<i>Artemisia verlotiorum</i> Lamotte ( <i>A. vulgaris</i> auct. p.p., non L.)	<i>Compositae</i>	Eu	East Asia	R	He	2010
25	<i>Artemisia vulgaris</i> L.	<i>Compositae</i>	Eu	Mediterranean	R	He	1945
26	<i>Arthraxon hispidus</i> (Thunb.) Makino	<i>Poaceae</i>	Mo	East Asia	R	Th	1926
27	<i>Atriplex tatarica</i> L.	<i>Amaranthaceae</i>	Eu	Native	R	Th	1939
28	<i>Bidens cernua</i> L.	<i>Compositae</i>	Eu	Native	R	Th	-
29	<i>Bifora radians</i> M.Bieb. ( <i>Coriandrum radians</i> (M.Bieb.) Prantl)	<i>Compositae</i>	Eu	Native	R	Th	-
30	<i>Bothriochloa ischaemum</i> (L.) Keng	<i>Poaceae</i>	Mo	Mediterranean	F	He	1919
31	<i>Buddleja davidii</i> Franch.	<i>Scrophulariaceae</i>	Eu	East Asia	R	Ph	2010
32	<i>Calystegia sepium</i> (L.) R.Br.	<i>Convolvulaceae</i>	Eu	Native	H	He	-
33	<i>Calystegia soldanella</i> (L.) R.Br.	<i>Convolvulaceae</i>	Eu	Native	H	He	-

No	Species	Families	Class	Origin	Ecological group	Life form	FRT
34	<i>Capsella bursa-pastoris</i> (L.) Medik.	<i>Brassicaceae</i>	Eu	Native	R	He	-
35	<i>Cardamine hirsuta</i> L.	<i>Brassicaceae</i>	Eu	Europe	R	Th	1938
36	<i>Cardamine parviflora</i> L.	<i>Brassicaceae</i>	Eu	Native	R	Th	-
37	<i>Cardamine quinquefolia</i> (M.Bieb.) Schmalh. ( <i>Dentaria quinquefolia</i> M.Bieb.)	<i>Brassicaceae</i>	Eu	Native	P	Th	-
38	<i>Carex divulsa</i> Stokes	<i>Cyperaceae</i>	Mo	Native	P	Ch	-
39	<i>Carex hirta</i> L.	<i>Cyperaceae</i>	Mo	Native	H	Ch	-
40	<i>Carex leporina</i> L.	<i>Cyperaceae</i>	Mo	Native	H	Ch	-
41	<i>Carex pendula</i> Huds.	<i>Cyperaceae</i>	Mo	Native	H	Ch	-
42	<i>Carya cordiformis</i> (Wangenh.) K.Koch ( <i>Juglans cordiformis</i> Wangenh.)	<i>Juglandaceae</i>	Eu	East Asia	F	Ph	2000
43	<i>Carum carvi</i> L.	<i>Compositae</i>	Eu	Native	G	He	-
44	<i>Centaurea oxylepis</i> (Wimm. & Grab.) Hayek ( <i>C. macroptilon</i> Borbás subsp. <i>oxylepis</i> (Wimm. & Grab.) Soó)	<i>Compositae</i>	Eu	Mediterranean	P	Th	1990
45	<i>Centaurium tenuiflorum</i> (Hoffmanns. & Link) Fritsch	<i>Gentianaceae</i>	Eu	Native	P	Th	-
46	<i>Cerastium glomeratum</i> Thuill.	<i>Caryophyllaceae</i>	Eu	Mediterranean	P	He	1939
47	<i>Chelidonium majus</i> L.	<i>Papaveraceae</i>	Eu	Native	R	He	-
48	<i>Chenopodium album</i> L.	<i>Amaranthaceae</i>	Eu	Europe	R	Th	1911
49	<i>Chenopodium urbicum</i> L. / <i>Oxybasis urbica</i> (L.) S.Fuentes, Uotila & Borsch	<i>Amaranthaceae</i>	Eu	Europe	R	Th	1950
50	<i>Cichorium intybus</i> L.	<i>Compositae</i>	Eu	Native	P-M	He	-
51	<i>Cirsium arvense</i> (L.) Scop.	<i>Compositae</i>	Eu	Europe	R	He	1917
52	<i>Cirsium vulgare</i> (Savi) Ten.	<i>Compositae</i>	Eu	Mediterranean	R	He	1937
53	<i>Cleome houtteana</i> Schldl. / <i>Tarenaya hassleriana</i> (Chodat) Iltis	<i>Cleomaceae</i>	Eu	South America	P	Th	2017
54	<i>Commelina communis</i> L.	<i>Commelinaceae</i>	Mo	East Asia	P R	Th	1944
55	<i>Convolvulus arvensis</i> L.	<i>Convolvulaceae</i>	Eu	Europe	R	Cr	1914
56	<i>Coreopsis tinctoria</i> Nutt. ( <i>Bidens tinctoria</i> (Nutt.) Baill.)	<i>Compositae</i>	Eu	North America	P	Th	2016
57	<i>Cornus sanguinea</i> L. subsp. <i>australis</i> (C.A.Mey.) Jáv. ( <i>C. australis</i> C.A.Mey.)	<i>Cornaceae</i>	Eu	Native	F	Ph	-
58	<i>Crassocephalum crepidioides</i> (Benth.) S.Moore	<i>Compositae</i>	Eu	South America	R	Th	1934
59	<i>Crepis setosa</i> Haller f. ( <i>Aegoseris setosa</i> (Haller f.) Fourr.)	<i>Compositae</i>	Eu	Mediterranean	P	Th	1939
60	<i>Cuscuta australis</i> R.Br.	<i>Convolvulaceae</i>	Eu	Native	R	Th	-
61	<i>Cynoglossum creticum</i> Mill.	<i>Boraginaceae</i>	Eu	Mediterranean	R	He	1916
62	<i>Cyperus badius</i> Poir.	<i>Cyperaceae</i>	Mo	Mediterranean	H	Cr	1940
63	<i>Cyperus esculentus</i> L.	<i>Cyperaceae</i>	Mo	Mediterranean	H	Cr	1917
64	<i>Cyperus longus</i> L.	<i>Cyperaceae</i>	Mo	Native	H	Cr	-
65	<i>Datura stramonium</i> L.	<i>Solanaceae</i>	Eu	North America	R	Th	1916
66	<i>Daucus carota</i> L.	<i>Apiaceae</i>	Eu	Europe	P	Cr	XX beg.
67	<i>Digitaria violascens</i> Link	<i>Poaceae</i>	Mo	East Asia	R	Th	1927
68	<i>Dysphania ambrosioides</i> (L.) Mosyakin & Clemants ( <i>Chenopodium ambrosioides</i> L.)	<i>Amaranthaceae</i>	Eu	South America	R	He	1930



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69	<i>Echinochloa crus-galli</i> (L.) P.Beauv.	Poaceae	Mo	East Asia	P	Th	1916
70	<i>Eleusine indica</i> (L.) Gaertn.	Poaceae	Mo	East Asia	R	Th	AnT
71	<i>Elsholtzia ciliata</i> (Thunb.) Hyl.	Lamiaceae	Eu	East Asia	R	Th	1934
72	<i>Epilobium palustre</i> L.	Onagraceae	Eu	Native	H	He	-
73	<i>Equisetum arvense</i> L.	Equisetaceae	sp	Native	H	Cr	-
74	<i>Equisetum palustre</i> L.	Equisetaceae	sp	Native	H	Cr	-
75	<i>Equisetum ramosissimum</i> Desf.	Equisetaceae	sp	Native	H	Cr	-
76	<i>Erigeron annuus</i> (L.) Pers.	Compositae	Eu	North America	P	Th	1929
77	<i>Erigeron bonariensis</i> L. ( <i>Conyza bonariensis</i> (L.) Cronquist)	Compositae	Eu	North America	R	He	1939
78	<i>Erigeron canadensis</i> L. ( <i>Conyza canadensis</i> (L.) Cronquist)	Compositae	Eu	North America	R	Th	1900
79	<i>Eriobotrya japonica</i> (Thunb.) Lindl.	Rosaceae	Eu	East Asia	P	Ph	2009
80	<i>Euphorbia falcata</i> L.	Euphorbiaceae	Eu	Native	R	Th	-
81	<i>Euphorbia peplus</i> L.	Euphorbiaceae	Eu	Mediterranean	R	Th	1917
82	<i>Euphorbia stricta</i> L.	Euphorbiaceae	Eu	Mediterranean	R	Th	1938
83	<i>Fallopia dumetorum</i> (L.) Holub ( <i>Polygonum dumetorum</i> L.)	Polygonaceae	Eu	Native	R	Th	-
84	<i>Ficus carica</i> L.	Moraceae	Eu	Native	S	Ph	-
85	<i>Filago arvensis</i> L.	Compositae	Eu	Native	M	Th	-
86	<i>Filago gallica</i> L. / <i>Logfia gallica</i> (L.) Coss. & Germ.	Compositae	Eu	Europe	P	Th	1932
87	<i>Fragaria vesca</i> L.	Rosaceae	Eu	Native	G	He	-
88	<i>Frangula alnus</i> Mill.	Rosaceae	Eu	Native	F	Ph	-
89	<i>Galinsoga ciliata</i> S.F.Blake / <i>Galinsoga quadriradiata</i> Ruiz & Pav.	Compositae	Eu	North America	R	Th	1914
90	<i>Galinsoga parviflora</i> Cav.	Compositae	Eu	North America	R	Th	1970
91	<i>Galium palustre</i> L.	Rubiaceae	Eu	Native	R	Th	-
92	<i>Galium spurium</i> L.	Rubiaceae	Eu	Europe	R	Th	1939
93	<i>Galium tricorntum</i> Dandy	Rubiaceae	Eu	Europe	R	Th	1939
94	<i>Geranium dissectum</i> L.	Geraniaceae	Eu	Mediterranean	G	Th	1916
95	<i>Geranium sibiricum</i> L.	Geraniaceae	Eu	Europe	G	He	1967
96	<i>Glechoma hederacea</i> L.	Lamiaceae	Eu	Native	P	Ph	-
97	<i>Gleditsia triacanthos</i> L.	Leguminosae	Eu	North America	F	Ph	1953
98	<i>Hibiscus syriacus</i> L.	Malvaceae	Eu	East Asia	R	Ph	1968
99	<i>Hippophae rhamnoides</i> L. ( <i>Elaeagnus rhamnoides</i> (L.) A.Nelson.)	Elaeagnaceae	Eu	Native	G	Ph	-
100	<i>Hydrocotyle ramiflora</i> Maxim.	Araliaceae	Eu	East Asia	H	Ch	1920
101	<i>Hydrocotyle vulgaris</i> L.	Araliaceae	Eu	Europe	H	Ch	1920
102	<i>Hypericum androsaemum</i> L.	Hypericaceae	Eu	Native	F	Ch	-
103	<i>Hypochaeris radiata</i> Falk.	Compositae	Eu	Native	P	He	-
104	<i>Impatiens balsamina</i> L.	Balsaminaceae	Eu	East Asia	R	Th	2018
105	<i>Juglans ailanthifolia</i> Carrière	Juglandaceae	Eu	East Asia	F	Ph	2000
106	<i>Juncus bufonius</i> L.	Juncaceae	Mo	Native	H	Th	-
107	<i>Juncus effusus</i> L.	Juncaceae	Mo	Native	H	Cr	-

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108	<i>Juncus tenuis</i> Willd.	<i>Juncaceae</i>	Mo	Native	H	Cr	-
109	<i>Kummerowia striata</i> (Thunb.) Schindl. / <i>Lespedeza striata</i> (Thunb.)	<i>Leguminosae</i>	Eu	East Asia	R	Th	1968
110	<i>Kyllinga gracillima</i> Miq. / <i>Cyperus brevifoloides</i> Thieret & Delahouss.	<i>Cyperaceae</i>	Mo	East Asia	H	He	1927
111	<i>Lactuca serriola</i> L.	<i>Compositae</i>	Eu	Native	R	He	-
112	<i>Lamium purpureum</i> L. ( <i>Lamiopsis purpurea</i> (L.) Opiz)	<i>Lamiaceae</i>	Eu	Europe	R	He	1938
113	<i>Laphangium affine</i> (D.Don) Tzvelev / <i>Pseudognaphalium affine</i> (D.Don) Anderb.	<i>Compositae</i>	Eu	East Asia	R	He	1916
114	<i>Laphangium luteoalbum</i> (L.) Tzvelev / <i>Helichrysum luteoalbum</i> (L.) Rchb.	<i>Compositae</i>	Eu	East Asia	R	He	1920
115	<i>Lathyrus aphaca</i> L.	<i>Leguminosae</i>	Eu	Europe	R	Th	1939
116	<i>Lathyrus hirsutus</i> L.	<i>Leguminosae</i>	Eu	Native	S	Th	-
117	<i>Leontodon hispidus</i> L.	<i>Compositae</i>	Eu	Native	S	Th	-
118	<i>Lepidium campestre</i> (L.) W.T.Aiton	<i>Brassicaceae</i>	Eu	Mediterranean	P	He	1942
119	<i>Lepidium coronopus</i> (L.) Al-Shehbaz ( <i>Coronopus squamatus</i> (Forssk.) Asch.)	<i>Brassicaceae</i>	Eu	Mediterranean	R	He	1980
120	<i>Lespedeza bicolor</i> Turcz.	<i>Leguminosae</i>	Eu	East Asia	R	Ch	1968
121	<i>Lolium perenne</i> L.	<i>Poaceae</i>	Mo	Europe	R	Ch	1925
122	<i>Lolium rigidum</i> Gaudin	<i>Poaceae</i>	Mo	Mediterranean	R	Th	1944
123	<i>Lonicera japonica</i> Thunb.	<i>Caprifoliaceae</i>	Eu	East Asia	R	Ph	1929
124	<i>Lotus tenuis</i> Waldst. & Kit. ex Willd.	<i>Leguminosae</i>	Eu	Native	P	He	-
125	<i>Ludwigia palustris</i> (L.) Elliott	<i>Onagraceae</i>	Eu	North America	R	Th	1938
126	<i>Luzula forsteri</i> (Sm.) DC.	<i>Juncaceae</i>	Mo	Native	G	He	-
127	<i>Lycopus europeus</i> L.	<i>Lamiaceae</i>	Eu	Native	H	He	-
128	<i>Lysimachia japonica</i> Thunb.	<i>Primulaceae</i>	Eu	East Asia	R	He	1938
129	<i>Lythrum salicaria</i> L.	<i>Lythraceae</i>	Eu	Native	H	Cr	-
130	<i>Malva ambigua</i> Guss.	<i>Malvaceae</i>	Eu	Europe	R	He	1939
131	<i>Malva neglecta</i> Wallr.	<i>Malvaceae</i>	Eu	Native	R	He	1938
132	<i>Marrubium vulgare</i> L.	<i>Lamiaceae</i>	Eu	Mediterranean	R	Ch	1970
133	<i>Melilotus albus</i> Medik.	<i>Leguminosae</i>	Eu	Native	P	Th	1966
134	<i>Melilotus officinalis</i> (L.) Lam.	<i>Leguminosae</i>	Eu	Native	P	Th	-
135	<i>Mentha aquatica</i> L.	<i>Lamiaceae</i>	Eu	Native	H	He	-
136	<i>Mentha pulegium</i> L.	<i>Lamiaceae</i>	Eu	Native	H	He	-
137	<i>Microstegium imberbe</i> (Ness) Tzvelev / <i>Microstegium vimineum</i> (Trin.) A.Camus	<i>Poaceae</i>	Mo	East Asia	R	Th	1917
138	<i>Microstegium japonicum</i> (Miq.) Koidz.	<i>Poaceae</i>	Mo	East Asia	R	He	1927
139	<i>Mirabilis jalapa</i> L.	<i>Nyctaginaceae</i>	Eu	South America	R	Cr	2012
140	<i>Miscanthus sinensis</i> Andersson	<i>Poaceae</i>	Mo	East Asia	R	Cr	1926
141	<i>Morus alba</i> L.	<i>Moraceae</i>	Eu	East Asia	G	Ph	AnT
142	<i>Myosotis palustris</i> (L.) Nathh. / <i>Myosotis scorpioides</i> L.	<i>Boraginaceae</i>	Eu	Native	H	He	-
143	<i>Oenothera biennis</i> L. s.l.	<i>Onagraceae</i>	Eu	North America	R	He	1927
144	<i>Oplismenus burmanni</i> (Retz.) P.Beauv.	<i>Poaceae</i>	Mo	East Asia	R	He	1930
145	<i>Oplismenus undulatifolius</i> (Ard.) Beauv.	<i>Poaceae</i>	Mo	East Asia	F	He	AnT

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146	<i>Oxalis corniculata</i> L.	Lamiaceae	Eu	North America	R	Th	1916
147	<i>Oxalis violacea</i> L.	Lamiaceae	Eu	North America	R	Cr	1946
148	<i>Parentucellia latifolia</i> Caruel.	Orobanchaceae	Eu	Europe	P	Th	2009
149	<i>Parthenocissus quinquefolia</i> (L.) Planch.	Vitaceae	Eu	North America	R	Ph	2015
150	<i>Paspalum distichum</i> L. ( <i>P. paspalodes</i> (Michx.) Scribn.)	Poaceae	Mo	East Asia	R	Cr	XX-beg.
151	<i>Paspalum thunbergii</i> Kunth ex Steud.	Poaceae	Mo	East Asia	R	Cr	1920
152	<i>Perilla nankinensis</i> (Lour.) Decne / <i>Perilla frutescens</i> var. <i>crispa</i> (Thunb.) H.Deane	Lamiaceae	Eu	East Asia	R	Th	1910
153	<i>Persicaria hydropiper</i> (L.) Delarbre ( <i>Polygonum hydropiper</i> L.)	Polygonaceae	Eu	Native	H	Th	-
154	<i>Persicaria maculosa</i> Gray ( <i>Polygonum persicaria</i> L.)	Polygonaceae	Eu	Native	H	Th	-
155	<i>Persicaria minor</i> (Huds.) Opiz ( <i>Polygonum minus</i> Huds.)	Polygonaceae	Eu	Europe	R	Th	1917
156	<i>Persicaria orientalis</i> (L.) Spach. ( <i>Polygonum orientale</i> L.)	Polygonaceae	Eu	East Asia	R	Th	1924
157	<i>Persicaria perfoliata</i> (L.) H.Gross ( <i>Polygonum perfoliatum</i> L.)	Polygonaceae	Eu	East Asia	R	Th	1924
158	<i>Persicaria posumbu</i> (Buch.-Ham. ex D.Don) H.Gross ( <i>Polygonum posumbu</i> Buch.-Ham. ex D.Don)	Polygonaceae	Eu	East Asia	R	Th	1910
159	<i>Persicaria thunbergii</i> (Siebold & Zucc.) H.Gross ( <i>Polygonum thunbergii</i> Siebold & Zucc.)	Polygonaceae	Eu	East Asia	H	Th	1927
160	<i>Physalis ixocarpa</i> Brot. ex Hornem.	Solanaceae	Eu	North America	P	Th	1935
161	<i>Phytolacca americana</i> L.	Phytolaccaceae	Eu	North America	R	Cr	XX beg.
162	<i>Plantago major</i> L.	Plantaginaceae	Eu	Native	R	He	-
163	<i>Platanus occidentalis</i> L.	Platanaceae	Eu	North America	F	Ph	2008
164	<i>Poa annua</i> L.	Poaceae	Mo	Europe	H	Th	1917
165	<i>Poa compressa</i> L.	Poaceae	Mo	Europe	P	He	1925
166	<i>Poa pratensis</i> L.	Poaceae	Mo	Native	G	He	-
167	<i>Polycarpon tetraphyllum</i> (L.) L.	Caryophyllaceae	Eu	Mediterranean	P	Th	1939
168	<i>Polygonum aviculare</i> L.	Polygonaceae	Eu	Europe	R	Th	1917
169	<i>Potentilla indica</i> (Andrews) Th.Wolf. ( <i>Duchesnea indica</i> (Andrews) Teschem.)	Rosaceae	Eu	East Asia	P	He	1924
170	<i>Portulaca oleracea</i> L. s.l.	Portulacaceae	Eu	Mediterranean	R	Th	1977
171	<i>Prunella vulgaris</i> L.	Lamiaceae	Eu	Native	F	Th	-
172	<i>Pycnus flavescens</i> (L.) P.Beauv. ex Rchb.	Cyperaceae	Mo	Native	H	Th	-
173	<i>Ranunculus muricatus</i> L.	Ranunculaceae	Eu	Mediterranean	R	Th	1917
174	<i>Ranunculus sceleratus</i> L.	Ranunculaceae	Eu	Europe	H	He	1939
175	<i>Rhus javanica</i> L.	Simaroubaceae	Eu	East Asia	R	Ph	1929
176	<i>Robinia pseudoacacia</i> L.	Leguminosae	Eu	North America	F	Ph	1965
177	<i>Rosa multiflora</i> Thunb.	Rosaceae	Eu	East Asia	P	Ph	2016
178	<i>Rubus anatolicus</i> Focke.	Rosaceae	Eu	Native	F	Ph	-
179	<i>Rubus caesius</i> L.	Rosaceae	Eu	Native	F	Ph	-
180	<i>Rubus proiectus</i> A.Beek ( <i>Rubus hirtus</i> auct.)	Rosaceae	Eu	Native	F	Ph	-

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181	<i>Rubus serpens</i> Weihe ex Lej. & Courtois	<i>Rosaceae</i>	Eu	Native	F	Ph	-
182	<i>Rudbeckia hirta</i> L.	<i>Compositae</i>	Eu	North America	R	He	1960
183	<i>Rumex acetosella</i> L.	<i>Polygonaceae</i>	Eu	Native	G	He	-
184	<i>Rumex acetosella</i> subsp. <i>acetoselloides</i> (Balansa) Den Nijs ( <i>Rumex acetoselloides</i> Balansa)	<i>Polygonaceae</i>	Eu	Native	R	He	-
185	<i>Rumex pulcher</i> L.	<i>Polygonaceae</i>	Eu	Native	R	He	-
186	<i>Salix babylonica</i> L.	<i>Salicaceae</i>	Eu	East Asia	H	Ph	-
187	<i>Salix caprea</i> L.	<i>Salicaceae</i>	Eu	Native	H	Ph	-
188	<i>Sambucus ebulus</i> L.	<i>Adoxaceae</i>	Eu	Native	R	Ch	-
189	<i>Sambucus nigra</i> L.	<i>Adoxaceae</i>	Eu	Native	F	Ph	-
190	<i>Saxifraga stolonifera</i> Curtis	<i>Saxifragaceae</i>	Eu	East Asia	P	Cr	1960
191	<i>Scirpus sylvaticus</i> L.	<i>Cyperaceae</i>	Mo	Native	H	Cr	-
192	<i>Scrophularia nodosa</i> L.	<i>Scrophulariaceae</i>	Eu	Europe	H	He	1916
193	<i>Senecio sylvaticus</i> L.	<i>Compositae</i>	Eu	Native	P	Th	-
194	<i>Senecio vernalis</i> Waldst. & Kit.	<i>Compositae</i>	Eu	Mediterranean	R	Th	1918
195	<i>Senecio vulgaris</i> L.	<i>Compositae</i>	Eu	Europe	R	Th	1916
196	<i>Setaria faberi</i> R.A.W. Herrm.	<i>Poaceae</i>	Mo	Mediterranean	R	Th	1913
197	<i>Setaria intermedia</i> Roem. & Schult.	<i>Poaceae</i>	Mo	East Asia	R	Th	1930
198	<i>Sherardia arvensis</i> L.	<i>Rubiaceae</i>	Eu	Native	R	Th	-
199	<i>Sigesbeckia orientalis</i> L.	<i>Compositae</i>	Eu	East Asia	R	Th	1917
200	<i>Sisymbrium officinale</i> (L.) Scop.	<i>Brassicaceae</i>	Eu	Mediterranean	R	Th	1939
201	<i>Sisyrinchium septentrionale</i> E.P.Bicknell	<i>Iridaceae</i>	Mo	North America	R	Th	2010
202	<i>Smilax excelsa</i> L.	<i>Smilacaceae</i>	Mo	Native	F	Ph	-
203	<i>Solanum carolinense</i> L.	<i>Solanaceae</i>	Eu	North America	R	Ch	1959
204	<i>Solanum decipiens</i> Opiz	<i>Solanaceae</i>	Eu	Europe	R	Th	1945
205	<i>Solanum luteum</i> Mill.	<i>Solanaceae</i>	Eu	South America	R	Th	1963
206	<i>Solanum nigrum</i> L.	<i>Solanaceae</i>	Eu	Europe	R	Th	1917
207	<i>Solanum pseudocapsicum</i> L.	<i>Solanaceae</i>	Eu	South America	R	Ph	1961
208	<i>Solidago canadensis</i> L.	<i>Compositae</i>	Eu	North America	R	He	2014
209	<i>Sorghum halepense</i> (L.) Pers.	<i>Poaceae</i>	Mo	Mediterranean	R	He	1920
210	<i>Sparganium erectum</i> L. (incl. <i>S. erectum</i> subsp. <i>neglectum</i> (Beeby) K.Richt.)	<i>Typhaceae</i>	Mo	Native	H	Cr	-
211	<i>Spiraea japonica</i> L.f.	<i>Rosaceae</i>	Eu	East Asia	R	Ph	1900
212	<i>Sporobolus fertilis</i> (Steud.) Clayton	<i>Poaceae</i>	Mo	East Asia	R	He	1929
213	<i>Stachys annua</i> L.	<i>Lamiaceae</i>	Eu	Europe	R	Th	1960
214	<i>Stellaria graminea</i> L.	<i>Caryophyllaceae</i>	Eu	Europe	P	He	1938
215	<i>Stellaria holostea</i> L. / <i>Rabclera holostea</i> (L.) M.T.Sharple & E.A.Tripp	<i>Caryophyllaceae</i>	Eu	Native	P	He	-
216	<i>Stellaria media</i> (L.) Vill.	<i>Caryophyllaceae</i>	Eu	Europe	H	Th	1916
217	<i>Symphyotrichum graminifolium</i> (Spreng.) G.L. Nesom ( <i>Conyzanthus graminifolius</i> (Spreng.) Tamamsch.)	<i>Compositae</i>	Eu	South America	R	He	1927
218	<i>Tagetes minuta</i> L.	<i>Compositae</i>	Eu	South America	R	Th	1934

No	Species	Families	Class	Origin	Ecological group	Life form	FRT
219	<i>Taraxacum officinale</i> Wigg.	<i>Compositae</i>	Eu	Native	G	Cr	-
220	<i>Torilis arvensis</i> (Huds.) Link	<i>Compositae</i>	Eu	Europe	R	Th	1952
221	<i>Torilis japonica</i> (Houtt.) DC.	<i>Compositae</i>	Eu	East Asia	R	He	1916
222	<i>Tradescantia fluminensis</i> Vell.	<i>Commelinaceae</i>	Mo	South America	R	He	1960
223	<i>Tradescantia virginiana</i> L.	<i>Commelinaceae</i>	Mo	North America	R	He	1969
224	<i>Trifolium campestre</i> Schreb.	<i>Leguminosae</i>	Eu	Native	P	Th	-
225	<i>Trifolium diffusum</i> Ehrh.	<i>Leguminosae</i>	Eu	Mediterranean	P	Th	1948
226	<i>Trifolium echinatum</i> M.Bieb.	<i>Leguminosae</i>	Eu	Mediterranean	P	Th	1939
227	<i>Trifolium fragiferum</i> L.	<i>Leguminosae</i>	Eu	Native	P	Th	-
228	<i>Trifolium micranthum</i> Viv.	<i>Leguminosae</i>	Eu	Mediterranean	P	Th	1939
229	<i>Typha angustifolia</i> L.	<i>Typhaceae</i>	Mo	Native	H	Cr	-
230	<i>Typha latifolia</i> L.	<i>Typhaceae</i>	Mo	Native	H	Cr	-
231	<i>Urtica dioica</i> L.	<i>Urticaceae</i>	Eu	Atlantic Europe	R	He	AnT
232	<i>Verbascum blattaria</i> L.	<i>Scrophulariaceae</i>	Eu	Native	R	Ch	-
233	<i>Verbena brasiliensis</i> Vell.	<i>Verbenaceae</i>	Eu	South America	P	Ch	2015
234	<i>Verbena officinalis</i> L.	<i>Verbenaceae</i>	Eu	Europe	R	Ch	XX beg.
235	<i>Veronica anagallis-aquatica</i> L.	<i>Plantaginaceae</i>	Eu	Native	R	He	-
236	<i>Veronica persica</i> Poir.	<i>Plantaginaceae</i>	Eu	Mediterranean	R	Th	1914
237	<i>Veronica serpyllifolia</i> L.	<i>Plantaginaceae</i>	Eu	Native	R	He	-
238	<i>Vicia lathyroides</i> L.	<i>Leguminosae</i>	Eu	Mediterranean	R	Th	1939
239	<i>Vicia sativa</i> L.	<i>Leguminosae</i>	Eu	Europe	G	Th	1917
240	<i>Viola prionantha</i> Bunge	<i>Violaceae</i>	Eu	East Asia	R	Th	1926
241	<i>Viola reichenbachiana</i> Jord. ex Boreau	<i>Violaceae</i>	Eu	Native	F	Th	-
242	<i>Xanthium californicum</i> Greene ( <i>X. strumarium</i> auct.)	<i>Compositae</i>	Eu	North America	R	Th	1934
243	<i>Xanthium spinosum</i> L.	<i>Compositae</i>	Eu	South America	R	Th	XX beg.
244	<i>Xanthium strumarium</i> L.	<i>Compositae</i>	Eu	North America	R	Th	XX beg.