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Contribution to the urban ecology of Greece: The flora of Mesolongi city

Abstract

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This paper presents a chorological, biological, and ecological analysis of the wild vascular flora of Mesolongi city, which consists of 346 taxa. 234 taxa are reported here for the first time. Fourteen chorological groups are distinguished in Mesolongi, with the Mediterranean element (44%) being dominant. Forty-five taxa are adventives, and their origins, times and methods of introduction are discussed. In the life-form spectrum, therophytes are over-represented (53.5%). Ecological groups are defined with respect to four significant parameters: warmth, moisture, soil reaction, and salt stress.

Introduction

The present study is part of a series dealing with the urban ecology of Greece, initiated by the second author in 1993 at the Botanical Institute of the University of Patras. The urban flora of Greece remains almost unexplored since, until today, only the city of Patras has been studied floristically (Chronopoulos & Christodoulakis 1996, 2000). The present paper aims to analyse wild vascular flora of Mesolongi city, with respect to its chorological affinities and main ecological and biological features.

The city of Mesolongi is situated in SW Greece, near the entrance to Patraikos Gulf, at longitude 38º 22' N, latitude 21º 26' E and altitude of one metre. It lies on the estuaries of two rivers: Acheloos and Evinos. Until 1700 AD Mesolongi was ruled by the Venetians. Some years later it came under Turkish rule from which the city was freed in 1821 AD. From the old city of Mesolongi, which was built in the 16th century, only the entrance gate and some walls remain. The city covers an area of ca. 28 km^2 and has a population of 17,450 according to the census of 2001. Mesolongi is the capital of the prefecture of Etolo-Akarnania. For the map of the study area see Tsiotsiou & Christodoulakis (2003).

Geologically, the area of Mesolongi comprises sedimentary formations of the Ionian and Gavrovo geotectonic zones (limestones, flysch rocks, breccias, evaporites, flint) (Bornovas & Rondogianni-Tsiambaou 1983).

According to Walter (1970) and based on the ombrothermic diagram of Mesolongi (Tsiotsiou & Christodoulakis 2003) the climate of the area belongs to class IV2, that is a predominantly typical Mediterranean climate with fairly high rainfall in winter and a five-month dry period (from early May to early October).

Material and methods

This study is based on the authors' collections and field observations taken from the end of 1999 to the spring of 2001. Roughly 1000 specimens were collected during different seasons of the year and from various biotopes within the city. Voucher material is deposited at the Botanical Museum of the University of Patras (UPA). Only wild vascular plants, together with some frequent sub-spontaneous escapes from cultivation, were taken into consideration in this study. All others were omitted since their distribution is controlled by man.

Plant nomenclature follows Flora Hellenica (Strid & Tan 1997), the Med-Checklist (Greuter & al. 1984-1989), and Flora Europaea (Tutin & al. 1964-1980). The life-form categories follow the system of Raunkiaer (1934). For the chorological types we used the classification of Pignatti (1982) in combination with that of Davis (1965). Ecological preferences of the taxa, where available, were taken from Boehling (1995). Where not available, the work of Ellenberg (1992) and the second author's experience were used.

In this paper, adventive taxa are defined as alien plants, introduced unintentionally by man, and escapes from cultivation that thrive spontaneously or sub-spontaneously in the study area.

Data on the origins of adventives were taken mainly from Tutin & al. (1964-1980) and Pignatti (1982), and additionally from Davis (1965-1985), Garcke (1972), and Oberdorfer (1979). Data on Greek archaeophytes (adventives introduced before 1500 AD) were taken from Hort (1961), Lenz (1966) and Baumann (1982).

The plant list also includes bibliographical references. The sequence of families, genera and species in the plant list is alphabetical.

Results

The wild vascular flora of Mesolongi city comprises 346 taxa, belonging to 226 genera and 65 families (Table 1). The families richest in species number are the *Gramineae* (60), *Compositae* (45) and *Leguminosae* (32), followed by the *Cruciferae* (16) and *Labiatae* (11).

Based on the data shown in the plant list, the species and subspecies found in the study

Table 1. Numbers of vascular plant taxa in the Mesolongi flora.

Systematic unit	Families	Genera	Species	Subspecies	Sp. & Subsp.	%
Pteridophyta	2	5	5		5	1.4
Gymnospermae	2	2	2		2	0.6
Dicotyledones	51	169	223	36	259	73.0
Monocotyledones	10	57	76	11	87	25.0
Total	65	226	299	47	346	100

Table 2. Chorological spectrum of the Mesolongi flora.

Chorological group	Number of taxa	%
Balkan (Balkan)	3	0.9
Mediterranean taxa		
Eurymediterranean (Eu. Med.)	69	20
Stenomediterranean (St. Med.)	56	16.2
Eastmediterranean (E. Med.)	27	7.8
Widely distributed taxa		
Mediterranean-Turanian (Med. - Turan.)	19	5.5
Mediterranean-Atlantic (Med. - Atl.)	11	3.2
Paleotemperate (Paleotemp.)	22	6.4
Eurasiatic (Euras.)	6	1.7
European-Caucasian (Europ. - Caucas.)	3	0.9
European (Europ.)	7	2
Circumboreal (Circumbor.)	4	1.1
Eurosiberian (Eurosiber.)	4	1.1
Pantropical (Pantrop.)	9	2.6
Sub-and Cosmopolitan (Subcosmop., Cosmop.)	61	17.6
Adventives (Adv.)	45	13
Total	346	100

area can be divided into fourteen chorological groups (Table 2). Only three taxa (0.9%) are endemic to the Balkan Peninsula. The Mediterranean elements (Eury-Mediterranean, Steno-Mediterranean and East-Mediterraean) are represented in the flora of Mesolongi with 44% (152 taxa). Of these, the Eury-Mediterranean element is dominant (69 taxa, 20%), while the Steno-Mediterranean element follows (56 taxa, 16.2%).

From the widely distributed taxa in the flora of Mesolongi, the Sub- and Cosmopolitan taxa are represented with 17.6% (61 taxa). The Paleotemperate (6.4%, 22 taxa), the Mediterranean-Turanian (5.5%, 19 taxa) and the Mediterranean-Atlantic (3.2%, 11 taxa) are represented by low percentages, while the other chorological groups of this category have much fewer taxa.

The adventive flora of Mesolongi consists of forty-five taxa, which represent 13% of the total flora (Table 3). Over half of the adventives (25 taxa, 56%) belong to the following seven families: *Gramineae, Compositae, Leguminosae,* and *Cruciferae* with four taxa (8.9%) each, *Amaranthaceae*, *Scrophulariaceae* and *Umbelliferae* with three taxa (6.8%) each. The remaining twenty taxa (44%) belong to sixteen families with one to two taxa each.

Concerning the origin of adventives in Mesolongi, American taxa dominate (11 taxa, 24.5%) together with those of Asiatic origin (10 taxa, 22.2%). Taxa of Tropical origin accounted for 17.8% (8 taxa) and those of European and Mediterranean origin accounted for 11.1% (5 taxa) of the adventive flora. The remaining areas of origin were represented by much fewer taxa (Tables 3 and 4).

Neophytes (taxa introduced after 1500 AD) accounted for 75.6% (34 taxa) of the adventive flora of Mesolongi. Of these neophytes, American taxa dominated (11 taxa, 32.4%). In contrast, archaeophytes were much less common (11 taxa, 24.4%) and these were mainly of Asiatic origin (6 taxa, 54.7%) (Table 4).

Table 3. Origin, time and method of introduction of adventives in the area of Mesolongi.

Taxon	**Origin**	**Introduction**	
		Time	**Method**
Acacia saligna	;	Neophyte	Ornamental
Alium cepa	WAs	Archaeophyte	Agricultural
Amaranthus deflexus	SA	Neophyte	Traffic & trade
A. retroflexus	NA	Neophyte	Weed of cultivation
A. blitoides	NA	Neophyte	Weed of cultivation
Antirrhinum majus	WMed	Archaeophyte	Ornamental
Apium graveolens	Submed-Med	Neophyte	Agricultural
Arundo donax	CAs, SAs	Archaeophyte	Agricultural
Aster squamatus	CA, SA	Neophyte	Traffic & trade
Brassica oleracea	WEur	Archaeophyte	Agricultural
Carpobrotus edulis	SAf	Neophyte	Ornamental
Cicer arietinum	CAs	Archaeophyte	Agricultural
Chenopodium ambrosioides	TA	Neophyte	Traffic & trade
Commelina communis	TeAs	Neophyte	Ornamental
Conyza albida	TA	Neophyte	Traffic & trade
Conyza bonariensis	TA	Neophyte	Traffic & trade
Coriandrum sativum	NAf, WAs	Archaeophyte	Agricultural
Coronopus didymus	SA	Neophyte	Traffic & trade
Cucurbita pepo	NCA	Neophyte	Agricultural
Cymbalaria muralis subsp. *muralis*	SA, WJu, It, Si	Neophyte	Ornamental
Cyperus alternifolius	Af	Neophyte	Ornamental
Datura stramonium	M, ENA	Neophyte	Traffic & trade
Eleusine indica	T, ST	Neophyte	Grass weed
Freesia refracta	;	Neophyte	Ornamental
Ipomoea purpurea	TA	Neophyte	Ornamental
Iris albicans	SA ;	Neophyte	Ornamental
Lens culinaris	H, SWAs	Archaeophyte	Agricultural
Lonicera japonica	EAs	Neophyte	Ornamental
Lunaria annua subsp. *annua*	;	Neophyte	Ornamental
Mirabilis jalapa	TA	Neophyte	Ornamental
Morus alba	In, Ch	Archaeophyte	Ornamental
Opuntia ficus-barbarica	TA	Neophyte	Ornamental
Oxalis articulata	CETSA	Neophyte	Ornamental

Table 3. Continued.

Oxalis pes-caprae	SAF	Neophyte	Ornamental
Pimpinella anisum	EMed	Neophyte	Agricultural
Pyrus communis	;	Neophyte	Agricultural
Sinapis alba subsp *alba*	Med, WAs;	Archaeophyte	Agricultural
Solanum lycopersicon	CA, SA	Neophyte	Agricultural
Tradescantia fluminensis	SEBr, Ar	Neophyte	Ornamental
Triticum durum	SWAs;	Neophyte	Agricultural
Veronica persica	SWAs;	Neophyte	Weed of cultivation
Vitis vinifera subsp. *vinifera*	;	Archaeophyte	Agricultural
Wisteria sinensis	EAs	Neophyte	Ornamental
Xanthium strumarium	;	Neophyte	Traffic & trade
Zea mays	TA	Neophyte	Agricultural

Time of introduction
Archaeophyte: before 1500 AD
Neophyte: after 1500 AD

Origin
Af: Africa
Ar: Argentina
CA: C America
CAs: C Asia
CETSA:Central Eastern Temperate South America
Ch: China
EAs: E Asia
ENA: Eastern N America
H: Himalayas
In: India
It: Italy
M: Mexico
Med: Mediterranean
NA: N America
NAf: N Africa
NCA: Northern C America
SA: S America
SAf: S Africa
SAs: S Asia
SEBr: SE Brazil
Si: Sicily
ST: Subtropics
Submed: Submediterranean
SWAs: SW Asia
T: Tropics
TA: Tropical America
TeAs: Temperate Asia
WAs: W Asia
WEur: W Europe
WJu: W Yugoslavia
WMed: W Mediterranean
?: Origin unknown

The largest percentage of adventives was introduced into the study area as ornamentals (40%) while a significant number was also introduced by agriculture (33.3%). Taxa introduced by traffic and trade followed with 17.8% (Table 5).

In the life-form spectrum of the Mesolongi flora (Table 6), therophytes form the highest proportion (53.5%), followed by the hemicryptophytes (21.4%). The percentage of geophytes is low (12.1%), while that of chamaephytes is much lower (4.3%). The flora of Mesolongi is poor in nanophytes (0.9%) and phanerophytes (7.2%).

The vascular plants of the study area have been attributed to ecological groups on the basis of some of the main ecological factors limiting their occurrence: warmth, moisture, soil reaction and salt stress (Table 7). For many taxa (37.3%, 129 taxa) found in the study area, warmth is not a limiting factor. The remaining percentage (62.7%) can be divided essentially into extreme warmth (26.9 %, 93 taxa), warmth (23.7%, 82 taxa) and moderate

Table 4. Origin of the adventive flora of Mesolongi.

Origin	Total number of adventives	%	Neophytes Number	%	Archaeophytes Number	%
America	11	24.5	11	32.4	-	-
Asia	10	22.2	4	11.8	6	54.7
Tropics	8	17.8	8	23.5	-	-
Europe & Mediterranean region	5	11.1	3	8.8	2	18.3
Africa	3	6.6	3	8.8	-	-
Europe & Asia	1	2.2	-	-	1	9
Africa & Asia	1	2.2	-	-	1	9
Unknown	6	13.4	5	14.7	1	9
Total	45	100	34	100	11	100

Table 5. Numbers and proportions of the adventive taxa of Mesolongi, categorized according to their method of introduction.

Method of introduction	Number of adventives	%
Agricultural	15	33.3
Ornamental	18	40
Weeds of cultivation	3	6.7
Traffic & Trade	8	17.8
Grass weed	1	2.2
Total	45	100

Table 6. Life-form spectrum of the Mesolongi flora.

Life-forms		**Number**	**of taxa**	**%**
Therophytes	Th	185		53.5
Th. caespitose	Thcaesp		3	
Th. reptant	Thrept		7	
Th. scapose	Thscap		175	
Geophytes	G	42		12.1
G. bulbous	Gbulb		19	
G. rhizomatosus	Grhiz		23	
Hemicryptophytes	H	74		21.4
H. caespitose	Hcaesp		12	
H. scapose	Hscap		30	
H. rosulate	Hros		8	
H. reptant	Hrept		4	
H. biennial	Hbienn		18	
H. scandent	Hscand		2	
Chamaephytes	Ch	15		4.3
Ch. suffruticose	Chsuffr		6	
Ch. reptant	Chrept		1	
Ch. fruticose	Chfrut		5	
Ch. succulent	Chsucc		3	
Nano-phanerophytes	Nph	3		0.9
Phanerophytes	Ph	25		7.2
Ph. shrubby	Phcaesp		8	
Ph. arborescent	Phscap		10	
Ph. succulent	Phsucc		1	
Ph. lianas	Phlian		6	
Hydrophytes	Hydr	2		
Hydr. natant			2	0.6
Total		346	346	100

Table 7. Ecological spectra of the Mesolongi flora.

Ecological factors	Ecological preferences	Number of taxa	%
Warmth	moderate cool indicator (1)	9	2.6
	moderate warmth indicator (2)	33	9.5
	warmth indicator (3)	82	23.7
	extreme warmth indicator (4)	93	26.9
	indifferent (x)	129	37.3
	Total	346	100
Moisture	indicator of extreme dry habitats (1)	4	1.2
	indicator of very dry habitats (2)	70	20.2
	indicator of dry habitats (3)	103	29.8
	indicator of moderate dry habitats (4)	42	12.1
	indicator of very slightly moist habitats (5)	44	12.7
	indicator of slightly moist habitats (6)	24	6.9
	indicator of moist habitats (7)	11	3.2
	indicator of aquatic habitats (8)	2	0.6
	indifferent (x)	46	13.3
	Total	346	100
Soil reaction	calcifuge species (1)	3	0.9
	acidophilous species (2)	27	7.8
	slight acid-slight alkaline indicator (3)	113	32.7
	basiphilous species (4)	63	18.2
	calcicolous species (5)	43	12.4
	indifferent (x)	97	28
	Total	346	100
Salt stress	Halophobes (1)	260	75.1
	halotolerant species (2)	68	19.7
	facultative halophytes (3)	11	3.2
	obligatory halophytes (4)	6	1.7
	indifferent (x)	1	0.3
	Total	346	100

warmth (9.5%, 33 taxa) species, while the percentage of moderately cool (2.6%, 9 taxa) species is relatively very low.

Regarding the moisture factor, the percentage of indifferent species is 13.3% (46 taxa). Characteristic of the study area are the species of dry habitats (29.8%, 103 taxa), followed by the species of very dry habitats (20.2%, 70 taxa). Percentages of taxa indicating very slightly moist habitats (12.7%, 44 taxa) and moderately dry habitats (12.1%, 42 taxa) are relatively high. Species of slightly moist (6.9%, 24 taxa) and moist habitats (3.2%, 11 taxa) occur in much smaller percentages (Table 7).

Concerning soil reaction, the slight acid-slight alkaline indicators (32.7%, 113 taxa) pre-

vail, followed by the indifferent species (28%, 97 taxa). Basiphilous (18.2%, 63 taxa) and calcicolous (12.4%, 43 taxa) taxa have fairly high percentages, while the remaining species are poorly represented (Table 7). Lastly, concerning salt stress, halophobes form the highest proportion (75.1%, 260 taxa) of the flora of Mesolongi, followed by the halotolerant plants (19.7 %, 68 taxa). Facultative and obligate halophytes occur in much smaller percentages (Table 7).

Plant list

Abbreviations and symbols used:
Life-forms = see Table 6
Chorology = see Table 2
Obs. = observation only, no herbarium specimens
T = V. Tsiotsiou
T & C = V. Tsiotsiou & D. Christodoulakis
T & al. = V. Tsiotsiou ,D. Christodoulakis & G. Chronopoulos
* = new record for the area of Mesolongi

The numbers in brackets represent indicators of warmth, moisture, soil reaction and salt stress respectively (see also Table 7).

PTERIDOPHYTA

Equisetaceae
∗*Equisetum ramosissimum* Desf.: Grhiz, Circumbor., (3,6,3,1); *T 352.*

Polypodiaceae
Adiantum capillus-veneris L.: Grhiz, Pantrop., (3,6,5,1); (T & C 2003).
Anogramma leptophylla (L.) Link: Thcaesp, Cosmop., (2,4,1,1); (T & C 2003) T & C *368.*
Asplenium ceterach L.: Hros, Paleotemp., (x,2,4,1); (T & C 2003) *T 353.*
∗*Pteridium aquilinum* (L.) Kuhn: Grhiz, Cosmop., (2,5,1,1); *T & C 369.*

GYMNOSPERMAE

Cupressaceae
∗*Cupressus sempervirens* L.: Phscap, E. Med., (2,3,x,1); obs.

Pinaceae
∗*Pinus halepensis* Miller subsp. *halepensis*: Phscap, St. Med., (2,2,x,2); obs.

DICOTYLEDONES

Aizoaceae
∗*Carpobrotus edulis* (L.) N. E. Br.: Chsuffr, Adv., (4,3,x,2); obs.

Amaranthaceae
∗*Amaranthus blitoides* S. Watson: Thscap, Adv., (4,2,3,1); *T 20, T & al. 243*.

∗*A. blitum* L.: Thscap, Cosmop., (4,3,3,1); *T 19, 420.*
∗*A. deflexus* L.: Thscap, Adv., (4,3,3,1); *T 417.*
∗*A. retroflexus* L.: Thscap, Adv., (3,3,3,1); *T & al. 107.*

Apocynaceae
∗*Nerium oleander* L. subsp. *oleander*: Phcaesp, St. Med., (4,5,x,1); *T 416.*

Araliaceae
Hedera helix L. subsp. *helix*: Phlian, Med.-Atl., (1,5,x,1); (T & C 2003) *T 354.*

Boraginaceae
∗*Borago officinalis* L.: Thscap, Eu. Med., (3,4,3,1); *T & al. 242.*
∗*Echium arenarium* Guss.: Hbienn, St. Med., (4,x,4,1); *T & al. 274.*
∗*E. plantagineum* L.: Thscap, Eu. Med., (4,3,x,1); *T & al. 275, T 28.*
Heliotropium europaeum L.: Thscap, Med.-Turan., (4,3,3,1); (T & C 2003) *T & al. 277, T 27.*
∗*Myosotis ramosissima* Rochel subsp. *ramosissima*: Thscap, Euras., (2,3,x,1); *T 421.*

Cactaceae
∗*Opuntia ficus-barbarica* A. Berger: Phsucc, Adv., (4,2,2,1); obs.

Campanulaceae
∗*Campanula ramosissima* Sm.: Thscap, E. Med., (2,4,5,1); *T & al. 299.*

Caprifoliaceae
∗*Lonicera implexa* Aiton: Phlian, St. Med., (2,4,4,1); *T & al. 225.*
∗*L. japonica* Thunb.: Phlian, Adv., (2,4,4,1); *T & al. 244.*

Caryophyllaceae
Arenaria leptoclados (Reichenb.) Guss.: Thscap, Paleotemp., (x,2,4,1); (T & C 2003) *T & al. 252.*
∗*Cerastium glomeratum* Thuill.: Thscap, Subcosmop., (x,3,3,1); *T & C 371.*
∗*Petrorhagia obcordata* (Margot & Reuter) Greuter & Burdet: Thscap, Balkan, (2,4,5,1); *T & al. 251.*
Polycarpon tetraphyllum (L.) L.: Thscap, Eu. Med., (4,3,3,1); (T & C 2003) *T & C 372.*
Sagina apetala Ard.: Thscap, Eu. Med., (2,3,3,1); (T & C 2003) *T & al. 200.*
∗*Saponaria officinalis* L.: Hscap, Eurosiber., (3,5,3,1); *T 332.*
Silene bellidifolia Jacq. (*S. vespertina* Retz.): Thscap, St. Med., (x,3,x,1); (Halácsy 1901:163).
S. nocturna L.:Thscap, St. Med., (4,3,2,2); (T & C 2003) *T 355* .
∗*Spergularia bocconei* (Scheele) Graebner:Thscap, Subcosmop., (x,x,4,2); *T & al. 241.*
Stellaria media (L.) Vill.: Thrept, Cosmop., (x,5,3,1); (T & C 2003) *T & al. 164.*
∗*S. pallida* (Dumort.) Piré:Thscap, Paleotemp., (x,x,3,1); *T 331.*

Chenopodiaceae
∗*Arthrocnemum macrostachyum* (Moric.) K. Koch: Chsucc, Eu. Med., (4,6,5,4); *T & al. 247.*
∗*Atriplex halimus* L.: Phcaesp, St. Med., (3,5,5,4); *T 419.*
∗*Chenopodium album* L.: Thscap, Subcosmop., (x,4,3,1); *T & al. 248, T 34.*

∗*C. ambrosioides* L.: Thscap, Adv., (2,5,3,1); *T & C 373.*
Salsola soda L.: Thscap, Paleotemp., (4,2,x,3); (Halácsy 1904: 55).
∗*Sarcocornia fruticosa* (L.) A. J. Scott: Chsucc, Subcosmop., (4,7,5,4); *T & al. 250.*
Suaeda splendens (Pourret) Gren. & Godron (*S. setigera* DC.): Thscap, Eu. Med., (3,2,3,3); (Halácsy 1904: 55).

Cistaceae
Helianthemum apenninum (L.) Miller: Chsuffr, Europ. (SW), (3,3,3,2); (Halácsy 1901:134).

Compositae
∗*Anthemis arvensis* L. subsp. *icrassata* (Loissel.) Nyman: Thscap, Subcosmop., (2,4,3,1); *T & al. 282.*
A. cotula L.: Thscap, Eu. Med., (x,x,2,2); (Halácsy 1902: 64).
Aster squamatus (Sprengel) Hieron.: Thscap, Adv., (4,4,3,1); (T & C 2003) *T & al. 112,126, T 38.*
∗*Bellis perennis* L.: Hros, Circumbor., (1,4,4,1); *T & C 374.*
∗*Calendula arvensis* L.: Thscap, Eu. Med., (3,3,2,1); *T & al. 103.*
∗ *Carduus australis* L. fil.: Ôhscap, Med.-Turan., (x,x,x,1); *T 333.*
∗ *C. pycnocephalus* subsp. *albidus* (Bieb.) Kazmi: Hbienn, E. Med., (x,x,x,1); *T & C 414, T 449.*
Carlina lanata L.: Thscap, St. Med., (x,3,4,2); (Halácsy 1902: 99).
Centaurea cyanus L.: Thscap, Subcosmop., (2,3,3,1); (Halácsy 1902: 138).
∗*Chamomilla recutita* (L.) Rauschert: Thscap, Subcosmop., (3,3,3,2); *T 357.*
Chondrilla juncea L.: Hscap, Paleotemp., (x,3,2,1); (Halácsy 1902: 204) *T & al. 100.*
∗*Chrysanthemum coronarium* L.: Thscap, St. Med, (3,3,3,2); *T 451.*
∗*Cichorium intybus* L.: Hscap, Cosmop., (x,3,x,2); *T & al. 114.*
Cirsium italicum (Savi) DC.: Hbienn, Europ. (SE), (x,6,3,1); (Halácsy 1902: 113).
∗*C. vulgare* (Savi) Ten.: Hbienn, Subcosmop.,(x,6,3,1); *T & al. 120.*
∗*Conyza albida* Willd.: Thscap, Adv., (4,2,3,1); *T & al. 308.*
C. bonariensis (L.) Cronq.: Thscap, Adv., (4,2,3,1); (T & C 2003) *T & al. 316.*
Crepis dioscoridis L.: Thscap, E. Med., (x,3,x,2); (Halácsy 1902: 230).
C. rubra L.: Thscap, E. Med., (1,4,x,1); (Halácsy 1902: 226).
C. setosa Haller fil.: Thscap., E. Med., (3,5,3,2); (Halácsy 1902: 228).
∗*C.*: Thscap; *T & C 411*
Cynara cardunculus L.: Hscap, St. Med., (3,4,x,1); (Halácsy 1902: 120) *T & C 391.*
∗*Ditrichia graveolens* (L.) W. Greuter: Thscap, Med.-Turan., (4,3,3,1); *T & al. 261, T 450.*
∗*D. viscosa* (L.) W. Greuter: Hscap, Eu. Med, (3,4,4,1); *T & al. 260, T 37, 447.*
Hedypnois cretica (L.) Dum.-Courset (*H. rhagadioloides* L.): Thscap, St. Med., (x,x,x,2); (Halàcsy 1902: 180).
∗*Hypochoeris achyrophorus* L.: Thscap, St. Med, (x,2,x,2); *T & C 392, T 427.*
∗*H. radicata* L.: Hros, Europ.-Caucas., (x,2,x,2); *T & C 409.*
Inula crithmoides L.: Chsuffr, Europ. (SW), (3,5,5,4); (Halácsy 1902: 24) *T & al. 259, T 434.*
∗*Lactuca seriolla* L.: Hbienn, Eurosiber., (4,4,5,1); *T 334, 446.*
Otanthus maritimus (L.) Hoffmanns. & Link (*Diotis maritima* L.): Chsuffr, Med.-Atl.,

(4,2,5,2); (Halácsy 1902: 40) *T & C 408.*
∗*Picris echioides* L.: Thscap, Eu. Med., (x,4,3,1); *T 335.*
Ptilostemon chamaepeuce (L.) Less. (*Chamaepeuce mutica* Cass.): Chfrut, E. Med., (3,4,5,2); (Halácsy 1902: 127).
∗*Pulicaria dysenterica* (L.) Bernh.: Hscap, Eu. Med., (3,7,3,1); *T 30, 358, 448.*
P. odora (L.) Reichenb.: Hscap, Eu. Med., (3,7,3,1); (Halácsy 1902: 25).
P. sicula (L.) Moris: Thscap, St. Med. (3,7,3,1): (Halácsy 1902: 27).
∗*Scolymus hispanicus* L.: Hbienn, Eu. Med., (x,3,x,1); obs.
Senecio aquaticus Hill subsp. *barbareifolius* (Wimmer & Grab.) Walters, (*S. barbareifolius* Krocker): Hbienn, Europ. (C), (3,4,3,1); (Halácsy 1902: 84).
S. vulgaris L.: Thscap, Cosmop., (x,2,x,1); (T & C 2003) *T & al. 113, T 429.*
∗*Silybum marianum* (L.) Gaertner: Hbienn, Med.-Turan., (4,3,5,1); obs.
Sonchus asper (L.) Hill: Thscap, Subcosmop., (x,5,3,1); (Halácsy 1902: 207) *T & al. 106, T 431.*
S. oleraceus L.: Thscap, Subcosmop., (x,3,3,1); (T & C 2003) *T & C* 376.
S. tenerrimus L.: Thscap, St. Med., (4,3,x,2); (T & C 2003) *T & C 393.*
∗*Taraxacum* : Hros; *T & al. 293.*
Tyrimnus leucographus (L.) Cass.: Thscap, St. Med., (2,4,1,1); (Halácsy 1902: 125).
Urospermum picroides (L.) Scop.: Thscap, Eu. Med., (x,3,4,2); (T & C 2003) *T & al. 154.*
∗*Xanthium strumarium* L. subsp. *italicum* (Moretti) D. Loeve: Thscap, Adv., (4,3,3,1); *T & al. 125, T 35, 423.*

Convolvulaceae
Calystegia sepium (L.) R. Br. subsp. *sepium*: Hscand, Paleotemp., (3,7,3,1); (T & C 2003) *T & al. 153.*
Convolvulus arvensis L.: Grhiz, Cosmop., (x,3,3,1); (T & C 2003) *T & al. 279.*
∗*C. betonicifolius* Miller: Grhiz, E. Med, (x,3,x,1); *T 339.*
C. elegantissimus Miller: Hscand, St. Med., (2,3,4,1); (T & C 2003) *T & al. 280.*
∗*Ipomoea purpurea* (L.) Roth: Thscap, Adv., (4,5,2,1); *T & al. 313, T 31.*

Crassulaceae
Sedum acre L. subsp. *neglectum* (Ten.) Rouy & Camus: Chsucc, Europ.-Caucas., (x,x,x,1); (Halácsy 1901: 584).
S. litoreum Guss.: Thscap, St. Med., (x,1,x,1); (Halácsy 1901: 5920).
S. rubens L.: Thscap, Med.-Atl. (Eu.), (3,1,x,1); (T & C 2003) *T & al. 271.*
S. stellatum L.: Thscap, St. Med., (x,1,x,1); (Halácsy 1901: 589).
Umbilicus chloranthus Heldr. & Sart.: Gbulb, E. Med., (2,2,x,1); (T & C 2003) *T 337.*
U. horizontalis (Guss.) DC.: Gbulb, St. Med., (3,2,x,1); (T & C 2003) *T 338.*

Cruciferae
∗*Biscutella didyma* L.: Thscap, Med.-Turan., (x,2,x,2); *T & C 377.*
∗*Brassica nigra* (L.) W. D. J. Koch: Thscap, E. Med., (3,2,5,1); *T & C 404.*
∗*B. oleracea* L.: Hbienn, Adv., (3,2,5,1); *T & al. 265.*
∗*Cakile maritima* Scop. subsp. *maritima*: Thscap, Med.-Atl., (3,2,5,3); *T & C 403.*
Capsella bursa-pastoris (L.) Medicus: Hbienn, Cosmop., (3,4,3,1); (T & C 2003) *T & al. 193.*

C. grandiflora (Fauché & Chaub.) Boiss.: Thscap, E. Med., (3,4,3,1); (Halácsy 1901:115).
Cardamine hirsuta L.: Thscap, Cosmop., (2,3,3,1); (T & C 2003) *T & al. 177.*
∗*Coronopus didymus* (L.) Sm.: Threpт, Adv., (3,5,3,1); *T & al. 218.*
∗*Hirschfeldia incana* (L.) Lagr.-Fossat: Hscap, Eu. Med., (x,3,4,1); *T & al. 219.*
Lepidium graminifolium L.*:* Hscap, Eu. Med., (3,4,x,1); (T & C 2003) *T & al. 276.*
∗*Lunaria annua* L. subsp. *annua*: Hscap, Adv., (2,5,3,1); *T & al. 179.*
∗*Raphanus raphanistrum* L. subsp. *landra* (Moretti ex DC.) Bonnier & Layens: Thscap, Eu. Med., (4,3,2,1); *T & al. 302.*
∗*R. raphanistrum* L. subsp. *raphanistrum* : Thscap, Circumbor., *(*4,3,2,1); *T & al. 278.*
∗*Sinapis alba* L. subsp. *alba* : Thscap, Adv., (x,2,4,1); *T & al. 102.*
∗*Sisymbrium officinale* (L.) Scop.: Thscap, Subcosmop., (x,5,3,1); *T & al. 195.*

Cucurbitaceae
∗*Cucurbita pepo* L. : Thscap, Adv., (x,x,x,1); obs.
∗*Ecballium elaterium* (L.) A. Richard: Gbulb, Eu. Med., (3,3,3,1); obs.

Dipsacaceae
∗*Dipsacus fullonum* L.: Hbienn, Eu. Med., (3,5,4,1); *T & al. 151.*

Euphorbiaceae
∗*Euphorbia helioscopia* L.: Thscap, Cosmop., (3,4,4,1); *T & al. 209, T 3.*
∗*E. paralias* L.: Chfrut, Eu. Med.- Atl., (4,2,4,3); obs.
E. peplus L.: Thscap, Cosmop., (x,x,x,1); (T & C 2003) *T & al. 157, T 426.*
∗*Mercurialis annua* L.: Thscap, Paleotemp., (x,3,4,1); *T & al. 109, T 25, 425.*

Gentianaceae
∗*Centaurium erythraea* Rafn subsp. *erythraea*: Hbienn, Paleotemp., (3,2,4,1); *T & al. 182, T 1.*

Geraniaceae
∗*Erodium malacoides* (L.) L' Hér.: Thscap, St. Med., (4,2,3,2); *T & al. 124.*
E. moschatum (L.) L' Hér: Thscap, Eu. Med., (x,2,x,2); (T & C 2003) *T & al. 121.*
∗*Geranium molle* L. subsp. *molle*: Thscap, Subcosmop., (x,2,2,1); *T & al. 141.*
∗*G. robertianum* subsp. *purpureum* (Vill.) Nyman: Thscap, Eu. Med., (x,2,x,1); *T 33.*
G. robertianum L. subsp. *robertianum*: Thscap, Eu. Med., (1,3,x,1); (T & C 2003) *T & al. 159.*
G. rotundifolium L.: Thscap, Paleotemp., (4,5,3,1); (T & C 2003) *T & al. 270, T 15, 428.*

Labiatae
∗*Coridothymus capitatus* (L.) Reichenb. fil.: Chfrut, St. Med., (x,3,5,2); *T & al. 312.*
Lamium amplexicaule L.: Thscap, Paleotemp., (x,2,3,1); (T & C 2003) *T & al. 314.*
∗*Melissa officinalis* L. subsp. *altissima* (Sm.) Arcangeli: Hscap, Eu. Med., (3,6,3,1); *T & C 401.*
∗*Mentha aquatica* L.: Hscap, Subcosmop., (3,7,3,1); *T & al. 162.*
∗*Mentha:* Hscap; *T & al. 292.*
∗*M. spicata* L.*:* Hscap, Eu. Med., (3,7,3,1); *T & C 378.*
∗*Origanum vulgare* L. subsp. *hirtum* (Link) Ietswaart: Hscap, E. Med., (x,3,2,1); *T & al. 220.*

∗*Prasium majus* L.: Chfrut, St. Med., (4,3,4,2); *T 350.*
∗*Rosmarinus officinalis* L.: Nph, St. Med., (4,3,2,1); *T & C 379.*
∗*Salvia viridis* L.: Thscap, St. Med., (4,2,5,1); *T & C 390.*
∗*Teucrium capitatum* L.: Chsuffr, Eu. Med., (x,2,x,2); *T 340.*

Lauraceae
∗*Laurus nobilis* L.: Phcaesp, St. Med., (3,6,2,1); obs.

Leguminosae
∗*Acacia saligna* (Labill.) Wendl. fil.: Phscap, Adv., (x,x,x,1); obs.
∗*Astragalus hamosus* L.: Thscap, Med.-Turan., (x,3,4,1); *T 351.*
∗*Bituminaria bituminosa* (L.) Stirton: Hscap, Eu. Med., (4,3,5,1); *T 341, 438.*
∗*Ceratonia siliqua* L.: Phscap, St. Med., (4,3,4,1); obs.
∗*Cicer arietinum* L.: Thscap, Adv., (x,x,x,1); *T & al. 214.*
Galega officinalis L.: Hscap, Eurosiber., (2,5,3,1); (Halácsy 1901: 427).
∗*Lens culinaris* Medicus: Thscap, Adv., (x,x,x,1); *T & al. 291.*
∗*Lotus peregrinus* L.: Thscap, E. Med., (4,2,5,1); *T & al. 305.*
∗*Medicago arabica* (L.) Hudson: Thscap, Eu. Med., (2,4,3,1); *T & al. 180.*
∗*M. arborea* L.: Phcaesp, E. Med, (4,3,4,2); *T & al. 189, T 441.*
M. coronata (L.) Bartal.: Thscap, St. Med., (x,2,x,1); (T & C 2003) *T & al. 181, T 442.*
M. minima (L.) L.: Thscap, Paleotemp , (x,2,5,1); (T & C 2003) *T & al. 213, T 443.*
∗*M. orbicularis* (L.) Bartal.: Thscap, Eu. Med., (x,2,x,1); *T & al. 167.*
∗*M. polymorpha* L.: Thscap, Subcosmop., (x,x,x,2); *T & al. 206.*
∗*Melilotus indicus* (L.) All.: Thscap, Subcosmop., (4,3,4,2); *T & al. 136.*
∗*M. officinalis* (L.) Lam.: Hbienn, Subcosmop., (4,3,4,1); *T & al. 137.*
∗*M. segetalis* (Brot.) Ser.: Thscap, St. Med., (4,3,5,2); *T 452.*
∗*M. sulcatus* Desf.: Thscap, St. Med, (4,3,5,2); *T & al. 191, 210.*
∗*Spartium junceum* L.: Phcaesp, Eu. Med., (x,3,x,1); obs.
∗*Trifolium angustifolium* L.: Thscap, Eu. Med., (x,x,2,1); *T & al. 190.*
T. campestre Schreber: Thscap, Paleotemp., (x,2,x,1); (T & C 2003) *T & al. 130.*
T. fragiferum L.: Hrept, Paleotemp., (x,4,x,1); (Halácsy 1901: 365).
T. nigrescens Viv. subsp. *petrisavii* (G.C. Clementi) Holmboe: Thscap, E. Med., (x,2,2,1); (T & C 2003) *T & al. 211, T 445.*
T. patens Schreber: Thrept, Eu. Med., (x,2,x,1); (Halácsy 1901: 406) *T & al. 254.*
∗*T. repens* L.: Hrept, Subcosmop., (x,2,2,1); *T & al. 255, T 444.*
T. resupinatum L.: Thrept, Paleotemp., (4,5,3,1); (Halácsy 1901: 395) *T & al. 212.*
∗*T. stellatum* L.: Thscap, Eu. Med., (x,2,x,1); *T & al. 256.*
∗*Vicia tenuifolia* Roth: Hscap, Euras., (x,3,3,2); *T & al. 269.*
∗*V. villosa* Roth subsp. *eriocarpa* (Hausskn.) P. W. Ball: Thscap, E. Med., (x,3,3,2); *T & al. 131, T 439.*
∗*V. villosa* Roth subsp. *microphylla* (Dum.-Urville) P. W. Ball: Thscap, E. Med., (4,2,2,1); *T & al. 132, T 440.*
∗*Wisteria sinensis* (Sims) Sweet: Phlian, Adv., (x,x,x,1); *T & al. 257.*

Lythraceae
Lythrum hyssopifolia L. ("*L. hyssopifolium"*): Thscap, Subcosmop., (x,6,3,1); (Halácsy

1901: 562) *T & al. 287.*

L. junceum Banks & Solander ("*L. flexuosum"*): Hscap, St. Med., (4,7,3,1); (Halácsy 1901: 561).

Malvaceae

∗*Lavatera cretica* L.: Thscap, St. Med., (4,3,3,2); *T & al. 258.*

∗*Malva cretica* Cav. subsp. *cretica*: Thscap, St. Med., (x,2,5,1); *T & al. 309.*

∗*M. parviflora* L.: Thscap, Eu. Med., (4,2,x,1); *T & al. 143.*

∗*M. sylvestris* L.: Hscap, Subcosmop., (4,3,3,1); *T & al. 128.*

Moraceae

∗*Ficus carica* L.: Phscap, Med.-Turan., (3,3,x,1); obs.

∗*Morus alba* L.: Phscap, Adv., (x,x,x,1); obs.

Myrtaceae

∗*Myrtus communis* L. subsp. *communis*: Phcaesp, St. Med., (3,6,2,1)*;* obs.

Nyctaginaceae

∗*Mirabilis jalapa* L.: Gbulb, Adv., (x,x,x,1); obs.

Oleaceae

∗*Olea europaea* L. subsp. *oleaster* (Hoffmanns. & Link) Negodi*:* Phcaesp, St. Med., (x,2,x,2); obs.

Oxalidaceae

∗*Oxalis articulata* Savigny: Grhiz, Adv., (4,3,3,1); *T & al. 178.*

∗*O. corniculata* L.: Hrept, Cosmop., (4,3,3,1); *T & al. 111, T 17.*

∗*O. pes-caprae* L.: Gbulb, Adv., (4,3,3,1); *T & al. 104.*

Papaveraceae

Fumaria capreolata L.: Thscap, Eu. Med., (4,4,3,1); (T & C 2003) *T & al. 158.*

F. officinalis L. subsp*. officinalis*: Thscap, Subcosmop., (x,3,3,1); (T & C 2003) *T & al. 138.*

∗*Glaucium flavum* Grantz: Hscap, Eu. Med., (4,3,3,2); *T & al. 216.*

∗*Papaver rhoeas* L.: Thscap, Paleotemp., (x,3,x,2); *T & al. 230.*

Plantaginaceae

∗*Plantago afra* L.: Thscap, Eu. Med., (x,2,x,1); *T & al. 166* .

∗*P. coronopus* L.: Hbienn, Eu. Med., (3,x,4,1); *T & al. 123.*

∗*P. lagopus* L.*:* Thscap, St. Med., (x,2,x,2); *T & al. 171.*

∗*P. lanceolata* L.*:* Hros, Cosmop., (3,x,4,1); *T & al. 240.*

∗*P. major* L.: Hros, Subcosmop., (4,5,3,1); *T & al. 262.*

∗*P. serraria* L.*:* Hros, St. Med., (3,x,4,1); *T & al. 134.*

∗*P. weldenii* Reichenb. subsp. *weldenii :* Thscap, Eu. Med., (x,2,x,2); *T & al. 263.*

Platanaceae

∗*Platanus orientalis* L.*:* Phscap, SE. Europ., (x,6,x,1); obs.

Plumbaginaceae

∗*Limonium narbonense* Miller: Hros, Eu. Med., (4,5,5,4); *T & al. 117.*

Polygonaceae

∗*Polygonum aviculare* L. subsp. *neglectum* (Besser) Arcang.*:* Thrept, Subcosmop., (3,5,3,1); *T & al. 222, T 32.*

∗*Rumex crispus* L.*:* Hscap, Cosmop., (3,6,3,1); *T & al. 204.*

∗*R. pulcher* L. subsp. *pulcher* : Hscap, Eu. Med., (x,x,2,1); *T & al. 165.*

Portulacaceae

∗*Portulaca oleracea* L.: Thscap, Subcosmop., (3,3,3,2); *T & al. 238.*

Primulaceae

∗*Anagallis arvensis* L.: Thrept, Subcosmop., (x,x,x,2); *T & al. 239.*

∗*Cyclamen hederifolium* Aiton: Gbulb, Eu. Med., (x,x,5,1); obs.

Ranunculaceae

∗*Anemone pavonina* Lam.: Gbulb, Eu. Med., (2,4,5,1); *T & al. 264.*

Clematis vitalba L.*:* Phlian, Europ.-Caucas., (x,4,4,1); (T & C 2003) *T & al. 310, T 24.*

∗*Consolida ajacis* (L.) Schur*:* Thscap, Eu. Med., (2,3,5,1); *T & al. 253, T 26.*

∗*Delphinium peregrinum* L.*:* Thscap, E. Med., (x,2,x,1); *T & al. 286.*

∗*Nigella damascena* L.: Thscap, Eu. Med., (4,2,5,1); *T & al. 231.*

∗*Ranunculus ficaria* L.*:* Gbulb, Euras., *(*2,5,3,1); *T & al. 207.*

∗*R. marginatus* d'Urv.: Thscap, E. Med., (4,6,3,1); *T & al. 208.*

∗*R. neapolitanus* Ten.: Hscap, Euras., (2,5,2,1); *T & al. 142.*

Rosaceae

Potentilla reptans L.: Hros, Subcosmop., (2,5,3,1); (Halácsy 1901: 512).

∗*Rubus ulmifolius* Schott*:* Nph, Eu. Med., (x,4,3,1); *T & al. 311.*

Sanguisorba minor Scop. (*Poterium sanguisorba* L.): Hscap, Subcosmop., (4,4,4,1); (Halácsy 1901: 536).

Rubiaceae

Galium aparine L.*:* Thscap, Paleotemp., (x,3,x,2); (T & C 2003) *T & al. 152.*

∗*Sherardia arvensis* L.*:* Thscap, Subcosmop., (x,2,x,2); *T & al. 330.*

Salicaceae

∗*Populus alba* L.*:* Phscap, Paleotemp., (3,4,4,1); obs.

∗*Salix alba* L.*:* Phscap, Paleotemp., (3,7,3,1); obs.

Saxifragaceae

Saxifraga tridactylites L.*:* Thscap, Eu. Med., (1,3,4,1); (T & C 2003) *T & al. 194, T 21.*

Scrophulariaceae

Antirrhinum majus L.*:* Chfrut, Adv., (3,5,3,1); (T & C 2003) *T & al. 235.*

Cymbalaria muralis P. Gaertner, B. Meyer & Scherb. subsp. *muralis*: Chrept, Adv., (2,3,4,1); (T & C 2003) *T & al. 160.*

∗*Parentucelia latifolia* (L.) Caruel: Thscap, Eu. Med., (1,2,4,1); *T & al. 237, T 23.*

∗*P. viscosa* (L.) Caruel: Thscap, Med.-Atl., (3,4,4,1); *T & al. 284.*

Scrophularia peregrina L.: Thscap, St. Med., (4,4,4,1); (T & C 2003) *T & al. 174.*

∗*Verbascum sinuatum* L.: Hbienn, Eu. Med., (4,3,3,1); *T & al. 273.*

∗*Veronica anagallis-aquatica* L.: Ôhscap, Cosmop., (2,7,3,1); *T & al. 122.*

V. arvensis L.: Thscap, Subcosmop., (x,3,3,1); (T & C 2003) *T & al. 285.*
V. cymbalaria Bodard: Thscap, Eu. Med., (x,2,x,1); (T & C 2003) *T & al. 155.*
V. glauca Sibth. & Sm.: Thscap, Balkan., (1,3,4,1); (T & C 2003) *T & al. 185, T 22.*
∗*V. hederifolia* L.: Thscap, Eurasiat., (1,3,4,1); *T & al. 198.*
∗*V. persica* Poiret: Thscap, Adv., (x,3,3,1); *T & al. 272.*
V. polita Fries: Thscap, Subcosmop., (x,3,3,1); (T & C 2003) *T & al. 183.*

Solanaceae
∗*Datura stramonium* L.*:* Thscap, Adv., (3,4,3,1); *T & al. 232.*
∗*Lycopersicon esculentum* Miller*:* Thscap, Adv., *(*x,3,3,1); obs.
∗*Solanum nigrum* L.*:* Thscap, Cosmop., (x,3,3,1); *T & al. 202.*
∗*S. tuberosum* L.*:* Thscap, Adv., (x,5,4,1); *T & al. 108.*

Tamaricaceae
Tamarix hampeana Boiss. & Heldr.*:* Phscap, E. Med., (x,6,5,3);(Halácsy 1901: 563) *T & al. 115.*

Theligonaceae
Theligonum cynocrambe L.*:* Thscap, Eu. Med., (2,3,4,1); (T & C 2003) *T & al. 268.*

Umbelliferae
∗*Ammi majus* L.: Thscap, Eu. Med., (4,3,3,1); *T & al. 298.*
A. visnaga (L.) Lam.: Thscap, Eu. Med., (4,3,3,1); (Halácsy 1901: 680).
∗*Apium graveolens* L.: Hscap, Adv., (3,5,3,2); *T & al. 297.*
∗*Bifora testiculata* (L.) Roth: Thscap, St. Med., (3,3,5,1); *T & al. 197.*
Bupleurum lancifolium Hornem. (*B. protractum* Hoffmanns. & Link): Thscap, Med.–Turan., (3,2,4,1); (Halácsy 1901: 688).
B. tenuissimum L. subsp. *gracile* (Bieb.) H. Wollf (*B. marschallianum* (A. Meyer): Thscap, E. Med., (3,2,4,1); (Halàcsy 1901: 693).
∗*Coriandrum sativum* L.: Thscap, Adv., (x,x,x,1); *T & al. 199, T 18.*
∗*Daucus carota* L. subsp. *major* (Vis.) Arcangeli: Hbienn, Europ., (4,3,2,1); *T & al. 267, T 29.*
∗*D. carota* L. subsp. *maritimus* (Lam.) Batt.: Hbienn, St. Med., (x,3,2,1,); *T & al. 229.*
∗*Eryngium maritimum* L.: Grhiz, Med.-Atl., (4,2,5,3); obs.
∗*Foeniculum vulgare* Miller: Hbienn, St. Med., (x,3,3,1); *T & C 380.*
Oenanthe pimpinelloides L.: Hscap, Med.-Atl., (2,5,2,1); (Halácsy 1901: 653) *T & C 400.*
Opopanax hispidus (Friv.) Griseb.: Hscap, E. Med., (3,3,2,1); (Halácsy 1901: 637).
∗*Pimpinella anisum* L.: Thscap, Adv., (4,2,2,1); *T 453.*
∗*Tordylium apulum* L.: Thscap, St. Med., (x,x,x,1); *T & al. 294.*
Torilis nodosa (L.) Gaertner: Thscap, Med.-Turan., (x,x,4,2); (T & C 2003) *T & al. 135.*

Urticaceae
Parietaria judaica L.: Hscap, Med.-Atl., (3,x,4,1); (T & C 2003) *T & al. 150.*
P. lusitanica L.: Thrept, Eu. Med., (x,2,4,1); (T & C 2003) *T & al. 163*.
∗*Urtica dioca* L.: Hscap, Subcosmop., (3,4,3,1); *T & al. 184.*
U. membranacea Poiret: Thscap, Med.-Turan., (3,4,3,1); (T & C 2003) *T & al. 295.*
∗*U. urens* L.: Thscap, Subcosmop., (3,4,3,1); *T 342.*

Valerianaceae

Centranthus ruber (L.) DC. subsp. *sibthorpii* (Heldr. & Sart.) Hayek: Chsuffr, Balkan, (x,2,4,1); (Halácsy 1901: 747).

Verbenaceae

∗*Vitex agnus-castus* L.: Phcaesp, Med.-Turan., (4,5,4,1); *T & al. 296.*

Vitaceae

Vitis vinifera L. subsp. *vinifera:* Phlian, Adv., (x,x,x,1); (T & C 2003).

Monocotyledens

Amaryllidaceae

∗*Pancratium maritimum* L.: Gbulb, St. Med., (4,2,5,2); obs.

Araceae

∗*Arisarum vulgare* Targ.-Tozz. subsp. *vulgare*: Grhiz, St. Med., (x,3,4,1); *T & C 399.*
∗*Arum italicum* Miller: Grhiz, St. Med., (3,5,4,1); *T 321.*
∗*Dracunculus vulgaris* Schott: Grhiz, E. Med., (3,3,4,1); *T 360.*

Commelinaceae

∗*Commelina communis* L.: Gbulb, Adv., (x,x,x,1); *T 361.*
∗*Tradescantia fluminensis* Velloso: Grhiz, Adv., (4,x,x,1); *T 322.*

Cyperaceae

Cladium mariscus (L.) Pohl: Grhiz, Subcosmop., (2,6,5,1); (Halácsy 1904: 306).
∗*Cyperus alternifolius* L.: Hcaesp, Adv., (3,6,3,1); *T & C 384.*

Gramineae

∗*Aegilops dichasians* (Zhuk.) Humphries: Thscap, E. Med., (4,1,5,1); *T & al. 303, T 2.*
Aeluropus littoralis (Gouan) Parl.: Grhiz, Med.–Turran., (4,6,5,4); (Halácsy 1904:384).
∗*Agrostis stolonifera* L.: Hrept, Circumbor., (x,6,x,1); *T & al. 146.*
∗*Alopecurus myosuroides* Hudson: Thscap, Subcosmop., (3,5,3,1); *T & al. 306.*
A. utriculatus Solander: Hcaesp, Subcosmop., (3,5,3,1); (Halácsy 1904: 343).
∗*Ammophila arenaria* (L.) Link subsp. *arundinacea* H. Lindb. fil.: Grhiz, Eu. Med., (4,3,5,2); *T 343.*
∗*Arundo donax* L.: Grhiz, Adv., (4,5,3,2); *T 318.*
∗*A. plinii* Turra: Grhiz, St. Med., (4,5,3,2); *T & C 382, T 13.*
∗*Avena barbata* Pott: Thscap, Med.-Turan., (x,x,x,2); *T & C 383.*
∗*A. byzantina* C. Koch: Thscap, Med.-Turan., (x,3,3,1); *T 319, 10.*
∗*A. fatua* L.: Thscap, Euras., (x,3,3,1); *T 320, 437.*
A. sterilis L. subsp. *ludoviciana* (Durieu) Nyman: Thscap, Med.-Turan., (4,x,x,2); (T & C 2003) *T & C 396, T 11.*
∗*A. sterilis* L. subsp. *sterilis:* Thscap, Med.-Turan., (x,x,x,2); *T 344, 9.*
∗*Brachypodium retusum* (Pers.) Beauv.: Hcaesp, St. Med., (3,5,4,1); *T & C 395, T 4.*
∗*Briza humilis* Bieb.: Thscap, E. Med., (1,3,4,1); *T & al. 168.*
∗*B. maxima* L.: Thscap, Paleosubtrop., (x,2,x,1); *T & al. 161.*
∗*B. media* L.: Hcaesp, Eurosiber., (x,2,x,1); *T 345.*

B. minor L.: Thscap, Subcosmop., (3,5,3,1); (Halácsy 1904: 412) *T & al. 288.*
∗*Bromus alopecuros* Poiret: Thscap, St. Med., (4,2,2,1); *T & al. 127.*
B. commutatus Schrader: Thscap, Europ., (3,5,4,1); (Halácsy 1904: 396).
∗*B. diandrus* Roth: Thscap, Eu. Med., (3,5,3,1); *T & al. 140.*
∗*B. fasciculatus* C. Presl: Thscap, E. Med., (x,2,x,2); *T & al. 147.*
∗*B. hordeaceus* L. subsp. *divaricatus* (Bonnier & Layens) Kerguelen: Thscap, Eu. Med., (3,5,4,1); *T & al. 148.*
B. hordeaceus L. subsp. *molliformis* (Lloyd) Maire & Weiller: Thscap, Eu. Med., (3,5,4,1); (Halácsy 1904: 396).
∗*B. intermedius* Guss.: Thscap, Eu. Med., (x,2,x,1); *T 362, 12*
∗*B. madritensis* L.: Thscap, Eu. Med., (x,2,x,2); *T & al. 144.*
∗*B. rigidus* Roth: Thscap, Peleosubtrop., (4,3,3,2); *T & C 363.*
B. rubens L.: Thscap, Med.-Turan., (x,2,x,2); (T & C 2003) *T & al. 156.*
∗*B. tectorum* L.: Thscap, Paleotemp., (x,2,x,2); *T 323, 424.*
∗*Cynodon dactylon* (L.) Pers.: Grhiz, Cosmop., (4,3,3,1); *T & al. 221.*
∗*Cynosurus echinatus* L.: Thscap, Eu. Med., (2,3,x,1); *T 325.*
Dactylis glomerata L. subsp. *hispanica* (Roth) Nyman: Hcaesp, St. Med, (3,3,4,2); (T & C 2003) *T & C 386.*
∗*Dasypyrum villosum* (L.) P. Candargy: Thscap, Med.-Turan., (3,3,5,1); *T 346.*
∗*Desmazeria marina* (L.) Druce: Thscap, Med.-Atl., (4,3,5,3); *T & C 385.*
∗*Digitaria sanguinalis* (L.) Scop.: Thscap, Cosmop., (4,6,3,1); *T & al. 101, T 6.*
∗*Eleusine indica* (L.) Gaertner: Thscap, Adv., (4,3,x,1); *T 324, 7.*
∗*Festuca arundinacea* Schreber: Hcaesp, Paleotemp., (3,7,2,1); *T & C 364, T 14.*
Gaudinia fragilis (L.) Beauv.: Thscap, Eu. Med., (3,5,x,1); (Halácsy 1904: 442) *T 326.*
Hainardia cylindrica (Willd.) W. Greuter (*Monerma cylindrica* Willd.): Thscap, Eu. Med., (2,6,5,3); (Halácsy 1904: 448) *T & C 388.*
∗*Hordeum hystrix* Roth: Thscap, St.-Med., (4,6,5,1); *T & al. 217.*
∗*H. murinum* L.: Thscap, Eu. Med, (x,2,5,2); *T & al. 105, T 432, 436.*
∗*Imperata cylindrica* (L.) Raeuschel: Grhiz, Cosmop., (4,3,4,2); *T & al. 223.*
∗*Lagurus ovatus* L.: Thscap, Eu. Med., (3,2,x,2); *T & al. 172.*
∗*Lolium rigidum* Gaudin subsp. *rigidum*: Thscap, Paleosubtrop, (x,x,x,2); *T & al. 307, T 435.*
Lophochloa cristata (L.) Hyl.: Thcaesp, Subcosmop., (x,2,x,2); (T & C 2003) *T & al. 170, T 430.*
∗*Parapholis incurva* (L.) C.E. Hubbard: Thscap, Med.-Atl., (4,3,4,3); *T & C 365, T 8.*
∗*Phalaris brachystachys* Link: Thscap, St.-Med., (4,x,x,2); *T & C 370.*
P. minor Retz.: Thscap, Paleosubtrop, (4,x,x,2); (T & C 2003) *T 327.*
∗*Phragmites australis* (Cav.) Trin.: Grhiz, Subcosmop., (4,7,4,2); *T & al. 245.*
∗*Piptatherum miliaceum* (L.) Cosson subsp. *miliaceum*: Hcaesp, Med.-Turan., (x,4,3,2); *T & al. 118, 129*
∗*Poa annua* L.: Thscap, Cosmop., (3,5,3,1); *T & al. 119, T 433.*
P. bulbosa L.: Hcaesp, Paleotemp., (x,3,x,1); (T & C 2003) *T & al. 203.*
∗*P. trivialis* L.: Hcaesp, Paleotemp., (x,x,3,1); *T & al. 226.*
∗*P. trivialis* L. subsp. *silvicola* (Guss.) H. Lindb. fil.: Hcaesp, Eu. Med., (x,x,3,1); *T & C 389.*

∗*Polypogon monspeliensis* (L.) Desf.: Thscap, Paleosubtrop., (4,x,x,2); *T & C 398.*
∗*P. viridis* (Gouan) Breistr.: Hcaesp, Paleosubtrop., (x,6,x,1); *T & al. 205.*
∗*Setaria viridis* (L.) Beauv.: Thscap., Subcosmop., (4,5,3,1); *T & C 387.*
∗*Sorghum halepense* (L.) Pers. : Grhiz, Cosmop., (3,6,3,1); *T & al. 110, T 36.*
∗*Triticum durum* Desf.: Thscap, Adv., (x,x,x,1); *T 328.*
∗*Vulpia ciliata* Dumort.: Thcaesp, Eu. Med., (x,3,2,2); *T 5, 454.*
∗*Zea mays* L.: Thscap, Adv., (4,x,3,1); *T 347.*

Iridaceae
Freesia refracta (Jacq.) Ecklon: Gbulb, Adv., (4,x,x,1); (T & C 2003) *T & al. 187.*
∗*Gladiolus italicus* Miller: Gbulb, Eu. Med., (4,3,5,1); *T & al. 186.*
∗*Iris albicans* Lange: Grhiz, Adv., (x,x,x,1); obs.
Romulea bulbocodium (L.) Sebastiani & Mauri: Gbulb, St. Med., (x,x,x,1); (Halácsy 1904: 192).

Juncaceae
∗*Juncus acutus* L. subsp. *acutus*: Hcaesp, Eu. Med., (3,6,5,3); *T & al. 227.*
J. subulatus Forskål.:Grhiz, St. Med., (4,6,4,x); (Halácsy 1904: 283).

Lemnaceae
Lemna gibba L.: Hydrnat, Subcosmop., (4,8,x,1); (Halácsy 1904: 295).

Liliaceae
∗*Allium ampeloprasum* L.: Gbulb, Eu. Med., (2,5,3,1); *T & al. 176.*
∗*A. cepa* L.: Gbulb, Adv., (3,4,3,1); *T & al. 289.*
∗*A. roseum* L.: Gbulb, St. Med., (3,4,3,1); *T & al. 175.*
∗*Asphodelus aestivus* Brot.: Grhiz, St. Med., (x,2,4,1); *T 329.*
∗*A. fistulosus* L.: Hscap, Paleosubtrop., (4,2,x,1); *T 349.*
∗*Muscari commutatum* Guss.: Gbulb, E. Med., (x,2,4,1); *T & C 366.*
∗*Ornithogallum collinum* Guss.: Gbulb, St. Med., (x,x,x.1); *T 348.*
∗*Smilax aspera* L.: Nph, Paleosubtrop., (3,4,3,1); obs.
∗*Urginea maritima* (L.) Baker: Gbulb, St. Med., (x,1,4,2); obs.

Potamogetonaceae
Ruppia maritima L. (*R. rostellata* Koch): Hydrnat, Cosmop., (4,8,5,3); (Halácsy 1904: 145).

Discussion and conclusions

Of the 346 taxa of vascular plants comprising the wild urban flora of Mesolongi, 234 are recorded from the area for the first time. 112 taxa are already known from bibliographical references and 40 of these have not yet been confirmed nor definitely rejected.

The chorological spectrum of the flora of Mesolongi does not differ much from that of Patras (Chronopoulos & Christodoulakis 1996).The predominance of the Mediterranean element with 44% reflects the phytogeographical position and the microclimatic characteristics of the study area.

The percentage of adventives found in the flora of Mesolongi (13%) is comparable to

that found in Patras (11.4%) (Chronopoulos & Christodoulakis 2000) and other Mediterranean cities of Central and Southern Italy (Celesti Grapow & al. 1996).

Taxa of American and Asiatic origin dominate the adventive flora of the study area (Table 4) and this is also the case with the city of Patras (Chronopoulos & Christodoulakis 2000) and other regions of the Mediterranean (Quezel & al. 1990; Celesti Grapow 1993-94) and Central Europe (Pyšek & al. 1995; Sukopp 1995).

Neophytes, which make up the majority of the adventive flora of Mesolongi (34 taxa, 75.6%), reached the area after the discovery of America and the subsequent increase in international trade. The Venetian (17th Century) and Turkish (17th – 18th Century) invasions also facilitated the introduction of neophytes.

Archaeophytes in the adventive flora of Mesolongi (11 taxa, 24.4%) are fewer than those recorded in other cities of Central Europe (see Kowarik 1990; Landolt 1991). This is because archaeophytes have merged greatly into the native Greek flora and are thus now difficult to recognize. These plants are considered to have been introduced to Greece around 6500-6000 BC by agricultural methods (see Lang 1994; Chronopoulos & Christodoulakis 2000). Archaeophytes identified in this study are common species, e.g. *Allium cepa*, *Lens culinaris*, *Vitis vinifera*, etc. (Table 3).

Ornamental and agricultural escapes form three quarters of the adventive flora of the city (73.3%) and are the main source of adventives (Table 5).

The life-form spectrum of Mesolongi's flora (Table 6) reflects the environmental conditions prevailing in the city. Due to the long summer aridity, therophytes predominate (53.5%). This is also due to the warmer and drier microclimates that characterize urban environments. The same high proportion of therophytes (53.7%) is also seen in the city of Patras (Chronopoulos & Christodoulakis 1996).

The high percentage of Mediterranean elements in combination with the high percentage of therophytes, indicates the strong Mediterranean character of Mesolongi's flora. This becomes clearer from its ecological analysis.

Although there are some reservations about using Boehling's (1995) indicator values on the study area, we have used them because they are the only values available for Greece. It is believed that these will increase the knowledge of the ecology of the flora of Mesolongi and consequently the understanding of its chorological character.

From the ecological spectra of the Mesolongi flora (Table 7) we conclude that the species of generally warmer biotopes account for about 60% of the total flora of Mesolongi. This means that thermophilous species (the majority of which are therophytes) can grow very well in the study area.

Furthermore, many species (37.3%) show great adaptation to a wide range of temperatures and grow equally well in high summer temperatures and low winter temperatures. Consequently, warmth is not a limiting factor for the majority of the flora. Phanaerophytes, chamaephytes and most hemicryptophytes belong to this group.

Although xerophytes (63.3%) dominate the flora, moisture is not a limiting factor for many species (36.7%) as these are found in moist biotopes. This reflects the moisture conditions of the study area. In dry biotopes mainly Mediterranean and Mediterranean-Turanian taxa are found, while moist biotopes host the Mediterranean-Atlantic taxa.

For many taxa (28%) soil reaction is not a limiting factor. Species growing on slightly acidic to slightly alkaline soils predominate (32.7%) in the flora. Basiphilous (18.2%) and

calcicolous plants (12.4%) are found with high percentages, and this reflects the presence of alkaline soils, due mainly to the geological substrate.

Halophobic taxa form a significant percentage (75.1%) of the flora of Mesolongi, which is a coastal city. This is due both to the predominant strong NE winds coming from the inland which reduce the sea influence and the predominant strong SW winds coming from the sea whose effect is inhibited by the city's infrastructure layout. As a result the influence of the sea in the city centre is very limited. Furthermore, halophytes and salt tolerant plants account for a fairly large percentage of species (24.6%). These taxa are not only found in coastal habitats but also in the inner city area.

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