LIVING COLLECTION OF *FLORA GRAECA* SIBTHORPIANA: FROM THE FOLIOS OF THE MONUMENTAL EDITION TO THE BEDS OF A BOTANIC GARDEN IN GREECE

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ABSTRACT

The results of a survey of vascular plants illustrated in the 19th-century publication *Flora Graeca* Sibthorpiana (*FGS*) and grown in Diomedes Botanic Garden (DBG) in Athens metropolitan area in Greece reveal a total number of 274 taxa belonging to 67 families, using the Raunkiaer system of categorising plants by life form (Raunkiaer, 1934). Therophytes dominate with 36 per cent, while hemicryptophytes, chamephytes and geophytes follow with 16 per cent, 14 per cent and 14 per cent respectively. In terms of life cycle, 60 per cent are perennials, 36 per cent annuals and 4 per cent other growth forms adapted to environmental disturbance. Although anthropogenic pressures and environmental stresses have caused loss of habitat and resulted in profound landscape transformation in the eastern Mediterranean, DBG contributes to the maintenance of approximately one-third of the plants collected in territories of the Levant in 1787. This living collection constitutes an important testimony to the scientific value, heritage and plant diversity described in *FGS*. Statistics are provided comparing the plants collected and illustrated for *FGS* and those now growing in DBG.

INTRODUCTION

Flora Graeca Sibthorpiana (Sibthorp and Smith, 1806–1840) is considered by many to be the most splendid and expensive flora ever produced and was printed in ten folio volumes between 1806 and 1840 (Stearn, 1967; Lack & Mabberley, 1999; Harris, 2007).

John Sibthorp (1758–1796), third Sherardian Professor of Botany at Oxford, resolved to collect and identify plants known since the time of classical antiquity and hundreds of plants mentioned in Dioscorides' manuscripts, and to confirm their botanical and medicinal value (Bruce, 1970; Rhizopoulou, 2008). He also believed that collecting plants from the classical territories of the eastern Mediterranean offered the greatest opportunities for enhancing the reputation of a botanist (Darlington, 1971; Harris, 2007). Sibthorp explored parts of the eastern Mediterranean during a journey in 1786 and the following year conceived the idea of a flora which was to contain botanical

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results of the trip and be named *Flora Graeca* (Lack & Mabberley, 1999; Harris, 2007; Baytop, 2010). This was at a time when scientists and travellers were accompanied by professional artists whose work supplemented their discoveries with visual evidence and when painted illustration was a scientific tool that supported the study of descriptive botany (Meikle, 1980; Lack, 1998; Nickelsen, 2006). Sibthorp hired the talented artist Ferdinand Bauer (1760–1828) as the draughtsman to accompany him on his journey to the eastern Mediterranean (Stearn, 1976; Lack & Mabberley, 1999; Krimbas, 2004; Rhizopoulou, 2004; Harris, 2007).

Sibthorp's team explored landscapes known from classical antiquity, islands and wild mountainous regions, and studied plants in their natural habitats; in doing so they discovered hundreds of species new to science. They also collected plants referred to in ancient texts centuries before the establishment of a classification based on the Linnean binomial system and without generic names (Stearn, 1976; Negbi, 1989; Raven, 2000; Rhizopoulou, 2004; Pavord, 2005).

Ferdinand Bauer produced 966 botanical watercolour paintings (Figs 1 & 2), which was to give the *FGS* its reputation for magnificence and also contributed to its extraordinary cost (Wise, 1989; Harris, 2007); Fig. 3 in particular demonstrates the fine quality and detail of Bauer's work. The first edition, which had a print run of only 25 copies and is generally thought to be among the rarest and most lavish of books (Harris, 2007; Soutteau, 2010), contained 966 hand-coloured copper engravings, based on the original watercolours by Bauer. *FGS* was a publishing phenomenon in its time and constitutes an early source of information highly relevant to the natural heritage of the eastern Mediterranean. It was also to influence botanical research, scientific illustrations and the cultivation of Mediterranean plants in English gardens (Batey, 1986; Steane, 2004; Harris, 2007). With the publication of *FGS* between 1806 and 1840 Mediterranean plants became known to the international scientific community. Forty copies of a second edition were published in the first half of the 19th century.

The eastern Mediterranean region exhibits a plant diversity that has emerged by means of natural selection and species evolution which explains the multitude of endemics (Blondel & Aronson, 1999; Georghiou & Delipetrou, 2010; Türe & Börük, 2010). The area is also characterised by the predominance of species displaying adaptations to a dry season, which is the most critical period of the year for plant survival (Rhizopoulou & Mitrakos, 1990; Rhizopoulou *et al*., 1997; Salleo *et al*., 1997; Abril & Hanano, 1998; Burgess, 2006). Added to this, the extent of environmental stress and anthropogenic pressure has caused a loss of habitats and profound transformation in Mediterranean landscapes (Lavergne *et al*., 2005; Vogiatzakis *et al*., 2006; Rhizopoulou, in press). This means that whatever effort can be made to maintain the diversity of the ecosystems of this region is closely connected to the preservation of plant species of the monumental *FGS*.

Botanic gardens protect plant life, they play an essential role as living museums and with their *ex situ* and *in situ* conservation collections they heighten community awareness of the need to protect the natural environment and the diversity of plants in

Fig. 1 *Capparis spinosa* drawn by Ferdinand Bauer and reproduced with permission of the National Library of Greece.

Fig. 2 *Nerium oleander* drawn by Ferdinand Bauer and reproduced with permission of the National Library of Greece.

Fig. 3 *Flora Graeca* Sibthorpiana, based on watercolours by Ferdinand Bauer, reproduced with permission of the National Library of Greece.

the wild (Stearn, 1971; Crane *et al*., 2009). Botanic gardens have an increasingly vital role to play in the future of plant biodiversity in our changing world (Dixon, 2007; Heywood, 2009). The preservation of biodiversity and a growing interest in the importance of native species enhance multidisciplinary research in botanic gardens (Maunder *et al*., 2001; Dosmann, 2006; Schulman & Lehvävirta, 2011). The research stimulates its own scientific investigation and provides a source of information over time (Smith *et al*., 2003; Pautasso & Parmentier, 2007; Golding *et al*., 2010; Volis & Blecher, 2010).

THE JULIA & ALEXANDER N. DIOMEDES BOTANIC GARDEN OF ATHENS

DBG, that is the Julia & Alexander N. Diomedes Botanic Garden,[5] usually abbreviated to Diomedes Botanic Garden, comprises a living collection of approximately 3,000 plant taxa and is the largest botanic garden in Greece. Alexander N. Diomedes (1875–1950) was a government minister, Governor of the National Bank of Greece, founder of the Bank of Greece and member of the Academy of Athens. When he died he left his legacy specifically for the establishment of a botanic garden. Having experienced something of the beauty of the botanic gardens of Central Europe, he believed that the development of the discipline of botany opened the way for new generations to occupy themselves with useful research and professional activity, and that it would bring human thought and action into closer harmony with the plant kingdom (Rhizopoulou, 2007).

DBG opened to the public in 1975 and belongs to the University of Athens which uses it for scientific purposes. The garden covers 460 acres, of which almost 50 have been dedicated to the cultivation of ornamental plants. Landscape construction based on the designs of Professor Herta Hammerbacher (1900–1985) of the University of Berlin (Hottentrager, 1992) converted a large forested area into a garden, paved paths and plantations in the 1960s. This was under the strict condition that the impact of landscape shaping on the natural ecosystem should be kept to a minimum. It is worth noting that the recovery of the natural vegetation of the area of DBG – for many years overgrazed by goats and sheep and subjected to the consequences of forest fires – started after the fencing was constructed (Sarlis, 1980). Tree species in the arboretum and other cultivated species seem to be perfectly matched with naturally occurring stands of trees, wild shrubs and herbs (Rhizopoulou, 2007).

The purpose of the study was to document the vascular plants collected in 1787 and presented in the illustrated edition of *FGS* (1806–1840) and compare them with those that grow in DBG today. To the best of our knowledge, the plant diversity shown in *FGS* has not hitherto been studied in the protected environment of a botanic garden.

5. The surname of the family was originally Kyriakos; the great-grandfather of Alexander Diomedes was actively involved in the struggle for independence from Ottoman occupation and contributed his private ship, *The Pelican*, renamed *Diomedes*, to the cause. According to Homer (*Iliad*, c. 8th century BC), Diomedes was a great warrior and legendary Greek hero blessed with wisdom and strength. In the period leading up to the war of independence from the Ottomans, figures drawn from classical antiquity lent moral support to the Greeks.

STUDY AREA, DATA AND SOURCES

The study was conducted in DBG, Greece (23°40' E 38°05' N), which is situated 14km west of downtown Athens; and detailed field observations were made on a monthly basis between 2007 and 2011. Interestingly, DBG is established in an area known to have been visited by John Sibthorp in 1787 (Lack & Mabberley, 1999). Identified taxa were compared with: (1) *FGS* (Sibthorp & Smith, 1806–1840), 2nd edition, housed in the National Library of Greece and Gennadius Library of the American School of Classical Studies at Athens (Greece); (2) *Florae Graecae Prodromus* (Sibthorp & Smith, 1806, 1813), housed in the Institute of Botany at the Department of Biology (University of Athens); (3) Digital *Flora Graeca* (Bodleian Libraries, 2012); (4) a register of plates sourced from the Lindley Library (Royal Horticultural Society, 2007) accessible online. Nomenclature follows Tutin *et al.* (1968–1980, 1993), Greuter *et al*. (1984–1989), Strid & Tan (1997, 2002), Greuter & von Raab-Straube (2008) and the online meta-resource International Plant Names Index (2012).

THE FLORISTIC SURVEY

A total of 274 taxa (266 species and 8 subspecies) that are illustrated in *FGS* flourish in DBG (Table 1). These belong to 211 genera in 67 families. When considering currently accepted scientific plant names we found that the inventory of 274 taxa corresponds to 282 plant engravings in the ten-volume edition of *FGS* (Table 2). The families with the largest number of species were Fabaceae (34 taxa), Asteraceae (32 taxa), Lamiaceae (21 taxa), Poaceae (14 taxa), Apiaceae (11 taxa) and Ranuculaceae (11 taxa) which contributed 45 per cent of the total (Appendix 1). Appendix 1 provides a list of the plants in *FGS* and growing in DBG; the corresponding plates from the printed edition of *FGS*, the family, life and growth forms, life cycle and status in Greece are also listed. Of the 274 taxa, 251 are indigenous, 8 are endemics, 10 are aliens and 5 are cultivated species in Greece (Sarlis, 1998; Arianoutsou *et al.*, 2010). Herbs are by far the most frequent growth form (70 per cent), while the proportion of shrubs (16 per cent) and subshrubs (6 per cent) is substantially lower. As for the life forms of the plants of *FGS* that prosper in DBG, 36 per cent are therophytes, 16 per cent hemicryptophytes, 14 per cent chamaephytes, 14 per cent geophytes, 11 per cent phanerophytes and 2 per cent

Plants	Native	Endemic	Alien	Cultivated	Total
Families	46	5	9	5	65
Genera	189	8	9	5	211
Species	246	5	10	5	266
Subspecies	5	3	-	-	8
Taxa	251	8	10	5	274

Table 1 Summarised data on plants illustrated in *FGS* and grown in DBG.

Volume of *FGS*	Vascular plants of *FGS* in DBG	Corresponding plates
I	31	31
II	25	25
III	27	27
IV	33	34
V	19	21
VI	33	33
VII	29	31
VIII	31	33
IX	20	21
X	26	26
Total	274	282

Table 2 Summarised data on vascular plants grown in DBG and the corresponding plates per volume of *FGS*.

nano-phanerophytes; it is likely that the great proportion of therophytes is the result of the dry soil they inhabit (Sarlis, 1980). For the same reason perennials are far more frequent (60 per cent) than annuals (36 per cent).

Five trees illustrated in *FGS* (that is, *Olea europaea* L., *Platanus orientalis* L., the cultivated *Pinus pinaster* Aiton and the aliens *Elaeagnus angustifolia* L. and *Punica granatum* L.) form focal points in DBG. Eight more species that are not native to Greece but are illustrated in *FGS* were found to grow in DBG. These are *Acanthus mollis* L., *Aloe vera* (L.) Burm.f., *Coriandrum sativum* L., *Iris germanica* L., *Iris florentina* L., *Lepidium sativum* L., *Lobularia maritima* (L.) Desv. and *Ricinus communis* (L.). The cultivated species include *Campanula persicifolia* L., *Linaria purpurea* (L.) Mill., *Onosma fruticosa* Lam. and *Teucrium fruticans* L. Hence, of the 274 taxa illustrated in *FGS* and grown in DBG, approximately 97 per cent are native and 3 per cent non-native species in Greece. Of the indigenous herbs, eight taxa (five species and three subspecies) are endemic to southern Greece and the islands of the Aegean archipelagos (Georghiou & Delipetrou, 2010); these are the annual therophytes *Anthemis peregrina* subsp. *heracleotica* (Boiss. & Heldr.) Georgiou, *Campanula drabifolia* Sm., *Pterocephalus brevis* (L.) Coult. and the widespread *Nigella arvensis* subsp. *aristata* (Sm.) Nyman; the perennial hemicryptophytes *Chondrilla ramosissima* Sm.; the widespread *Centaurea raphanina* subsp. *mixta* (DC.) Runemark; the rare *Ebenus sibthorpii* DC.; and the widespread perennial geophyte *Scorzonera crocifolia* Sm.

Human influence has been dramatic in the eastern Mediterranean, which is considered to be one of the world's biodiversity hotspots (Myers *et al.*, 2000) and has caused profound transformation in ecosystems, concomitantly reducing the distribution of indigenous plants and enhancing a widespread concern about the extent of habitat and species loss (Mayr, 1992; Phitos *et al*., 2009; Jones-Walters & Čivić, 2010; Magurran & Dornelas, 2010; Mazaris *et al*., 2010).

The protected environment of a botanic garden is also an evolving system; *in situ* and *ex situ* conservation methods employed by a botanic garden provide a proven method of preserving plant life under ambient conditions in a properly designed area (Crane, 2004).

CONCLUSION

The occurrence of 274 taxa of *FGS* in DBG provides a useful resource for research and education for plant biologists, teachers, excursionists and natural historians. Among the 274 vascular plants, there are taxa either widely distributed in the eastern Mediterranean or found by Sibthorp's mission in 1787 to grow in the most inhospitable places and neglected landscapes of Greece (Petrova, 2010; Strid & Strid, 2009–2011). Thus, vascular plants illustrated in *FGS* (1806–1840) can be seen growing in DBG; this living collection in the environment of a botanic garden creates new challenges for researchers in identifying comparative principles governing community species richness and environmental physiology of taxa collected during Sibthorp's expedition in the Levant (1787).

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APPENDIX 1

List of plants in *Flora Graeca* Sibthorpiana (in alphabetical order) growing in DBG; the corresponding plate(s) from the printed edition of *FGS*, family, life form, growth form, life cycle and status in Greece are provided. Abbreviations: alien_c: casual alien; alien_e: established alien; C: chamaephyte; H: hemicryptophyte; G: geophyte; P: phanerophyte; T: therophyte; NP: nano-phanerophyte; and T/H: therophyte/hemicryptophyte.

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
1	610	*Acanthus mollis* L.	Acanthaceae	H	herb	perennial	alien_c
2	611	*Acanthus spinosus* L.	Acanthaceae	H	herb	perennial	native
3	93	*Aegilops geniculata* Roth.	Poaceae	T	herb	annual	native
4	525	*Ajuga iva* (L.) Schreb.	Lamiaceae	C	subshrub	perennial	native
5	662	*Alcea rosea* L.	Malvaceae	H	herb	perennial	native
6	312	*Allium ampeloprasum* L.	Amaryllidaceae	G	herb	perennial	native
7	326	*Allium cepa* L.	Amaryllidaceae	G	herb	perennial	native
8	315	*Allium guttatum* subsp. *sardoum*	Amaryllidaceae	G	herb	perennial	native
9	325	*Allium neapolitanum* Cirillo	Amaryllidaceae	G	herb	perennial	native
10	318	*Allium paniculatum* L.	Amaryllidaceae	G	herb	perennial	native
11	314	*Allium roseum* L.	Amaryllidaceae	G	herb	perennial	native
12	313	*Allium subhirsutum* L.	Amaryllidaceae	G	herb	perennial	native
13	341	*Aloe vera* (L.) Burm.f.	Asphodelaceae	NP	shrub	perennial	alien_e
14	273	*Ammi majus* L.	Apiaceae	T	herb	annual	native
15	366	*Anagyris foetida* L.	Fabaceae	P	shrub	perennial	native
16	165	*Anchusa undulata* L.	Boraginaceae	H	herb	perennial	native
17	514	*Anemone coronaria* L.	Ranunculaceae	G	herb	perennial	native
18	515	*Anemone hortensis* L.	Ranunculaceae	G	herb	perennial	native
19	884	*Anthemis chia* L.	Asteraceae	T	herb	annual	native
20	883	*Anthemis peregrina* subsp. *heracleotica* (Boiss. & Heldr.) Georgiou	Asteraceae	T	herb	annual	endemic

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
21	683	*Anthyllis hermanniae* L.	Fabaceae	C	shrub	perennial	native
22	641	*Arabis verna* (L.) R.Br.	Brassicaceae	T	herb	annual	native
23	374	*Arbutus andrachne* L.	Ericaceae	P	shrub/tree	perennial	native
24	373	*Arbutus unedo* L.	Ericaceae	P	shrub/tree	perennial	native
25	948	*Arisarum vulgare* Targ. Tozz.	Araceae	G	herb	perennial	native
26	934	*Aristolochia sempervirens* L.	Aristolochiaceae	P	shrub	perennial	native
27	947	*Arum dioscoridis* Sm.	Araceae	G	herb	perennial	native
28	337	*Asparagus acutifolius* L.	Liliaceae	C	shrub	perennial	native
29	338	*Asparagus aphyllus* L.	Liliaceae	C	shrub	perennial	native
30	334	*Asphodelus ramosus* Brot.	Liliaceae	G	herb	perennial	native
31	335	*Asphodelus fistulosus* L.	Liliaceae	G	herb	perennial	native
32	189	*Asterolinon linum-stellatum* (L.) Duby	Primulaceae	T	herb	annual	native
33	734	*Astragalus angustifolius* Lam.	Fabaceae	C	shrub	perennial	native
34	729	*Astragalus hamosus* L.	Fabaceae	T	herb	annual	native
35	839	*Atractylis cancellata* L.	Asteraceae	T	herb	annual	native
36	628	*Aubrieta deltoidea* (L.) DC.	Brassicaceae	C	subshrub	perennial	native
37	562	*Ballota acetabulosa* (L.) Benth.	Lamiaceae	C	subshrub	perennial	native
38	585	*Bartsia trixago* (L.) All.	Orobanchaceae	T	herb	annual	native
39	876	*Bellis annua* L.	Asteraceae	T	herb	annual	native
40	254	*Beta vulgaris* L. subsp. *maritima* (L.) Arcang.	Amaranthaceae	T/H	herb	annual/perennial	native
41	629	*Biscutella didyma* L.	Brassicaceae	T	herb	annual	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
42	738	*Bituminaria bituminosa* (L.) C. H. Stirt.	Fabaceae	H	herb	perennial	native
43	76	*Briza maxima* L.	Poaceae	T	herb	annual	native
44	83	*Bromus rubens* L.	Poaceae	T	herb	annual	native
45	940	*Bryonia cretica*	Cucurbitaceae	G/H	herb	perennial	native
46	263	*Bupleurum fruticosum* L.	Apiaceae	NP	shrub	perennial	native
47	920	*Calendula arvensis* L.	Asteraceae	T/H	herb	annual/biennial	native
48	215	*Campanula drabifolia* Sm.	Campanulaceae	T	herb	annual	endemic
49	205	*Campanula persicifolia* L.	Campanulaceae	T	herb	annual	cultivated?
50	486	*Capparis spinosa* L.	Capparidaceae	C	shrub	perennial	native
51	836	*Carlina lanata* L.	Asteraceae	T	herb	annual	native
52	840	*Carthamus dentatus* (Forskal) Vahl.	Asteraceae	T	herb	annual	native
53	911	*Centaurea raphanina* Sm. subsp. *mixta* (DC.) Runemark	Asteraceae	H	herb	perennial	endemic
54	902	*Centaurea spinosa* L.	Asteraceae	C	shrub	perennial	native
55	367	*Cercis siliquastrum* L.	Fabaceae	P	shrub/tree	perennial	native
56	171	*Cerinthe retorta* Sm.	Boraginaceae	T	herb	annual	native
57	795	*Chondrilla ramosissima* Sm.	Asteraceae	H	herb	perennial	endemic
58	951	*Chrozophora obliqua* (Vahl.) A.Juss. ex Spreng.	Euphorbiaceae	T	herb	annual	native
59	877	*Chrysanthemum coronarium* L.	Asteraceae	T	herb	annual	native
60	494, 495	*Cistus incanus* subsp. *creticus* L.	Cistaceae	C	shrub	perennial	native
61	493	*Cistus monspeliensis* L.	Cistaceae	C	shrub	perennial	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
62	496	*Cistus parviflorus* Lam.	Cistaceae	C	shrub	perennial	native
63	497	*Cistus salviifolius* L. Cistaceae	Cistaceae	C	shrub	perennial	native
64	517	*Clematis cirrhosa* L.	Ranunculaceae	P	shrub	perennial	native
65	516	*Clematis viticella* L.	Ranunculaceae	P	shrub	perennial	native
66	906	*Cnicus benedictus* L.	Asteraceae	T	herb	annual	native
67	201	*Convolvulus dorycnium* L.	Convolvulaceae	C	shrub	perennial	native
68	194	*Convolvulus althaeoides* L.	Convolvulaceae	H	herb	perennial	native
69	195	*Convolvulus elegantissimus* Mill.	Convolvulaceae	H	herb	perennial	native
70	283	*Coriandrum sativum* L.	Apiaceae	T	herb	annual	alien_c
71	544	*Coridothymus capitatus* (L.) Rchb.f.	Lamiaceae	C	shrub	perennial	native
72	715	*Coronilla scorpioides* (L.) W.D.J.Koch	Fabaceae	T	herb	annual	native
73	808	*Crepis dioscoridis* L.	Asteraceae	T	herb	annual	native
74	900	*Crupina crupinastrum* (Moris) Vis.	Asteraceae	T	herb	annual	native
75	185	*Cyclamen persicum* Mill.	Primulaceae	G	herb	perennial	native
76	186	*Cyclamen repandum* Sm.	Primulaceae	G	herb	perennial	native
77	60	*Cynodon dactylon* (L.) Pers.	Poaceae	G/H	herb	perennial	native
78	78	*Cynosurus echinatus* L.	Poaceae	T	herb	annual	native
79	44	*Cyperus rotundus* L.	Cyperaceae	G	herb	perennial	native
80	45	*Cyperus rotundus* L.	Cyperaceae	G	herb	perennial	native
81	81	*Dactylis glomerata* L.	Poaceae	H	herb	perennial	native
82	269	*Daucus guttatus* Sm.	Apiaceae	T	herb	annual	native
83	270	*Daucus bicolor* Sm.	Apiaceae	T	herb	annual	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
84	506	*Delphinium peregrinum* L.	Ranunculaceae	T	herb	annual	native
85	508	*Delphinium staphisagria* L.	Ranunculaceae	T	herb	annual	native
86	866	*Dittrichia graveolens* (L.) W.Greuter	Asteraceae	T	herb	annual	native
87	759	*Dorycnium hirsutum* (L.) Ser.	Fabaceae	C	subshrub	perennial	native
88	946	*Dracunculus vulgaris* Schott	Araceae	G	herb	perennial	native
89	740	*Ebenus sibthorpii* DC.	Fabaceae	H	herb	perennial	endemic
90	939	*Ecballium elaterium* (L.) A.Rich.	Cucurbitaceae	G	herb	perennial	native
91	268	*Echinophora tenuifolia* L.	Apiaceae	H	herb	perennial	native
92	923	*Echinops sphaerocephalus* L.	Asteraceae	H	herb	perennial	native
93	181	*Echium angustifolium* Mill.	Boraginaceae	H	herb	perennial	native
94	182	*Echium diffusum* Sm.	Boraginaceae	H	herb	perennial	native
95	179	*Echium plantagineum* L.	Boraginaceae	T	herb	annual	native
96	152	*Elaeagnus angustifolia* L.	Elaeagnaceae	P	tree	perennial	alien_e
97	347	*Emex spinosa* (L.) Campd.	Polygonaceae	T	herb	annual	native
98	961	*Ephedra distachya* L. s.l.	Ephedraceae	NP	shrub	perennial	native
99	352	*Erica manipuliflora* Salisb.	Ericaceae	C	shrub	perennial	native
100	657	*Erodium chium* (L.) Willd.	Geraniaceae	T/H	herb	annual/biennial	native
101	658	*Erodium malacoides* (L.) L'Her.	Geraniaceae	T/H	herb	annual/biennial	native
102	646, 647	*Eruca versicaria* (L.) Cav.	Brassicaceae	T	herb	annual	native
103	461	*Euphorbia chamaesyce* L.	Euphorbiaceae	T	herb	annual	native
104	470	*Euphorbia dendroides* L.	Euphorbiaceae	NP/P	shrub/tree	perennial	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
105	279	*Ferula communis* L.	Apiaceae	H	herb	perennial	native
106	921	*Filago pygmaea* L.	Asteraceae	T	herb	annual	native
107	4	*Fraxinus ornus* L.	Oleaceae	P	shrub/tree	perennial	native
108	503	*Fumana arabica* (L.) Spach	Cistaceae	C	subshrub	perennial	native
109	500	*Fumana thymifolia* (L.) Webb	Cistaceae	C	subshrub	perennial	native
110	668	*Fumaria parviflora* Lam.	Fumariaceae	T	herb	annual	native
111	336	*Gagea graeca* (L.) A.Terracc.	Liliaceae	G	herb	perennial	native
112	726	*Galega officinalis* L.	Fabaceae	H	herb	perennial	native
113	115	*Galium murale* (L.) All. T Herb	Rubiaceae	T	herb	annual	native
114	674	*Genista acanthoclada* DC.	Fabaceae	C	shrub	perennial	native
115	37	*Gladiolus communis* L.	Iridaceae	G	herb	perennial	native
116	709	*Glycyrrhiza glabra* L.	Fabaceae	C	subshrub	perennial	native
117	42	*Gynandriris sisyrinchium* (L.) Parl.	Iridaceae	G	herb	perennial	native
118	812, 813	*Hedypnois rhagadioloides* (L.) F.W.Schmidt	Asteraceae	T	herb	annual	native
119	499	*Helianthemum salicifolium* (L.) Mill.	Cistaceae	T	herb	annual	native
120	523	*Helleborus orientalis* Lam.	Ranunculaceae	H	herb	perennial	native
121	41	*Hermodactylus tuberosus* (L.) Mill.	Iridaceae	G	herb	perennial	native
122	252	*Herniaria hirsuta* L.	Caryophyllaceae	T	herb	annual	native
123	98	*Hordeum bulbosum* L.	Poaceae	H	herb	perennial	native
124	768	*Hymenocarpos circinnatus* (L.) Savi	Fabaceae	T	herb	annual	native
125	230	*Hyoscyamus albus* L.	Solanaceae	T/H	herb	annual/biennial/ perennial	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
126	156	*Hypecoum imberbe* Sm.	Papaveraceae	T	herb	annual	native
127	771	*Hypericum calycinum* L.	Hypericaceae	C	subshrub	perennial	native
128	774	*Hypericum empetrifolium* Willd.	Hypericaceae	C	shrub	perennial	native
129	772	*Hypericum olympicum* L.	Hypericaceae	C	shrub	perennial	native
130	776	*Hypericum triquetrifolium* Turra	Hypericaceae	G	herb	perennial	native
131	815	*Hypochaeris achyrophorus* L.	Asteraceae	T	herb	annual	native
132	39	*Iris florentina* L.	Iridaceae	G	herb	perennial	alien_e
133	40	*Iris germanica* L.	Iridaceae	G	herb	perennial	alien_e
134	794	*Lactuca tuberosa* Jacq.	Asteraceae	G	herb	perennial	native
135	243	*Lagoecia cuminoides* L.	Apiaceae	T	herb	annual	native
136	90	*Lagurus ovatus* L.	Poaceae	T	herb	annual	native
137	556	*Lamium maculatum* L.	Lamiaceae	H	herb	perennial	native
138	694	*Lathyrus cicera* L.	Fabaceae	T	herb	annual	native
139	691	*Lathyrus vernus* (L.) Bernh.	Fabaceae	G	herb	perennial	native
140	365	*Laurus nobilis* L.	Lauraceae	P	shrub/tree	perennial	native
141	549	*Lavandula stoechas* L.	Lamiaceae	C	subshrub	perennial	native
142	665	*Lavatera arborea* L.	Malvaceae	H	herb	biennial	native
143	616	*Lepidium sativum* L.	Brassicaceae	T	herb	annual	alien_c
144	301	*Limonium sinuatum* (L.) Mill.	Plumbaginaceae	H	herb	perennial	native
145	588	*Linaria purpurea* (L.) Mill.	Plantaginaceae	H	herb	perennial	cultivated?
146	304	*Linum strictum* L.	Linaceae	T	herb	annual	native
147	621	*Lobularia maritima* (L.) Desv.	Brassicaceae	H	herb	perennial	alien_e

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
148	223	*Lonicera xylosteum* L.	Caprifoliaceae	P	shrub	perennial	native
149	757	*Lotus corniculatus* L.	Fabaceae	H	herb	perennial	native
150	756	*Lotus edulis* L.	Fabaceae	T	herb	annual	native
151	685	*Lupinus angustifolius* L.	Fabaceae	T	herb	annual	native
152	282	*Malabaila aurea* (Sm.) Boiss.	Apiaceae	H	herb	perennial	native
153	634	*Malcolmia flexuosa* Sm.	Brassicaceae	T	herb	annual	native
154	232	*Mandragora officinarum* L.	Solanaceae	H	herb	perennial	native
155	636, 637	*Matthiola fruticulosa* (L.) Maire	Brassicaceae	C	herb	perennial	native
156	639	*Matthiola tricuspidata* (L.) R.Br.	Brassicaceae	T	herb	annual	native
157	767	*Medicago arborea* L.	Fabaceae	NP/P	shrub	perennial	native
158	70	*Melica ciliata* L.	Poaceae	T	herb	annual	native
159	579	*Melissa officinalis* L.	Lamiaceae	H	herb	perennial	native
160	475	*Myrtus communis* L.	Myrtaceae	P	shrub	perennial	native
161	158	*Neatostema apulum* (L.) I.M.Johnst.	Boraginaceae	T	herb	annual	native
162	547	*Nepeta nuda* L.	Lamiaceae	H	herb	perennial	native
163	248	*Nerium oleander* L.	Apocynaceae	P	shrub	perennial	native
164	512	*Nigella arvensis* L.	Ranunculaceae	T	herb	annual	native
165	510	*Nigella arvensis* subsp. *aristata* (Sm.) Nyman	Ranunculaceae	T	herb	annual	endemic
166	509	*Nigella damascena* L.	Ranunculaceae	T	herb	annual	native
167	831	*Notobasis syriaca* (L.) Cass.	Asteraceae	T	herb	annual	native
168	3	*Olea europaea* L.	Oleaceae	P	shrub/tree	perennial	native
169	725	*Onobrychis aequidentata* (Sm.) d'Urv	Fabaceae	T	herb	annual	native

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170	723	*Onobrychis caput-galli* (L.) Lam.	Fabaceae	T	herb	annual	native
171	679	*Ononis ornithopodioides* L.	Fabaceae	T	herb	annual	native
172	676	*Ononis pusilla* L.	Fabaceae	H	herb	perennial	native
173	677	*Ononis reclinata* L.	Fabaceae	H	herb	perennial	native
174	832	*Onopordum caulescens* d'Urv.	Asteraceae	H	herb	biennial	native
175	174	*Onosma fruticosa* Lam.	Boraginaceae	C	subshrub	perennial	cultivated?
176	930	*Ophrys fusca* Link	Orchidaceae	G	herb	perennial	native
177	929	*Ophrys tenthredinifera* Willd.	Orchidaceae	G	herb	perennial	native
178	928	*Orchis papilionacea* L.	Orchidaceae	G	herb	perennial	native
179	333	*Ornithogalum sibthorpii* Greuter	Liliaceae	G	herb	perennial	native
180	954	*Osyris alba* L.	Santalaceae	NP	shrub	perennial	native
181	240	*Paliurus spina-christi* Mill.	Rhamnaceae	P	shrub	perennial	native
182	898	*Pallenis spinosa* (L.) Cass.	Asteraceae	H	herb	biennial/perennial	native
183	309	*Pancratium maritimum* L.	Amaryllidaceae	G	herb	perennial	native
184	586	*Parentucellia latifolia* (L.) Caruel	Orobanchaceae	T	herb	annual	native
185	154	*Parietaria cretica* L.	Urticaceae	T/H	herb	annual/perennial	native
186	247	*Paronychia capitata* (L.) Lam.	Caryophyllaceae	C	subshrub	perennial	native
187	249	*Periploca graeca* L.	Asclepiadaceae	P	shrub	perennial	native
188	826	*Phagnalon graecum* Boiss & Heldr.	Asteraceae	C	subshrub	perennial	native
189	56	*Phalaris aquatica* L.	Poaceae	T	herb	annual	native
190	2	*Phillyrea latifolia* L. P	Oleaceae	P	shrub/tree	perennial	native
191	563	*Phlomis fruticosa* L. NP	Lamiaceae	NP	shrub	perennial	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
192	827	*Picnomon acarna* (L.) Cass.	Asteraceae	T	herb	annual	native
193	949	*Pinus pinaster* Aiton	Pinaceae	P	tree	perennial	cultivated
194	66	*Piptatherum miliaceum* (L.) Cosson	Poaceae	H	herb	perennial	native
195	957	*Pistacia lentiscus* L.	Anacardiaceae	P	shrub	perennial	native
196	956	*Pistacia terebinthus* L. s.l.	Anacardiaceae	P	shrub	perennial	native
197	671	*Pisum sativum* L.	Fabaceae	T	herb	annual	native
198	145	*Plantago albicans* L.	Plantaginaceae	C	herb	perennial	native
199	144	*Plantago lagopus* L.	Plantaginaceae	T	herb	annual	native
200	945	*Platanus orientalis* L.	Platanaceae	P	tree	perennial	native
201	102	*Polycarpon tetraphyllum* (L.) L. s.l	Caryophyllaceae	T	herb	annual	native
202	669	*Polygala venulosa* Sm.	Polygalaceae	H	herb	perennial	native
203	364	*Polygonum equisetiforme* Sm.	Polygonaceae	NP	shrub	perennial	native
204	457	*Portulaca oleracea* L.	Portulacaceae	T	herb	annual	native
205	584	*Prasium majus* L.	Lamiaceae	C	subshrub	perennial	native
206	112	*Pterocephalus brevis* (L.) Coult.	Caprifoliaceae	T	herb	annual	endemic
207	113	*Pterocephalus perennis* Coult.	Caprifoliaceae	T	herb	annual	native
208	847	*Ptilostemon chamaepeuce* (L.) Less.	Asteraceae	C	shrub	perennial	native
209	476	*Punica granatum* L.	Punicaceae	P	tree	perennial	alien_e
210	944	*Quercus coccifera* L.	Fagaceae	P	shrub/tree	perennial	native
211	520	*Ranunculus paludosus* Poiret	Ranunculaceae	H	herb	perennial	native
212	791, 793	*Reichardia picroides* (L.) Roth	Asteraceae	H	herb	perennial	native
213	459	*Reseda alba* L.	Resedaceae	T/H	herb	annual/perennial	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
214	952	*Ricinus communis* L.	Euphorbiaceae	P	shrub	perennial	alien_e
215	36	*Romulea bulbocodium* (L.) Sebast. & Mauri	Iridaceae	G	herb	perennial	native
216	483	*Rosa sempervirens* L.	Rosaceae	P	shrub	perennial	native
217	14	*Rosmarinus officinalis* L.	Lamiaceae	C/NP	shrub	perennial	native
218	444	*Rosularia serrata* (L.) A.Berger	Crassulaceae	H	herb	perennial	native
219	142	*Rubia pelegrina*	Rubiaceae	P	shrub	perennial	native
220	345	*Rumex bucephalophorus* L.	Polygonaceae	T	herb	annual	native
221	348	*Rumex tuberosus* L.	Polygonaceae	G	herb	perennial	native
222	368	*Ruta chalepensis* L.	Rutaceae	C	herb	perennial	native
223	25	*Salvia sclarea* L.	Lamiaceae	H	herb	biennial	native
224	24	*Salvia verbenaca* L.	Lamiaceae	H	herb	perennial	native
225	19	*Salvia viridis* L.	Lamiaceae	T	herb	annual	native
226	20	*Salvia horminum* L.	Lamiaceae	T	herb	annual	native
227	943	*Sarcopoterium spinosum* (L.) Spach	Rosaceae	C	shrub	perennial	native
228	540	*Satureja juliana* L.	Lamiaceae	C	subshrub	perennial	native
229	541	*Satureja thymbra* L.	Lamiaceae	C	subshrub	perennial	native
230	285	*Scandix australis* L.	Apiaceae	T	herb	annual	native
231	825	*Scolymus hispanicus* L.	Asteraceae	H	herb	biennial	native
232	718, 719	*Scorpiurus muricatus* L.	Fabaceae	T	herb	annual	native
233	786	*Scorzonera crocifolia* Sm.	Asteraceae	G	herb	perennial	endemic
234	603	*Scrophularia heterophylla* Willd.	Scrophulariaceae	C	herb	perennial	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
235	597	*Scrophularia peregrina* L.	Scrophulariaceae	T	herb	annual	native
236	447, 448	*Sedum cepaea* L.	Crassulaceae	T	herb	annual	native
237	871	*Senecio bicolor* subsp. *cineraria* (DC.) Chater	Asteraceae	T	herb	annual	native
238	551	*Sideritis montana* L.	Lamiaceae	T	herb	annual	native
239	552	*Sideritis romana* L. T Herb Annual	Lamiaceae	T	herb	annual	native
240	429	*Silene italica* (L.) Pers.	Caryophyllaceae	H	herb	perennial	native
241	408	*Silene nocturna* L.	Caryophyllaceae	T	herb	annual	native
242	431	*Silene spinescens* Sm.	Caryophyllaceae	C	subshrub	perennial	native
243	959	*Smilax aspera* L.	Smilacaceae	G/P	herb/shrub	perennial	native
244	68	*Sorghum halepense* (L.) Pers.	Poaceae	G	herb	perennial	native
245	558	*Stachys cretica* L.	Lamiaceae	H	herb	perennial	native
246	310	*Sternbergia lutea*	Amaryllidaceae	G	herb	perennial	native
247	87	*Stipa bromoides* (L.) Dorfl.	Poaceae	H	herb	perennial	native
248	86	*Stipa capensis* Thunb.	Poaceae	T	herb	annual	native
249	375	*Styrax officinalis* L.	Styracaceae	P	shrub	perennial	native
250	291	*Tamarix gallica* L.	Tamaricaceae	P	shrub/tree	perennial	native
251	796	*Taraxacum officinale* Weber	Asteraceae	H	herb	perennial	native
252	536	*Teucrium capitatum* L.	Lamiaceae	C	subshrub	perennial	native
253	527	*Teucrium fruticans* L.	Lamiaceae	C	shrub	perennial	cultivated?
254	287	*Thapsia garganica* L.	Apiaceae	H	herb	perennial	native
255	360	*Thymelaea hirsuta* (L.) Endl.	Thymelaeaceae	C/NP	shrub	perennial	native
256	354, 355	*Thymelaea tartonraira* (L.) All.	Thymelaeaceae	NP	shrub	perennial	native

Number of taxa	Number of plate	Taxon	Family	Life form	Growth form	Life cycle	Status in Greece
257	109	*Tremastelma palaestinum* (L.) Janchen	Dipsacaceae	T	herb	annual	native
258	372	*Tribulus terrestris* L.	Zygophyllaceae	T	herb	annual	native
259	749	*Trifolium angustifolium* L.	Fabaceae	T	herb	annual	native
260	745	*Trifolium cherleri* L.	Fabaceae	T	herb	annual	native
261	750	*Trifolium stellatum* L.	Fabaceae	T	herb	annual	native
262	762	*Trigonella balansae* (L.) Boiss & Reut.	Fabaceae	T	herb	annual	native
263	763	*Trigonella spicata* Sm.	Fabaceae	T	herb	annual	native
264	764	*Trigonella spruneriana* Boiss.	Fabaceae	T	herb	annual	native
265	498	*Tuberaria guttata* (L.) Four.	Cistaceae	T	herb	annual	native
266	781	*Urospermum picroides* (L.) F.W.Schmidt	Asteraceae	T	herb	annual	native
267	138	*Valantia hispida* L.	Rubiaceae	T	herb	annual	native
268	137	*Valantia muralis* L.	Rubiaceae	T	herb	annual	native
269	226	*Verbascum undulatum* Lam.	Scrophulariaceae	H	herb	perennial	native
270	9	*Veronica cymbalaria* Bodard	Plantaginaceae	T	herb	annual	native
271	699	*Vicia villosa* Roth subsp. *varia* (Host) Corb.	Fabaceae	T	herb	annual	native
272	609	*Vitex agnus-castus* L.	Verbenaceae	P	shrub	perennial	native
273	242	*Vitis vinifera* L.	Vitaceae	P	shrub	perennial	native
274	233	*Withania somnifera* (L.) Dunal	Solanaceae	NP	shrub	perennial	native