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CONTRIBUTION TO THE STUDY OF ADRIATIC ISLAND FLORA: VASCULAR PLANT SPECIES DIVERSITY IN THE CROATIAN ISLAND OF OLIB

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This paper is a first contribution to knowledge of the vascular plant species diversity of the NE Adriatic Island of Olib (26.13 km^2). The total vascular flora of the island comprises 465 taxa of native and naturalised vascular plants, and 69 commonly cultivated taxa. The Mediterranean character of Olib flora is reflected by a large proportion of taxa belonging to the families *Poaceae*, *Fabaceae* and *Asteraceae* and a clear domination of the steno-Mediterranean plants, accompanied by a high percentage of therophytes. Although a low level of human influence is shown, the presence of exotic taxa outside cultivation has to be monitored due to their potential naturalisation. With this in mind, this article aimed at updating the statuses of the species *Ipomoea quamoclit* and *Aptenia cordifolia* in the checklist of Croatian vascular plants.

Key words: vascular plants, diversity, Island of Olib, eastern Adriatic, Mediterranean

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Ovaj rad prvi je prilog poznavanju raznolikosti vaskularne flore sjevernojadranskog otoka Oliba (26,13 km^2), koja prema našem istraživanju obuhvaća 465 domaćih i udomaćenih biljnih svojta te 69 češće uzgajanih vrsta. Sredozemni karakter olipske flore ogleda se u velikoj zastupljenosti svojta iz porodica *Poaceae*, *Fabaceae* i *Asteraceae*, te prevladavanju steno-mediteranskih vrsta s visokim udjelom jednoljetnica (terofiti). Usprkos tome što je utjecaj čovjeka na otoku danas slab, pronašli smo više stranih vrsta izbjeglih iz uzgoja, što ukazuje na potrebu nadziranja njihovog budućeg širenja i mogućeg udomaćivanja. Smatramo potrebnim i da se vrste *Ipomoea quamoclit* i *Aptenia cordifolia* uključe u popis hrvatske flore.

Ključne riječi: vaskularne biljke, raznolikost, otok Olib, istočni Jadran, Sredozemlje

INTRODUCTION

The Mediterranean basin is the second largest biodiversity hotspot on Earth, the largest of the world's five Mediterranean-climate regions and third richest hotspot in terms of its plant diversity (Mittermeier *et al.*, 2004). Circum-Mediterranean countries house about 25,000 plant species, almost one tenth of the world's vascular flora, 63 % of which are endemic (Greuter, 1991; Médail & Quézel, 1997, 1999). Nearly 10,000 islands of all sizes and

origins exist in the Mediterranean basin and their wide ranges of altitudes, substrates and morphologies, as well as human activities, have resulted in the evolution of a highly diversified flora (e.g. Snogerup, 1985; Hulme, 2004; Vogiatzakis & Griffiths, 2008). Generally, the islands are highly vulnerable ecosystems on which intense environmental fluctuations or human interference, even of a low intensity, can considerably affect the flora and vegetation (Vidal *et al.*, 1998; Panitsa & Tzanoudakis, 2010).

In the northern section of the Mediterranean Sea, the Adriatic basin forms its most important part. The Adriatic Sea comprises over 1,300 islands and isles, mostly located along its eastern, Croatian, coast, which are considered among the most diverse in the Mediterranean region. Generally, the Dalmatian coast could be also defined as a hotspot, but the data on its flora are still incomplete (Médail & Quézel, 1997). An estimation using the species-area relationship analysis (SAR) for 106 Adriatic islands (Nikolić *et al.*, 2008), shows that 1,807 plant taxa grow on the Croatian islands, providing a heritage of biodiversity that must be bequeathed to future generations as a 'reservoir' available for the processes of biological evolution and for their ecological value. Most recent investigations (e.g. Jasprica *et al.*, 2015a) emphasized the importance of continuous floristic and phytocoenological investigations on the Croatian islands and islets, as done by local and foreign authors for other sites in the Adriatic basin and in some other Mediterranean countries (Jeričević *et al.*, 2014 and references therein).

The total number of Croatian insular plant species is unknown, while there are still many islands and islets that have remained floristically unexplored. Among these is the subject of this study, the 18th largest Croatian island, Olib (Fig. 1). The Island of Olib is a representative example of how island flora and vegetation could be rapidly changed by

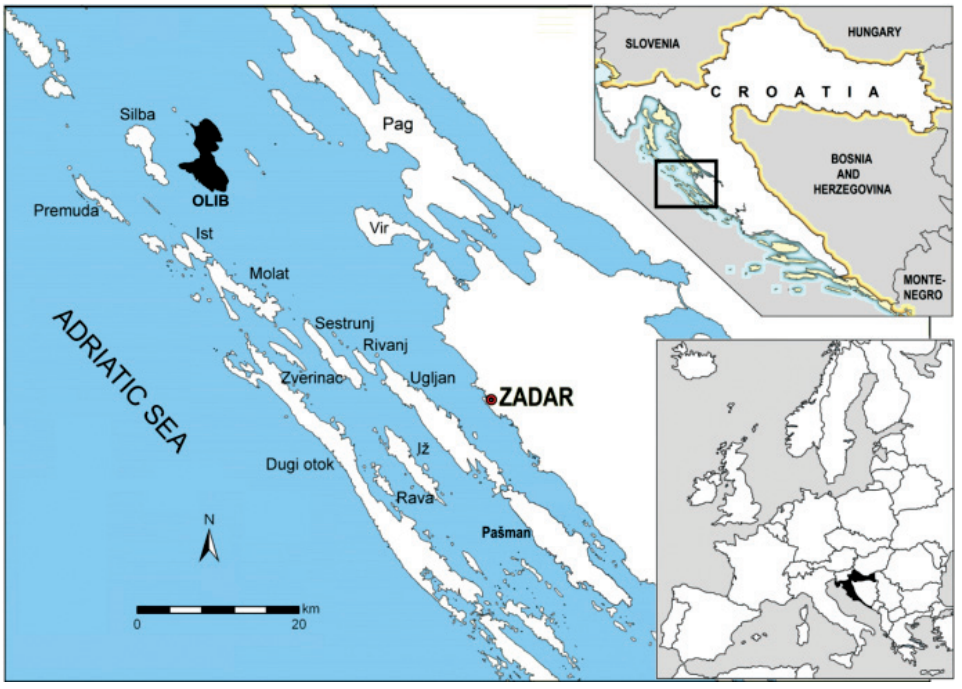

Fig. 1. Geographical position of the Island of Olib.

humans: strong depopulation (emigration) during the past century, accompanied by the rapid abandonment of agriculture and livestock breeding, have caused the grasslands to become overgrown with woody vegetation in a relatively short period of time (Bura, 1955; Magaš & Faričić, 2002; Ivin, 2009).

The present paper provides, for the first time, floristic data on the Island of Olib, thus expanding the knowledge about the vascular flora of Croatian islands in general. The floristic data have been used to analyse life-form and chorological spectra, assess the species-area relationship, occurrence of rare plants and island specialists, as well as risk of alien plant invasion.

Study area

The Island of Olib (surface area 26.13 km^2, perimeter 34.5 km, max. altitude 74 m a.s.l.) belongs to the North-Adriatic group of islands and the western part of the Zadar archipelago (Fig. 1). The island is flat, stretching in the N-S direction and located 23.5 km from the mainland. It is 9.5 km long, but in the middle only 1.4 km wide, increasing to the maximum of 5.8 km. Predominantly, Olib is built of Upper Cretaceous carbonates of an age ranging from Cenomanian to Senonian, and belongs to the Dinaric karst belt (Moro & Jelaska, 1994; Vlahović & Munda, 2012). Red Mediterranean soil or *terra rossa* is mostly developed on this geological substrate (Magaš & Faričić, 2002). Although there are some sand and gravel beaches on the Island, the coast is predominantly low and rocky, with sea depths around it of 1–30 m. Precipitation drains almost exclusively through the underground and surface water flows appear only after extremely heavy rains. Surface retention of rainwater is very rare and related to locally pronounced limestone dolomitisation processes. Unlike most Croatian Adriatic islands, Olib has favourable hydrological conditions to accumulate significant quantities of groundwater in the karst aquifer, which fully complies with the sanitary quality of drinking water (Vlahović & Munda, 2012).

No meteorological station exists on Olib. Though there are some data on the local measurements for the Island of Silba (aerial distance of 6 km; Bogdanović *et al*., 2013), the nearest official station of the Croatian Meteorological and Hydrological Service is situated in the town of Mali Lošinj (Island of Mali Lošinj, aerial distance from Olib approx. 27 km). According to these comprehensive data (Croatian Meteorological and Hydrological Service, for 1985–2014), the average annual air temperature of the area is 15.8 °C and precipitation averages 937.6 mm yr^{-1}. The highest daily average temperature is 24.9 °C in July, and the lowest falls below 7.9 °C in February. The absolute minimum temperature (–4.4 °C) was recorded on February 7th 1991 and December 26th 1996, and the absolute maximum (37.4 °C) on August 3rd 1998. The largest rainfall is in October and November (average in each 122 mm), and in December (average 102.8 mm). In the period from June to August the total rainfall is 151.9 mm. Northern winds prevail throughout the year. The highest wind speed is recorded in December (average 2.5 m s^{-1}). This area has 2651.3 hours of sunshine per year. On average, the relative air humidity is 71% (Penzar *et al*., 2001). These data agree well with those reported for the neighbouring Island of Silba for 1991–2000 (Bogdanović *et al*., 2013), while differing slightly from the City of Zadar for 1976–2006 (the average annual air temperature being 15.0 °C and precipitation averages 860.4 mm yr^{-1}) (Pandža, 2010). On the basis of the phytoclimatic indices (Rivas-Martínez *et al*., 1999, 2004), the area is included in the Mediterranean pluviseasonal-oceanic bioclimatic region, lower meso-Mediterranean phytoclimatic belt, and upper subhumid ombrotype.

Olib Island is a Croatian triple NATURA 2000-Ecological network-site (Anonymous, 2013c): it is a part of the protected area important for birds (site code HR1000034 *North part of the Zadar Archipelago*), as well as for the species and habitats (HR2001280 *Olib – lands* and HR3000052 *Olib – underwater*). Our research (Jasprica *et al.*, 2016) revealed that at least 18 NATURA 2000 habitat types could be recognized on Olib Island.

From a biogeographic viewpoint, the study area is included in the Epiro-Dalmatian sector of the Adriatic province (Rivas-Martínez *et al.*, 2004), and phytogeographically, the island belongs to the Mediterranean vegetation zone of the *Fraxino orni-Quercion ilicis* alliance (Trinajstić, 1995; Biondi *et al*., 2014). The phytocoenotic diversity, with 33 plant associations within 23 vegetation classes, is prominent (Jasprica *et al*., 2016), emphasizing the high biogeographical value of the study area. The mainly rocky coastal line is the site of an endemic association within the *Crithmo maritimi-Staticetea* vegetation class. The sandy substrates contain the *Cakiletea maritimae* communities. Not far from the sea, there are evergreen *Quercus ilex* woodlands, which can be considered as the potential vegetation type (the *Myrto communis-Quercetum ilicis* association).

Human factor

In the case of the Island of Olib, human activities are a factor that influences plant species diversity in general must be emphasized. The largest human immigration to the island came during the Turkish (Ottoman) invasions in 1476, when Olib was colonized from the Croatian hinterland (settlements around Vrlika, Zagora region). The newcomers did not accept the maritime way of living (sailing, fishing, using sea-food), but practised their traditional, continental land-farming practices (Magaš & Faričić, 2002; Ivin, 2009), thus changing the surface of the island immensely. The new inhabitants build vast dry stone walls, preparing the land for implementing extensive agriculture (vineyards, olive-groves, vegetable gardens). Large parts of the woods were cut down to obtain open pastures, intended for rearing the sheep. In such a manner, Olib was gradually cultivated up to the one-third of the total area (Bura, 1955; Ivin, 2009). After the First (1918), and then again Second World War (1945), many Olib people emigrated to the USA and Canada, abandoning the agricultural lands completely. Consequently, large areas under the dry grasslands (today mostly listed in the Annex I of the Habitat Directive) were gradually overgrown by woody vegetation, generally characterized by a significantly poorer flora (Magaš & Faričić, 2002; Jasprica *et al*., 2016).

Today, all permanent inhabitants live in the single settlement and harbour on the island, the village of Olib, which has existed since the Roman times (Magaš & Faričić, 2002). It is located close to the sea, on the SW part of the Island (44°22'46.9'' N, 14°46'39.9'' E). Olib roads are not suitable for the use of larger vehicles, but the whole Island is intersected with many kilometres of easily walkable, narrow earth-paths, bordered with impressive, tall dry stone walls. Numbering at the beginning of the 20th century almost 2500 inhabitants (Ivin, 2009), the Olib human population density gradually diminished: according to the 2011 census down to 140, while nowadays (personal communication) there are fewer than 80 permanent inhabitants. Current human activity, including tourism, is limited and restricted to the village of Olib and the sandy beaches nearby, while cutting of aging holm oak (*Quercus ilex* L.) trees is evident over the most of the island's surface area. Sheep were extensively reared until the period between the two World Wars, but for the last several decades have been scarce. In the outer zones of the Island there are some extensively managed olive groves and (mostly abandoned) fields, whereas within the village of Olib traditional gardening and some orchard-growing is practiced.

MATERIAL AND METHODS

The study was carried out in May and August of 2015, using the standard methods (Nikolić, 2006; Nikolić *et al*., 1998). Whenever possible, a specimen of each taxon encountered in the flowering state was collected and pressed, but only if 10 or more individuals were present in a plant population. Herbarium specimens are deposited in the Herbarium Croaticum (ZA) of the Faculty of Science, University of Zagreb.

The study includes all noted indigenous and some common or prominent cultivated taxa. Accordingly, only naturalised and invasive plants (Richardson *et al*., 2000) are included in the main flora list (Appendix 1). Plant species found exclusively in cultivation are shown in a separate list (Appendix 2), and are not included in the analysis of flora.

Taxa were determined using the standard keys, books and guides (Tutin *et al*., 1968-1980; Pignatti, 1982; Tutin *et al*., 1993; Domac, 1994; Delforge, 2006; Cullen & Knees, 2011).

The nomenclature of plant taxa mainly follows *Flora Croatica Database* (Nikolić, 2016a), with the exception of some cultivated taxa, where *European Garden Flora* (Cullen & Knees, 2011) was used. The taxa listed in Appendix 1 are given in alphabetical order of genera and species. Family, life form and chorological type (geoelement) were attributed to each taxon, while other, more local characteristics (endemic, threatened, statutorily protected, invasive) are given if they exist.

Biological form was verified in the field and denoted according to categories reported in Pignatti (1982), these being based on the classification of Raunkiaer (1934): Ch (Chamaephyta), G (Geophyta), H (Hemicryptophyta), P (Phanerophyta) and T (Therophyta).

Regarding chorological form, the division of the plants into floral elements and lower categories has been performed according to the classification of Horvatić (1963) and Horvatić *et al*. (1967/1968). For some taxa, data from Fournier (1961) and Pignatti (1982) were also used following the aforementioned classifications of Horvatić (1963) and Horvatić *et al*. (1967/1968).

Statutorily strictly protected (SPR) taxa, defined by Croatian laws (Anonymous, 2013ab), are also denoted, as well as taxa that are considered invasive alien species (IAS; Boršić *et al*., 2008) in Croatia. Endemic taxa are defined according to Nikolić *et*

Tab. 1. Taxonomic analysis of flora on the Island of Olib.

Taxa	Pteridophyta	Gymnospermae	Angiospermae		Total
			Dicotyledones	Monocotyledones	
Families	1	2	69	16	88
Genera	1	3	209	60	273
Species	4	3	324	99	430
Subspecies	0	1	20	13	34
Varieties	0	0	1	0	1
No. of species and infraspecific taxa	4	4	345	112	465
% of total flora	0.86	0.86	74.19	24.09	100

Tab. 2. Families with the highest number of taxa in the Island of Olib flora.

Family	No. of taxa	% of total flora
Poaceae	68	14.62
Fabaceae	49	10.54
Asteraceae	26	5.59
Cichoriaceae	25	5.38
Lamiaceae	21	4.52
Brassicaceae	13	2.80
Scrophulariaceae	13	2.80
Caryophyllaceae	12	2.58
Apiaceae	12	2.58
Rosaceae	12	2.58
Chenopodiaceae	12	2.58
Other families (77)	202	43.44
Total (88 families)	465	100.00

al. (2015) and threatened species according to the Red Lists of Vascular Flora of Croatia (Nikolić, 2016b), Europe (Bilz *et al*., 2011, Anonymous, 2016a) and the Mediterranean (Anonymous, 2016b).

RESULTS

During the floristic studies on the Island of Olib, 465 taxa (430 species, 34 subspecies and one variety) of native and naturalised vascular plants (Appendix 1) were noted, as well as 69 cultivated taxa (Appendix 2), altogether from 88 families and 273 genera (Tab. 1). Among them, the most represented families were: *Poaceae* (14.62 %), *Fabaceae* (10.54 %), *Asteraceae* (5.59 %), *Cichoriaceae* (5.38 %) and *Lamiaceae* (4.52 %) (Tab. 2).

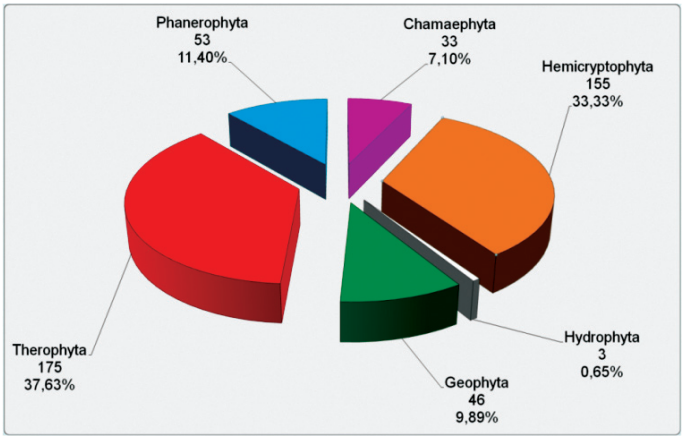

Fig. 2. Life-form spectrum in the Island of Olib flora.

Genera with the highest number of taxa were *Trifolium* (13), *Bromus* (10) and *Medicago* (8), followed by *Allium*, *Carex* and *Euphorbia* (seven taxa in each genus), *Amaranthus* and *Plantago* (six taxa each), and *Brachypodium*, *Lotus* and *Sedum* (five taxa each).

The analysis of plant life forms showed that the Olib flora is dominated by therophytes (37.63 %) and hemicryptophytes (33.33 %) (Fig. 2).

The Mediterranean floral element (42.58 %), mostly circum-Mediterranean plants, followed by a considerable proportion of Cosmopolitans (20.65 %) and South European plants (16.99 %) dominated on the Island (Tab. 3).

In total, 34 plant species found on the Island of Olib are statutorily strictly protected (SPR; Anonymous, 2013b). Nine species are considered to be endemic (Nikolić *et al*., 2015) (Tab. 4, Appendix 1), mostly belonging to the group of Illyrian-Adriatic endemics, while there are no real island endemics.

From the Croatian Red List, the category of Critically Endangered (CR) is assigned to one noted species (*Elymus farctus* (Viv.) Runemark ex Melderis). Three species (*Carex*

Tab. 3. Floral elements (geoelements) in the Island of Olib flora.

Geoelements					No. of taxa	%
1.	MEDITERRANEAN				198	42.58
	1.1.	Circum-Mediterranean plants (**CIME**)			122	26.24
	1.2.	West-Mediterranean plants (**WME**)			2	0.43
	1.3.	East-Mediterranean plants (**EME**)			11	2.37
	1.4.	Illyrian Mediterranean plants			22	4.73
		A)	Illyrian-South European plants (**ILSEU**)		9	1.94
		B)	Illyrian-Adriatic plants		13	2.80
			a)	*Illyrian-Adriatic endemic plants* (**ILAE**)	7	1.51
			b)	*Kvarner-Liburnian plants* (**KVLIB**)	1	0.22
			b)	*Illyrian-Apennine plants* (**ILAP**)	5	1.08
	1.5.	Mediterranean-Atlantic plants (**MEAT**)			25	5.38
	1.6.	European Mediterranean plants (**EUME**)			6	1.29
	1.7.	Mediterranean-Pontic plants (**MEPO**)			10	2.15
2.	SOUTH EUROPEAN				79	16.99
	2.1.	South European-Mediterranean plants (**SEUME**)			63	13.55
	2.2.	South European-Pontic plants (**SEUPO**)			16	3.44
3.	EAST EUROPEAN-PONTIC (EEUPO)				2	0.43
4.	SOUTHEAST EUROPEAN (SEEU)				1	0.22
5.	EUROPEAN (EURO)				11	2.37
6.	EURASIAN (EUAS)				34	7.31
7.	CIRCUM-HOLARKTIC PLANTS (CIHO)				3	0.65
8.	WIDESPREAD PLANTS (WISP)				96	20.65
9.	CULTIVATED and ADVENTITIOUS PLANTS (CUAD)				41	8.82
TOTAL					465	100.00

Tab. 4. The number of plant taxa on the Island of Olib registered in Croatian Red List of Vascular Plants, statutorily strictly protected and invasive.

Category	No. of taxa	% of total flora (465)
Endemic (END)	9	1.94%
Critically Endangered (CR)	1	0.22%
Endangered (EN)	3	0.65%
Vulnerable (VU)	9	1.94%
CR+EN+VU	13	2.80%
Nearly Threatened (NT)	9	1.94%
Data Deficient (DD)	14	3.01%
Least Concern (LC)	7	1.51%
NT+DD+LC	30	6.45%
Strictly protected (SPR)	34	7.31%
Invasive plants (IAS)	16	3.44%

divisa Huds., *C. extensa* Gooden. and *Glaucium flavum* Crantz) are considered to be Endangered (EN), while nine are classified as Vulnerable (VU). From the lower categories of concern, nine taxa have been classified as Nearly Threatened (NT), seven are of Least Concern (LC) and 14 were found to be Data Deficient (DD) (Tab. 4, Appendix 1).

According to the global Red Lists, there are no taxa on the Island that can be considered directly threatened (categories CR, EN, VU). In the Red Lists for Europe (Bilz *et al*., 2011; Anonymous, 2016a), the orchid *Epipactis microphylla* (Ehrh.) Sw. is considered Nearly Threatened (NT), while 51 taxa are of Least Concern (LC) and two are Data Deficient (DD). In the IUCN Red List for the Mediterranean region (Anonymous, 2016b), seven species are listed as of Least Concern (LC). Being of low consideration, these data were not used in the final analysis of Olib flora.

Up to 16 taxa found on the Island are considered to be invasive (IAS) in Croatian territory (Tab. 4, Appendix 1).

DISCUSSION

Until this research, there was almost a complete lack of data concerning plant richness of the Island of Olib: 13 species are stated just in the work of Bura (1955). Nevertheless, Olib was, among other Croatian islands, included in the NATURA 2000 Ecological network (Anonymous, 2013c).

During our field investigations 465 plant taxa were registered, representing 16.6 % of the total flora of the entire Mediterranean area in Croatia (2797 taxa) or 9.2 % of the total Croatian flora (5014 taxa), as recorded by Nikolić *et al*., (2008) and Nikolić (2016a), respectively. The largest proportion of taxa belong to *Poaceae*, *Fabaceae* and *Asteraceae*, which are among the families adapted best to the ecological conditions of the Mediterranean area, as confirmed by many floristic studies of eastern (e.g.Pandža, 2003; Jasprica *et al*., 2006, 2015a; Jasprica & Ruščić, 2013; Milović *et al*., 2013; Pandža & Milović, 2015)

and western Adriatic (Cristofolini *et al*., 1967), as well as other Mediterranean insular areas (f.e. Gianguzzi *et al*., 2006; Kougioumoutzis *et al*., 2012; Iliadou *et al*., 2014). The Mediterranean character of Olib flora is also reflected in the high proportions of Mediterranean plant taxa, in conjunction with the high percentage of therophytes.

According to a simplified analysis of the species/area relationship made for some eastern Adriatic islands, with surface areas between 11 and 26 km^2 (Tab. 5), the investigated Island of Olib showed a relatively low variety of vascular plant taxa. Although, in general, surface area is considered the most influential explanatory variable of species richness in island biogeography (Whittaker & Fernández-Palacios, 2007), the roles of geographical position, geological history and palaeogeography determine the individual island floras as well (Nikolić *et al*., 2008; Iliadou *et al*., 2014). It has to be emphasized that Adriatic islands are very variable, not only according to their total area, but also according to their bioclimatic properties (autumn deciduous zone in the north; mixed and evergreen zones; spring deciduous zone on several open sea islands and islets), geomorphology (island height, terrain slopes and aspects, related soil characteristics, etc.), as well as the level of human impact (actual and historic land use, human population density, etc.). Finally, according to the equilibrium theory of island biogeography (MacArthur & Wilson, 1967), the number of vascular plant taxa on any island is in a state of dynamic equilibrium.

Abandonment of the traditional agriculture after the depopulation of the Island of Olib is in particular shown in the deserted terraced olive groves. A significant reduction in the vegetation and floristic diversity, as a result of secondary succession, was also previously shown on some Adriatic (Ljubičić, 2008; Sedlar, 2010) and Mediterranean islands (Maccherini *et al*., 2013).

The currently low proportion of alien species (3.4 %), frequently found mostly on disturbed places in the village of Olib within the *Stellarietea mediae* vegetation class (Jasprica *et al*., 2016), may be related to the low level of human activity. For example, although *Mesembryanthemum crystallinum* L. is considered to be an invasive alien plant in the Mediterranean (Vilà *et al*., 2006) and the Adriatic islands (Boršić *et al*., 2008), in the case of Olib it appears only in cultivation. Known invasive species *Agave americana* L., *Carpobrotus acinaciformis* (L.) L. Bolus and *Opuntia vulgaris* Miller, which in Olib are not invasive, nevertheless should be considered as potentially harmful. On the other hand,

Tab. 5. Comparison between the number of vascular plant taxa and surface areas of some eastern Adriatic islands.

Island	Surface area (km^2)	No. of taxa	Reference
Unije	16.88	626	Trinajstić (1988)
Vir	22.08	623	Milović & Pandža (2016)
Murter	17.58	591	Pandža (1998)
Šipan	16.22	555	Hećimović (1981)
Olib	26.14	534	This study
Silba	14.27	532	Bogdanović *et al*. (2013)
Žirje	15.08	451	Pandža (2003)
Drvenik Veli	11.70	405	Bedalov (1976)
Molat	22.18	308	Domac (1963)

some of the otherwise exclusively cultivated taxa were found as ''garden escapes'' or ''casuals'' (Richardson *et al*., 2000), but they have not yet became naturalized (e.g. *Albizia julibrissin* Durazz., *Bassia scoparia* (L.) A. J. Scott, *Cosmos bipinnatus* Cav., *Passiflora caerulea* L., *Petunia hybrida* Vilm., *Tanacetum parthenium* (L.) Sch. Bip.), as was previously reported for some sites along the eastern Adriatic coast (Tafra *et al*. 2012, and references therein). In addition, the present study revealed the presence of two alien plants which are already found to be invasive worldwide (*Ipomoea quamoclit* L. and *Aptenia cordifolia* (L. f.) N. E. Br.), found both in cultivation and as ''casuals''. The findings of exotic taxa and/or aliens outside cultivation, as well as at the same time monitoring the status of the currently 'just cultivated' taxa, seems to became an imperative, while they are potential candidates for possible naturalisation and subsequent invasiveness (Verloove, 2006; Heywood & Sharrock, 2013). With this in mind, this article aimed at updating the recent checklist of total vascular plant flora of Croatia (Nikolić, 2016a) with such species (*Ipomoea quamoclit* and *Aptenia cordifolia*).

On the Island of Olib we have not detected any of the real island specialists. The finding of *Asplenium hybridum* (Milde) Bange (Fig. 3), a stenoendemic fern restricted to the NE Adriatic islands (Nikolić *et al*., 2015), contributed to our present knowledge of the species range. We also found three endemics (*Limonium cancellatum* (Bernh. ex Bertol.) Kuntze, *Lolium subulatum* Vis. and *Drypis spinosa* L. ssp. *jacquiniana* Murb. et Wettst.) associated with halophilous or nitro-halophilous habitats (Jasprica *et al*., 2016), while others were related to the dry rocky grasslands and garrigue. Threatened taxa (2.8 %) are primarily distributed within the coastal brackish and halophilous communities, particularly on gravelly or sandy soils rich in nutrients, which are among the most threatened habitats in the eastern Adriatic (Alegro *et al*., 2004; Pandža *et al*., 2007; Jasprica *et al*., 2015b).

In sum, the inventory of plant species diversity in the Island of Olib fills one more gap in the floristic information available, both for this previously floristically unexplored island, and the whole North Adriatic group of islands, thus adding to and complement-

Fig. 3. *Asplenium hybridum* (Milde) Bange, a stenoendemic of the NE Adriatic islands, in the crevice of an old dry stone wall (photo by M. Milović).

ing the case of the eastern Adriatic archipelago. Of particular note, the present study shows that the Island of Olib hosts significant plant species diversity and it is nowadays exposed to a low level of human influence, after six centuries of intensive agriculture. Further infringement upon the Island, with respect to the increase of activities carried out during the summer season (tourism), is not to be expected. However, the knowledge of the species diversity basically presented here is of crucial importance for management plans, which must ensure that land types, particularly coastal halophilous habitats and others included in the NATURA 2000 Ecological network, are used in a sustainable way.

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SAŽETAK

Prilog istraživanju flore jadranskih otoka: raznolikost vaskularnih biljaka na otoku Olibu

M. Milović, S. Kovačić, N. Jasprica & V. Stamenković

Olib je veličinom 18. hrvatski otok (26,13 km^2) i najveći na kojemu dosada nisu provedena sustavna floristička istraživanja. Ovaj je rad stoga prvi prilog poznavanju raznolikosti vaskularnih biljaka toga sjevernojadranskog otoka. U povijesti poznat od rimskih vremena, izvorno šumoviti Olib stoljećima je naseljen. Posljednji veliki priljev stanovništva zbio se u 15. stoljeću, zbjegom hrvatskoga življa iz okolice Vrlike (Zagora) pred najezdom Turaka. Dolaskom na otok pridošlice krče šume hrasta crnike, kako bi se nastavile baviti tradicijskom poljoprivredom svoga kraja: poljodjelstvom i uzgojem ovaca. U trenutku najgušće napučenosti, na Olibu je živjelo nešto manje od 2500 stanovnika koji su se bavili poljoprivredom na gotovo trećini otoka, izgradivši nepregledne suhozide tijekom pripreme tla. Nakon Prvoga (1918.) i osobito Drugoga (1945.) svjetskog rata, s Oliba su u Sjevernu Ameriku odselile sto-

tine obitelji te danas na otoku živi jedva 80 stalnih stanovnika. Napuštanje zemljoradnje i stočarstva vidljivo je na svakom koraku. Kako je daleko od kopna i prometno slabo povezan, Olib je i turistički nerazvijen (ne postoje prometnice pogodne za automobile niti prikladna infrastruktura) te su njegove prekrasne pješčane i šljunčane plaže poznate uglavnom „jahtašima".

Iako slabo istražen, Olib je trostruko Natura-područje: uključen u Ekološku mrežu Republike Hrvatske kao područje važno za ptice (HR1000034 *Sjeverni dio zadarskog arhipelaga*) te za vrste i staništa (HR2001280 *Olib – kopno* i HR3000052 *Olib – podmorje*).

Tijekom proljeća i ljeta 2015. godine, uz financijsku potporu *Javne ustanove* „Natura Jadera" *za upravljanje zaštićenim dijelovima prirode na području Zadarske županije*, proveli smo sustavno popisivanje vaskularne flore na otoku Olibu. Istraživanje je provedeno diljem otoka i obuhvatilo je sva najznačajnija staništa, na kojima smo utvrdili 465 domaćih i udomaćenih biljnih svojta te 69 češće uzgajanih vrsta. Sredozemni karakter olipske flore ogleda se u velikoj zastupljenosti svojta iz porodica trava (*Poaceae*), mahunarki (*Fabaceae*) i glavočika (*Asteraceae*), dominaciji steno-mediteranskih vrsta te visokom udjelu jednogodišnjih vrsta (terofiti). Analiza podataka ukazuje na relativno nisku raznovrsnost biljnih vrsta za hrvatski otok te veličine, što vjerojatno treba pripisati napuštanju tradicijskog gospodarenja i prepuštanju otoka sukcesiji.

Analizom podataka na Olibu smo utvrdili postojanje 34 zakonom strogo zaštićene vrste i devet ilirsko-jadranskih endema, među kojima i rijetku paprat, križani jelenak (*Asplenium hybridum*). Jedna vrsta nalazi se na popisu kritično ugroženih (CR) vrsta hrvatske flore, tri na popisu ugroženih (EN), a devet je osjetljivih (VU). Šesnaest pronađenih vrsta nalazi se na popisu invazivnih u Republici Hrvatskoj, no većinu nismo uočili izvan privatnih vrtova i cvjetnjaka. Međutim, usprkos tome što je današnji antropogeni utjecaj na Olibu slab, pronalazak nekoliko stranih svojti izvan uzgoja ukazuje na potrebu nadziranja njihova budućeg širenja i mogućeg udomaćivanja. Dvije cijenjene uresnice, pantropsku jedoljetnicu *Ipomoea quamoclit* i mesnatu trajnicu *Aptenia cordifolia*, pronašli smo na Olibu izbjegle iz kulture te smatramo potrebnim uključiti ih u popis hrvatske flore (*Flora Croatica Database*) barem iz predostrožnosti, s obzirom na to da su u mnogim zemljama svijeta već zabilježene kao invazivne.

Naposljetku, želimo zahvaliti Kati i Duji, jedinim učenicima Osnovne škole „*Zadarski otoci*" – Područni odjel „*Otok Olib*" u šk. god. 2014/15., i njihovoj učiteljici, gospođi Tatjani Vukšević, koji su nam pomogli u inventariziranju biljaka na svome otoku. Njihovim odlaskom na dalje školovanje u Zadar, osnovna škola na Olibu u lipnju 2015. ponovo je zatvorena, na nepoznato razdoblje.

Appendix 1.
The list of vascular plant taxa of the Island of Olib.

Life form: Ch – Chamaephyta, G – Geophyta, H – Hemicryptophyta, Hy – Hydrophyta, P – Phanerophyta, T – Therophyta; Chorological group: CIME – Circum-Mediteranean, WME – West-Mediterranean, EME – East-Mediterranean, ILSEU – Illyrian-South European, ILADE – Illyrian-Adriatic endemics, ILAP – Illyrian-Apennine, KVLIB – Kvarner-Liburnian, MEAT – Mediterranean-Atlantic, EUME – European Mediterranean, MEPO – Mediterranean-Pontic, SEUME – South European-Mediterranean, SEUPO – South European-Pontic, EEUPO – East European-Pontic, SEEU – Southeast European, EURO – European, EUAS – Eurasian, CIHO – Circum-Holarctic, WISP – Widespread, CUAD – Cultivated&Adventitious; Endemic&Threatened taxa: end – Endemic; CR – Critically Endangered, EN – Endangered, VU – Vulnerable, NT – Near Threatened, LC – Least Concern, DD – Data Deficient; Protected taxa: SPR – strictly protected; Invasive plants (sensu BORŠIĆ *et al*., 2008): IAS

No. of taxa	Taxa	Family	Life form	Chorological group	Endemic & Threatened taxa	Protected	Invasive
1.	*Aegilops geniculata* Roth	*Poaceae*	T	CIME			
2.	*Aegilops neglecta* Req. ex Bertol.	*Poaceae*	T	CIME	NT		
3.	*Aetheorhiza bulbosa* (L.) Cass.	*Cichoriaceae*	G	CIME			
4.	*Agave americana* L.	*Agavaceae*	P	CUAD			
5.	*Agrimonia eupatoria* L.	*Rosaceae*	H	CIHO			
6.	*Agrostis capillaris* L.	*Poaceae*	H	CIHO			
7.	*Ailanthus altissima* (Mill.) Swingle	*Simaorubaceae*	P	CUAD			IAS
8.	*Ajuga genevensis* L.	*Lamiaceae*	H	EUAS			
9.	*Ajuga reptans* L.	*Lamiaceae*	H	EUAS			
10.	*Alcea rosea* L.	*Malvaceae*	H	CUAD			
11.	*Allium ampeloprasum* L.	*Amaryllidaceae*	G	CIME			
12.	*Allium commutatum* Guss.	*Amaryllidaceae*	G	CIME			
13.	*Allium flavum* L.	*Amaryllidaceae*	G	CIME			
14.	*Allium neapolitanum* Cirillo	*Amaryllidaceae*	G	CIME			
15.	*Allium paniculatum* L.	*Amaryllidaceae*	G	SEUME			
16.	*Allium sphaerocephalon* L.	*Amaryllidaceae*	G	SEUME			
17.	*Allium subhirsutum* L.	*Amaryllidaceae*	G	CIME			
18.	*Amaranthus cruentus* L.	*Amaranthaceae*	T	CUAD			
19.	*Amaranthus deflexus* L.	*Amaranthaceae*	T	WISP			IAS
20.	*Amaranthus graecizans* L.	*Amaranthaceae*	T	MEPO			
21.	*Amaranthus hybridus* L.	*Amaranthaceae*	T	WISP			IAS
22.	*Amaranthus powellii* S.Watson	*Amaranthaceae*	T	CUAD			
23.	*Amaranthus retroflexus* L.	*Amaranthaceae*	T	WISP			IAS
24.	*Anacamptys pyramidalis* (L.) Rich.	*Orchidaceae*	G	EURO	NT	SPR	
25.	*Anagallis arvensis* L.	*Primulaceae*	T	WISP			
26.	*Anchusa italica* Retz.	*Boraginaceae*	H	CIME			
27.	*Anemone hortensis* L.	*Ranunculaceae*	G	CIME			

28.	*Anthoxantum aristatum* Boiss.	*Poaceae*	T	MEAT	DD	SPR	
29.	*Anthoxantum odoratum* L.	*Poaceae*	H	EUAS			
30.	*Anthyllis vulneraria* L. ssp. *praepropera* (A.Kern.) Bornm.	*Fabaceae*	H	EUME			
31.	*Antirrhinum majus* L.	*Scrophulariaceae*	Ch	CUAD			
32.	*Arabis hirsuta* (L.) Scop.	*Brassicaceae*	H	WISP			
33.	*Arabis turrita* L.	*Brassicaceae*	H	SEUME			
34.	*Arbutus unedo* L.	*Ericaceae*	P	CIME			
35.	*Arctium minus* Bernh.	*Asteraceae*	H	EURO			
36.	*Arenaria leptoclados* (Reichenb.) Guss.	*Caryophyllaceae*	T	EUAS			
37.	*Aristolochia clematitis* L.	*Aristolochiaceae*	H	SEUPO			
38.	*Aristolochia rotunda* L.	*Aristolochiaceae*	G	CIME			
39.	*Arthrocnemum fruticosum* (L.) Moq.	*Chenopodiaceae*	Ch	SEUME			
40.	*Arthrocnemum macrostachyum* (Moric.) C. Koch	*Chenopodiaceae*	Ch	SEUME			
41.	*Arum italicum* Mill.	*Araceae*	G	CIME			
42.	*Arundo donax* L.	*Poaceae*	G	CIME			
43.	*Arundo micrantha* Lam.	*Poaceae*	G	CIME			
44.	*Asparagus acutifolius* L.	*Asparagaceae*	G	CIME			
45.	*Asphodelus aestivus* Brot.	*Xanthorrhoeaceae*	G	CIME			
46.	*Asphodelus fistulosus* L.	*Xanthorrhoeaceae*	H	MEPO			
47.	*Asplenium ceterach* L.	*Aspleniaceae*	H	SEUME			
48.	*Asplenium hybridum* (Milde) Bange	*Aspleniaceae*	H	KVLIB	end; NT	SPR	
49.	*Asplenium ruta-muraria* L.	*Aspleniaceae*	H	CIHO			
50.	*Asplenium trichomanes* L.	*Aspleniaceae*	H	WISP			
51.	*Aster squamatus* (Spreng.) Hieron.	*Asteraceae*	T	CUAD			IAS
52.	*Astragalus hamosus* L.	*Fabaceae*	T	CIME			
53.	*Atriplex patula* L.	*Chenopodiaceae*	T	WISP			
54.	*Atriplex prostrata* Boucher ex DC. in Lam. et DC.	*Chenopodiaceae*	T	WISP			
55.	*Avena barbata* Pott. ex Link	*Poaceae*	T	SEUPO			
56.	*Avena sterilis* L.	*Poaceae*	T	SEUPO			
57.	*Ballota nigra* L. ssp. *foetida* Hayek	*Lamiaceae*	H	SEUME			
58.	*Beta vulgaris* L. ssp. *maritima* (L.) Arcang.	*Chenopodiaceae*	H	MEAT			
59.	*Biscutella cichoriifolia* Loisel.	*Brassicaceae*	T	SEUME			
60.	*Blackstonia perfoliata* (L.) Huds.	*Gentianaceae*	T	MEAT			
61.	*Brachypodium distachyon* (L.) P.Beauv.	*Poaceae*	T	CIME			
62.	*Brachypodium phoenicoides* (L.) Roem. et Schult.	*Poaceae*	H	WME	DD		
63.	*Brachypodium pinnatum* (L.) P.Beauv. ssp. *rupestre* (Host) Schübl. et M. Martens	*Poaceae*	H	EUAS			

64.	*Brachypodium retusum* (Pers.) P.Beauv.	*Poaceae*	H	CIME			
65.	*Brachypodium sylvaticum* (Huds.) P. Beauv.	*Poaceae*	H	EUAS			
66.	*Briza maxima* L.	*Poaceae*	T	CIME			
67.	*Bromus erectus* Huds. ssp. *condensatus* (Hack.) Asch. et Graebn.	*Poaceae*	H	SEUME			
68.	*Bromus erectus* Huds. ssp. *erectus*	*Poaceae*	H	SEUME			
69.	*Bromus hordeaceus* L. ssp. *hordeaceus*	*Poaceae*	T	WISP			
70.	*Bromus hordeaceus* L. ssp. *molliformis* (Lloyd) Maire et Weiller	*Poaceae*	T	SEUME			
71.	*Bromus intermedius* Guss.	*Poaceae*	T	CIME			
72.	*Bromus madritensis* L.	*Poaceae*	T	MEAT			
73.	*Bromus rigidus* Roth	*Poaceae*	T	EEUPO			
74.	*Bromus scoparius* L.	*Poaceae*	T	CIME	DD	SPR	
75.	*Bromus squarosus* L.	*Poaceae*	T	SEUPO			
76.	*Bromus sterilis* L.	*Poaceae*	T	WISP			
77.	*Bunias erucago* L.	*Brassicaceae*	T	SEUME			
78.	*Bupleurum veronense* Turra	*Apiaceae*	T	ILSEU			
79.	*Cakile maritima* Scop.	*Brassicaceae*	T	WISP			
80.	*Calamintha glandulosa* (Req.) Benth.	*Lamiaceae*	H	SEUME			
81.	*Calamintha nepetoides* Jord.	*Lamiaceae*	H	SEUPO			
82.	*Calendula arvensis* L.	*Asteraceae*	T	SEUME			
83.	*Calendula officinalis* L.	*Asteraceae*	T	CUAD			
84.	*Calystegia sepium* (L.) R.Br.	*Convolvulaceae*	H	WISP			
85.	*Campanula pyramidalis* L.	*Campanulaceae*	T	ILADE			
86.	*Campanula rapunculus* L.	*Campanulaceae*	H	EUAS			
87.	*Campsis radicans* (L.) Seen.	*Bignoniaceae*	P	CUAD			
88.	*Capsella bursa-pastoris* (L.) Medik.	*Brassicaceae*	T	WISP			
89.	*Capsella rubella* Reut.	*Brassicaceae*	T	CIME			
90.	*Carduus micropterus* (Borbás) Teyber ssp. *micropterus*	*Asteraceae*	H	ILADE	end	SPR	
91.	*Carduus pycnocephalus* L.	*Asteraceae*	H	CIME	DD		
92.	*Carex distachya* Desf.	*Cyperaceae*	H	CIME			
93.	*Carex distans* L.	*Cyperaceae*	H	SEUME			
94.	*Carex divisa* Huds.	*Cyperaceae*	G	SEUME	EN	SPR	
95.	*Carex divulsa* Stokes	*Cyperaceae*	H	WISP			
96.	*Carex extensa* Gooden.	*Cyperaceae*	H	WISP	EN	SPR	
97.	*Carex flacca* Schreb. ssp. *serrulata* (Biv.) Greuter	*Cyperaceae*	G	CIME			
98.	*Carex hallerana* Asso	*Cyperaceae*	H	SEUME			
99.	*Carlina corymbosa* L.	*Asteraceae*	H	CIME			
100.	*Carpobrotus acinaciformis* (L.) L. Bolus	*Aizoaceae*	Ch	CUAD			

101.	*Carthamus lanatus* L.	*Asteraceae*	T	CIME			
102.	*Celtis australis* L.	*Ulmaceae*	P	SEUME			
103.	*Centaurea solstitialis* L.	*Asteraceae*	H	SEUPO			
104.	*Centaurium erythraea* Rafn	*Gentianaceae*	T	WISP			
105.	*Centaurium pulchellum* (Sw.) Druce	*Gentianaceae*	T	EUAS			
106.	*Centaurium spicatum* (L.) Fritsch	*Gentianaceae*	T	CIME			
107.	*Centranthus ruber* (L.) DC.	*Valerianaceae*	Ch	CUAD			
108.	*Cerastium pumilum* Curtis ssp. *glutinosum* (Fries) Jalas	*Caryophyllaceae*	T	WISP			
109.	*Chaenorhinum minus* (L.) Lange ssp. *litorale* (Willd.) Hayek	*Scrophulariaceae*	T	ILAP			
110.	*Chenopodium album* L.	*Chenopodiaceae*	T	WISP			
111.	*Chenopodium strictum* Roth	*Chenopodiaceae*	T	WISP	DD		
112.	*Chondrilla juncea* L.	*Cichoriaceae*	H	EUAS			
113.	*Chrysopogon gryllus* (L.) Trin.	*Poaceae*	H	MEPO			
114.	*Cichorium intybus* L.	*Cichoriaceae*	H	WISP			
115.	*Cirsium arvense* (L.) Scop.	*Asteraceae*	T	EUAS			
116.	*Cirsium vulgare* (Savi) Ten.	*Asteraceae*	H	EUAS			
117.	*Cistus incanus* L.	*Cistaceae*	P	CIME			
118.	*Cistus monspeliensis* L.	*Cistaceae*	P	CIME			
119.	*Cistus salvifolius* L.	*Cistaceae*	P	CIME			
120.	*Clematis flammula* L.	*Ranunculaceae*	P	CIME			
121.	*Clematis vitalba* L.	*Ranunculaceae*	P	EURO			
122.	*Convolvulus althaeoides* L. ssp. *tenuissimus* (Sibth. et Sm.) Stace	*Convolvulaceae*	H	EME			
123.	*Convolvulus arvensis* L.	*Convolvulaceae*	G	WISP			
124.	*Conyza bonariensis* (L.) Cronquist	*Asteraceae*	T	CUAD			IAS
125.	*Conyza canadensis* (L.) Cronquist	*Asteraceae*	T	CUAD			IAS
126.	*Conyza sumatrensis* (Retz.) E.Walker	*Asteraceae*	T	CUAD			IAS
127.	*Coronilla emerus* L. ssp. *emeroides* Boiss. et Spruner	*Fabaceae*	P	EME			
128.	*Coronilla scorpioides* (L.) Koch	*Fabaceae*	T	CIME			
129.	*Coronilla varia* L.	*Fabaceae*	H	EURO			
130.	*Crataegus monogyna* Jacq.	*Rosaceae*	P	WISP			
131.	*Crepis neglecta* L.	*Cichoriaceae*	T	EUME			
132.	*Crepis sancta* (L.) Babc.	*Cichoriaceae*	T	EME			
133.	*Crepis zacintha* (L.) Babc.	*Cichoriaceae*	T	CIME			
134.	*Crithmum maritimum* L.	*Apiaceae*	Ch	MEAT			
135.	*Cupressus sempervirens* L. (incl. C. *horizontalis* Mill.)	*Cupressaceae*	P	CUAD			
136.	*Cuscuta campestris* Yuncker	*Cuscutaceae*	T	CUAD			IAS
137.	*Cyclamen repandum* Sibth. et Sm.	*Primulaceae*	G	EUME	NT		

138.	*Cymodocea nodosa* (Ucria) Asch.	*Cymodoceaceae*	Hy	MEAT	DD	SPR	
139.	*Cynodon dactylon* (L.) Pers.	*Poaceae*	G	WISP			
140.	*Cynoglossum creticum* Mill.	*Boraginaceae*	T	CIME			
141.	*Cynosurus echinatus* L.	*Poaceae*	T	SEUME			
142.	*Dactylis glomerata* L. ssp. *glomerata*	*Poaceae*	H	EUAS			
143.	*Dactylis glomerata* L. ssp. *hispanica* (Roth) Nyman	*Poaceae*	H	CIME			
144.	*Datura inoxia* Mill.	*Solanaceae*	T	CUAD			IAS
145.	*Daucus carota* L. ssp. *carota*	*Apiaceae*	H	EUAS			
146.	*Daucus carota* L. ssp. *major* (Vis.) Arcang.	*Apiaceae*	H	ILADE			
147.	*Desmazeria marina* (L.) Druce	*Poaceae*	T	MEAT	VU	SPR	
148.	*Desmazeria rigida* (L.) Tutin	*Poaceae*	T	MEAT			
149.	*Dichanthium ischaemum* (L.) Roberty	*Poaceae*	H	SEUME			
150.	*Digitaria sanguinalis* (L.) Scop.	*Poaceae*	T	WISP			
151.	*Diplotaxis muralis* (L.) DC.	*Brassicaceae*	T	WISP			
152.	*Diplotaxis tenuifolia* (L.) DC.	*Brassicaceae*	H	WISP			
153.	*Dittrichia viscosa* (L.) Greuter	*Asteraceae*	H	CIME			
154.	*Dorycnium herbaceum* Vill.	*Fabaceae*	H	SEUME			
155.	*Dorycnium hirsutum* (L.) Ser.	*Fabaceae*	Ch	CIME			
156.	*Dorycnium pentaphyllum* Scop.	*Fabaceae*	Ch	WME			
157.	*Drypis spinosa* L. ssp. *jacquiniana* Murb. et Wettst.	*Caryophyllaceae*	Ch	ILADE	end; LC	SPR	
158.	*Ecballium elaterium* (L.) A. Rich.	*Cucurbitaceae*	Ch	CIME	DD		
159.	*Echinaria capitata* (L.) Desf.	*Poaceae*	T	CIME	DD	SPR	
160.	*Echium italicum* L.	*Boraginaceae*	H	CIME			
161.	*Echium plantagineum* L.	*Boraginaceae*	T	MEAT			
162.	*Elymus elongatus* (Host) Runemark	*Poaceae*	H	SEUME	DD		
163.	*Elymus farctus* (Viv.) Runemark ex Melderis	*Poaceae*	G	MEAT	CR	SPR	
164.	*Elymus pycnanthus* (Godr.) Melderis	*Poaceae*	G	CIME	NT		
165.	*Elymus repens* (L.) Gould	*Poaceae*	G	WISP			
166.	*Epipactis microphylla* (Ehrh.) Sw.	*Orchidaceae*	G	EUAS		SPR	
167.	*Eragrostis cilianensis* (All.) F.T.Hubb.	*Poaceae*	T	WISP			
168.	*Erica arborea* L.	*Ericaceae*	P	CIME			
169.	*Erigeron annuus* (L.) Pers.	*Asteraceae*	T	CUAD			IAS
170.	*Erodium malacoides* (L.) L. Hér.	*Geraniaceae*	T	CIME			
171.	*Eryngium amethystinum* L.	*Apiaceae*	H	ILSEU			
172.	*Eryngium campestre* L.	*Apiaceae*	H	SEUME			
173.	*Euphorbia chamaesyce* L.	*Euphorbiaceae*	T	SEUME			
174.	*Euphorbia characias* L. ssp. *wulfenii* (Hoppe ex Koch) A. M. Sm.	*Euphorbiaceae*	Ch	EME			

175.	*Euphorbia helioscopia* L.	*Euphorbiaceae*	T	WISP			
176.	*Euphorbia paralias* L.	*Euphorbiaceae*	Ch	MEAT	DD		
177.	*Euphorbia peplis* L.	*Euphorbiaceae*	T	MEAT			
178.	*Euphorbia peplus* L.	*Euphorbiaceae*	T	WISP			
179.	*Euphorbia pinea* L.	*Euphorbiaceae*	Ch	CIME			
180.	*Fallopia convolvulus* (L.) Á.Löve	*Polygonaceae*	T	WISP			
181.	*Festuca arundinacea* Schreb.	*Poaceae*	H	EURO			
182.	*Festuca pratensis* Huds.	*Poaceae*	H	WISP			
183.	*Ficus carica* L.	*Moraceae*	P	CUAD			
184.	*Filago vulgaris* Lam.	*Asteraceae*	T	WISP			
185.	*Foeniculum vulgare* Mill.	*Apiaceae*	H	CIME			
186.	*Fraxinus ornus* L.	*Oleaceae*	P	SEUME			
187.	*Fumaria capreolata* L.	*Fumariaceae*	T	MEAT			
188.	*Fumaria officinalis* L.	*Fumariaceae*	T	WISP			
189.	*Galium aparine* L.	*Rubiaceae*	T	WISP			
190.	*Galium corrudifolium* Vill.	*Rubiaceae*	H	SEUME			
191.	*Galium mollugo* L.	*Rubiaceae*	H	EUAS			
192.	*Galium murale* (L.) All.	*Rubiaceae*	T	CIME			
193.	*Gastridium ventricosum* (Gouan) Schinz et Thell.	*Poaceae*	T	MEAT			
194.	*Geranium molle* L. ssp. *molle*	*Geraniaceae*	T	WISP			
195.	*Geranium purpureum* Vill.	*Geraniaceae*	T	SEUME			
196.	*Geranium robertianum* L.	*Geraniaceae*	T	WISP			
197.	*Geranium rotundifolium* L.	*Geraniaceae*	T	EUAS			
198.	*Gladiolus illyricus* W.D.J.Koch	*Iridaceae*	G	SEUME		SPR	
199.	*Glaucium flavum* Crantz	*Papaveraceae*	H	MEAT	EN	SPR	
200.	*Hainardia cylindrica* (Willd.) Greuter	*Poaceae*	T	CIME	VU	SPR	
201.	*Halimione portulacoides* (L.) Aellen	*Chenopodiaceae*	Ch	WISP			
202.	*Hedera helix* L.	*Araliaceae*	P	EURO			
203.	*Hedypnois cretica* (L.) Dum.Cours.	*Cichoriaceae*	T	CIME			
204.	*Helichrysum italicum* (Roth) G.Don	*Asteraceae*	Ch	CIME			
205.	*Heliotropium europaeum* L.	*Boraginaceae*	T	MEPO			
206.	*Herniaria hirsuta* L.	*Caryophyllaceae*	T	EURO			
207.	*Herniaria incana* L.	*Caryophyllaceae*	H	SEUME			
208.	*Hieracium hoppeanum* Schult.	*Cichoriaceae*	H	ILSEU			
209.	*Hieracium piloselloides* Vill.	*Cichoriaceae*	H	ILSEU			
210.	*Hieracium praealtum* Vill. ex Gochnat ssp. *bauhinii* (Besser) Petunn.	*Cichoriaceae*	H	EUAS			
211.	*Hippocrepis comosa* L.	*Fabaceae*	H	SEUME			
212.	*Hordeum murinum* L. ssp. *leporinum* (Link) Arcang.	*Poaceae*	T	CIME			

213.	*Hypericum perforatum* L.	*Clusiaceae*	H	WISP			
214.	*Inula conyza* DC.	*Asteraceae*	H	SEUPO			
215.	*Inula crithmoides* L.	*Asteraceae*	Ch	MEAT			
216.	*Inula spiraeifolia* L.	*Asteraceae*	H	SEUME			
217.	*Iris germanica* L.	*Iridaceae*	G	CUAD		SPR	
218.	*Iris illyrica* Tomm.	*Iridaceae*	G	ILADE	end; LC	SPR	
219.	*Juncus acutus* L.	*Juncaceae*	H	MEAT			
220.	*Juncus bufonius* L.	*Juncaceae*	T	WISP			
221.	*Juncus compressus* Jacq.	*Juncaceae*	G	WISP			
222.	*Juncus gerardi* Loisel.	*Juncaceae*	G	WISP			
223.	*Juncus maritimus* Lam.	*Juncaceae*	G	WISP			
224.	*Juniperus oxycedrus* L. ssp. *oxycedrus*	*Cupressaceae*	P	CIME			
225.	*Juniperus phoenicea* L.	*Cupressaceae*	P	CIME			
226.	*Kickxia commutata* (Bernh. ex Rchb.) Fritsch	*Scrophulariaceae*	H	EUME			
227.	*Kickxia spuria* (L.) Dumort.	*Scrophulariaceae*	T	EUAS			
228.	*Koelaria splendens* C.Presl	*Poaceae*	H	SEUME			
229.	*Lactuca serriola* L.	*Cichoriaceae*	H	WISP			
230.	*Lactuca viminea* (L.) J. et C.Presl	*Cichoriaceae*	H	SEUPO			
231.	*Lagurus ovatus* L.	*Poaceae*	T	CIME			
232.	*Lathyrus aphaca* L.	*Fabaceae*	T	SEUME			
233.	*Laurus nobilis* L.	*Lauraceae*	P	CIME			
234.	*Lavatera arborea* L.	*Malvaceae*	H	EUME			
235.	*Leontodon crispus* Vill.	*Cichoriaceae*	H	SEUME			
236.	*Lepidium graminifolium* L. ssp. *suffruticosum* (L.) P.Monts.	*Brassicaceae*	H	SEUPO			
237.	*Lilium candidum* L.	*Liliaceae*	G	CUAD			
238.	*Limodorum abortivum* (L.) Sw.	*Orchidaceae*	G	SEUME		SPR	
239.	*Limonium bellidifolium* (Gouan) Dumont	*Plumbaginaceae*	H	MEPO			
240.	*Limonium cancellatum* (Bernh. ex Bertol.) Kuntze	*Plumbaginaceae*	H	ILAP	end	SPR	
241.	*Limonium narbonense* Mill.	*Plumbaginaceae*	H	CIME			
242.	*Limonium oleifolium* Miller	*Plumbaginaceae*	H	CIME	DD		
243.	*Linaria angustissima* (Loisel.) Borbás	*Scrophulariaceae*	H	SEUME			
244.	*Linaria vulgaris* Mill.	*Scrophulariaceae*	H	EUAS			
245.	*Linum biennne* Mill.	*Linaceae*	H	MEAT			
246.	*Lobularia maritima* (L.) Desv.	*Brassicaceae*	H	CUAD			
247.	*Lolium multiflorum* Lam.	*Poaceae*	T	CIME			
248.	*Lolium perenne* L.	*Poaceae*	H	EURO			
249.	*Lolium rigidum* Gaudin ssp. *lepturoides* (Boiss.) Sennen et Mauricio	*Poaceae*	T	EME			

250.	*Lolium rigidum* Gaudin ssp. *rigidum*	*Poaceae*	T	CIME			
251.	*Lolium subulatum* Vis.	*Poaceae*	T	EME	end; DD	SPR	
252.	*Lonicera etrusca* Santi	*Caprifoliaceae*	P	CIME			
253.	*Lonicera implexa* Aiton	*Caprifoliaceae*	P	CIME			
254.	*Lophochloa cristata* (L.) Hyl.	*Poaceae*	T	MEAT			
255.	*Lotus angustissimus* L.	*Fabaceae*	T	SEUME			
256.	*Lotus corniculatus* L. ssp. *corniculatus*	*Fabaceae*	H	WISP			
257.	*Lotus corniculatus* L. ssp. *hirsutus* Rothm.	*Fabaceae*	H	SEUME			
258.	*Lotus cytisoides* L.	*Fabaceae*	Ch	CIME			
259.	*Lotus glaber* Mill.	*Fabaceae*	H	WISP			
260.	*Lotus ornithopodioides* L.	*Fabaceae*	T	CIME			
261.	*Lythrum hyssopifolia* L.	*Lythraceae*	T	WISP			
262.	*Malva neglecta* Wallr.	*Malvaceae*	T	WISP			
263.	*Malva nicaensis* All.	*Malvaceae*	H	CIME			
264.	*Malva sylvestris* L.	*Malvaceae*	H	WISP			
265.	*Marrubium incanum* Desr.	*Lamiaceae*	H	CIME			
266.	*Matricaria perforata* Mérat	*Asteraceae*	T	WISP			
267.	*Matthiola incana* (L.) R. Br.	*Brassicaceae*	Ch	CUAD			
268.	*Medicago arabica* (L.) Huds.	*Fabaceae*	T	WISP			
269.	*Medicago disciformis* DC.	*Fabaceae*	T	CIME			
270.	*Medicago falcata* L.	*Fabaceae*	H	EUAS			
271.	*Medicago lupulina* L.	*Fabaceae*	T	WISP			
272.	*Medicago minima* (L.) Bartal.	*Fabaceae*	T	WISP			
273.	*Medicago orbicularis* (L.) Bartal.	*Fabaceae*	T	CIME			
274.	*Medicago polymorpha* L.	*Fabaceae*	T	SEUME			
275.	*Medicago sativa* L.	*Fabaceae*	H	WISP			
276.	*Melica ciliata* L.	*Poaceae*	H	EUAS			
277.	*Melilotus indica* (L.) All.	*Fabaceae*	T	CIME			
278.	*Melilotus officinalis* (L.) Lam.	*Fabaceae*	H	EUAS			
279.	*Melissa officinalis* L.	*Lamiaceae*	H	EME			
280.	*Mentha spicata* L.	*Lamiaceae*	H	CUAD			
281.	*Mercurialis annua* L.	*Euphorbiaceae*	T	WISP			
282.	*Micromeria juliana* (L.) Benth. ex Rchb.	*Lamiaceae*	Ch	CIME			
283.	*Mirabilis jalapa* L.	*Nyctaginaceae*	G	CUAD			
284.	*Misopates orontium* (L.) Raf.	*Scrophulariaceae*	T	EUAS			
285.	*Morus alba* L.	*Moraceae*	P	CUAD			
286.	*Muscari comosum* (L.) Mill.	*Asparagaceae*	G	SEUME			
287.	*Muscari neglectum* Guss. ex Ten.	*Asparagaceae*	G	SEUME			
288.	*Myrtus communis* L.	*Myrtaceae*	P	CIME			
289.	*Narcissus tazetta* L.	Amaryllidaceae	G	CIME	NT		

290.	*Nerium oleander* L.	*Apocynaceae*	P	CUAD			
291.	*Nigella damascena* L.	*Ranunculaceae*	T	CIME			
292.	*Oenanthe pimpinelloides* L.	*Apiaceae*	H	MEAT			
293.	*Oenanthe silaifolia* M.Bieb.	*Apiaceae*	H	SEUPO			
294.	*Oenothera biennis* L.	*Onagraceae*	H	CUAD			IAS
295.	*Olea europea* L.	*Oleaceae*	P	CUAD			
296.	*Olea europaea* L. var. *sylvestris* Brot.	*Oleaceae*	P	CIME			
297.	*Onopordum illyricum* L.	*Asteraceae*	H	CIME			
298.	*Ophrys bertolonii* Moretti	*Orchidaceae*	G	SEUME	VU	SPR	
299.	*Ophrys scolopax* Cav. ssp. *cornuta* (Steven) E.G.Camus	*Orchidaceae*	G	MEPO	DD	SPR	
300.	*Opuntia vulgaris* Miller	*Cactaceae*	P	CUAD			
301.	*Orchis tridentata* Scop.	*Orchidaceae*	G	SEUME	VU	SPR	
302.	*Origanum heracleoticum* L.	*Lamiaceae*	H	EME			
303.	*Orobanche minor* Sm.	*Orobanchaceae*	T	SEUME			
304.	*Oxalis articulata* Savigny	*Oxalidaceae*	G	CUAD			
305.	*Oxalis corniculata* L.	*Oxalidaceae*	H	WISP			
306.	*Paliurus spina-christi* Mill.	*Rhamnaceae*	P	ILSEU			
307.	*Pallenis spinosa* (L.) Cass.	*Asteraceae*	T	CIME			
308.	*Papaver rhoeas* L.	*Papaveraceae*	T	WISP			
309.	*Parapholis incurva* (L.) C.E.Hubb.	*Poaceae*	T	WISP	VU	SPR	
310.	*Parietaria judaica* L.	*Urticaceae*	H	SEUME			
311.	*Parietaria officinalis* L.	*Urticaceae*	H	SEUME			
312.	*Partenocissus quinquefolia* (L.) Planchon	*Vitaceae*	P	CUAD			IAS
313.	*Petrorhagia saxifraga* (L.) Link	*Caryophyllaceae*	H	SEUME			
314.	*Phillyrea latifolia* L.	*Oleaceae*	P	CIME			
315.	*Phillyrea media* L.	*Oleaceae*	P	CIME			
316.	*Phleum subulatum* (Savi) Asch. et Grabn.	*Poaceae*	T	CIME			
317.	*Physalis alkekengi* L.	*Solanaceae*	H	CUAD			
318.	*Picris hieracioides* L.	*Cichoriaceae*	H	EUAS			
319.	*Picris hispidissima* (Bartl.) Koch	*Cichoriaceae*	H	ILSEU			
320.	*Pinus halepensis* Mill.	*Pinaceae*	P	CIME			
321.	*Piptatherum miliaceum* (L.) Coss.	*Poaceae*	H	CIME			
322.	*Pistacia lentiscus* L.	*Anacardiaceae*	P	CIME			
323.	*Plantago altissima* L.	*Plantaginaceae*	H	SEUME			
324.	*Plantago coronopus* L. ssp. *coronopus*	*Plantaginaceae*	T	EUAS			
325.	*Plantago coronopus* L. ssp. *weldenii* (Rchb.) Arcang.	*Plantaginaceae*	T	MEPO			
326.	*Plantago holosteum* Scop.	*Plantaginaceae*	H	SEUME	LC		
327.	*Plantago lanceolata* L.	*Plantaginaceae*	H	WISP			

328.	*Plantago major* L. ssp. *intermedia* (Gilib.) Lange	*Plantaginaceae*	H	WISP			
329.	*Plumbago europaea* L.	*Plumbaginaceae*	Ch	CIME			
330.	*Poa annua* L.	*Poaceae*	T	WISP	LC		
331.	*Poa pratensis* L.	*Poaceae*	H	WISP			
332.	*Poa trivialis* L. ssp. *sylvicola* (Guss.) H. Lindb.	*Poaceae*	H	EUME	LC		
333.	*Polycarpon tetraphyllum* (L.) L.	*Caryophyllaceae*	T	SEUME			
334.	*Polygonum arenastrum* Boreau	*Polygonaceae*	T	WISP			
335.	*Polygonum aviculare* L.	*Polygonaceae*	T	WISP			
336.	*Polygonum maritimum* L.	*Polygonaceae*	Ch	MEPO			
337.	*Polypogon maritimus* Willd.	*Poaceae*	T	CIME	NT		
338.	*Polypogon monspeliensis* (L.) Desf.	*Poaceae*	T	WISP	NT		
339.	*Portulaca oleracea* L.	*Portulacaceae*	T	WISP			
340.	*Posidonia oceanica* (L.) Delile	*Zoosteraceae*	Hy	CIME	DD	SPR	
341.	*Potentilla detommasii* Ten.	*Rosaceae*	H	SEEU			
342.	*Potentilla recta* L.	*Rosaceae*	H	EUAS			
343.	*Potentilla reptans* L.	*Rosaceae*	H	WISP			
344.	*Prunella laciniata* (L.) L.	*Lamiaceae*	H	SEUME			
345.	*Prunus cerasifera* Ehrh.	*Rosaceae*	P	CUAD			
346.	*Prunus dulcis* (Mill.) D.A.Webb	*Rosaceae*	P	CUAD			
347.	*Prunus persica* (L.) Batsch	*Rosaceae*	P	CUAD			
348.	*Prunus spinosa* L.	*Rosaceae*	P	EUAS			
349.	*Punica granatum* L.	*Punicaceae*	P	CUAD			
350.	*Quercus ilex* L.	*Fagaceae*	P	CIME			
351.	*Ranunculus acris* L.	*Ranunculaceae*	H	WISP			
352.	*Ranunculus muricatus* L.	*Ranunculaceae*	T	CIME			
353.	*Ranunculus parviflorus* L.	*Ranunculaceae*	T	MEAT			
354.	*Ranunculus sardous* Crantz	*Ranunculaceae*	T	WISP			
355.	*Reichardia picroides* (L.) Roth	*Cichoriaceae*	H	CIME			
356.	*Reseda alba* L.	*Resedaceae*	H	CIME			
357.	*Reseda phyteuma* L.	*Resedaceae*	T	SEUME			
358.	*Rhamnus alaternus* L.	*Rhamnaceae*	P	CIME			
359.	*Robinia pseudoacacia* L.	*Fabaceae*	P	CUAD			IAS
360.	*Romulea bulbocodium* (L.) Sebast. et Mauri	*Iridaceae*	G	CIME			
361.	*Rosa sempervirens* L.	*Rosaceae*	P	CIME			
362.	*Rubia peregrina* L.	*Rubiaceae*	P	CIME			
363.	*Rubus ulmifolius* Schott	*Rosaceae*	P	MEAT			
364.	*Rumex conglomeratus* Murray	*Polygonaceae*	H	WISP			

365.	*Rumex crispus* L.	*Polygonaceae*	H	WISP			
366.	*Rumex pulcher* L.	*Polygonaceae*	H	SEUPO			
367.	*Ruscus aculeatus* L.	*Asparagaceae*	P	CIME	LC		
368.	*Ruta graveolens* L.	*Rutaceae*	Ch	ILAP			
369.	*Sagina maritima* G.Don	*Caryophyllaceae*	T	MEAT			
370.	*Salicornia procumbens* Sm. ssp. *procumbens*	*Chenopodiaceae*	T	WISP			
371.	*Salsola kali* L.	*Chenopodiaceae*	T	WISP	VU	SPR	
372.	*Salsola soda* L.	*Chenopodiaceae*	T	SEUPO	VU	SPR	
373.	*Salvia bertolonii* Vis.	*Lamiaceae*	H	ILADE			
374.	*Salvia pratensis* L.	*Lamiaceae*	H	EURO			
375.	*Salvia verbenaca* L.	*Lamiaceae*	H	MEAT			
376.	*Sambucus ebulus* L.	*Caprifoliaceae*	G	EURO			
377.	*Samolus valerandi* L.	*Primulaceae*	H	WISP			
378.	*Sanguisorba minor* Scop. ssp. *muricata* Briq.	*Rosaceae*	H	SEUME			
379.	*Satureja montana* L.	*Lamiaceae*	Ch	SEUME			
380.	*Scirpus maritimus* L.	*Cyperaceae*	G	WISP	NT		
381.	*Scolymus hispanicus* L.	*Cichoriaceae*	H	CIME			
382.	*Scorpiurus muricatus* L.	*Fabaceae*	T	CIME			
383.	*Securigera cretica* (L.) Lassen	*Fabaceae*	T	EME			
384.	*Securigera securidaca* (L.) Degen et Dörfl.	*Fabaceae*	T	CIME			
385.	*Sedum acre* L.	*Crassulaceae*	Ch	WISP			
386.	*Sedum album* L.	*Crassulaceae*	Ch	EUAS			
387.	*Sedum ochroleucum* Chaix	*Crassulaceae*	Ch	SEUME			
388.	*Sedum sexangulare* L.	*Crassulaceae*	Ch	SEUME			
389.	*Sedum telephium* L. ssp. *maximum* (L.) Krock.	*Crassulaceae*	H	EURO			
390.	*Sempervivum tectorum* L.	*Crassulaceae*	Ch	CUAD		SPR	
391.	*Senecio vulgaris* L.	*Asteraceae*	T	WISP			
392.	*Sesleria autumnalis* (Scop.) F.W.Schultz	Poaceae	H	ILSEU			
393.	*Setaria verticillata* (L.) P.Beauv.	*Poaceae*	T	WISP			
394.	*Setaria viridis* (L.) P.Beauv.	*Poaceae*	T	EUAS			
395.	*Sherardia arvensis* L.	*Rubiaceae*	T	WISP			
396.	*Sideritis romana* L.	*Lamiaceae*	T	CIME			
397.	*Silene latifolia* Poir.	*Caryophyllaceae*	H	EUAS			
398.	*Silene vulgaris* (Moench) Garcke ssp. *angustifolia* Hayek	*Caryophyllaceae*	H	SEUME			
399.	*Sisymbrium officinale* (L.) Scop.	*Brassicaceae*	T	WISP			
400.	*Smilax aspera* L.	*Smilacaceae*	P	CIME			
401.	*Smyrnium olusatrum* L.	*Apiaceae*	T	MEAT			

402.	*Smyrnium perfoliatum* L.	*Apiaceae*	H	CIME			
403.	*Solanum nigrum* L.	*Solanaceae*	T	WISP			
404.	*Solanum villosum* Mill. ssp. *alatum* (Moench) Dostal	*Solanaceae*	T	EUAS			
405.	*Sonchus asper* (L.) Hill ssp. *glaucescens* (Jord.) Ball	*Cichoriaceae*	T	CIME			
406.	*Sonchus oleraceus* L.	*Cichoriaceae*	T	WISP			
407.	*Sonchus tenerrimus* L.	*Cichoriaceae*	T	CIME			
408.	*Sorghum halepense* (L.) Pers.	*Poaceae*	G	WISP			IAS
409.	*Spartium junceum* L.	*Fabaceae*	P	CIME			
410.	*Spergularia salina* J. Presl et C. Presl	*Caryophyllaceae*	T	WISP			
411.	*Stachys cretica* L. ssp. *salviifolia* (Ten.) Rech.f.	*Lamiaceae*	H	ILAP			
412.	*Stachys thirkei* K. Koch	*Lamiaceae*	H	EME			
413.	*Stellaria media* (L.) Vill.	*Caryophyllaceae*	T	WISP			
414.	*Stipa bromoides* (L.) Dörfl.	*Poaceae*	H	CIME			
415.	*Suaeda maritima* (L.) Dumort.	*Chenopodiaceae*	T	WISP	VU	SPR	
416.	*Tamarix dalmatica* Baum	*Tamaricaceae*	P	EME			
417.	*Tammus communis* L.	*Dioscoreaceae*	G	SEUME			
418.	*Tanacetum cinerariifolium* (Trevir.) Sch. Bip.	*Asteraceae*	Ch	ILSEU	end	SPR	
419.	*Taraxacum officinale* Weber	*Cichoriaceae*	H	WISP			
420.	*Teucrium chamaedrys* L.	*Lamiaceae*	Ch	SEUPO			
421.	*Teucrium polium* L. ssp. *capitatum* (L.) Arcang.	*Lamiaceae*	Ch	MEPO			
422.	*Theligonum cynocrambe* L.	*Theligonaceae*	T	SEUME			
423.	*Thymus longicaulis* C.Presl	*Lamiaceae*	Ch	ILAP			
424.	*Torilis arvensis* (Huds.) Link ssp. *purpurea* (Ten.) Hayek	*Apiaceae*	T	CIME			
425.	*Tragopogon dubius* L.	*Cichoriaceae*	H	SEUPO			
426.	*Tragopogon porrifolius* L.	*Cichoriaceae*	H	CIME			
427.	*Tribulus terrestris* L.	*Zygophyllaceae*	T	SEUME			
428.	*Trifolium angustifolium* L.	*Fabaceae*	T	CIME			
429.	*Trifolium campestre* Schreber	*Fabaceae*	T	WISP			
430.	*Trifolium cherleri* L.	*Fabaceae*	T	SEUME			
431.	*Trifolium fragiferum* L.	*Fabaceae*	H	WISP			
432.	*Trifolium lappaceum* L.	*Fabaceae*	T	CIME			
433.	*Trifolium repens* L. ssp. *prostratum* Nyman	*Fabaceae*	H	CIME			
434.	*Trifolium repens* L. ssp. *repens*	*Fabaceae*	H	WISP			
435.	*Trifolium resupinatum* L.	*Fabaceae*	T	MEPO	VU	SPR	
436.	*Trifolium scabrum* L.	*Fabaceae*	T	CIME			

437.	*Trifolium squamosum* L.	*Fabaceae*	T	CIME			
438.	*Trifolium stellatum* L.	*Fabaceae*	T	CIME			
439.	*Trifolium striatum* L.	*Fabaceae*	T	EUAS			
440.	*Trifolium tomentosum* L.	*Fabaceae*	T	CIME			
441.	*Ulmus minor* Miller	*Ulmaceae*	P	WISP			
442.	*Urospermum dalechampii* (L.) Scop. ex F.W.Schmidt	*Cichoriaceae*	H	CIME			
443.	*Urospermum picroides* (L.) Scop. ex F.W.Schmidt	*Cichoriaceae*	T	CIME			
444.	*Urtica dioica* L.	*Urticaceae*	H	WISP			
445.	*Valantia muralis* L.	*Rubiaceae*	T	CIME			
446.	*Verbascum blattaria* L.	*Scrophulariaceae*	H	SEUPO			
447.	*Verbascum phoeniceum* L.	*Scrophulariaceae*	T	SEUPO			
448.	*Verbascum sinuatum* L.	*Scrophulariaceae*	H	CIME			
449.	*Verbena officinalis* L.	*Verbenaceae*	H	WISP			
450.	*Veronica arvensis* L.	*Scrophulariaceae*	T	EUAS			
451.	*Veronica persica* Poir.	*Scrophulariaceae*	T	WISP			IAS
452.	*Veronica polita* Fr.	*Scrophulariaceae*	T	EUAS			
453.	*Viburnum tinus* L.	*Caprifoliaceae*	P	CIME			
454.	*Vicia hybrida* L.	*Fabaceae*	T	CIME			
455.	*Vicia parviflora* Cav.	*Fabaceae*	T	CIME			
456.	*Vicia sativa* L.	*Fabaceae*	T	WISP			
457.	*Vicia tenuissima* (M.Bieb.) Schinz et Thell.	*Fabaceae*	T	SEUME			
458.	*Vicia villosa* Roth ssp. *varia* (Host) Corb.	*Fabaceae*	T	EEUPO			
459.	*Vinca major* L.	*Apocynaceae*	Ch	CUAD			
460.	*Vincetoxicum hirundinaria* Medik. ssp. *adriaticum* (Beck) Markgr.	*Asclepiadaceae*	H	ILSEU	end; LC	SPR	
461.	*Viola suavis* M.Bieb. ssp. *adriatica* (Freyn) Haesler	*Violaceae*	H	ILADE	end	SPR	
462.	*Vitex agnus-castus* L.	*Verbenaceae*	P	CIME			
463.	*Vitis vinifera* L.	*Vitaceae*	P	CUAD			
464.	*Vulpia ciliata* Dumort.	*Poaceae*	T	SEUME			
465.	*Zannichellia palustris* L.	*Zannichelliaceae*	Hy	WISP			

Appendix 2.
Cultivated taxa in the flora of Olib. *Casual* alien taxa *sensu* Richardson *et al.* (2000) are marked by an asterisk (*).

No. of taxa	Taxa	Family
1.	*Albizia julibrissin* Durazz.*	*Fabaceae*
2.	*Amaranthus caudatus* L.	*Amaranthaceae*
3.	*Apium graveolens* L.	*Apiaceae*
4.	*Aptenia cordifolia* (L.f.) Schwantes*	*Aizoaceae*
5.	*Asparagus officinalis* L.	*Asparagaceae*
6.	*Atriplex halimus* L.	*Chenopodiaceae*
7.	*Bassia scoparia* (L.) A.J.Scott*	*Chenopodiaceae*
8.	*Beta vulgaris* L. ssp. *vulgaris*	*Chenopodiaceae*
9.	*Bougainvillea spectabilis* Willd.	*Nyctaginaceae*
10.	*Brassica oleracea* L.	*Brassicaceae*
11.	*Buxus sempervirens* L.	*Buxaceae*
12.	*Callistephus chinensis* (L.) Nees	*Asteraceae*
13.	*Cedrus atlantica* (Endl.) Carriere	*Pinaceae*
14.	*Centaurea cyanus* L.	*Asteraceae*
15.	*Chrysanthemum coronarium* L.	*Asteraceae*
16.	*Cicer arietinum* L.	*Fabaceae*
17.	*Citrus aurantium* L.	*Rutaceae*
18.	*Citrus deliciosa* Ten.	*Rutaceae*
19.	*Citrus limon* (L.) Burm. f.	*Rutaceae*
20.	*Consolida ajacis* (L.) Schur*	*Ranunculaceae*
21.	*Cosmos bipinnatus* Cav.*	*Asteraceae*
22.	*Cucurbita pepo* L.	*Cucurbitaceae*
23.	*Cycas revoluta* Thunb.	*Cycadaceae*
24.	*Cynara scolymus* L.	*Asteraceae*
25.	*Cyperus involucratus* Rottb.	*Cyperaceae*
26.	*Dianthus caryophyllus* L.	*Caryophyllaceae*
27.	*Eriobotrya japonica* (Thunb.) Lindl.	*Rosaceae*
28.	*Erysimum cheiri* (L.) Crantz	*Brassicaceae*
29.	*Euonymus japonicus* L.f.	*Celastraceae*
30.	*Euphorbia marginata* Pursh	*Euphorbiaceae*
31.	*Fragaria* x *ananassa* Duchesne	*Rosaceae*
32.	*Hedera canariensis* Willd.	*Hederaceae*
33.	*Iberis sempervirens* L.	*Brassicaceae*
34.	*Ipomoea quamoclit* L.*	*Convolvulaceae*
35.	*Juglans regia* L.	*Juglandaceae*

36.	*Lantana camara* L.	*Verbenaceae*
37.	*Lavandula angustifolia* Mill.	*Lamiaceae*
38.	*Lavandula* x *hybrida* Balb. ex Ging.	*Lamiaceae*
39.	*Lippia triphylla* (L' Hér.) Kuntze	*Verbenaceae*
40.	*Lonicera pileata* Oliv.	*Caprifoliaceae*
41.	*Mesembryanthemum crystallinum* L.	*Aizoaceae*
42.	*Morus nigra* L.	*Moraceae*
43.	*Osteospermum jucundum* (E.Phillips) Norl.	*Asteraceae*
44.	*Paeonia lactiflora* Pall.	*Paeoniaceae*
45.	*Partenocissus tricuspidata* (Siebold et Zucc.) Planchon	*Vitaceae*
46.	*Passiflora caerulea* L.*	*Passifloraceae*
47.	*Pelargonium* x *hybridum* (L.) L' Hér.	*Geraniaceae*
48.	*Pelargonium zonale* (L.) Aiton	*Geraniaceae*
49.	*Petroselinum crispum* (Mill.) A.W.Hill	*Apiaceae*
50.	*Petunia hybrida* Vilm.*	*Solanaceae*
51.	*Phoenix dactylifera* L.	*Arecaceae*
52.	*Pisum sativum* L.	*Fabaceae*
53.	*Pittosporum tobira* (Thunb.) Aiton f.	*Pittosporaceae*
54.	*Pointiana gilesii* Hook.	*Fabaceae*
55.	*Portulaca grandiflora* Hooker	*Portulacaceae*
56.	*Prunus avium* L.	*Rosaceae*
57.	*Prunus domestica* L.	*Rosaceae*
58.	*Rosmarinus officinalis* L.	*Lamiaceae*
59.	*Salvia officinalis* L.	*Lamiaceae*
60.	*Santolina chamaecyparissus* L.	*Asteraceae*
61.	*Solanum lycopersicum* L.	*Solanaceae*
62.	*Solanum tuberosum* L.	*Solanaceae*
63.	*Syringa vulgaris* L.	*Oleaceae*
64.	*Tagetes patula* L.	*Asteraceae*
65.	*Tanacetum parthenium* (L.) Sch.Bip.*	*Asteraceae*
66.	*Teucrium fruticans* L.	*Lamiaceae*
67.	*Tilia cordata* Mill.	*Tiliaceae*
68.	*Trachycarpus fortunei* (Hook.) H. Wendl.	*Arecaceae*
69.	*Viola odorata* L.	*Violaceae*