



# Vascular flora of eight water reservoir areas in southern Italy

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**Abstract:** Artificial lakes play an important role in maintaining the valuable biodiversity linked to water bodies and related habitats. The vascular plant diversity of eight reservoirs and surrounding areas in southern Italy was inventoried and further analysed in terms of biodiversity. A total of 730 specific and subspecific taxa were recorded, with 179 taxa in the poorest area and 303 in the richest one. The results indicate a good richness of the habitats surrounding the water basins, with some species of nature conservation interest and only a few alien species.

**Key words:** vascular plants, reservoirs, southern Italy, wetlands, flora

## INTRODUCTION

Wetlands are increasingly contracting under the influence of anthropogenic pressures (Egertson et al. 2004). Indications of biodiversity loss and habitat loss have been recorded worldwide (Moyle and Leidy 1992; Croce et al. 2012; Kozłowski and Bondallaz 2012; Azzella et al. 2013). Even small ponds and lakes (Semlitsch and Bodie 1998; Williams et al. 2004) can be of strategic importance for freshwater biodiversity at a regional scale (Gibbs 2000).

In large parts of the Mediterranean basin, reservoirs are the most important water bodies. There are 70 artificial lakes of varying size and shape in southern Italy, accounting for approximately 4 billion cubic metres of water (Romano and Costantini 2010). Construction of these water reservoirs led to the inundation of farm land and rural areas in the valley bottoms. Shores were often reforested and protected by enclosures and other protective measures. The succession of secondary vegetation in the abandoned areas led to the establishment of natural and seminatural habitats, while the disturbance of the existing natural habitats decreased. Thus, the areas surrounding the reservoirs evolved into isolated patches of nature in an agriculturally dominated landscape.

Although many authors have reported the negative impact of dams on rivers and their ecosystems (e.g., McAllister et al. 2001; Nilsson et al. 2005), dams are very important for wildlife, such as birds (Mancuso 2010). Artificial lakes fulfill an important role as water reservoirs for agricultural irrigation; however, their other functions, such as recreation, fishing, and biodiversity conservation, should not be overlooked. The Italian National Institute for Economic Agriculture (INEA) launched the project “Azione 7” (Romano and Costantini 2010) to assess the suitability of reservoirs in southern Italy for nature conservation purposes. Nine basins were chosen as a case study that would implement aspects of the researches concerning landscape features, aquatic biology, vascular plants, and birds. The present work is based on a botanic survey carried out in 2007 for the above-mentioned project (Croce 2010). The aims of this study were to explore the floristic diversity of the reservoir areas, and to define their importance for plant conservation.

## MATERIALS AND METHODS

### Study areas

Eight reservoirs located in six regions in southern Italy were selected for the present study (Figure 1 and Table 1). These reservoirs were the focus of an INEA “Azione 7” project (Romano and Costantini 2010). The Marsico Nuovo area was excluded because the maximum water level was always under the operating level, resulting in the widespread emergence of artificial shores. According to the European Environment Agency (EEA 2011), all of the sites are located in the Mediterranean Biogeographic Region, with the exception of Penne Lake, which is located in the Continental Biogeographic Region. Altitudes range from 43–434 m above sea level (a.s.l.).

A 500-m buffer zone was established around the lake perimeters. Within these zones, the land use and floristic composition were described. The following land use categories were applied to the various landscapes of the basins:

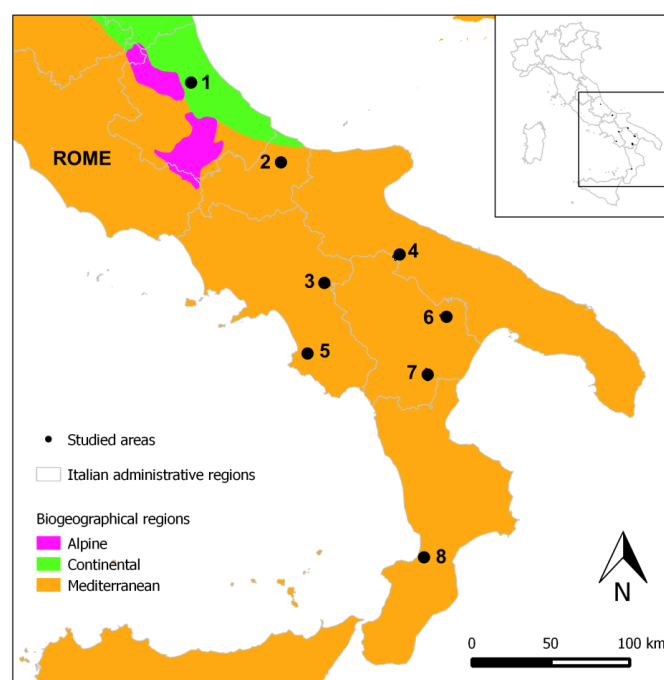
- 1) Reforestations: artificial woodlands, dominated by conifers (*Cupressus sempervirens* L. and *Pinus* spp.), sometimes with additions of *Eucalyptus camaldulensis* Dehnh.
- 2) Grasslands: secondary communities dominated by herbs;
- 3) Shrublands and transitional woodlands or shrublands, including maquis and garrigues;
- 4) Broad-leaved forests dominated by deciduous trees (e.g., *Carpinus* spp., *Ostrya carpinifolia* Scop., *Quercus pubescens* s.l., etc.) or evergreen sclerophyllous trees (*Quercus ilex* L. and *Q. suber* L.). They include hygrophilous forests with *Salix* spp., *Populus* spp., *Alnus glutinosa* L. Gaertn.;
- 5) Open spaces with little or no vegetation (rocks, badlands, sandy shores, etc.);
- 6) Artificial or agricultural areas (farming, buildings, etc.).

The land cover composition of the eight areas is shown in Figure 2. Cartographic analyses were realised with the software Qgis 1.8.0 (Quantum GIS Development Team 2013).

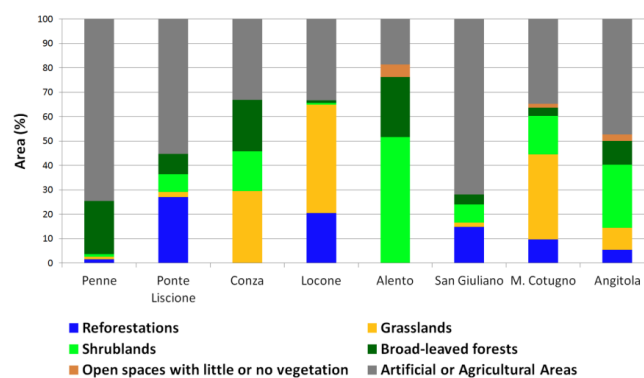
### Floristic procedures

The database built for the botanic survey of the INEA project was used to analyse the floristic diversity. Each basin was explored during the spring, summer, and autumn of 2007 to compile an inventory of the vascular flora that was as complete as possible. For each habitat, random plots were established for floristic sampling, and a random exploration of the shores and the adjacent habitats was carried out. Species were identified in the field, or they were collected (with the exclusion of protected species) and identified by using *Flora d'Italia* (Pignatti 1982) and *Flora Europaea* (Tutin et al. 1964–1980, 1993). All specimens were stored in the herbarium of the Department of Environmental, Biological, and Pharmaceutical Sciences and Technologies of the Second University of Naples (Caserta).

Nomenclature of the inventoried flora mainly follows Conti et al. (2005, 2007), but the Index Plantarum Florae Italicae (IPFI) (Acta Plantarum 2013) was also consulted. For the Orchidaceae family, the nomenclature of GIROS (2009) was used. For the European white oak the name *Quercus pubescens* s.l. (including *Q. virgiliana* Ten., *Q.*



**Figure 1.** Location of the eight analysed basins. Biogeographic regions after EEA (2011). See Table 1 for the names and features of each basin.



**Figure 2.** Land cover of the 500-m buffer surrounding the studied reservoirs.

*dalechampii* Ten., *Q. amplifolia* Guss, etc.) has been used. The systematic scheme used in this study follows Peruzzi (2010), but families, genera, and intraspecific taxa are listed in alphabetical order. The plant life form, according to Raunkiaer (1934) and modified by Pignatti (1982), was assigned to each taxon as follows:

P Phanerophytes. Woody perennials (trees, shrubs), including Epiphytes (EP).

**Table 1.** Information about the eight reservoirs analysed.

Basin	Number (Figure 1)	Region	Biogeographical region	Area (ha)	Altitude (m a.s.l.)	Latitude	Longitude
Penne	1	Abruzzo	Continental	57	256	42°26' N	013°54' E
Ponte Liscione	2	Molise	Mediterranean	534	248	41°48' N	014°49' E
Conza	3	Campania	Mediterranean	179	434	40°52' N	015°18' E
Locone	4	Puglia	Mediterranean	173	170	41°05' N	015°59' E
Alento	5	Campania	Mediterranean	146	118	40°19' N	015°07' E
S. Giuliano	6	Basilicata	Mediterranean	910	100	40°36' N	016°30' E
Monte Cotugno	7	Basilicata	Mediterranean	1550	252	40°09' N	016°19' E
Angitola	8	Calabria	Mediterranean	173	43	38°44' N	016°14' E

**Table 2.** Protected areas established in the studied areas (SCI = Site of Community importance; SPA = Special Protection Area).

Basin	Protected area
Penne	Regional Natural Reserve WWF Oasis
Ponte Liscione	SCI IT7222249 "Lago di Guardialfiera - M. Peloso"
Conza	SCI/SPA IT8040007 "Lago di Conza della Campania" WWF Oasis
Locone	No protected area
Alento	SCI IT8050012 "Fiume Alento"
San Giuliano	SCI/SPZ IT9220144 "Lago di S. Giuliano e Timmari" Natural Oriented Reserve "Lago S. Giuliano e Timmari"
Monte Cotugno	SPA IT9210275 "Massiccio del Monte Pollino e Monte Alpi"
Angitola	Wetland of International Importance (RAMSAR) WWF Oasis

- Ch Chamaephytes. Woody plants with buds less than 25 cm from the ground.
- G Geophytes. Perennial plants with buds below the ground, and with rhizomes, bulbs, etc.
- H Hemicryptophytes. Perennial herbs with buds very close to the ground or at ground level.
- He Helophytes. Perennial herbs with buds resting in marshlands. They are included in the Hemicryptophytes type because of their very low numbers.
- I Hydrophytes. Perennial plants with subaquatic buds.
- T Therophytes. Annual plants (herbs) surviving the winter season as seeds.

Chorological types were assigned to each taxon according to the following nine main categories (after Pignatti 1982):

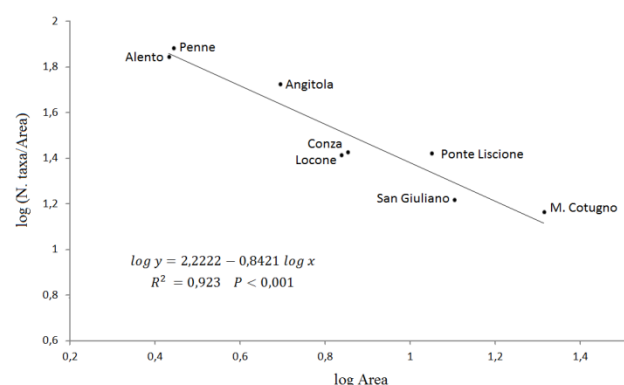
- EN Endemic
- SM Steno-Mediterranean
- EM Euri-Mediterranean
- MM Mediterranean-mountain
- EU Eurasiatic
- AT Atlantic
- OS Orophyllous-south European
- CI Circumboreal
- CO Cosmopolite

The endemic taxa have been checked according to Peruzzi et al. 2014.

To analyse the importance of each species objectively, criteria were selected that consider the species value at a national or international level, without consideration of regional protection laws. Endemic and subendemic taxa, species listed in Annexes II, IV, and V of EU Directive 92/43 /CEE, Appendices I, II, and III of the CITES Convention, and Annex I of the Bern Convention were considered patrimonial species.

### Statistical analysis

The Sørensen-Dice coefficient (Sørensen 1948) was computed to measure the similarity between the eight floras. The matrix obtained was correlated with the

**Figure 3.** Linear regression between the areas (log) and the number of taxa/area ratio (log).

matrix of the geographic distances. A Mantel Test with 10,000 permutations was carried out. Mantel tests were performed with the use of zt (Bonnet and Van de Peer 2002). Principal component analysis (PCA) was performed on both the life form and chorotype compositions. The eigenvalues of the two main components were used as factors to test for a correlation (Spearman  $r_s$ ) with altitude, latitude, longitude, distance from sea, and land cover types. PCA and the correlation test were performed in PAST (Hammer et al. 2001).

### RESULTS

A total of 730 specific and subspecific taxa were recorded for the studied habitats surrounding the lakes (Table 3). The flora of the basins represented 9.5% of the Italian flora (Conti et al. 2005). The richness varied from 179 taxa for the Locone basin to 303 taxa for Monte Cotugno. The species/area ratio was highly correlated with the area of each basin in a log-log space (Figure 3).

Aquatic species were absent or scarce. Only three hydrophytes (*Alisma plantago-aquatica* L., *Lemna minor* L., and *Ranunculus trichophyllus* Chaix subsp. *trichophyllus*) and one helophyte (*Schoenoplectus tabernaemontani* (C.C. Gmel.) Palla) were recorded in three basins, although several plants associated with aquatic habitats were present (e.g., *Lycopus europaeus* L., *Phragmites australis* (Cav.) Trin. ex Steud. subsp. *australis*, *Typha* spp., *Veronica anagallis-aquatica* L.). The variation in water level, with excursions of up to several meters during the year (and complete drying up of some lakes in the summer), was not compatible with the life of aquatic plants, especially hydrophytes. Therefore, the major interests lie in the species collected from the shores or from the wetlands at the confluence of small streams and rivers.

A total of 89 families were represented. Three families (i.e., Fabaceae, Asteraceae, and Poaceae) accounted for 33.3% to 38.7% of the total flora, with few differences between different areas (Table 4). The number of families showed a statistically significant correlation with the species richness (Spearman  $r_s = 0.85$ ;  $P < 0.05$ ).

**Table 3.** Vascular flora of the eight studied areas. The inventory shows the scientific name, the life form (Ch = Chamephyte, G = Geophyte, He = Helophyte, H = Hemicyptophyte, I = Hydrophyte, P = Phanerophyte, T = Therophyte), the chorology (EN = Endemic, SM = Steno-Mediterranean, EM = Euri-Mediterranean, MM = Mediterranean-mountain, EU = Eurasiatic, AT = Atlantic, OS = Orophyllous-South European, CI = Circumboreal, CO = Cosmopolite), the collection area (PEN = Penne, PLI = Ponte Liscione, CON = Conza, ALE = Alento, LOC = Locone, MCO = Monte Cotugno, SGI = San Giuliano, and ANG = Angitola) and the voucher number (accession number). All specimens have been collected by the author and deposited in the Herbarium of the Department of Environmental, Biological, and Pharmaceutical Sciences and Technologies of the Second University of Naples (Caserta).

Family/species	Life Form	Chorology	Collection areas	Voucher number
<b>Adoxaceae</b>				
<i>Sambucus ebulus</i> L.	H	EM	PEN, PLI, ALE	
<i>Sambucus nigra</i> L.	P	EU	PEN, ANG	
<i>Viburnum tinus</i> L. subsp. <i>tinus</i>	P	SM	PEN, MCO	L34943
<b>Alismataceae</b>				
<i>Alisma plantago-aquatica</i> L.	H	CO	PLI, CON	
<b>Amaranthaceae</b>				
<i>Atriplex halimus</i> L.	P	SM	SGI	
<i>Beta vulgaris</i> L. subsp. <i>vulgaris</i>	T	EM	PLI	L10272, L36260
<i>Camphorosma monspeliaca</i> L.	Ch	EU	SGI	L36244, L36246, L36267
<i>Oxybasis urtica</i> (L.) S. Fuentes, Uotila & Borsch	T	CI	SGI	L36250, L36587
<b>Amaryllidaceae</b>				
<i>Allium ampeloprasum</i> L.	G	EM	MCO	L36682
<i>Allium chamaemoly</i> L. subsp. <i>chamaemoly</i>	G	SM	LOC, MCO	L36691
<i>Allium roseum</i> L.	G	SM	PLI, MCO, ANG	L9018, L12205, L36407, L36708
<i>Allium sphaerocephalon</i> L. subsp. <i>sphaerocephalon</i>	G	EU	SGI	L36571
<i>Allium subhirsutum</i> L.	G	SM	SGI, MCO	L10571, L36312, L36385
<i>Narcissus tazetta</i> L. subsp. <i>tazetta</i>	G	SM	MCO	
<b>Anacardiaceae</b>				
<i>Pistacia lentiscus</i> L.	P	SM	PLI, LOC, ALE, SGI, MCO, ANG	
<i>Pistacia terebinthus</i> L. subsp. <i>terebinthus</i>	P	SM	PLI	
<b>Apiaceae</b>				
<i>Aegopodium podagraria</i> L.	G	CI	PEN, ANG	L36432
<i>Bifora radians</i> M. Bieb.	T	CO	MCO	L11056
<i>Bifora testiculata</i> (L.) Spreng.	T	CO	CON, MCO	L36297
<i>Bupleurum lancifolium</i> Hornem.	T	CO	MCO	L36349, L36684, L36696
<i>Chaerophyllum temulum</i> L.	T	EU	PEN, CON	L36420
<i>Conium maculatum</i> L. subsp. <i>maculatum</i>	H	CO	CON, LOC	L36393
<i>Daucus carota</i> L. subsp. <i>carota</i>	T	CO	PLI, CON, LOC, MCO, ANG	L36522
<i>Elaeostelinum asclepium</i> (L.) Bertol. subsp. <i>asclepium</i>	H	SM	SGI	L36576
<i>Eryngium campestre</i> L.	H	EM	PLI, LOC, SGI, MCO	
<i>Ferula glauca</i> L.	H	EM	SGI	
<i>Foeniculum vulgare</i> Mill.	H	EM	PEN, PLI, CON, LOC, ALE, SGI, ANG	L9082
<i>Helosciadium nodiflorum</i> (L.) W.D.J. Koch	H	EM	LOC, SGI, MCO	L36344, L36601
<i>Oenanthe pimpinelloides</i> L.	H	AT	ALE, SGI, MCO, ANG	L12228, L36398, L36494
<i>Opopanax chironium</i> (L.) W.D.J. Koch	H	SM	SGI	L36291
<i>Orlaya daucorlaya</i> Murb.	T	EM	PLI	L10219
<i>Scandix pecten-veneris</i> L. subsp. <i>pecten-veneris</i>	T	CO	PLI, CON, LOC, MCO	L36361
<i>Tordylium apulum</i> L.	T	SM	PLI, CON, LOC, ALE, MCO	L9412, L12181, L36219, L36733
<i>Torilis arvensis</i> (Huds.) Link subsp. <i>arvensis</i>	T	CO	PEN, PLI, SGI, MCO	L10158, L36333, L36666
<i>Torilis nodosa</i> (L.) Gaertn.	T	CO	PLI, SGI, MCO	L10174, L36269, L36270, L36357
<i>Turgenia latifolia</i> (L.) Hoffm.	T	EM	MCO	L36356
<b>Apocynaceae</b>				
<i>Nerium oleander</i> L. subsp. <i>oleander</i>	P	SM	SGI, MCO	
<i>Vinca major</i> L. subsp. <i>major</i>	Ch	EM	CON, MCO, ANG	
<i>Vinca minor</i> L.	Ch	EU	ALE	
<i>Vincetoxicum hirundinaria</i> Medik. subsp. <i>hirundinaria</i>	H	EU	PEN	
<b>Araceae</b>				
<i>Arum italicum</i> Mill. subsp. <i>italicum</i>	G	SM	PEN, CON, LOC, ALE, SGI, MCO, ANG	
<i>Lemna minor</i> L.	I	CO	MCO	
<b>Araliaceae</b>				
<i>Hedera helix</i> L. subsp. <i>helix</i>	P	AT	PEN, CON, ALE	
<b>Aristolochiaceae</b>				
<i>Aristolochia lutea</i> Desf.	G	EM	SGI, MCO	L36595, L36676

Continued

Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<b>Asparagaceae</b>				
<i>Asparagus acutifolius</i> L.	G	SM	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Asparagus tenuifolius</i> Lam.	G	EU	CON	L36556
<i>Bellevalia romana</i> (L.) Sweet	G	EM	PEN, PLI, CON, SGI, MCO, ANG	
<i>Loncomelos narbonense</i> (Torn. in L.) Raf.	G	EM	MCO, ANG	L11064, L36717
<i>Muscari commutatum</i> Guss.	G	SM	SGI	
<i>Muscari comosum</i> (L.) Mill.	G	EM	PLI, CON, LOC, ALE, SGI, MCO	
<i>Muscari neglectum</i> Guss. ex Ten.	G	EM	CON, SGI, MCO	
<i>Ornithogalum divergens</i> Boreau	G	EM	PEN, PLI, CON, MCO	L36301, L36463, L36619, L36690
<i>Ornithogalum exscapum</i> Ten.	G	EM	CON, MCO	
<i>Ornithogalum refractum</i> Kit. ex Willd.	G	EU	LOC, SGI	L9942, L12176
<i>Ruscus aculeatus</i> L.	G	EM	PEN, PLI, CON, ALE, SGI	
<b>Aspleniaceae</b>				
<i>Asplenium onopteris</i> L.	H	CO	ALE, ANG	L12253
<i>Asplenium trichomanes</i> L. subsp. <i>quadrivalens</i> D.E. Mey.	G	CO	ALE	
<b>Asteraceae</b>				
<i>Anacyclus clavatus</i> (Desf.) Pers.	T	SM	PLI, ALE, SGI, MCO	L9878, L10278, L36282, L36504, L36727, L36730, L36739
<i>Anacyclus radiatus</i> Loisel. subsp. <i>radiatus</i>	T	SM	LOC, SGI	L36401, L36607
<i>Anthemis arvensis</i> L. subsp. <i>arvensis</i>	T	CO	LOC, ALE	L36188
<i>Anthemis cotula</i> L.	T	EM	LOC	L10920
<i>Arctium nemorosum</i> Lej.	H	EU	PEN	
<i>Artemisia campestris</i> L. subsp. <i>variabilis</i> (Ten.) Greuter	Ch	EN	PLI, CON	L36833
<i>Artemisia vulgaris</i> L.	H	CI	PEN	
<i>Atractylis cancellata</i> L.	T	SM	SGI, MCO	L36268, L36748
<i>Bellis annua</i> L. subsp. <i>annua</i>	T	SM	ALE, MCO	
<i>Bellis perennis</i> L.	H	CI	PEN, CON, LOC, SGI, MCO, ANG	L36465
<i>Bellis sylvestris</i> Cirillo	H	SM	PLI, MCO	
<i>Calendula arvensis</i> (Vaill.) L.	T	EM	PEN, PLI, CON, LOC, SGI, MCO	
<i>Cardopatum corymbosum</i> (L.) Pers.	H	MM	PLI	L10176
<i>Carduus acicularis</i> Bertol.	T	SM	PLI	L10165
<i>Carduus corymbosus</i> Ten.	T	EN	MCO	L36686, L36702
<i>Carduus nutans</i> L. subsp. <i>macrolepis</i> (Peterm.) Kazmi	H	AT	LOC	L12138
<i>Carduus nutans</i> L. subsp. <i>nutans</i>	H	AT	CON	L36538
<i>Carduus pycnocephalus</i> L. subsp. <i>pycnocephalus</i>	T	CO	PLI, LOC, SGI	L10166, L36569
<i>Carlina corymbosa</i> L.	H	SM	CON, MCO, ANG	
<i>Carlina vulgaris</i> L. subsp. <i>spinosa</i> (Velen.) Vandas	H	EM	SGI, ANG	
<i>Carthamus caeruleus</i> L.	H	SM	CON, SGI, MCO	L36603, L36729
<i>Catananche lutea</i> L.	T	SM	SGI	L36265
<i>Centaurea calcitrapa</i> L.	H	EM	CON	L36539
<i>Centaurea sicula</i> L.	H	SM	LOC, SGI	L12139, L14168, L36274
<i>Cichorium intybus</i> L.	H	CO	PEN, PLI, CON, LOC, SGI	L10282, L36272
<i>Cirsium arvense</i> (L.) Scop.	G	CO	PEN, PLI, LOC	L10281, L14729
<i>Cirsium vulgare</i> (Savi) Ten.	H	CO	PEN	
<i>Coleostephus myconis</i> (L.) Cass. ex Rchb. f.	T	SM	ANG	L36764
<i>Cota tinctoria</i> (L.) J. Gay subsp. <i>tinctoria</i>	H	EU	PEN, PLI	
<i>Crepis leontodontoides</i> All.	H	MM	ANG	L12192
<i>Crepis neglecta</i> L.	T	EM	ALE, ANG	L36486, L36799, L36821
<i>Crepis rubra</i> L.	T	SM	ALE	L36397
<i>Crepis sancta</i> (L.) Bab. subsp. <i>nemausensis</i> (P. Fourn.) Bab.	T	CO	CON, LOC, MCO	L36402
<i>Crepis setosa</i> Haller f.	T	EM	MCO	L36679
<i>Crepis vesicaria</i> L. subsp. <i>vesicaria</i>	T	AT	PEN, PLI, LOC, SGI, MCO, ANG	L9871, L12137, L12169, L12246, L36419, L36694, L36765
<i>Crepis leontodontoides</i> All.	H	MM	ANG	L12192
<i>Crupina vulgaris</i> Cass.	T	EU	MCO	
<i>Cynara cardunculus</i> L. subsp. <i>cardunculus</i>	H	SM	PLI, LOC, SGI, MCO	
<i>Dittrichia viscosa</i> (L.) Greuter subsp. <i>viscosa</i>	H	EM	PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Erigeron canadensis</i> L.	T	CO	MCO, ANG	L12241, L36731
<i>Eupatorium cannabinum</i> L. subsp. <i>cannabinum</i>	H	EU	PEN, ALE, ANG	
<i>Filago pyramidata</i> L.	T	EM	LOC, MCO	L12140, L36657

Continued

Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<i>Galactites tomentosus</i> Moench	H	SM	PLI, LOC, ALE, ANG	
<i>Geropogon hybridus</i> (L.) Sch. Bip.	T	SM	PLI, SGI	L10235, L36306
<i>Glebionis segetum</i> (L.) Fourr.	T	EM	LOC, ALE	
<i>Helichrysum italicum</i> (Roth) G. Don	Ch	EM	LOC, SGI, MCO	L36675
<i>Helminthotheca echioides</i> (L.) Holub	T	EM	PEN, PLI, MCO	L36365
<i>Hypochaeris achyrophorus</i> L.	T	SM	PLI, CON, LOC, SGI, MCO	L9899, L12135, L36561, L36591, L36620, L36630, L36698
<i>Hypochaeris radicata</i> L.	H	EU	ANG	
<i>Inula conyzae</i> (Griess.) Meikle	H	EU	ANG	
<i>Jacobaea delphinifolia</i> (Vahl) Pelser & Veldk.	T	SM	PLI, SGI	L10209, L36277
<i>Lactuca serriola</i> L.	T	EU	PLI	L36834
<i>Laphangium luteoalbum</i> (L.) Tzvelev	T	CO	MCO	L36633, L36688
<i>Leontodon tuberosus</i> L.	H	SM	MCO	L36518, L36692
<i>Leucanthemum pallens</i> (Perreyem.) DC.	H	EM	ALE	
<i>Leucanthemum vulgare</i> (Vaill.) Lam. subsp. <i>vulgare</i>	H	CI	PEN, ANG	L36792
<i>Mantisalca duriaei</i> (Spach) Briq. & Cavill.	T	SM	PLI, LOC, SGI, MCO	L10177, L10245, L11054, L36266, L36835
<i>Matricaria chamomilla</i> L.	T	CO	SGI, MCO	L36573, L36721
<i>Notobasis syriaca</i> (L.) Cass.	T	SM	PLI	L10212
<i>Pallenis spinosa</i> (L.) Cass. subsp. <i>spinosa</i>	T	EM	PLI, CON, LOC, SGI, MCO, ANG	L36689, L36808
<i>Phagnalon rupestre</i> (L.) DC. subsp. <i>illyricum</i> (H. Lindb.) Ginzb.	Ch	MM	PLI	L36259
<i>Picris hieracioides</i> L. s.l.	H	CI	PEN, PLI, ALE, SGI, MCO, ANG	
<i>Pilosella cymosa</i> (L.) F.W. Schultz & Sch. Bip.	H	OS	CON	
<i>Podospermum laciniatum</i> (L.) DC. subsp. <i>laciniatum</i>	H	EU	MCO	L36664, L36695
<i>Ptilostemon strictus</i> (Ten.) Greuter	H	EU	PLI	
<i>Pulicaria dysenterica</i> (L.) Bernh.	T	EM	ALE	L36493
<i>Pulicaria odora</i> (L.) Rchb.	H	EM	ALE	
<i>Pulicaria vulgaris</i> Gaertn.	T	EU	PLI	L36524
<i>Reichardia picroides</i> (L.) Roth	H	SM	PLI, LOC, ALE, SGI, MCO, ANG	L12182
<i>Rhagadiolus stellatus</i> (L.) Gaertn.	T	EM	ALE, MCO, ANG	L36366, L36820
<i>Scolymus hispanicus</i> L. subsp. <i>hispanicus</i>	H	EM	PLI, LOC	L10211
<i>Scorzonera hirsuta</i> L.	H	SM	LOC	L12136
<i>Scorzonera villosa</i> Scop. subsp. <i>villosa</i>	H	EM	PLI	L36527
<i>Scorzoneroides cichoriacea</i> (Ten.) Greuter	H	MM	PLI	
<i>Senecio inaequidens</i> DC.	T	CO	CON	L11786
<i>Senecio leucanthemifolius</i> Poir. subsp. <i>leucanthemifolius</i>	T	SM	LOC, MCO	L36406, L36744
<i>Senecio vulgaris</i> L.	T	CO	MCO, ANG	
<i>Silybum marianum</i> (L.) Gaertn.	H	CO	PLI, CON, LOC, SGI, MCO, ANG	
<i>Solidago gigantea</i> Aiton	H	CO	PEN	
<i>Sonchus arvensis</i> L. subsp. <i>arvensis</i>	H	CO	PEN, PLI, SGI, ANG	L12180, L36446, L36609, L36613, L36778
<i>Sonchus asper</i> (L.) Hill subsp. <i>asper</i>	H	CO	PEN, PLI, CON, LOC, ALE, MCO	L12179, L36413, L36445, L36540, L36681, L36736
<i>Sonchus oleraceus</i> L.	G	SM	PLI	
<i>Tanacetum corymbosum</i> (L.) Sch. Bip. subsp. <i>achilleae</i> (L.) Greuter	H	EM	SGI	L36279
<i>Taraxacum officinale</i> (group)	H	CI	PEN	L36429, L36433, L36481
<i>Tragopogon dubius</i> Scop.	H	EU	PLI	
<i>Tragopogon porrifolius</i> L. subsp. <i>australis</i> (Jord.) Nyman	T	EM	PEN, CON, SGI, MCO	L10579, L36320, L36469, L36541, L36565, L36667
<i>Tussilago farfara</i> L.	G	EU	CON, ANG	
<i>Urospermum dalechampii</i> (L.) F.W. Schmidt	H	EM	PLI, LOC, ALE, MCO	
<i>Urospermum picroides</i> (L.) Scop. ex F.W. Schmidt	T	EM	PLI, CON, LOC, MCO, ANG	L9840, L36257, L36640
<i>Xanthium spinosum</i> L.	T	CO	PLI, SGI, MCO	
<i>Xanthium strumarium</i> L. subsp. <i>strumarium</i>	T	CO	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	
<b>Betulaceae</b>				
<i>Alnus cordata</i> (Loisel.) Duby	P	EN	PLI, LOC, ALE	
<i>Alnus glutinosa</i> (L.) Gaertn.	P	EU	LOC, ANG	
<i>Carpinus orientalis</i> Mill. subsp. <i>orientalis</i>	P	EU	PEN, PLI, ALE, MCO	
<i>Corylus avellana</i> L.	P	EU	PEN, CON, LOC, ALE	
<i>Ostrya carpinifolia</i> Scop.	P	CI	PEN, CON	

Continued

Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<b>Boraginaceae</b>				
<i>Alkanna tinctoria</i> (L.) Tausch subsp. <i>tinctoria</i>	H	SM	LOC	L10256
<i>Anchusa azurea</i> Mill.	H	EM	PLI, LOC, MCO	L12107, L36521, L36743
<i>Anchusella cretica</i> (Mill.) Bigazzi, E. Nardi & Selvi	T	SM	ANG	
<i>Borago officinalis</i> L.	T	EM	PLI, CON, ALE, MCO	
<i>Buglossoides arvensis</i> (L.) I.M. Johnst. subsp. <i>arvensis</i>	T	EM	CON	L36342
<i>Buglossoides purpurocaerulea</i> (L.) I.M. Johnst.	Ch	EU	PEN, PLI, CON, MCO, ANG	
<i>Cerintho major</i> L. s.l.	T	SM	PLI, CON, SGI, MCO, ANG	L9316, L12168, L12255
<i>Cynoglossum cheirifolium</i> L. subsp. <i>cheirifolium</i>	H	SM	CON, SGI, MCO	L36511, L36722, L36771
<i>Echium italicum</i> L. subsp. <i>italicum</i>	H	EM	PLI, CON, MCO, ANG	
<i>Echium plantagineum</i> L.	H	EM	PLI, ALE, MCO	L9881, L36500, L36726
<i>Echium vulgare</i> L.	H	EU	LOC	L36644, L36836
<i>Myosotis arvensis</i> (L.) Hill subsp. <i>arvensis</i>	T	EU	ANG	
<i>Myosotis ramosissima</i> Rochel ex Schult. subsp. <i>ramosissima</i>	T	EU	ALE, MCO, ANG	
<i>Onosma echioides</i> (L.) L. subsp. <i>echioides</i>	Ch	EN	PLI	L36255
<i>Pulmonaria hirta</i> L. subsp. <i>apennina</i> (Cristof. & Puppi) Peruzzi	H	EN	PEN	
<i>Symphytum bulbosum</i> K.F. Schimp.	G	EU	ANG	L12256
<i>Symphytum tuberosum</i> L. subsp. <i>angustifolium</i> (A. Kern.) Nyman	G	EU	PEN, ALE, ANG	
<b>Brassicaceae</b>				
<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	T	EU	PEN	
<i>Alyssum alyssoides</i> (L.) L.	T	EM	CON	L36302
<i>Arabidopsis thaliana</i> (L.) Heynh.	T	CO	ALE, ANG	L10332
<i>Arabis sagittata</i> (Bertol.) DC.	H	EU	PLI	L9900
<i>Biscutella didyma</i> L. subsp. <i>didyma</i>	T	CO	LOC	L12063
<i>Brassica rapa</i> L. subsp. <i>campestris</i> (L.) Clapham	T	SM	ANG	L12229
<i>Bunias erucago</i> L.	T	SM	PEN, PLI, LOC	
<i>Calepina irregularis</i> (Asso) Thell.	T	CO	CON	L8303
<i>Capsella bursa-pastoris</i> (L.) Medik. subsp. <i>bursa-pastoris</i>	T	CO	PEN	L36443
<i>Capsella rubella</i> Reut.	T	EM	CON, MCO, ANG	L36233, L36725
<i>Cardamine flexuosa</i> With.	H	CI	ANG	L14582
<i>Cardamine hirsuta</i> L.	T	CO	CON, ALE, ANG	L36264, L36773
<i>Cardaria draba</i> (L.) Desv. subsp. <i>draba</i>	G	CO	PLI, CON, LOC, SGI, MCO	
<i>Diplotaxis eruroides</i> (L.) DC. subsp. <i>eruroides</i>	T	SM	PEN, PLI	L34937, L36258, L36437, L36614
<i>Erophila verna</i> (L.) DC. subsp. <i>praecox</i> (Steven) Walp.	T	CI	MCO	
<i>Hirschfeldia incana</i> (L.) Lagr.- Foss. subsp. <i>incana</i>	H	EM	LOC	L36638
<i>Isatis tinctoria</i> L. subsp. <i>tinctoria</i>	H	CO	LOC, SGI	L12064, L36837
<i>Myagrum perfoliatum</i> L.	T	CO	PLI	
<i>Nasturtium officinale</i> R. Br. subsp. <i>officinale</i>	H	CO	PLI, ALE, MCO, ANG	L10530
<i>Raphanus raphanistrum</i> L. subsp. <i>raphanistrum</i>	T	EM	CON, LOC, ALE, ANG	L12065, L12227, L36223
<i>Rapistrum rugosum</i> (L.) Arcang.	T	EM	PLI, CON, LOC, ALE, MCO	L12066, L34931, L34947, L36337, L36374, L36400
<i>Sinapis alba</i> L. subsp. <i>alba</i>	T	MM	PLI, SGI	L9886, L12174, L36616
<i>Sinapis arvensis</i> L. subsp. <i>arvensis</i>	T	SM	MCO	L36354
<i>Sisymbrium officinale</i> (L.) Scop.	T	CO	PLI	
<i>Thlaspi alliaceum</i> L.	T	AT	PEN	L36442
<i>Thlaspi arvense</i> L.	T	CO	CON	L11505, L36295
<i>Thlaspi perfoliatum</i> L. subsp. <i>perfoliatum</i>	T	EU	PEN, PLI	L34936
<b>Campanulaceae</b>				
<i>Legousia falcata</i> (Ten.) Janch.	T	SM	MCO	L36677
<i>Legousia hybrida</i> (L.) Delarbre	T	AT	MCO	L36678
<i>Legousia speculum-veneris</i> (L.) Chaix	T	EM	LOC, SGI, MCO	L36371, L36636
<b>Cannabaceae</b>				
<i>Humulus lupulus</i> L.	P	EU	PEN	
<b>Caprifoliaceae</b>				
<i>Cephalaria transsylvanica</i> (L.) Roem. & Schult.	T	EU	PLI	L36525
<i>Dipsacus fullonum</i> L.	H	EM	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Fedia graciliflora</i> Fisch. & C.A. Mey.	T	SM	ANG	L12233

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<i>Knautia arvensis</i> (L.) Coult.	H	EU	SGI	L36606
<i>Lonicera caprifolium</i> L.	P	EU	PEN, PLI, CON, ALE	L36300, L36427
<i>Lonicera etrusca</i> Santi	P	EM	PEN	L36483
<i>Scabiosa columbaria</i> L. subsp. <i>columbaria</i>	H	EU	PLI, ANG	L36788
<i>Scabiosa uniseta</i> Savi	H	EN	ANG	L12226
<i>Sixalix atropurpurea</i> (L.) Greuter & Burdet	H	SM	LOC	L12129
<i>grandiflora</i> (Scop.) Soldano & F. Conti				
<i>Valerianella eriocarpa</i> Desv.	T	SM	CON, LOC, ALE, MCO	L12047, L36218, L36395, L36399, L36533, L36359
<i>Valerianella microcarpa</i> Loisel.	T	SM	ALE	L36228
<b>Caryophyllaceae</b>				
<i>Agrostemma githago</i> L.	T	EU	CON	
<i>Arenaria serpyllifolia</i> L. subsp. <i>serpyllifolia</i>	T	CO	MCO, ANG	L36660, L36719, L36812
<i>Cerastium brachypetalum</i> Desp. ex Pers. subsp. <i>tenoreanum</i> (Ser.) Soó & Jáv.	T	EU	ANG	L36783
<i>Cerastium glomeratum</i> Thuill.	T	CO	PEN, CON, LOC, MCO, ANG	L12053, L12232, L12242, L36464, L36551, L36693, L36784
<i>Gypsophila arrostii</i> Guss. subsp. <i>arrostii</i>	Ch	MM	PLI, SGI	L36322, L36523
<i>Petrorhagia dubia</i> (Raf.) G. López & Romo	T	SM	ANG	
<i>Petrorhagia saxifraga</i> (L.) Link subsp. <i>gasparrinii</i> (Guss.) Greuter & Burdet	H	EM	MCO	L11582
<i>Petrorhagia saxifraga</i> (L.) Link subsp. <i>saxifraga</i>	H	EM	PLI	
<i>Silene italica</i> (L.) Pers. subsp. <i>italica</i>	H	EM	CON	
<i>Silene latifolia</i> Poir. subsp. <i>latifolia</i>	H	SM	PLI, ANG	L12196
<i>Silene vulgaris</i> (Moench) Garcke subsp. <i>vulgaris</i>	H	CO	PLI, ALE	
<i>Stellaria media</i> (L.) Vill. subsp. <i>media</i>	T	CO	PEN, PLI, CON, LOC, SGI, MCO, ANG	L12054, L36472, L36552
<b>Celastraceae</b>				
<i>Euonymus europaeus</i> L.	P	EU	PEN, CON, MCO, ANG	
<b>Cistaceae</b>				
<i>Cistus creticus</i> L. subsp. <i>eriocephalus</i> (Viv.) Greuter & Burdet	P	SM	PLI, ALE, MCO, ANG	
<i>Cistus monspeliensis</i> L.	P	SM	ALE, MCO	
<i>Cistus salviifolius</i> L.	P	SM	ALE, MCO, ANG	
<i>Fumana arabica</i> (L.) Spach	Ch	CO	PLI	L36623
<i>Fumana thymifolia</i> (L.) Spach ex Webb	Ch	SM	MCO	L36528
<i>Helianthemum croceum</i> (Desf.) Pers.	Ch	MM	SGI	L12173
<i>Helianthemum jonium</i> Lacaïta	Ch	EN	LOC	L12045
<i>Helianthemum nummularium</i> (L.) Mill. subsp. <i>obscurum</i> (Celak.) Holub	Ch	EU	PEN, PLI, CON	L14725, L36233, L36449, L36450
<b>Convolvulaceae</b>				
<i>Calystegia sepium</i> (L.) R. Br. subsp. <i>sepium</i>	H	EU	PLI	L10227
<i>Calystegia silvatica</i> (Kit.) Griseb.	H	EU	ALE, ANG	
<i>Convolvulus althaeoides</i> L.	H	SM	PLI	L9873, L10249
<i>Convolvulus arvensis</i> L.	G	CO	PEN, PLI, CON, LOC, MCO	L36656
<i>Convolvulus cantabrica</i> L.	H	EM	SGI, MCO	L36330, L36355, L36655, L
<i>Convolvulus elegantissimus</i> Mill.	H	SM	PLI, LOC, SGI, MCO	L12164, L36567, L36654
<i>Cuscuta campestris</i> Yunck.	T	EU	PLI	L10222
<b>Cornaceae</b>				
<i>Cornus sanguinea</i> L. s.l.	P	EU	PEN, PLI, CON, ALE, MCO, ANG	
<b>Crassulaceae</b>				
<i>Phedimus stellatus</i> (L.) Raf.	T	SM	PLI, CON, MCO, ANG	
<i>Sedum cepaea</i> L.	T	AT	PLI, ALE	
<i>Sedum rupestre</i> L. subsp. <i>rupestre</i>	Ch	AT	SGI	L36307, L36829
<i>Umbilicus horizontalis</i> (Guss.) DC.	G	SM	MCO, ANG	
<b>Cucurbitaceae</b>				
<i>Bryonia cretica</i> L. subsp. <i>dioica</i> (Jacq.) Tutin	H	EM	CON	
<i>Ecballium elaterium</i> (L.) A. Rich.	H	EM	PLI	
<b>Cupressaceae</b>				
<i>Cupressus sempervirens</i> L.	P	CO	PLI, LOC, SGI, MCO, ANG	L9297
<i>Juniperus communis</i> L.	P	CI	PEN	
<i>Juniperus oxycedrus</i> L. subsp. <i>deltoides</i> (R. P. Adams) N. G. Passal.	P	EM	PLI, SGI, MCO	

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<b>Cyperaceae</b>				
<i>Bolboschoenus maritimus</i> (L.) Palla	G	CO	SGI, MCO, ANG	L8211, L10577, L11049, L12175, L12215, L36273, L36281, L36287, L36718
<i>Carex cuprina</i> (Heuff.) A. Kern.	H	AT	PLI, LOC, ALE, SGI, MCO, ANG	L9847, L12222, L36512, L36604
<i>Carex distans</i> L.	H	EM	LOC, ANG	L10251, L12199
<i>Carex divulsa</i> Stokes	H	EM	ANG	L12223, L36484
<i>Carex extensa</i> Gooden.	H	AT	MCO	L10581
<i>Carex flacca</i> Schreb. subsp. <i>serrulata</i> (Biv.) Greuter	G	EU	PEN, PLI, CON, ALE, SGI, MCO, ANG	L8734, L9239, L10190, L36737
<i>Carex halleriana</i> Asso	H	EM	PLI	L9889, L9891
<i>Carex leersii</i> F.W. Schultz <sup>(1)</sup>	H	EU	ALE	L14566
<i>Carex pendula</i> Huds.	H	EU	PEN, ALE, ANG	
<i>Carex rostrata</i> Stokes	G	CI	ANG	L12230
<i>Cyperus fuscus</i> L.	T	EU	PLI	L11581
<i>Cyperus longus</i> L.	G	EU	LOC, ANG	L12197
<i>Eleocharis palustris</i> (L.) Roem. & Schult. subsp. <i>palustris</i>	G	CO	CON	L11782
<i>Isolepis cernua</i> (Vahl) Roem. & Schult.	T	CO	ALE	L10371
<i>Schoenoplectus tabernaemontani</i> (C.C. Gmel.) Palla	He	CI	CON, MCO	L10576, L36548
<i>Scirpoides holoschoenus</i> (L.) Soják	G	SM	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	L36531
<b>Cytinaceae</b>				
<i>Cytinus ruber</i> Fourr. ex Fritsch	G	SM	ANG	L12243
<b>Dennstaedtiaceae</b>				
<i>Pteridium aquilinum</i> (L.) Kuhn subsp. <i>aquilinum</i>	G	CO	PEN, ANG	
<b>Dioscoreaceae</b>				
<i>Tamus communis</i> L.	G	EM	PEN, PLI, ALE, SGI, MCO	
<b>Dryopteridaceae</b>				
<i>Polystichum setiferum</i> (Forssk.) T. Moore ex Woyn.	G	CI	ANG	L12247
<b>Equisetaceae</b>				
<i>Equisetum arvense</i> L. subsp. <i>arvense</i>	G	CI	PEN, ANG	L36444, L12234
<i>Equisetum ramosissimum</i> Desf.	G	CI	CON, ANG	L36555, L36763
<i>Equisetum telmateia</i> Ehrh.	G	CI	PEN, ANG	L12235
<b>Ericaceae</b>				
<i>Arbutus unedo</i> L.	P	SM	PEN, ALE, MCO, ANG	
<i>Erica arborea</i> L.	P	SM	ALE, ANG	
<b>Euphorbiaceae</b>				
<i>Euphorbia amygdaloides</i> L. subsp. <i>amygdaloides</i>	Ch	EU	PEN	
<i>Euphorbia apios</i> L.	G	SM	SGI	L12172
<i>Euphorbia cyparissias</i> L.	Ch	EU	PEN	
<i>Euphorbia exigua</i> L. subsp. <i>exigua</i>	T	EM	PLI, LOC, ALE, SGI, MCO, ANG	L36313, L36390
<i>Euphorbia helioscopia</i> L. subsp. <i>helioscopia</i>	T	CO	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Euphorbia peplus</i> L.	T	CO	PEN, ALE, MCO, ANG	L36441
<i>Euphorbia platyphyllos</i> L. subsp. <i>platyphyllos</i>	T	EM	PEN	L34933
<i>Euphorbia spinosa</i> L. subsp. <i>spinosa</i>	Ch	SM	SGI	L12167
<i>Ricinus communis</i> L.	P	CO	ANG	
<b>Fabaceae</b>				
<i>Acacia dealbata</i> Link	P	CO	ANG	
<i>Amorpha fruticosa</i> L.	P	CO	PLI, MCO	L36547
<i>Anthyllis vulneraria</i> L. subsp. <i>maura</i> (Beck) Maire	H	SM	PLI, CON	L9271, L36345
<i>Astragalus hamosus</i> L.	T	CO	PLI	L9865
<i>Bituminaria bituminosa</i> (L.) C.H. Stirt.	H	EM	PEN, MCO, ANG	L36392
<i>Cercis siliquastrum</i> L. subsp. <i>siliquastrum</i>	P	EU	PEN, PLI	
<i>Colutea arborescens</i> L.	P	EM	MCO	
<i>Coronilla scorpioides</i> (L.) W.D.J. Koch	T	EM	PLI, CON, LOC, SGI, MCO	L8345
<i>Cytisophyllum sessilifolium</i> (L.) O. Lang	P	OS	PEN, PLI	L9248
<i>Cytisus hirsutus</i> L. subsp. <i>hirsutus</i>	Ch	CI	LOC	L12074
<i>Cytisus scoparius</i> (L.) Link subsp. <i>scoparius</i>	P	AT	PLI	
<i>Cytisus villosus</i> Pourr.	P	SM	MCO, ANG	L36767, L36769
<i>Emerus major</i> Mill. subsp. <i>major</i>	P	EU	PEN, PLI, SGI, MCO, ANG	L36428, L36612, L36780
<i>Galega officinalis</i> L.	H	EU	PEN	
<i>Genista tinctoria</i> L.	Ch	EU	CON	L36232
<i>Hippocrepis biflora</i> Spreng.	T	EM	SGI, MCO	L10588, L11067, L36515, L36588

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<i>Hippocrepis comosa</i> L. subsp. <i>comosa</i>	H	EU	PLI	L9270, L10568
<i>Laburnum anagyroides</i> Medik. subsp. <i>anagyroides</i>	P	EM	CON	
<i>Lathyrus annuus</i> L.	T	EM	PEN	L34934
<i>Lathyrus aphaca</i> L. subsp. <i>aphaca</i>	T	EM	PLI, CON, ALE, SGI, MCO, ANG	L36585
<i>Lathyrus cicera</i> L.	T	EM	PEN, LOC, MCO, ANG	L12076, L36414, L36826
<i>Lathyrus clymenum</i> L.	T	SM	PLI, ALE, MCO, ANG	L36378
<i>Lathyrus latifolius</i> L.	H	EM	PLI, SGI	L10154, L36323
<i>Lathyrus ochrus</i> (L.) DC.	T	SM	PEN, PLI, CON, SGI, MCO	
<i>Lathyrus sphaericus</i> Retz.	T	EM	PEN, PLI	L9887, L36456
<i>Lathyrus sylvestris</i> L. subsp. <i>sylvestris</i>	H	EU	PEN, CON, ANG	
<i>Lathyrus venetus</i> (Mill.) Wohlf.	H	EU	PEN, ALE	L36424
<i>Lotus angustissimus</i> L.	T	EM	PEN	
<i>Lotus corniculatus</i> L. subsp. <i>corniculatus</i>	H	CO	PEN, CON	L36448
<i>Lotus dorycnium</i> L.	H	CO	PEN, ANG	L12252, L36451, L36801
<i>Lotus edulis</i> L.	T	SM	ALE, ANG	L36220, L36822
<i>Lotus hirsutus</i> L.	H	EM	PEN, PLI, ALE, SGI, MCO, ANG	L12244
<i>Lotus ornithopodioides</i> L.	T	SM	PEN, PLI, LOC, ALE, MCO, ANG	L9885, L9837, L10163, L34950, L36411, L36447, L36496, L36514, L36818
<i>Lotus tetragonolobus</i> L.	T	SM	PEN, PLI, CON, MCO, ANG	L9013
<i>Lupinus angustifolius</i> L.	T	SM	ANG	
<i>Medicago arabica</i> (L.) Huds.	T	EM	PEN, CON, ALE, MCO, ANG	L36440, L36753, L36759
<i>Medicago intertexta</i> (L.) Mill. subsp. <i>intertexta</i>	T	EM	MCO, ANG	L36680
<i>Medicago lupulina</i> L.	T	EU	PEN, PLI, CON, ALE, ANG	
<i>Medicago minima</i> (L.) L.	T	EM	PLI, CON, LOC, ALE, SGI, MCO	L9846, L10257, L36498, L36505, L36589, L36627, L36557, L36639, L36697
<i>Medicago orbicularis</i> (L.) Bartal.	T	EM	PLI, CON, MCO, ANG	L12224, L36658, L36758
<i>Medicago polymorpha</i> L.	T	CO	PLI, ALE, ANG	L9836, L36225, L36819
<i>Medicago praecox</i> DC.	T	SM	ANG	L36824
<i>Medicago rigidula</i> (L.) All.	T	EM	PEN, CON, MCO, ANG	L36480, L36558, L36628, L36787, L36805
<i>Medicago sativa</i> L.	H	EU	PEN, CON, SGI	
<i>Medicago scutellata</i> (L.) Mill.	T	EM	SGI	L36283
<i>Medicago truncatula</i> Gaertn.	T	SM	PLI	L9877
<i>Melilotus albus</i> Medik.	T	EU	CON	L36537
<i>Melilotus indicus</i> (L.) All.	T	CO	PLI, SGI	L36284
<i>Melilotus neapolitanus</i> Ten.	T	SM	MCO	L36673
<i>Melilotus officinalis</i> (L.) Pall.	H	CO	PEN	
<i>Melilotus segetalis</i> (Brot.) Ser.	T	SM	SGI	L36583
<i>Melilotus sulcatus</i> Desf.	T	SM	PLI, MCO, ANG	L9845, L36308, L36594, L36363, L36705, L36713, L36806
<i>Onobrychis aequidentata</i> (Sm.) d'Urv.	T	SM	PLI, SGI, MCO	L9273, L10562, L36271
<i>Onobrychis caput-galli</i> (L.) Lam.	T	SM	ALE	L36213, L36491
<i>Onobrychis viciifolia</i> Scop.	H	MM	CON	L36231
<i>Ononis mitissima</i> L.	T	SM	PLI	L10237
<i>Ononis natrix</i> L. subsp. <i>natrix</i>	T	SM	ALE	L36492
<i>Ononis reclinata</i> L.	T	CO	MCO	
<i>Ononis viscosa</i> L. subsp. <i>breviflora</i> (DC.) Nyman	T	SM	PLI	L10182
<i>Ornithopus compressus</i> L.	T	EM	ANG	
<i>Robinia pseudacacia</i> L.	P	CO	PEN, PLI, CON, LOC, SGI, ANG	
<i>Scorpiurus muricatus</i> L.	T	EM	PEN, PLI, CON, ALE, SGI, MCO, ANG	
<i>Securigera securidaca</i> (L.) Degen & Dörfel.	T	EM	MCO	L36249
<i>Spartium junceum</i> L.	P	EM	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Sulla capitata</i> (Desf.) B.H. Choi & H. Ohashi	T	SM	LOC	L12072
<i>Sulla coronaria</i> (L.) Medik.	H	SM	PEN, PLI, CON, LOC, SGI, MCO, ANG	
<i>Trifolium alexandrinum</i> L.	T	SM	PLI	L10223, L10279
<i>Trifolium angustifolium</i> L. subsp. <i>angustifolium</i>	T	EM	PLI, CON, LOC, SGI, MCO, ANG	
<i>Trifolium campestre</i> Schreb.	T	EU	PEN, PLI, CON, LOC, SGI	L36586
<i>Trifolium glomeratum</i> L.	T	EM	ANG	L36786
<i>Trifolium michelianum</i> Savi	T	SM	ALE	L10336
<i>Trifolium nigrescens</i> Viv.	T	EM	PEN	L36482
<i>Trifolium ochroleucon</i> Huds.	H	EU	ANG	L36757

Continued

Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<i>Trifolium pallidum</i> Waldst. & Kit.	T	EM	SGI	L36592
<i>Trifolium pratense</i> L. subsp. <i>pratense</i>	H	CI	PEN, CON, ALE, MCO, ANG	L36669
<i>Trifolium repens</i> L. subsp. <i>repens</i>	H	CO	PEN, CON, ALE, MCO, ANG	L36516
<i>Trifolium resupinatum</i> L.	T	EU	PEN, CON, ALE, SGI, MCO, ANG	L12221, L36214, L36293, L36804
<i>Trifolium squarrosum</i> L.	T	EM	PEN, PLI, MCO, ANG	L10208, L10346, L11069, L12220, L14734
<i>Trifolium stellatum</i> L.	T	EM	PLI, SGI, MCO, ANG	
<i>Trifolium subterraneum</i> L. subsp. <i>subterraneum</i>	T	EM	ALE	
<i>Trifolium tomentosum</i> L.	T	EU	CON	L36536
<i>Trigonella gladiata</i> M. Bieb.	T	SM	CON	L36299
<i>Trigonella monspeliaca</i> L.	T	EM	LOC	L36403
<i>Tripodion tetraphyllum</i> (L.) Fourr.	T	SM	MCO	L6106
<i>Vicia bithynica</i> (L.) L.	T	EM	CON, LOC, ALE, MCO, ANG	L12075
<i>Vicia disperma</i> DC.	T	SM	MCO	L36251
<i>Vicia hirsuta</i> (L.) Gray	T	CO	ANG	L36772
<i>Vicia hybrida</i> L.	T	EM	PLI, LOC, MCO, ANG	L9284, L12073
<i>Vicia lutea</i> L.	T	EM	ALE, MCO	L11059, L36244, L36382, L36699
<i>Vicia parviflora</i> Cav.	T	EM	PLI, SGI, MCO, ANG	L9844, L12219, L14581, L36598, L36706
<i>Vicia pubescens</i> (DC.) Link	T	EM	CON, ANG	L36543, L36815
<i>Vicia sativa</i> L. subsp. <i>cordata</i> (Hoppe) Batt.	T	CO	MCO	L36370, L36747
<i>Vicia sativa</i> L. subsp. <i>nigra</i> (L.) Ehrh.	T	CO	PEN, PLI, CON, LOC, ALE, SGI, ANG	L36404, L36458, L36542, L36776, L36828
<i>Vicia sativa</i> L. subsp. <i>sativa</i>	T	CO	MCO	L11063
<i>Vicia tetrasperma</i> (L.) Schreb.	T	CO	ALE, ANG	L36226, L36802
<i>Vicia villosa</i> Roth subsp. <i>varia</i> (Host) Corb.	T	EM	ALE, SGI, ANG	L36485, L36507, L36580
<b>Fagaceae</b>				
<i>Quercus cerris</i> L.	P	EM	PEN, ANG	
<i>Quercus frainetto</i> Ten.	P	EU	ALE	L36221
<i>Quercus ilex</i> L. subsp. <i>ilex</i>	P	SM	PLI, ALE, SGI, MCO, ANG	
<i>Quercus pubescens</i> s.l.	P	EU	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	L6364, L9371, L10152, L12195
<i>Quercus suber</i> L.	P	EM	ANG	
<b>Gentianaceae</b>				
<i>Blackstonia perfoliata</i> (L.) Huds. subsp. <i>perfoliata</i>	T	EM	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	L6053, L8239, L36217, L36470, L36575, L36707
<i>Centaurium erythraea</i> Rafn subsp. <i>erythraea</i>	H	EU	PEN, SGI	
<i>Centaurium erythraea</i> Rafn subsp. <i>rumelicum</i> (Velen.) Melderis	H	EU	PLI, ALE	L10189, L36396
<i>Centaurium maritimum</i> (L.) Fritsch	T	SM	MCO	L36734
<i>Centaurium pulchellum</i> (Sw.) Druce subsp. <i>pulchellum</i>	T	EU	ANG	L12126, L12240
<i>Centaurium tenuiflorum</i> (Hoffmanns. & Link) Fritsch subsp. <i>acutiflorum</i> (Schott) Zeltner	T	EU	PEN, LOC	L14732
<b>Geraniaceae</b>				
<i>Erodium chium</i> (L.) Willd.	T	EM	PLI, SGI	L9874, L12171
<i>Erodium ciconium</i> (L.) L'Hér.	T	EU	LOC	L12092
<i>Erodium malacoides</i> (L.) L'Hér. subsp. <i>malacoides</i>	H	SM	CON, LOC, MCO	L10569, L12091, L36341, L36348
<i>Geranium columbinum</i> L.	T	EU	ALE, MCO, ANG	L36487
<i>Geranium dissectum</i> L.	T	CO	PEN, PLI, ALE, MCO, ANG	L12237, L14586, L36351, L36360, L36409, L36459, L36488, L36489, L36526, L36704
<i>Geranium molle</i> L.	T	CO	PLI, ALE, SGI, MCO, ANG	L12245, L36352, L36490
<i>Geranium purpureum</i> Vill.	T	EM	PLI, ALE, MCO, ANG	
<i>Geranium robertianum</i> L.	T	CO	PEN, PLI, ALE, SGI, ANG	L36254
<b>Hypericaceae</b>				
<i>Hypericum australe</i> Ten.	H	SM	ALE	L36229
<i>Hypericum hircinum</i> L. subsp. <i>majus</i> (Aiton) N. Robson	P	SM	ALE, ANG	
<i>Hypericum perfoliatum</i> L.	H	SM	MCO, ANG	L10561, L12191
<i>Hypericum perforatum</i> L.	H	CO	PEN, PLI, CON, LOC, ALE, SGI, MCO	
<i>Hypericum spruneri</i> Boiss.	H	EU	SGI	L36331, L36334
<i>Hypericum tetrapterum</i> Fr.	H	EU	PEN	
<b>Iridaceae</b>				
<i>Gladiolus italicus</i> Mill.	G	EM	CON, ALE, SGI, MCO, ANG	L8592
<i>Hermodactylus tuberosus</i> (L.) Mill.	G	SM	PLI, SGI, MCO	

Continued

Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<i>Iris germanica</i> L.	G	CO	SGI	
<i>Iris lorea</i> Janka	G	MM	SGI	L36335
<i>Romulea columnae</i> Sebast. & Mauri	G	SM	SGI	L12178
<b>Juglandaceae</b>				
<i>Juglans regia</i> L.	P	CO	PEN, ALE	
<b>Juncaceae</b>				
<i>Juncus acutus</i> L. subsp. <i>acutus</i>	H	EM	SGI, MCO	L6146, L36285
<i>Juncus articulatus</i> L.	G	CI	PEN, PLI, CON, ALE, MCO	L10574, L14715, L36509, L36550, L36672
<i>Juncus bufonius</i> L.	T	CO	PLI, ALE, SGI, MCO, ANG	L10333, L12216, L36676, L36791
<i>Juncus inflexus</i> L.	H	EU	LOC, ANG	L36286, L36770
<i>Luzula forsteri</i> (Sm.) DC.	H	EM	ALE, ANG	
<b>Lamiaceae</b>				
<i>Ajuga chamaepitys</i> (L.) Schreb. subsp. <i>chamaepitys</i>	T	EM	PLI, CON, LOC, MCO	
<i>Ajuga reptans</i> L.	H	EU	PEN, ALE, MCO, ANG	
<i>Clinopodium nepeta</i> (L.) Kuntze subsp. <i>nepeta</i>	Ch	MM	PLI, LOC, ALE, MCO, ANG	L36643
<i>Clinopodium vulgare</i> L. subsp. <i>vulgare</i>	H	CI	PLI, SGI, ANG	
<i>Lamium album</i> L. subsp. <i>album</i>	H	EU	ANG	
<i>Lamium amplexicaule</i> L.	T	EU	CON, SGI	
<i>Lamium bifidum</i> Cirillo subsp. <i>bifidum</i>	T	SM	PLI, ANG	L36622, L36781
<i>Lamium flexuosum</i> Ten.	H	MM	CON	L36234
<i>Lycopus europaeus</i> L. subsp. <i>europaeus</i>	H	CI	PEN, PLI, CON, LOC, MCO	
<i>Marrubium vulgare</i> L.	H	CO	PLI, LOC, SGI	L12177
<i>Melissa officinalis</i> L. s.l.	H	EM	PEN, ALE, MCO, ANG	
<i>Micromeria graeca</i> (L.) Benth. ex Rchb. subsp. <i>graeca</i>	Ch	SM	PLI, LOC, SGI, MCO, ANG	L36568, L36593, L36714, L36825
<i>Origanum vulgare</i> L. s.l.	H	EU	ANG	
<i>Phlomis herba-venti</i> L. subsp. <i>herba-venti</i>	H	SM	LOC, MCO	L12110, L36247, L36375
<i>Prasium majus</i> L.	Ch	SM	SGI	L36245, L36316
<i>Prunella laciniata</i> (L.) L.	H	EM	CON, MCO	
<i>Prunella vulgaris</i> L. subsp. <i>vulgaris</i>	H	CI	ALE, ANG	
<i>Rosmarinus officinalis</i> L.	P	SM	SGI, MCO	
<i>Salvia argentea</i> L.	H	SM	MCO	
<i>Salvia haematodes</i> L.	H	EN	SGI	L36332, L36577
<i>Salvia verbenaca</i> L.	H	AT	PLI, CON, LOC, SGI, MCO	
<i>Stachys arvensis</i> (L.) L.	T	CO	PEN, ANG	L36777, L36789
<i>Stachys germanica</i> L. subsp. <i>germanica</i>	H	EM	CON, LOC, ALE	L10280, L10354, L36530
<i>Stachys ocymastrum</i> (L.) Briq.	T	SM	PLI, ANG	L12203, L14584
<i>Stachys officinalis</i> (L.) Trevis.	H	EU	PEN	
<i>Stachys sylvatica</i> L.	H	CI	PEN	
<i>Stachys tymphaea</i> Hausskn.	H	MM	PLI, MCO	L11041, L36379, L36520
<i>Teucrium capitatum</i> L. subsp. <i>capitatum</i>	Ch	SM	PLI, LOC, SGI, MCO	L12109, L36326
<i>Teucrium chamaedrys</i> L. subsp. <i>chamaedrys</i>	Ch	EM	PEN, PLI, LOC, SGI, MCO	L36242
<i>Teucrium flavum</i> L. subsp. <i>flavum</i>	Ch	SM	SGI	
<i>Thymus longicaulis</i> C. Presl subsp. <i>longicaulis</i>	Ch	EM	PEN	L36452
<b>Liliaceae</b>				
<i>Tulipa australis</i> Link	G	SM	MCO	L12165, L36685
<b>Linaceae</b>				
<i>Linum bienne</i> Mill.	H	EM	PEN, PLI, CON, ALE, MCO, ANG	
<i>Linum corymbulosum</i> Rchb.	T	SM	PEN, PLI, LOC, SGI	L10197, L12089, L14714, L36570, L36590
<i>Linum strictum</i> L. subsp. <i>spicatum</i> (Pers.) Nyman	T	SM	SGI	L36311
<b>Loranthaceae</b>				
<i>Loranthus europaeus</i> Jacq.	P (EP)	EU	ANG	L12194
<b>Lythraceae</b>				
<i>Lythrum junceum</i> Banks & Sol.	T	SM	ALE, ANG	L36795
<i>Punica granatum</i> L.	P	CO	MCO	
<b>Malvaceae</b>				
<i>Althaea hirsuta</i> L.	T	EM	PEN	L34940
<i>Malope malacoides</i> L.	T	SM	PLI, SGI, MCO	L10187, L36318, L36328, L36381
<i>Malva cretica</i> Cav. subsp. <i>cretica</i>	T	SM	SGI	L36605
<i>Malva punctata</i> (All.) Alef.	T	SM	PEN	L14717
<i>Malva sylvestris</i> L. subsp. <i>sylvestris</i>	H	CO	PEN, PLI, ANG	L36422, L36793

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<b>Moraceae</b>				
<i>Morus alba</i> L.	P	CO	PEN	L34942, L34949
<i>Ficus carica</i> L.	P	CO	ANG	
<b>Myrtaceae</b>				
<i>Eucalyptus camaldulensis</i> Dehnh.	P	CO	PLI, LOC, SGI, MCO	L36248
<i>Myrtus communis</i> L. s.l.	P	SM	ALE, MCO, ANG	
<b>Oleaceae</b>				
<i>Fraxinus angustifolia</i> Vahl subsp. <i>oxycarpa</i> (Willd.) Franco & Rocha Afonso	P	EU	PEN, MCO	L36383, L36478
<i>Fraxinus ornus</i> L. subsp. <i>ornus</i>	P	EU	PEN, PLI, CON, LOC, ALE, MCO, ANG	
<i>Ligustrum vulgare</i> L.	P	EU	PEN, PLI, CON, ALE, MCO	
<i>Olea europaea</i> L.	P	SM	PLI, LOC, SGI	
<i>Phillyrea latifolia</i> L.	P	SM	PLI, LOC, ALE, SGI, MCO, ANG	
<b>Onagraceae</b>				
<i>Epilobium hirsutum</i> L.	H	EU	ALE	
<i>Epilobium tetragonum</i> L. s.l.	H	EU	PEN	
<b>Orchidaceae</b>				
<i>Anacamptis morio</i> (L.) R.M. Bateman, Pridgeon & M.W. Chase subsp. <i>morio</i>	G	EU	CON	
<i>Anacamptis pyramidalis</i> (L.) Rich.	G	EM	CON, MCO	
<i>Epipactis microphylla</i> (Ehrh.) Sw.	G	EU	CON	
<i>Gymnadenia conopsea</i> (L.) R. Br.	G	EU	CON	
<i>Himantoglossum robertianum</i> (Loisel.) P. Delforge	G	SM	LOC, SGI	
<i>Ophrys apifera</i> Huds.	G	AT	CON, ALE	
<i>Ophrys bertolonii</i> Moretti	G	SM	MCO	
<i>Ophrys bombyliflora</i> Link	G	SM	LOC, MCO	
<i>Ophrys fuciflora</i> (F.W. Schmidt) Moench subsp. <i>apulica</i> O. & E. Danesch	G	EN	LOC	
<i>Ophrys fuciflora</i> (F.W. Schmidt) Moench subsp. <i>fuciflora</i>	G	EM	CON	
<i>Ophrys incubacea</i> Bianca	G	SM	PLI, CON, MCO	
<i>Ophrys lutea</i> Cav.	G	SM	MCO	
<i>Ophrys sphegodes</i> Mill. subsp. <i>garganica</i> E. Nelson	G	EN	SGI, MCO	
<i>Ophrys sphegodes</i> Mill. subsp. <i>sphogodes</i>	G	EM	PLI, LOC, SGI, ANG	
<i>Orchis anthropophora</i> (L.) All.	G	AT	PLI, CON, SGI, MCO	
<i>Orchis italica</i> Poir.	G	SM	PLI, LOC, SGI, MCO	
<i>Orchis purpurea</i> Huds.	G	EU	PEN, PLI, CON, LOC	
<i>Orchis simia</i> Lam.	G	EM	CON	
<i>Platanthera bifolia</i> (L.) Rich.	G	EU	ANG	
<i>Serapias cordigera</i> L.	G	SM	ANG	
<i>Serapias lingua</i> L.	G	SM	ALE, MCO, ANG	
<i>Serapias parviflora</i> Parl.	G	SM	LOC, MCO, ANG	
<i>Serapias vomeracea</i> (Burm. f.) Briq.	G	EM	PLI, CON, LOC, ALE, MCO, ANG	
<b>Orobanchaceae</b>				
<i>Bellardia trixago</i> (L.) All.	T	EM	PLI, LOC, ALE, SGI, MCO, ANG	L36189, L36327, L36394
<i>Odontites luteus</i> (L.) Clairv.	T	EM	ANG	
<i>Orobanche crenata</i> Forssk.	T	EM	ALE, ANG	
<i>Orobanche variegata</i> Wallr.	T	SM	ANG	L36814
<i>Parentucellia viscosa</i> (L.) Caruel	T	AT	SGI, MCO, ANG	L8095
<i>Phelipanche purpurea</i> (Jacq.) Soják	T	EU	ANG	L36807
<b>Oxalidaceae</b>				
<i>Oxalis articulata</i> Savigny	G	CO	PEN	
<i>Oxalis corniculata</i> L.	H	CO	ANG	L12239
<i>Oxalis pes caprae</i> L.	G.	CO	SGI, ANG	
<i>Oxalis stricta</i> L.	H	CO	PEN, ALE	L36216, L36439
<b>Papaveraceae</b>				
<i>Fumaria capreolata</i> L. subsp. <i>capreolata</i>	T	EM	PLI, ALE, MCO	
<i>Fumaria flabellata</i> Gasp.	T	SM	ANG	L36785
<i>Fumaria officinalis</i> L. subsp. <i>officinalis</i>	T	CO	PEN, PLI, LOC, ALE, SGI, MCO	
<i>Papaver rhoeas</i> L. subsp. <i>rhoeas</i>	T	MM	PEN, PLI, CON, LOC, SGI, MCO	L36391, L36720

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<b>Pinaceae</b>				
<i>Pinus halepensis</i> Mill.	P	SM	PEN, PLI, LOC, SGI, MCO, ANG	L36624
<i>Pinus pinaster</i> Aiton subsp. <i>pinaster</i>	P	CO	PLI, SGI, ANG	
<b>Plantaginaceae</b>				
<i>Antirrhinum majus</i> L. subsp. <i>majus</i>	Ch	SM	PLI	
<i>Digitalis lutea</i> L. subsp. <i>australis</i> (Ten.) Arcang.	H	EN	PEN	
<i>Linaria purpurea</i> (L.) Mill.	H	EN	PEN, PLI	
<i>Misopates orontium</i> (L.) Raf. subsp. <i>orontium</i>	T	EU	ALE	
<i>Plantago afra</i> L. subsp. <i>afra</i>	T	SM	PLI, ALE, SGI, ANG	L10324, L36227, L36317, L36794
<i>Plantago albicans</i> L.	T	SM	SGI	L36325
<i>Plantago coronopus</i> L. subsp. <i>coronopus</i>	T	EM	ANG	L12217
<i>Plantago holosteum</i> Scop.	H	EU	LOC	L12046
<i>Plantago lanceolata</i> L.	H	CO	PEN, PLI, LOC, ALE, SGI, MCO, ANG	L10268, L36665, L36724, L36803
<i>Plantago major</i> L. subsp. <i>major</i>	H	CO	CON, ALE, MCO, ANG	
<i>Plantago major</i> L. subsp. <i>pleiosperma</i> Pilg.	H	CO	PEN	L14733
<i>Plantago serraria</i> L.	H	SM	PLI, LOC, ALE, SGI, MCO	L11060, L36324
<i>Veronica anagallis-aquatica</i> L. subsp. <i>anagallis-aquatica</i>	H	CO	PLI, SGI, MCO	L9866, L10544, L10545, L36566, L36600
<i>Veronica arvensis</i> L.	T	CO	PEN, ALE, MCO, ANG	L36453, L36460, L36754
<i>Veronica hederifolia</i> L. subsp. <i>hederifolia</i>	T	EU	PEN, CON, SGI, MCO	L36346, L36417, L36421
<i>Veronica persica</i> Poir.	T	CO	PEN, CON, LOC, ALE, ANG	L12236, L34939, L34935, L34941, L36347, L36782
<i>Veronica polita</i> Fr.	T	CO	PLI, ANG	L9882, L12249
<b>Poaceae</b>				
<i>Achnatherum bromoides</i> (L.) P. Beauv.	H	SM	PLI, SGI	L10210, L36278, L36574, L36615, L36621
<i>Aira elegantissima</i> Schur	T	EM	ANG	L36813
<i>Alopecurus myosuroides</i> Huds.	T	CO	PEN, PLI	L9839, L36412, L36434
<i>Alopecurus rendlei</i> Eig	T	EM	ANG	L12206, L12250
<i>Ampelodesmos mauritanicus</i> (Poir.) T. Durand & Schinz	H	SM	ALE, ANG	
<i>Anisantha diandra</i> (Roth) Tzvelev	T	EM	PEN, PLI, ALE, ANG	L12202, L36462, L36476, L36503, L36611
<i>Anisantha madritensis</i> (L.) Nevski subsp. <i>madritensis</i>	T	EM	CON, ALE, SGI, MCO, ANG	L36215, L36315, L36340, L36369, L36380, L36742, L36762, L36797, L36809
<i>Anisantha sterilis</i> (L.) Nevski	T	EM	PEN	L36461
<i>Arundo collina</i> Ten. <sup>(2)</sup>	G	SM	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	L13668
<i>Arundo donax</i> L.	G	CO	PEN, PLI, LOC, ALE, SGI, ANG	
<i>Avena barbata</i> Link subsp. <i>barbata</i>	T	EM	PEN, PLI, ALE, SGI, MCO, ANG	L36377, L36629, L36712
<i>Avena fatua</i> L.	T	EU	PEN, MCO	L34951, L36368
<i>Avena sativa</i> L. subsp. <i>sativa</i>	T	CO	PLI	L36261
<i>Brachypodium phoenicoides</i> (L.) Roem. & Schult.	H	SM	MCO	
<i>Brachypodium retusum</i> (Pers.) P. Beauv.	H	SM	PLI, LOC	L36641
<i>Brachypodium rupestre</i> (Host) Roem. & Schult.	H	AT	PEN, PLI, ANG	L12225, L36338, L36454, L36473
<i>Brachypodium sylvaticum</i> (Huds.) P. Beauv. subsp. <i>sylvaticum</i>	H	EU	PEN, PLI, CON, ALE, ANG	
<i>Briza maxima</i> L.	T	CO	PLI, ALE, MCO, ANG	
<i>Briza minor</i> L.	T	CO	ANG	L36298
<i>Bromopsis erecta</i> (Huds.) Fourr. subsp. <i>erecta</i>	H	EU	CON	L36563
<i>Bromus hordeaceus</i> L. subsp. <i>hordeaceus</i>	T	CO	PEN, PLI, LOC, SGI, MCO, ANG	L12212, L36474, L36479, L36582, L36635, L36642, L36709, L36746
<i>Bromus hordeaceus</i> L. subsp. <i>molliformis</i> (Billot) Maire & Weiller	T	EM	ALE	L36499
<i>Bromus intermedius</i> Guss. subsp. <i>intermedius</i>	T	EM	MCO	L36745
<i>Bromus japonicus</i> Thunb. s.l.	T	EU	PLI	L10270
<i>Bromus lanceolatus</i> Roth	T	EU	SGI	L36314
<i>Catapodium rigidum</i> (L.) C.E. Hubb. subsp. <i>rigidum</i>	T	EM	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	L9217, L36438, L36495, L36579, L36735
<i>Cynodon dactylon</i> (L.) Pers.	H	CO	PEN, PLI, LOC, SGI	
<i>Cynosurus echinatus</i> L.	T	EM	PLI, LOC, MCO	
<i>Dactylis glomerata</i> L. subsp. <i>glomerata</i>	H	EU	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Dactylis glomerata</i> L. subsp. <i>hispanica</i> (Roth) Nyman	H	SM	PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Dasyphyrum villosum</i> (L.) P. Candargy, non Borbás	T	EM	PLI, SGI, MCO	
<i>Drymochloa drymeja</i> (Mert. & Koch) Holub subsp. <i>exaltata</i> (C. Presl) Foggi & Signorini	H	EU	ALE	L36501

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<i>Elytrigia repens</i> (L.) Nevski subsp. <i>repens</i>	G	CI	PEN, PLI, LOC, SGI, MCO	L14716, L36159, L36581
<i>Festuca heterophylla</i> Lam.	H	EU	CON, MCO	L36238
<i>Glyceria notata</i> Chevall.	G	CO	LOC, ANG	L12152, L12208, L36309, L36790
<i>Hainardia cylindrica</i> (Willd.) Greuter	T	EM	PLI	L10168
<i>Helictotrichon convolutum</i> (C. Presl) Henrard	H	SM	SGI, MCO	L36510, L36687
<i>Holcus lanatus</i> L.	H	CI	ALE	
<i>Hordeum bulbosum</i> L.	H	CO	SGI	
<i>Hordeum marinum</i> Huds. subsp. <i>marinum</i>	T	EM	MCO	L36674
<i>Hordeum murinum</i> L. subsp. <i>leporinum</i> (Link) Arcang.	T	EM	PEN, PLI, MCO, ANG	L36457
<i>Hordeum vulgare</i> L.	T	CO	PLI	L9893
<i>Hyparrhenia hirta</i> (L.) Stapf subsp. <i>hirta</i>	H	CO	ALE, ANG	
<i>Lolium multiflorum</i> Lam. subsp. <i>gaudini</i> (Parl.) Schinz & Thell.	T	EM	PEN, PLI, SGI	L36418, L36827
<i>Lolium perenne</i> L.	H	CI	PLI, SGI	L10167, L36597
<i>Lolium rigidum</i> Gaudin	T	CO	ALE	L36497
<i>Lolium temulentum</i> L. subsp. <i>temulentum</i>	T	CO	ANG	L12198, L36740, L36741
<i>Lygeum spartum</i> L.	H	SM	SGI, MCO	L12170
<i>Melica ciliata</i> L. subsp. <i>magnolii</i> (Gren. & Godr.) Husn.	H	CO	LOC, SGI	L11583, L12154, L36319
<i>Melica transsilvanica</i> Schur subsp. <i>transsilvanica</i>	H	EU	PLI	
<i>Panicum capillare</i> L.	T	CO	PEN	L34932
<i>Paspalum distichum</i> L.	G	CO	PEN	L14731
<i>Phalaris brachystachys</i> Link	T	SM	PLI, SGI, MCO	L10200, L11057, L36275, L36364, L36372
<i>Phalaris caerulea</i> Desf.	H	SM	PLI, MCO	L10224, L11058, L36358, L36373, L36716, L36749
<i>Phalaris canariensis</i> L.	T	EM	CON, LOC	L36236
<i>Phalaris minor</i> Retz.	T	CO	SGI	L36276
<i>Phalaris paradoxa</i> L.	T	SM	PLI, SGI	L9841, L36280
<i>Phragmites australis</i> (Cav.) Trin. ex Steud. subsp. <i>australis</i>	G	CO	PEN, PLI, CON, LOC, SGI	
<i>Piptatherum miliaceum</i> (L.) Coss. subsp. <i>miliaceum</i>	H	SM	PLI, LOC, SGI, MCO, ANG	
<i>Poa annua</i> L.	T	CO	PEN, ALE, ANG	L12251
<i>Poa bulbosa</i> L.	H	EU	PLI, CON, LOC, MCO	L8304
<i>Poa pratensis</i> L.	H	CI	PEN, PLI, CON	L9868, L36304, L36339, L36431, L36455, L36457, L36477, L36564
<i>Poa sylvicola</i> Guss.	H	EM	ANG	L12193
<i>Poa trivialis</i> L.	H	EU	ALE, MCO, ANG	L36502, L36508, L36715, L36790
<i>Polypogon monspeliensis</i> (L.) Desf.	T	CO	PLI, LOC	L12153, L36241, L36329
<i>Polypogon viridis</i> (Gouan) Breistr.	H	CO	PLI, LOC	L10296, L36240
<i>Psilurus incurvus</i> (Gouan) Schinz & Thell.	T	EM	ALE, MCO	L36625
<i>Rostraria cristata</i> (L.) Tzvelev subsp. <i>cristata</i>	T	CO	CON, LOC, MCO	
<i>Rostraria hispida</i> (Savi) Dogan	T	SM	LOC, SGI	
<i>Schedonorus uechtritzianus</i> (Wiesb.) Holub	H	EU	ANG	L12214, L14587
<i>Stipa austroitalica</i> Martinovský subsp. <i>austroitalica</i>	H	EN	LOC, MCO	L10573, L12151
<i>Stipa capensis</i> Thunb.	T	SM	LOC	L10241
<i>Trachynia distachya</i> (L.) Link	T	CO	PLI, ALE, SGI, MCO	L10366, L36292, L36321, L36336, L36506, L36668
<i>Triticum ovatum</i> (L.) Raspail	T	CO	PLI, CON, LOC, SGI, MCO	L8248, L36290, L36296, L36662, L36710
<i>Triticum triunciale</i> (L.) Raspail	T	EM	MCO	L36661
<i>Vulpia bromoides</i> (L.) Gray	T	EU	CON	L36237
<i>Vulpia ciliata</i> Dumort	T	CO	MCO	L36631, L36663
<i>Vulpia ligustica</i> (All.) Link	T	SM	CON, ALE, ANG	L10331, L12211
<i>Vulpia muralis</i> (Kunth) Nees	T	SM	ANG	
<i>Vulpia myuros</i> (L.) C.C. Gmel.	T	CO	MCO	
<b>Polygalaceae</b>				
<i>Polygala monspeliaca</i> L.	T	SM	CON	L11781
<i>Polygala nicaeensis</i> W.D.J. Koch subsp. <i>mediterranea</i> Chodat	H	EM	PLI, MCO	L9269
<i>Polygala vulgaris</i> L. subsp. <i>vulgaris</i>	H	EU	PEN, MCO	L36387, L36426
<b>Polygonaceae</b>				
<i>Polygonum aviculare</i> L. subsp. <i>aviculare</i>	T	CO	MCO	

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<i>Rumex bucephalophorus</i> L. subsp. <i>bucephalophorus</i>	T	EM	ALE, ANG	L12210
<i>Rumex conglomeratus</i> Murray	H	EU	PEN, PLI, CON, LOC, SGI	L36423, L36468, L36534, L36560, L36584
<i>Rumex crispus</i> L.	H	CO	PLI, MCO	L10206
<i>Rumex pulcher</i> L. subsp. <i>pulcher</i>	H	EM	MCO	L36389
<b>Polypodiaceae</b>				
<i>Polypodium cambricum</i> L.	G	EM	ALE	L10338
<b>Portulacaceae</b>				
<i>Portulaca oleracea</i> L. subsp. <i>oleracea</i>	T	CO	CON, MCO	
<b>Primulaceae</b>				
<i>Cyclamen hederifolium</i> Aiton subsp. <i>hederifolium</i>	G	SM	ALE, ANG	
<i>Cyclamen repandum</i> Sm. subsp. <i>repandum</i>	G	SM	PEN, PLI	
<i>Lysimachia arvensis</i> (L.) U. Manns & Anderb. subsp. <i>arvensis</i>	T	EM	PEN, PLI, ALE, SGI, MCO, ANG	L9320, L9875, L12162, L14719, L36659, L36817, L36832
<i>Lysimachia foemina</i> (Mill.) U. Manns & Anderb.	T	CO	LOC	L12102
<i>Samolus valerandi</i> L.	H	CO	PLI, ALE	L10192, L11580
<b>Pteridaceae</b>				
<i>Anogramma leptophylla</i> (L.) Link	T	CO	ANG	
<b>Ranunculaceae</b>				
<i>Adonis annua</i> L.	T	CO	PLI, CON, LOC, MCO	L6313, L9212, L11785, L36252, L36535, L36701, L36752
<i>Anemone hortensis</i> L. subsp. <i>hortensis</i>	G	EM	PLI, CON, LOC, SGI, MCO, ANG	
<i>Clematis flammula</i> L.	P	EM	PEN, PLI, SGI	
<i>Clematis vitalba</i> L.	P	EU	PEN, PLI, ALE, MCO	
<i>Clematis viticella</i> L.	P	EU	SGI	L8281, L36288
<i>Delphinium halteratum</i> Sm. subsp. <i>halteratum</i>	T	SM	LOC	L12059
<i>Helleborus bocconeii</i> Ten. subsp. <i>bocconeii</i>	G	EN	ANG	L12254
<i>Helleborus foetidus</i> L. subsp. <i>foetidus</i>	G	AT	PEN, CON	
<i>Nigella arvensis</i> L. subsp. <i>arvensis</i>	T	EM	LOC	
<i>Nigella damascena</i> L.	T	EM	CON, MCO	L11062, L11066
<i>Ranunculus arvensis</i> L.	T	EU	MCO	L11070, L36362, L36700
<i>Ranunculus ficaria</i> L. subsp. <i>ficaria</i>	G	EU	PEN, PLI, CON, MCO, ANG	L8294, L36553
<i>Ranunculus ficaria</i> L. subsp. <i>ficariiformis</i> (F.W. Schultz) Rouy & Foucaud	H	EM	ANG	L36766
<i>Ranunculus lanuginosus</i> L.	H	EU	PEN	L36435
<i>Ranunculus millefoliatus</i> Vahl	H	MM	MCO	L36386
<i>Ranunculus muricatus</i> L.	T	SM	PLI, ALE, SGI, MCO	L36350, L36599
<i>Ranunculus neapolitanus</i> Ten.	H	MM	PLI, CON, LOC, ALE, ANG	L9872, L10252, L12200, L12248, L36222
<i>Ranunculus paludosus</i> Poir.	H	SM	MCO	L10565
<i>Ranunculus repens</i> L.	H	CO	PEN	
<i>Ranunculus sardous</i> Crantz s.l.	T	EM	ANG	L12238, L36796
<i>Ranunculus trichophyllus</i> Chaix subsp. <i>trichophyllus</i>	I	EU	CON	L11787
<i>Ranunculus trilobus</i> Desf.	T	SM	ANG	L12218, L14580
<i>Ranunculus velutinus</i> Ten.	H	EM	MCO	L36703
<i>Thalictrum simplex</i> L. subsp. <i>simplex</i>	H	CI	MCO	L11044
<b>Resedaceae</b>				
<i>Reseda alba</i> L. subsp. <i>alba</i>	H	SM	PLI, CON, LOC, SGI, MCO	
<i>Reseda lutea</i> L. subsp. <i>lutea</i>	H	EU	LOC	
<b>Rhamnaceae</b>				
<i>Paliurus spina-christi</i> Mill.	P	EU	PEN, PLI, SGI	L10160
<i>Rhamnus alaternus</i> L. subsp. <i>alaternus</i>	P	SM	PLI, LOC, SGI	L36578, L36596, L36608
<b>Rosaceae</b>				
<i>Agrimonia eupatoria</i> L. subsp. <i>eupatoria</i>	H	CO	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	L36760
<i>Crataegus laevigata</i> (Poir.) DC.	P	AT	ANG	L36823
<i>Crataegus monogyna</i> Jacq.	P	EU	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	L36353, L36384, L36811
<i>Cydonia oblonga</i> Mill.	P	CO	PLI, LOC	L10178, L12070
<i>Filipendula vulgaris</i> Moench	H	EU	MCO	L10548
<i>Potentilla pedata</i> Willd. ex Hornem.	H	EM	MCO	L36388
<i>Potentilla reptans</i> L.	H	CO	PEN, PLI, CON, ALE, SGI, MCO, ANG	
<i>Prunus avium</i> L. subsp. <i>avium</i>	P	EU	PEN, PLI, CON, LOC, ALE, SGI	
<i>Prunus mahaleb</i> L.	P	EU	LOC	L10285, L12069
<i>Prunus spinosa</i> L. subsp. <i>spinosa</i>	P	EU	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	L36761

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<i>Pyracantha coccinea</i> M. Roem.	P	EM	PEN, ALE, MCO, ANG	L7708, L12209, L14726
<i>Pyrus communis</i> L.	P	CO	PLI, CON, LOC, ALE, MCO	L10155, L10179
<i>Pyrus spinosa</i> Forssk.	P	SM	LOC, SGI, MCO	L12163, L36637, L36723
<i>Rosa canina</i> L.	P	EU	CON	L11784, L36303
<i>Rosa corymbifera</i> Borkh.	P	EU	PEN, CON	L36466, L36467, L36544
<i>Rosa dumalis</i> Bechst.	P	EU	PLI	L9876
<i>Rosa sempervirens</i> L.	P	SM	PLI, CON, ALE, SGI, MCO, ANG	L36830
<i>Rubus ulmifolius</i> Schott	P	EM	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Sanguisorba minor</i> Scop. subsp. <i>balearica</i> (Bourg. ex Nyman) Muñoz Garm. & C. Nava	H	CO	PEN, PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Sorbus domestica</i> L.	P	EM	PLI, CON, ALE, ANG	
<b>Rubiaceae</b>				
<i>Asperula laevigata</i> L.	H	SM	ALE	L36239
<i>Cruciata glabra</i> (L.) Ehrend. s.l.	H	EU	PEN, CON	
<i>Cruciata laevipes</i> Opiz	H	EU	ALE	
<i>Galium aparine</i> L.	T	EU	PLI, CON, LOC	L9884, L36253, L36529
<i>Galium corrudifolium</i> Vill.	H	SM	PEN, MCO	L14721, L36632
<i>Galium lucidum</i> All. s.l.	H	EM	PLI, LOC	L36618
<i>Galium mollugo</i> L. subsp. <i>erectum</i> Syme	H	EU	PEN, LOC	L36634
<i>Galium spurium</i> L.	T	EU	PEN, PLI	L9883, L36415
<i>Galium tricorutum</i> Dandy	T	EM	LOC, MCO	L36367, L36405
<i>Rubia peregrina</i> L. subsp. <i>peregrina</i>	P	SM	PEN, PLI, ALE, SGI, MCO, ANG	
<i>Sherardia arvensis</i> L.	T	CO	PLI, CON, LOC, ALE, SGI, MCO, ANG	
<i>Theligonum cynocrambe</i> L.	T	SM	PLI, ANG	
<b>Salicaceae</b>				
<i>Populus alba</i> L.	P	EU	PEN, PLI, CON, MCO, ANG	L11577, L36750, L36945
<i>Populus canescens</i> (Aiton) Sm.	P	EM	PEN, PLI, CON, MCO, ANG	L6203, L11578, L11783, L12204, L14723, L36751
<i>Populus nigra</i> L.	P	EU	PEN, PLI, CON, MCO, ANG	
<i>Salix alba</i> L.	P	EU	PEN, PLI, CON, ALE, SGI, MCO, ANG	L9078, L12231, L14728, L36310, L36410, L36513, L36559, L36683
<i>Salix eleagnos</i> Scop. subsp. <i>eleagnos</i>	P	OS	PEN, ALE	L36436
<i>Salix pentandra</i> L.	P	CI	PEN, ANG	L14585, L14735, L34946
<i>Salix purpurea</i> L. subsp. <i>purpurea</i>	P	EU	PEN, ALE, MCO	L36652, L36670, L36756
<i>Salix triandra</i> L. subsp. <i>triandra</i>	P	CI	PEN, PLI, MCO	L10171, L36671, L36755
<b>Santalaceae</b>				
<i>Osyris alba</i> L.	P	EM	PLI, SGI, MCO	L36572
<i>Thesium humifusum</i> DC.	H	EM	PLI	L36617
<i>Viscum album</i> L. subsp. <i>album</i>	P (EP)	EU	MCO	L10547
<b>Sapindaceae</b>				
<i>Acer campestre</i> L.	P	EU	PEN, PLI, CON, ALE	
<i>Acer opalus</i> Mill. subsp. <i>obtusatum</i> (Waldst. & Kit. ex Willd.) Gams	P	EU	PEN, PLI	
<i>Acer pseudoplatanus</i> L.	P	CO	PEN	L8657, L14718
<i>Aesculus hippocastanum</i> L.	P	CO	PEN	
<b>Saxifragaceae</b>				
<i>Saxifraga tridactylites</i> L.	T	EM	CON	
<b>Scrophulariaceae</b>				
<i>Scrophularia canina</i> L. subsp. <i>bicolor</i> (Sm.) Greuter	H	EM	MCO	
<i>Scrophularia nodosa</i> L.	H	CI	PEN	
<i>Scrophularia peregrina</i> L.	T	SM	PLI, ANG	L36775
<i>Verbascum blattaria</i> L.	H	CO	PEN, PLI, MCO	L11065, L14730
<i>Verbascum sinuatum</i> L.	H	EM	PLI, LOC, ANG	
<i>Verbascum thapsus</i> L. subsp. <i>thapsus</i>	H	EU	PEN	
<b>Selaginellaceae</b>				
<i>Selaginella denticulata</i> (L.) Spring	Ch	SM	ALE, ANG	
<b>Simaroubaceae</b>				
<i>Ailanthus altissima</i> (Mill.) Swingle	P	CO	PEN, PLI, CON, SGI, MCO	
<b>Smilacaceae</b>				
<i>Smilax aspera</i> L.	P	CO	PLI, ALE, SGI, ANG	

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Table 3. Continued.

Family/species	Life Form	Chorology	Collection areas	Voucher number
<b>Solanaceae</b>				
<i>Solanum nigrum</i> L. subsp. <i>nigrum</i>	T	CO	PLI, ALE, ANG	
<i>Solanum villosum</i> Mill. subsp. <i>alatum</i> (Moench) Dostál	T	EM	MCO, ANG	L36774
<b>Tamaricaceae</b>				
<i>Tamarix gallica</i> L.	P	SM	PLI, CON, LOC, SGI	L9043
<b>Thymelaeaceae</b>				
<i>Daphne gnidium</i> L.	P	SM	ANG	
<b>Typhaceae</b>				
<i>Typha angustifolia</i> L.	G	CI	PLI	L10162
<i>Typha latifolia</i> L.	G	CO	CON	
<i>Typha minima</i> Funk	G	EU	CON	
<b>Ulmaceae</b>				
<i>Ulmus glabra</i> Huds.	P	EU	PEN, PLI, ANG	L10191, L36416, L36810
<i>Ulmus laevis</i> Pall.	P	EU	PLI	L36243
<i>Ulmus minor</i> Mill. subsp. <i>minor</i>	P	EU	PEN, PLI, CON, LOC, SGI, MCO, ANG	L14727, L36610
<b>Urticaceae</b>				
<i>Mercurialis annua</i> L.	T	EU	PLI, ANG	
<i>Mercurialis perennis</i> L.	G	EU	CON	
<i>Parietaria judaica</i> L.	H	EM	PLI	L8782
<i>Parietaria officinalis</i>	H	EU	PEN	
<i>Urtica dioica</i> L. subsp. <i>dioica</i>	H	CO	PEN, ALE, ANG	
<i>Urtica pilulifera</i> L.	T	SM	PLI	L9044
<i>Urtica urens</i> L.	T	CO	PLI	L9838
<b>Verbenaceae</b>				
<i>Verbena officinalis</i> L.	H	CO	PEN, PLI, LOC, ALE, MCO	L36728
<b>Violaceae</b>				
<i>Viola alba</i> Besser subsp. <i>dehnhardtii</i> (Ten.) W. Becker	H	EM	PLI, ALE, MCO	
<i>Viola odorata</i> L.	H	EM	CON	L36554
<i>Viola reichenbachiana</i> Jord. ex Boreau	H	CI	PEN, ANG	L14583, L36430, L36768
<b>Vitaceae</b>				
<i>Vitis vinifera</i> L. s.l.	P	CO	PEN, LOC, ALE	
<b>Xanthorrhoeaceae</b>				
<i>Asphodelus fistulosus</i> L.	H	CO	SGI	
<i>Asphodelus ramosus</i> L. subsp. <i>ramosus</i>	G	SM	LOC, SGI	

(1) Note: previously reported in locchi et al. (2011).

(2) Identified using Danin (2004)

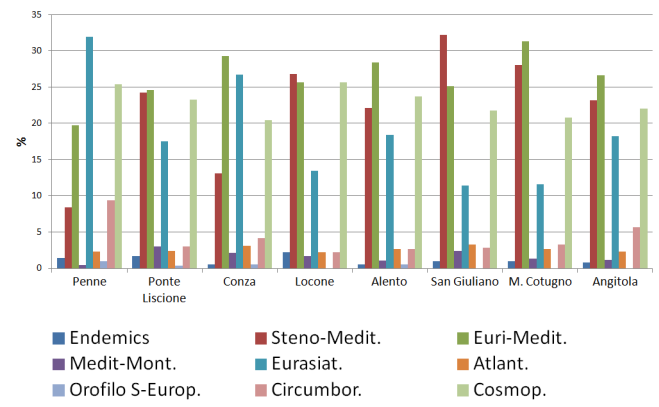
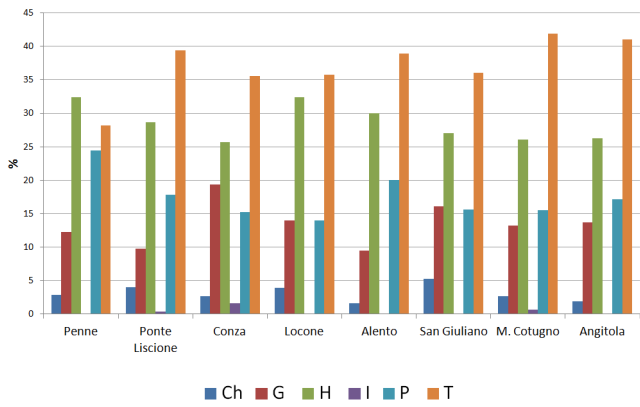
Table 4. Number and relative abundance of the three richest families of the analyzed flora.

	Penne		Alento		Angitola		Conza		Locone		M Cotugno		P Liscione		San Giuliano		Total	
	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%
Fabaceae	33	15.5	24	12.7	43	16.3	31	16.2	15	8.4	41	13.5	39	13.1	25	11.8	96	13.2
Asteraceae	19	8.9	18	9.5	24	9.1	20	10.5	30	16.8	38	12.5	39	13.1	29	13.7	90	12.3
Poaceae	21	9.9	21	11.1	27	10.3	16	8.4	23	12.8	32	10.6	37	12.5	27	12.8	80	11.0
Total	73	34.3	63	33.3	94	35.7	67	35.1	68	38.0	111	36.6	115	38.7	81	38.4	266	36.4
<b>Total Flora</b>	<b>213</b>		<b>190</b>		<b>263</b>		<b>191</b>		<b>179</b>		<b>303</b>		<b>297</b>		<b>211</b>		<b>730</b>	

Considering the life form composition (Figure 4), herbaceous species (Therophytes, Hemicryptophytes, and Geophytes) dominated woody species (Chamaephytes and Phanerophytes). Therophytes were the most represented life form, ranging from 35.3% to 41.9%, except in the Penne reservoir (28%), which is in agreement with its position in the Continental Biogeographic Region. Phanerophytes, on the other hand, accounted for less than 20% in the studied areas, with the exception

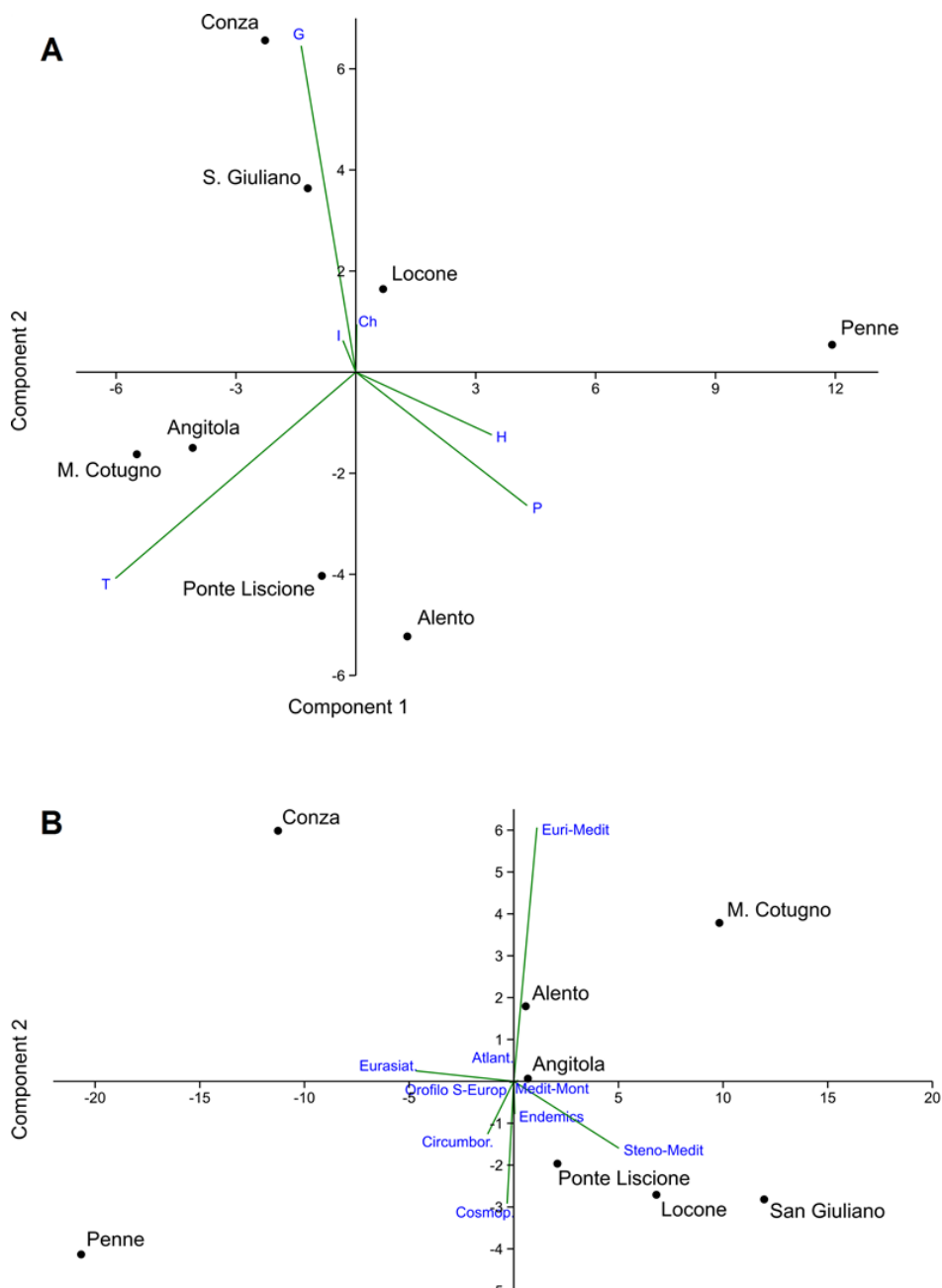
of the Penne and Alento Lakes.

The first two components of the PCA performed on the life form spectra explained 87% of the variability (Figure 6A). The life form composition typically varies along the Italian Peninsula (Pignatti 1994). However, the first component was not statistically correlated with latitude, even though Penne Lake was situated on the extreme end of another quadrant in the diagram. On the other hand, the second axis was correlated with the



**Figure 4.** Life form spectra of the eight studied basins. Ch = Chamaephytes, G = Geophytes, H = Hemicryptophytes (incl. Helophytes), I = Hydrophytes, P = Phanerophytes, and T = Therophytes.

**Figure 5.** Chorological spectra of the studied areas.



**Figure 6.** PCA diagrams of the eight reservoir areas, based on analyses of the life form spectra (A) and the chorological spectra (B).

distance to the sea (Spearman  $r_s = 0.8$ ;  $P < 0.05$ ), so it is assumed to be related to the life form compositions.

Although the Mantel test did not show a correlation between distance and the Sørensen-Dice coefficient for similarity ( $r = -0.216399$ ,  $P = 0.18$ ), the chorological spectra (Figure 5) were representative of the geographic positions of the lakes. Mediterranean species (Euri-Mediterranean + Steno-Mediterranean) tended to increase southward, representing only 28% of the variability for Lake Penne and exceeding 60% for Monte Cotugno. Furthermore, Eurasiatic chorotypes were dominant around Lake Penne (32%) and Lake Conza (27%), whereas they were less present around the other basins.

The first component of the PCA performed on the chorotype composition explained more than 86% of the total variability and was significantly correlated with longitude (Spearman  $r_s = -0.78$ ,  $P < 0.05$ ; see Figure 6B). This result indicates the presence of the well-known east-west-directed vegetation gradient, in which the eastern part of the Italian Peninsula received an admixture of species from Eastern Europe (e.g., Balcanic, Illyric, SE-European and Pontic species; see Trotter 1912, Pezzetta 2010, Peruzzi et al. 2014; Wagensommer et al. 2014). On the other hand, the PCA diagram showed a high correlation of this axis with an abundance of Eurasiatic floristic species.

Only 16 taxa were present in all the studied areas. Among them, eight have a Mediterranean distribution (*Arundo collina* Ten., *Asparagus acutifolius* L., *Blackstonia perfoliata* (L.) Huds. subsp. *perfoliata*, *Catapodium rigidum* (L.) C.E. Hubb. subsp. *rigidum*, *Dipsacus fullonum* L., *Rubus ulmifolius* Schott, *Scirpoides holoschoenus* (L.) Soják., *Spartium junceum* L.); four are Eurasian chorotypes (*Crataegus monogyna* Jacq., *Dactylis glomerata* L. subsp. *glomerata*, *Prunus spinosa* L. subsp. *spinosa*, *Quercus pubescens* s.l.); and four are cosmopolite, but not Alien, species (*Agrimonia eupatoria* L. subsp. *eupatoria*, *Euphorbia helioscopia* L. subsp. *helioscopia*, *Sanguisorba minor* Scop. subsp. *balearica* (Bourg. ex Nyman) Muñoz Garm. & C. Nava, *Xanthium strumarium* L. subsp. *strumarium*). Fifteen taxa are present in seven areas: six Mediterranean, four Eurasian, and six cosmopolite, but not Alien species. Finally, 270 taxa (37%) were present in only one basin.

Thirty-nine taxa were selected as patrimonial species (Table 5). Twenty-three taxa were orchid species, related to open habitats, such as meadows, grasslands, and shrublands. The Locone and Conza Lakes showed a high number of patrimonial taxa, despite these areas having relatively low floristic biodiversity. The Penne and Alento Lakes harboured the lowest number of patrimonial species. On the other hand, the number of invasive species and their impact on the floristic biodiversity were very limited. There were only 22 invasive species in a total of 125 (sub)cosmopolite species (Celesti-Grapow

et al 2010; see Table 6). The most common ones were *Arundo donax* L. and *Robinia pseudacacia* L. (six areas), and *Ailanthus altissima* (Mill.) Swingle (five areas). The highest number of invasive species occurred in the Lake Penne and Ponte Liscione areas (9 taxa), whereas only two taxa were found around Lake Alento and only three taxa around Lake Conza.

## DISCUSSION

The INEA “Azione 7” project represents an important case study of the natural value of large reservoir areas. Similar surveys have been conducted in South America (Tundisi and Matsumura-Tundisi 2003; Tundisi et al. 2008; Alves-da-Silva et al. 2014) and China (Tian et al. 2007). These studies underlined the positive effects of the presence of inundated areas on the aquatic biodiversity and the surrounding habitats, although the construction of dams had a high impact on the landscape. The project provided opportunities to collect biological information in agricultural areas that remained poorly studied because they were of little interest to botanists.

Seven of the eight basins have long been designated as either Sites of Community Importance (SCIs) or Special Protection Areas (SPAs), according to the European Council Directive 92/43/CEE (known as the “Habitats Directive”), or as Ramsar sites or WWF Oases (Table 2). These designations were done mainly taking account of the occurrence of rare bird species and the European otter (*Lutra lutra* L.). Knowledge of the floristic diversity is scarce for most of the areas (Scoppola and Blasi 2005). The floristic survey of the selected reservoir areas resulted in an inventory of 730 specific and subspecific taxa belonging to 89 families. The high biodiversity of the areas surrounding the reservoirs, varying from 179 to 303 taxa, counterbalanced the scarcity of aquatic plant species in the reservoirs. The two main factors related to the floristic composition of the areas were the distance from the sea and the east-west gradient across the Italian peninsula. The importance of this gradient for the floristic diversity of areas in southern Italy was recognised previously. The high plant biodiversity was probably underestimated because the present study was carried out over only 1 year. The biodiversity could be increased by increasing the natural state of some of the habitats, for example, by using reforestation, creating or increasing the size of ponds, preventing the complete drying up of some of the lakes, and enabling the establishment and growth of aquatic vegetation.

The floristic inventory identified several species that are of interest in terms of nature conservation. Therefore, the basins can be considered as biodiversity hotspots in agriculturally dominated landscapes. The contribution of such (semi-)natural habitat remnants is critical for the regional biodiversity (Duelli and Obrist 2003). In addition, the invasive plant species

were limited in number, and their facilitation was not observed (Johnson et al. 2008). The lakes and their surrounding habitats acted not only as water reservoirs, but also as reserves of plant species.

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**Table 5.** Patrimonial species of the eight basins. B = Bern Convention, Annex I, C = Cites Convention, Annex II; D-II = Directive 92/43/CEE, Annex II; D-V = Directive 92/43/CEE, Annex V; and E = Endemic.

Taxon	Family	Patr. Status	Penne	Ponte Liscione	Conza	Locone	Alento	San Giuliano	M. Cotugno	Angitola
<i>Alnus cordata</i>	Betulaceae	E		X		X	X			
<i>Anacamptis morio</i> subsp. <i>morio</i>	Orchidaceae	C			X					
<i>Anacamptis pyramidalis</i>	Orchidaceae	C			X				X	
<i>Artemisia campestris</i> subsp. <i>variabilis</i>	Asteraceae	E		X	X					
<i>Carduus corymbosus</i>	Asteraceae	E							X	
<i>Cyclamen hederifolium</i> subsp. <i>hederifolium</i>	Primulaceae	C					X			X
<i>Cyclamen repandum</i> subsp. <i>repandum</i>	Primulaceae	C	X	X						
<i>Digitalis lutea</i> subsp. <i>australis</i>	Plantaginaceae	E	X							
<i>Epipactis microphylla</i>	Orchidaceae	C			X					
<i>Gymnadenia conopsea</i>	Orchidaceae	C			X					
<i>Helianthemum jonium</i>	Cistaceae	E				X				
<i>Helleborus bocconei</i> subsp. <i>bocconei</i>	Ranunculaceae	E								X
<i>Himantoglossum robertianum</i>	Orchidaceae	C				X		X		
<i>Linaria purpurea</i>	Plantaginaceae	E	X	X						
<i>Onosma echioides</i> subsp. <i>echioides</i>	Boraginaceae	E		X						
<i>Ophrys apifera</i>	Orchidaceae	C			X		X			
<i>Ophrys bertolonii</i>	Orchidaceae	C							X	
<i>Ophrys bombyliflora</i>	Orchidaceae	C				X			X	
<i>Ophrys fuciflora</i> subsp. <i>apulica</i>	Orchidaceae	E+C				X				
<i>Ophrys fuciflora</i> subsp. <i>fuciflora</i>	Orchidaceae	C			X					
<i>Ophrys incubacea</i>	Orchidaceae	C		X	X				X	
<i>Ophrys lutea</i>	Orchidaceae	C							X	
<i>Ophrys sphegodes</i> subsp. <i>garganica</i>	Orchidaceae	E+C						X	X	
<i>Ophrys sphegodes</i> subsp. <i>sphegodes</i>	Orchidaceae	C		X		X		X		X
<i>Orchis anthropophora</i>	Orchidaceae	C		X	X			X	X	
<i>Orchis italica</i>	Orchidaceae	C		X		X		X	X	
<i>Orchis purpurea</i>	Orchidaceae	C	X	X	X	X				
<i>Orchis simia</i>	Orchidaceae	C			X					
<i>Platanthera bifolia</i>	Orchidaceae	C								X
<i>Pulmonaria hirta</i> subsp. <i>apennina</i>	Boraginaceae	E	X							
<i>Ruscus aculeatus</i>	Asparagaceae	D-V	X	X	X		X	X		
<i>Salvia haematodes</i>	Lamiaceae	E						X		
<i>Scabiosa uniseta</i>	Caprifoliaceae	E								X
<i>Serapias cordigera</i>	Orchidaceae	C								X
<i>Serapias lingua</i>	Orchidaceae	C					X		X	X
<i>Serapias parviflora</i>	Orchidaceae	C				X			X	X
<i>Serapias vomeracea</i>	Orchidaceae	C		X	X	X	X		X	X
<i>Stipa austroitalica</i> subsp. <i>austroitalica</i>	Poaceae	E + D-II				X			X	
<i>Typha minima</i>	Typhaceae	B			X					
		<b>TOTAL</b>	<b>6</b>	<b>12</b>	<b>14</b>	<b>11</b>	<b>6</b>	<b>7</b>	<b>13</b>	<b>9</b>

**Table 6.** Recorded alien species in the eight reservoir areas.

Taxon	Family	Penne	Ponte Liscione	Conza	Locone	Alento	San Giuliano	M. Cutugno	Angitola
<i>Acacia dealbata</i>	Fabaceae								X
<i>Aesculus hippocastanum</i>	Sapindaceae	X							
<i>Ailanthus altissima</i>	Simaroubaceae	X	X	X			X	X	
<i>Amorpha fruticosa</i>	Fabaceae		X					X	
<i>Arundo donax</i>	Poaceae	X	X		X	X	X		X
<i>Avena sativa subsp. sativa</i>	Poaceae		X						
<i>Cydonia oblonga</i>	Rosaceae		X		X				
<i>Erigeron canadensis</i>	Asteraceae							X	X
<i>Eucalyptus camaldulensis</i>	Myrtaceae		X		X		X	X	
<i>Hordeum vulgare</i>	Poaceae		X						
<i>Isatis tinctoria subsp. tinctoria</i>	Brassicaceae				X		X		
<i>Morus alba</i>	Moraceae	X							
<i>Oxalis articulata</i>	Oxalidaceae	X							
<i>Oxalis pes-caprae</i>	Oxalidaceae						X		X
<i>Panicum capillare</i>	Poaceae	X							
<i>Punica granatum</i>	Lythraceae							X	
<i>Ricinus communis</i>	Euphorbiaceae								X
<i>Robinia pseudacacia</i>	Fabaceae	X	X	X	X		X		X
<i>Senecio inaequidens</i>	Asteraceae			X					
<i>Solidago gigantea</i>	Asteraceae	X							
<i>Vitis vinifera</i>	Vitaceae	X			X	X			
<i>Xanthium spinosum</i>	Asteraceae		X				X	X	
<b>TOTAL</b>		<b>9</b>	<b>9</b>	<b>3</b>	<b>6</b>	<b>2</b>	<b>7</b>	<b>6</b>	<b>6</b>

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