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# Contribution to the urban ecology of Greece: The flora of the city of Patras and the surrounding area

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## Abstract

Chronopoulos G. and Christodoulakis D. 1996. Contribution to the urban ecology of Greece: the flora of the city of Patras and the surrounding area. *Bot. Helv.* 106: 159–176.

The wild vascular urban flora of the area of Patras is especially rich and consists of 808 taxa, 575 of which are reported here for the first time. The great number of species of the area in relation to its extent (ca. 55 km<sup>2</sup>) is mainly due to the existence of a great variety of biotopes, as well as to the richness of the Greek flora. A concise species list with indications of life-forms and chorological data is provided. In the life-form spectrum, therophytes are over-represented (53.7%) mainly as a result of the long dry period and, to a lesser degree, the “city” factor. Fifteen chorological groups are distinguished, with the Mediterranean element being the dominant one. Ten Greek and 16 Balkan endemic taxa, as well as 100 adventive taxa are present. The distribution of the endemic element in natural and man-made habitats of the urban environment is discussed. Finally, a preliminary attempt to compare the data of the city of Patras to those available of central European cities is carried out.

*Key words:* Urban flora, chorology, floristics, Greece.

## Introduction

Until today, the study of natural ecosystems in Greece has been the main field of scientific interest from the botanical and ecological aspect. In contrast, no attention has been given to the urban areas and any relevant systematic and complete study has been lacking.

This gap is hoped to be filled as far as possible by the research program on the urban ecology of Greece, initiated by the authors in 1993 at the Botanical Institute of the University of Patras. The purpose of this program is to investigate the Greek cities concerning their flora, vegetation, and biotopes, and their correlation with the abiotic factors which compose the ecological structure of a city in general (types of city construction, microclimate, soil, etc.).

In this study, the flora of a Greek city is presented for the first time. Its results will firstly be the basis for further studies on urban ecology and secondly, will contribute towards the larger scale survey of “Flora Hellenica” a collaborative project being carried

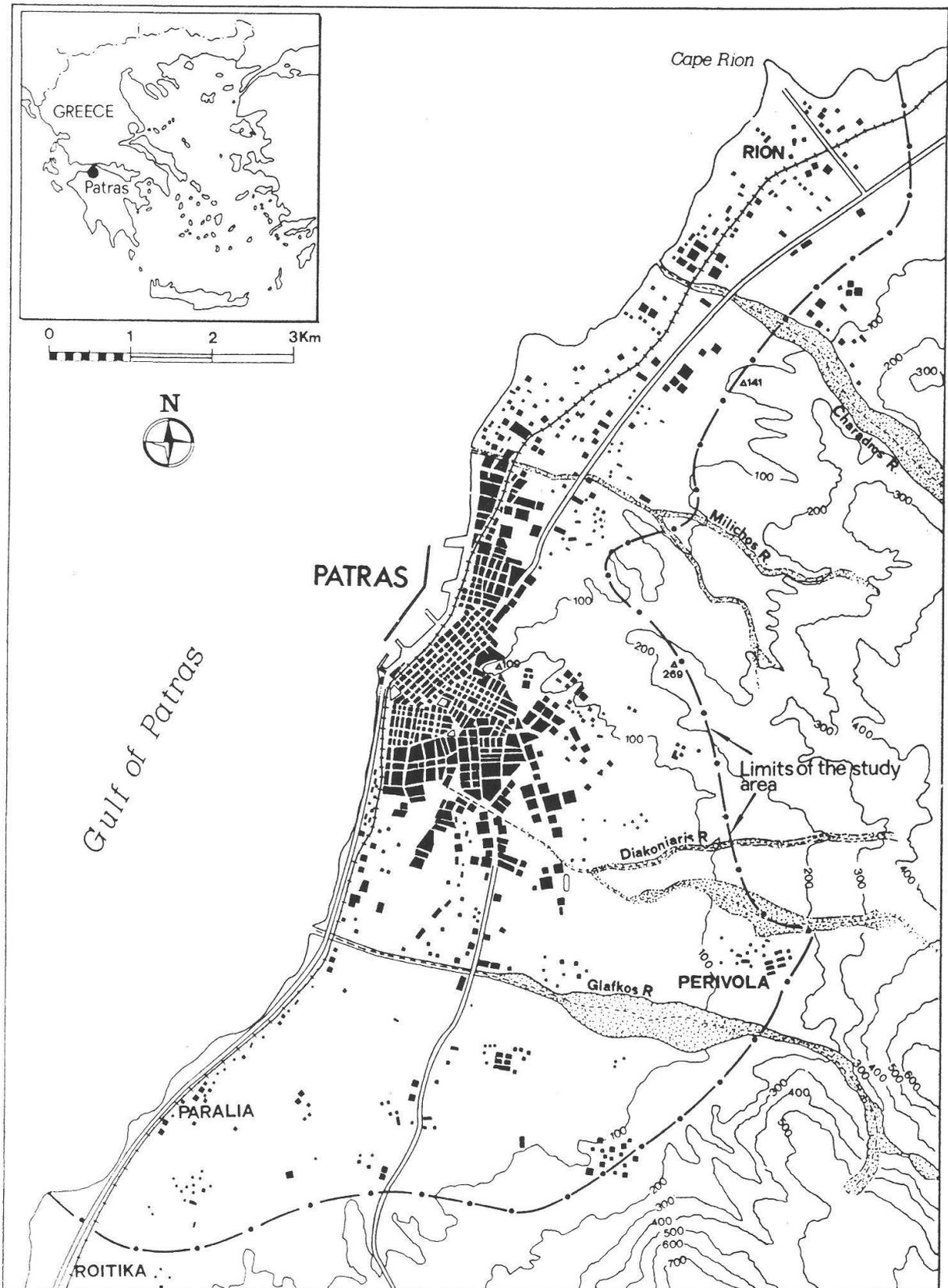


Fig. 1. Map of the study area.

out by the Botanical Institutes of Patras and Copenhagen and the Botanical Museums of Berlin and Lund.

The most important references relevant to the flora of the area of Patras are: Halácsy (1894), "Conspectus florae graecae" (Halácsy 1901–1904) and Bornmüller (1928). Also, a study of the vegetation of the area of Patras has been made by Lavrentiades (1976).

*Features of the study area.* The study area lies on the NW coast of the Peloponnese. It covers an area of ca. 55 km<sup>2</sup> with a population of ca. 170,000 inhabitants and contains the main city of Patras and its suburbs. The altitude of the area is between 0 and 269 m (Fig. 1).

From a geological point of view, the largest part of the area consists of holocenic alluvial sediments which comprise mainly sandy-clay materials, pebbles and cobbles. The hills which lie to the east and south of the city are of alternating beds of marls, clays, coarse-grained sands, sandstones and conglomerates, all of Pliocenic or Pleistocenic age (Tsophlias 1970, 1980, Loftus and Tsophlias 1971, Mettos and Karpchakis 1985).

According to Walter (1970) and based on the ombrothermic diagram (Fig. 2), the climate of Patras belongs to the class IV 2, i.e., a predominantly typical Mediterranean climate with a fairly high rainfall in winter and a dry period of almost five-month (from early May to late September).

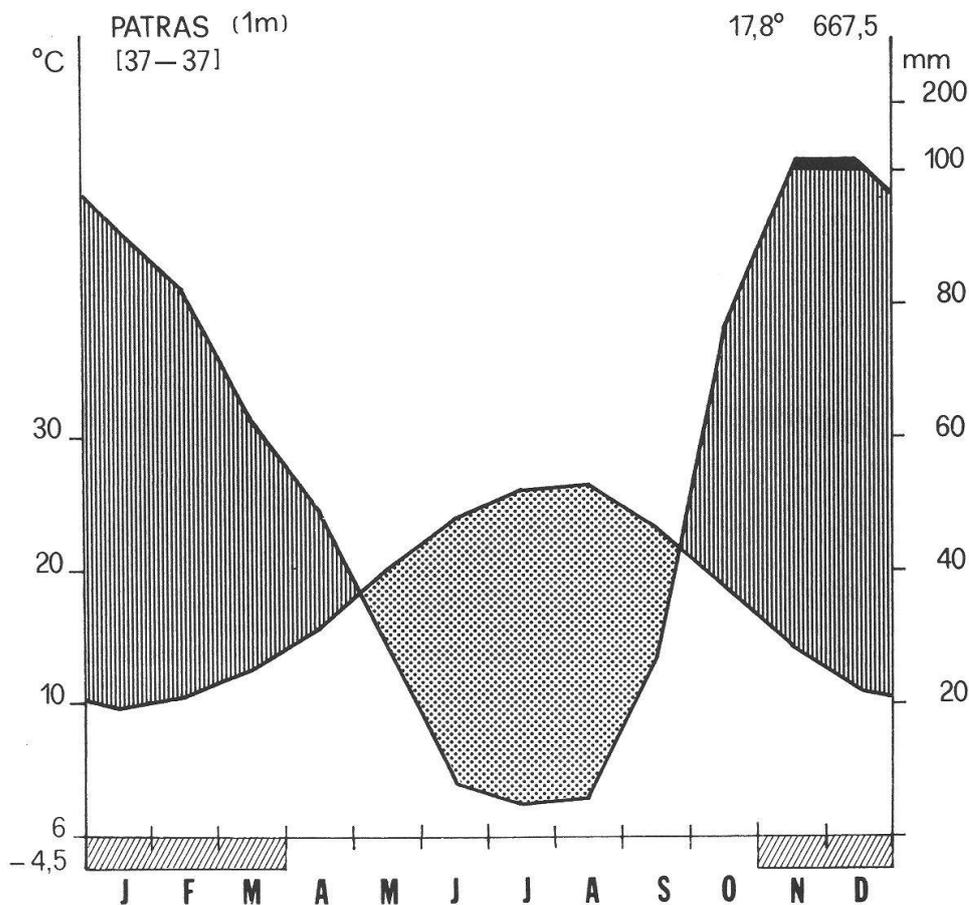


Fig. 2. Ombrothermic diagram of Patras.

## Materials and methods

This study is based on collections and field observations which were made from May 1993 to October 1995. A total of about 3,000 specimens were collected during different seasons of the year and from various biotopes within the city and its suburbs. Herbarium specimens are deposited at the Botanical Museum of the University of Patras (UPA). Only vascular wild plants, together with some frequent subspontaneous escapes from cultivation, were taken into consideration in this study. All others were omitted since their distribution is controlled by man.

The nomenclature followed here is after Tutin *et al.* (1964–1980) and, where appropriate, Greuter *et al.* (1984–1989). The authors names are given in the plant list only for the taxa not included in the above-mentioned two publications. The life-form categories follow the system by Raunkiaer (1934). For the chorological types, the classification by Pignatti (1982), in combination with that of Davis (1965–1985), has been used. The characterization of adventive taxa is according to Yannitsaros (1982).

The plant list also includes bibliographical references. Families, genera and species have been placed in alphabetical order.

## Results

The vascular flora of the city of Patras area consists of 808 taxa from 99 families and 423 genera (Table 1). In addition, two hybrids have been included in the plant list, but these are not numbered and have not been taken into account in the floristic analysis (Tables 1–3).

More than one third (37.3%) of the taxa found in the studied area belongs to three families: *Leguminosae*, *Compositae* and *Gramineae*. The families of *Cruciferae* and *Labiatae* are also well represented by 39 and 31 taxa, respectively.

In the life-form spectrum found in the Patras flora (Table 2), therophytes form the highest proportion (53.7%), followed by the hemicryptophytes (21%), while other forms occur in much smaller percentages.

Based on the data shown in the plant list, the species and subspecies of the area can be divided into 15 chorological groups as far as their distribution is concerned (Table 3). 316 taxa (39.1%) are considered as widely distributed. From these the sub- and cosmopolitan groups comprise 103 taxa, while the Mediterranean-Turanian and Paleotemperate groups are represented by 70 and 44 taxa, respectively. The other chorological groups of this category include fewer taxa.

The Mediterranean elements (Stenomediterranean, Eurymediterranean and East-mediterranean) are over represented in the flora of Patras area with a percentage of 45.3% (366 taxa). Of these, the Stenomediterranean element is dominant (176 taxa, 21.8%).

The endemic flora consists of 26 taxa (3.2%) from which 10 taxa are strictly endemic to Greece and 16 taxa (2%) are endemic to the Balkan Peninsula.

Adventive taxa, as a specific part of the flora registered, represent 12.4% (100 taxa) of the total flora.

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

Systematic unit	Families	Genera	Species	Subspecies	Sp. & Subsp.	%
Pteridophyta	3	5	6	0	6	0.7
Gymnospermae	3	3	3	0	3	0.4
Dicotyledones	80	330	542	94	636	78.7
Monocotyledones	13	85	137	26	163	20.2
Total	99	423	688	120	808	100

Table 2. Life-form spectrum of the Patras flora.

Life-forms		Number of taxa	%
Therophytes	Th	434	53.7
Th. scapose	Thscap	400	
Th. caespitose	Thcaesp	7	
Th. reptant	Thrept	19	
Th. rosulate	Thros	1	
Th. parasite	Thpar	7	
Hemicryptophytes	H	170	21
H. scapose	Hscap	84	
H. caespitose	Hsaesp	25	
H. reptant	Hrept	5	
H. rosulate	Hros	14	
H. biennial	Hbienn	40	
H. scandent	Hscand	2	
Geophytes	G	90	11.1
G. bulbous	Gbulb	42	
G. rhizomatosus	Grhiz	47	
G. radicant	Grad	1	
Chamaephytes	Ch	32	4
Ch. suffruticose	Chsuffr	20	
Ch. fruticose	Chfrut	7	
Ch. reptant	Chrept	3	
Ch. succulent	Chsucc	2	
Nano-phanerophytes	Nph	19	2.4
Phanerophytes	Ph	59	7.3
Ph. arborescent	Phscap	25	
Ph. shrubby	Phcaesp	23	
Ph. lianas	Phlian	10	
Ph. succulent	Phsucc	1	
Hydrophytes	Hyd	4	0.5
Hyd. radicant	Hydrad	4	
Total		808	100

Table 3. Chorological spectrum of the Patras flora.

Chorological group	Number of taxa	%
Widely distributed taxa		
Sub- & Cosmopolitan (Subcosmop., Cosmop.)	103	12.8
Eurasiatic (Euras.)	18	2.2
Paleotemperate (Paleotemp.)	44	5.4
Mediterranean-Turanian (Med.-Turan.)	70	8.7
Mediterranean-Atlantic (Med.-Atl.)	26	3.2
European (Europ.)	9	1.1
European-Caucasian (Europ.-Caucas.)	13	1.6
Pan-, Paleo-, Paleosub-, Sub-tropical (Pantrop., Paleotrop., Paleosubtrop., Subtrop.)	12	1.5
Eurosiberian (Eurosiber.)	10	1.2
Circumboreal (Circumbor.)	11	1.4
Mediterranean taxa		
Stenomediterranean (St. Med.)	176	21.8
Eurymediterranean (Eu. Med.)	138	17
Eastmediterranean (E. Med.)	52	6.5
Endemic taxa		
Greek endemics (Greek)	10	1.2
Balkan endemics (Balkan)	16	2
Adventives (Adv.)	100	12.4
Total	808	100

## Plant list

Abbreviations and symbols used:

Life-forms = see Table 2

Chorology = see Table 3

\* = new record for the area of Patras

Obs. = observation only, no herbarium specimens.

### Pteridophyta

Aspleniaceae

*Asplenium ceterach*: Hros, Euras.

Equisetaceae

\**Equisetum ramosissimum*: Grhiz, Circumbor.

\**E. telmateia*: Grhiz, Circumbor.

Polypodiaceae

\**Adiantum capillus-veneris*: Grhiz, Pantrop.;  
Obs.

\**Anogramma leptophylla*: Thcaesp, Cosmop.

\**Pteridium aquilinum*: Grhiz, Cosmop.

### Gymnospermae

Cupressaceae

\**Cupressus sempervirens*: Phscap, E. Med.

Ephedraceae

\**Ephedra distachya*: Nph, St. Med.

Pinaceae

*Pinus halepensis*: Phscap, St. Med.

### Dicotyledones

Acanthaceae

\**Acanthus spinosus*: Hscap, E. Med.

Aizoaceae

\**Carpobrotus edulis*: Chsuffr, Adv.

Amaranthaceae

\**Amaranthus albus*: Thscap, Adv.

\**A. blitoides*: Thscap, Adv.

\**A. blitum*: Thscap, Cosmop.

\**A. cruentus*: Thscap, Adv.

\**A. deflexus*: Thscap, Adv.

- \**A. retroflexus*: Thscap, Adv.  
 Anacardiaceae  
 \**Pistacia lentiscus*: Phcaesp, St. Med.  
 \**P. terebinthus*: Phcaesp, Eu. Med.  
*Schinus molle*: Phscap, Adv.; (Bornmüller 1928: 191)  
 Apocynaceae  
*Nerium oleander*: Phcaesp, St. Med.  
*Vinca major* ssp. *major*: Chrept, Eu. Med.  
 Araliaceae  
 \**Hedera helix*: Phlian, Med.-Atl.  
 Aristolochiaceae  
 \**Aristolochia rotunda*: Gbulb, Eu. Med.  
 \**A. sempervirens*: Phlian, St. Med.  
 Asclepiadaceae  
 \**Asclepias curassavica*: Grhiz, Adv.  
*Cionura erecta*: Chsuffr, Europ.-Caucas.; (Halácsy 1902: 292)  
 Boraginaceae  
*Anchusa hybrida*: Hscap, St. Med.  
 \**A. italica*: Hscap, Eu. Med.  
 \**Borago officinalis*: Thscap, Eu. Med.  
 \**Cerintho major*: Thscap, St. Med.  
 \**Cynoglossum creticum*: Hbienn, Med.-Turan.  
 \**Echium arenarium*: Hbienn, St. Med.  
 \**E. italicum*: Hbienn, Eu. Med.  
*E. plantagineum*: Thscap, Eu. Med.  
*Heliotropium europaeum*: Thscap, Med.-Turan.  
*H. hirsutissimum*: Thscap, E. Med.  
 \**Lithospermum arvense*: Thscap, Eu. Med.  
*L. purpureo-caeruleum*: Hscap, Europ.  
 \**Myosotis ramosissima* ssp. *ramosissima*: Thscap, Euras.  
 \**Neatostema apulum*: Thscap, St. Med.  
 \**Nonea obtusifolia*: Thscap, E. Med.  
*Symphytum bulbosum*: Grhiz, Europ.  
 Cactaceae  
 \**Opuntia ficus-barbarica*: Phsucc, Adv.; Obs.  
 Campanulaceae  
 \**Campanula erinus*: Thscap, St. Med.  
*C. ramosissima*: Thscap, St. Med.  
*C. spatulata* ssp. *spruneriana*: Hscap, Balkan  
*Legousia speculum-veneris*: Thscap, Eu. Med.  
 Capparaceae  
 \**Capparis spinosa*: Nphscap, Euras.  
 Caprifoliaceae  
 \**Lonicera implexa*: Phlian, St. Med.  
 \**L. japonica*: Phlian, Adv.  
 \**Sambucus ebulus*: Grhiz, Eurosiber.  
 \**Viburnum tinus*: Phcaesp, St. Med.  
 Caryophyllaceae  
 \**Agrostemma githago*: Thscap, Eurosiber.  
*Arenaria leptoclados*: Thscap, Paleotemp.  
 \**Cerastium brachypetalum* ssp. *roeseri*: Thscap, Eu. Med.  
*C. glomeratum*: Thscap, Subcosmop.  
 \**Dianthus tripunctatus*: Thscap, St. Med.  
 \**Herniaria hirsuta*: Thscap, Paleotemp.  
*Minuartia globulosa*: Thscap, E. Med.  
*M. hybrida*: Thscap, Paleotemp.  
*M. mediterranea* (Link) K. Maly ssp. *laxiflora* Kamari: Thscap, St. Med.  
 \**Petrorhagia obcordata*: Thscap, Balkan  
 \**P. saxifraga*: Hcaesp, Eu. Med.  
*P. velutina*: Thscap, St. Med.  
 \**Polycarpon tetraphyllum* ssp. *tetraphyllum*: Thscap, Eu. Med.  
 \**Sagina apetala*: Thscap, Eu. Med.  
 \**Saponaria officinalis*: Hscap, Eurosiber.  
*Silene bellidifolia*: Thscap, St. Med.  
 \**S. cretica*: Thscap, St. Med.  
*S. colorata*: Thscap, St. Med.  
 \**S. gallica*: Thscap, Cosmop.  
*S. graeca*: Thscap, Balkan  
*S. italica* ssp. *italica*: Hros, Eu. Med.  
 \**S. nocturna*: Thscap, St. Med.  
 \**S. vulgaris* ssp. *vulgaris*: Hscap, Subcosmop.  
 \**Spergularia bocconii*: Thscap, Subcosmop.  
 \**Stellaria cupaniana*: Thscap, St. Med.  
*S. media* ssp. *media*: Thrept, Cosmop.  
 \**S. media* ssp. *neglecta*: Thscap, Paleotemp.  
 \**S. pallida*: Thscap, Paleotemp.  
 Chenopodiaceae  
*Atriplex halimus*: Phcaesp, St. Med.  
 \**A. portulacoides*: Chfrut, Circumbor.  
 \**A. prostrata*: Thscap, Paleotemp.  
 \**A. tatarica*: Thscap, Med.-Turan.  
 \**Bassia scoparia*: Thscap, Adv.  
 \**Beta maritima*: Hscap, Eu. Med.  
 \**Chenopodium album*: Thscap, Subcosmop.  
 \**C. ambrosioides*: Thscap, Adv.  
 \**C. murale*: Thscap, Subcosmop.  
 \**C. opulifolium*: Thscap, Paleotemp.  
 \**C. vulvaria*: Thscap, Paleotemp.  
 \**Salsola kali* ssp. *tragus*: Thscap, Paleotemp.  
 \**S. soda*: Thscap, Paleotemp.  
 \**Sarcocornia fruticosa*: Chsucc, Subcosmop.  
 Cistaceae  
*Cistus creticus*: Nph, St. Med.  
 \**C. salviifolius*: Nph, St. Med.  
*Fumana arabica*: Chsuffr, Med.-Turan.  
*F. thymifolia*: Chsuffr, St. Med.  
 \**Helianthemum salicifolium*: Thscap, Eu. Med.  
*Tuberaria guttata*: Thscap, Eu. Med.  
 Compositae  
 \**Achillea millefolium* ssp. *millefolium*: Hscap, Eurosiber.  
*Aetheorhiza bulbosa* ssp. *microcephala*: Gbulb, St. Med.

- Anacyclus clavatus*: Thscap, St. Med.  
 \**Anthemis altissima*: Thscap, Euras.  
*A. arvensis* ssp. *incrassata*: Thscap, Subcosmop.  
*A. chia*: Thscap, E. Med.; (Bornmüller 1928: 289)  
 \**A. cotula*: Thscap, Eu. Med.  
*A. peregrina* ssp. *peregrina* × *A. tomentosa*  
 \**Aster squamatus*: Thscap, Adv.  
 \**A. tripolium*: Hbienn, Euras.  
*Asteriscus aquaticus*: Thscap, St. Med.  
*Atractylis cancellata*: Thscap, St. Med.  
 \**A. gummifera*: Hros, St. Med.  
*Bellis annua*: Thscap, St. Med.  
 \**B. perennis*: Hros, Circumbor.  
*B. sylvestris*: Hros, St. Med.  
 \**Bidens pilosa*: Thscap, Adv.  
 \**Calendula arvensis*: Thscap, Eu. Med.  
 \**C. officinalis*: Thscap, Adv.  
 \**Carduus pycnocephalus* ssp. *albidus*: Hbienn, Med.-Turan.  
*C. pycnocephalus* ssp. *arabicus*: Hbienn, St. Med.  
*Carlina corymbosa* ssp. *graeca*: Hscap, Balkan  
 \**Carthamus lanatus*: Thscap, Eu. Med.  
*Centaurea calcitrapa*: Hbienn, Subcosmop.  
 \**C. cyanus*: Thscap, Subcosmop.  
 \**C. solstitialis*: Thscap, Subcosmop.  
*Chamomilla recutita*: Thscap, Subcosmop.  
*Chondrilla juncea*: Hscap, Eurosiber.  
 \**Chrysanthemum coronarium*: Thscap, St. Med.  
 \**C. segetum*: Thscap, Med.-Turan.  
 \**Cichorium intybus*: Hscap, Cosmop.  
 \**Cirsium creticum*: Hbienn, E. Med.  
 \**C. vulgare*: Hbienn, Subcosmop.  
 \**Cnicus benedictus*: Thscap, Med.-Turan.  
 \**Conyza albida*: Thscap, Adv.  
 \**C. bonariensis*: Thscap, Adv.  
*C. canadensis*: Thscap, Adv.  
 \**Cosmos bipinnatus* Cav.: Thscap, Adv.  
 \**Crepis foetida* ssp. *commutata*: Thscap, E. Med.  
 \**C. foetida* ssp. *foetida*: Thscap, Eu. Med.  
*C. hellenica* ssp. *hellenica*: Thscap, Greek  
 \**C. sancta*: Thscap, Med.-Turan.  
 \**C. setosa*: Thscap, E. Med.  
*C. vesicaria* ssp. *vesicaria*: Thscap, Eu. Med.  
 \**C. zacintha*: Thscap, St. Med.  
*Crupina crupinastrum*: Thscap, St. Med.  
*Cynara cardunculus*: Hscap, St. Med.  
*Dittrichia graveolens*: Thscap, Med.-Turan.  
 \**D. viscosa*: Hscap, Eu. Med.  
*Evax pygmaea*: Thrept, St. Med.  
 \**Filago eriocephala*: Thscap, St. Med.  
 \**F. pyramidata*: Thscap, Eu. Med.  
 \**F. vulgaris*: Thscap, Paleotemp.  
 \**Gnaphalium luteo-album*: Thscap, Subcosmop.  
 \**Hedypnois cretica*: Thscap, St. Med.  
 \**Helianthus annuus*: Thscap, Adv.  
 \**H. tuberosus*: Gbulb, Adv.  
 \**Helichrysum stoechas* ssp. *barrelieri*: Chsuffr, St. Med.  
 \**Hyoseris scabra*: Thros, St. Med.  
*Hypochoeris achyrophorus*: Thscap, St. Med.  
 \**H. cretensis*: Hscap, E. Med.  
 \**H. radicata*: Hros, Europ.-Caucas.  
 \**Inula crithmoides*: Chsuffr, Europ.  
 \**Lactuca saligna*: Thscap, Med.-Turan.  
 \**L. serriola*: Hbienn, Eurosiber.  
*Leontodon tuberosus*: Hros, St. Med.  
*Logfia gallica*: Thscap, Eu. Med.  
 \**Notobasis syriaca*: Thscap, St. Med.  
 \**Onopordum illyricum*: Hbienn, St. Med.  
 \**Otanthus maritimus*: Chsuffr, Med.-Atl.  
 \**Pallenis spinosa* ssp. *spinosa*: Thscap, Eu. Med.  
*Phagnalon graecum*: Chsuffr, E. Med.  
 \**Picnomon acarna*: Hscap, St. Med.  
*Picris echioides*: Thscap, Eu. Med.  
*P. sprengerana*: Thscap, Europ.  
 \**Ptilostemon stellatus*: Thscap, St. Med.  
 \**Pulicaria dysenterica*: Hscap, Eu. Med.  
 \**P. odora*: Hscap, St. Med.  
*Reichardia picroides*: Hscap, St. Med.  
 \**Rhagadiolus stellatus*: Thscap, Eu. Med.  
 \**Scolymus hispanicus*: Hbienn, Eu. Med.  
*Scorzonera cana*: Hscap, Euras.  
 \**S. crocifolia*: Hscap, Greek  
 \**Senecio vernalis*: Thscap, Med.-Turan.  
*S. vulgaris*: Thscap, Cosmop.  
 \**Silybum marianum*: Hbienn, Med.-Turan.  
 \**Sonchus asper* ssp. *asper*: Thscap, Subcosmop.  
 \**S. asper* ssp. *glaucescens*: Hbienn, Paleotemp.  
 \**S. oleraceus*: Thscap, Subcosmop.  
 \**S. cf. tenerrimus*: Thscap, St. Med.  
 \**Taraxacum apollonis* Dahlst.: Hros, Greek  
 \**T. cf. dialeptum* Sonck: Hros, Greek  
 \**T. hellenicum*: Hros, St. Med.  
 \**T. scaturiginosum*: Hros, Europ.  
 \**Tolpis barbata*: Thscap, St. Med.  
*Tragopogon hybridus*: Thscap, Eu. Med.  
*T. porrifolius* ssp. *porrifolius*: Hbienn, Eu. Med.  
 \**Tussilago farfara*: Grhiz, Paleotemp.  
*Urospermum picroides*: Thscap, Eu. Med.  
 \**Xanthium spinosum*: Thscap, Adv.  
 \**X. strumarium* ssp. *cavanillesi*: Thscap, Europ.  
 Convolvulaceae  
 \**Calystegia sepium* ssp. *sepium*: Hscand, Paleotemp.

- \**Convolvulus arvensis*: Grhiz, Cosmop.  
 \**C. betonicifolius*: Grhiz, E. Med.  
*C. elegantissimus*: Hscand, E. Med.  
 \**Cuscuta approximata*: Thpar, Paleosubtrop.  
 \**C. campestris*: Thpar, Adv.  
*C. palaestina* ssp. *palaestina*: Thpar, E. Med.  
 \**Ipomoea indica*: Grhiz, Adv.  
 \**I. purpurea*: Thscap, Adv.
- Cornaceae  
*Cornus sanguinea*: Phcaesp, Euras.
- Crassulaceae  
 \**Sedum caespitosum*: Thscap, St. Med.  
 \**S. cepaea*: Thscap, Eu. Med.  
 \**S. litoreum*: Thscap, St. Med.  
 \**S. rubens*: Thscap, Eu. Med.  
 \**S. sediforme*: Chsucc, St. Med.  
*Umbilicus chloranthus*: Gbulb, Balkan  
 \**U. horizontalis*: Gbulb, St. Med.
- Cruciferae  
*Alyssum repens* ssp. *trichostachyum*, Chsuffr, Europ.-Caucas.; (Bornmüller 1928: 173)  
*A. simplex*: Thscap, Med.-Turan.  
 \**A. strigosum*: Thscap, E. Med.  
*Arabis verna*: Thscap, St. Med.  
*Biscutella didyma*: Thscap, Med.-Turan.  
 \**Brassica nigra*: Thscap, Subcosmop.  
 \**B. oleracea*: Hbienn, Adv.  
 \**B. rapa* ssp. *sylvestris*: Thscap, Med.-Atl.  
 \**Bunias erucago*: Thscap, Eu. Med.  
 \**Cakile maritima*: Thscap, Med.-Atl.  
 \**Calepina irregularis*: Thscap, Med.-Turan.  
 \**Capsella bursa-pastoris*: Hbienn, Cosmop.  
 \**Cardamine graeca*: Thscap, St. Med.  
 \**C. hirsuta*: Thscap, Cosmop.  
 \**Cardaria draba*: Grhiz, Med.-Turan.  
*Clypeola jonthlaspi*: Thscap, Eu. Med.  
 \**Coronopus didymus*: Thrept, Adv.  
*C. squamatus*: Thrept, Subcosmop.  
 \**Diploaxis muralis*: Thscap, Med.-Atl.  
 \**Erophila praecox*: Thscap, Eu. Med.  
 \**Eruca sativa* ssp. *longirostris*: Thscap, Med.-Turan.  
 \**Erysimum graecum*: Hbienn, Greek  
 \**Hirschfeldia incana*: Hbienn, Med.-Turan.  
 \**Lepidium graminifolium*: Hscap, Eu. Med.  
 \**L. sativum* ssp. *sativum*: Thscap, Adv.  
 \**Lobularia maritima*: Hscap, St. Med.  
 \**Lunaria annua* ssp. *annua*: Hbienn, Adv.  
 \**Matthiola tricuspidata*: Thscap, St. Med.  
 \**Nasturtium officinale*: Hscap, Cosmop.  
 \**Raphanus raphanistrum* ssp. *raphanistrum*: Thscap, Circumbor.  
 \**R. raphanistrum* ssp. *landra*: Thscap, Eu. Med.  
 \**R. sativus*: Hbienn, Adv.
- \**Rapistrum rugosum*: Thscap, Eu. Med.  
*Sinapis alba* ssp. *alba*: Thscap, Adv.  
 \**S. arvensis*: Thscap, Eu. Med.  
 \**Sisymbrium irio*: Thscap, Paleotemp.  
*S. officinale*: Thscap, Subcosmop.  
 \**S. orientale*: Thscap, Eu. Med.  
*S. polyceratium*: Thscap, Eu. Med.
- Cucurbitaceae  
 \**Bryonia dioica*: Grhiz, Eu. Med.  
 \**Citrullus lanatus*: Thscap, Adv.  
 \**Cucurbita pepo*: Thscap, Adv.  
 \**Ecballium elaterium*: Gbulb, Eu. Med.
- Dipsacaceae  
 \**Dipsacus fullonum*: Hbienn, Eu. Med.  
 \**Knautia integrifolia*: Thscap, Eu. Med.  
*Lomelosia brachiata*: Thscap, Eu. Med.  
 \**Sixalix atropurpurea* ssp. *maritima*: Hbienn, St. Med.
- Elaeagnaceae  
 \**Elaeagnus angustifolia*: Phscap, Adv.
- Ericaceae  
 \**Arbutus unedo*: Nph, St. Med.
- Euphorbiaceae  
 \**Chrozophora tinctoria*: Thscap, Med.-Turan.  
 \**Euphorbia exigua*: Thscap, Eu. Med.  
 \**E. falcata* ssp. *falcata*: Thscap, Med.-Turan.  
 \**E. helioscopia*: Thscap, Cosmop.  
 \**E. hirsuta*: Grhiz, Eu. Med.  
*E. peplus*: Thscap, Cosmop.  
 \**E. prostrata*: Thrept, Adv.  
 \**Mercurialis annua*: Thscap, Paleotemp.  
 \**Ricinus communis*: Phscap, Adv.
- Fagaceae  
*Quercus coccifera*: Phcaesp, St. Med.  
 \**Q. pubescens*: Phscap, Europ.
- Frankeniaceae  
 \**Frankenia hirsuta*: Chsuffr, Med.-Turan.
- Gentianaceae  
*Blackstonia perfoliata* ssp. *perfoliata*: Thscap, Eu. Med.  
 \**Centaurium erythraea* ssp. *erythraea*: Hbienn, Paleotemp.  
 \**C. erythraea* ssp. *rumelicum*: Thscap, Eu. Med.  
 \**C. spicatum*: Thscap, Med.-Turan.
- Geraniaceae  
 \**Erodium cicutarium* ssp. *cutarium*: Thscap, Subcosmop.  
 \**E. malacoides*: Thscap, St. Med.  
*E. moschatum*: Thscap, Eu. Med.  
*Geranium columbinum*: Thscap, Eurosiber.  
*G. dissectum*: Thscap, Subcosmop.  
*G. lucidum*: Thscap, Eu. Med.; (Bornmüller 1928: 190)

- G. molle* ssp. *molle*: Thscap, Subcosmop.  
*G. molle* ssp. *brutium*: Thscap, E. Med.  
*G. robertianum* ssp. *purpureum*: Thscap, Eu. Med.  
 \**G. rotundifolium*: Thscap, Paleotemp.
- Globulariaceae  
 \**Globularia alypum*: Chfrut, St. Med.
- Guttiferae  
*Hypericum perforatum*: Hscap, St. Med.  
*H. triquetrifolium*: Hscap, E. Med.
- Juglandaceae  
 \**Juglans regia*: Phscap, Euras.
- Labiatae  
 \**Ballota nigra* ssp. *uncinata*: Hscap, St. Med.  
*Coridothymus capitatus*: Chfrut, St. Med.  
 \**Lamium amplexicaule*: Thscap, Paleotemp.  
 \**L. bifidum* ssp. *bifidum*: Thscap, St. Med.  
 \**Lycopus europaeus*: Hydrad, Circumbor.  
 \**Marrubium vulgare*: Hscap, Subcosmop.  
 \**Melissa officinalis*: Hscap, Eu. Med.  
*Mentha aquatica*: Hscap, Subcosmop.  
 \**M. cf. longifolia*: Hscap, Paleotemp.  
 \**M. pulegium*: Hscap, Subcosmop.  
 \**M. spicata*: Hscap, Eu. Med.  
*Origanum vulgare* ssp. *hirtum*: Hscap, E. Med.  
*Phlomis fruticosa*: Nph, E. Med.  
*Prasium majus*: Chsuffr, St. Med.  
*Prunella laciniata*: Hscap, Eu. Med.  
 \**P. vulgaris*: Hscap, Circumbor.  
 \**Rosmarinus officinalis*: Nph, St. Med.  
 \**Salvia argentea*: Hscap, St. Med.  
 \**S. verbenaca*: Hscap, Med.-Atl.  
*S. verticillata*: Hscap, Europ.-Caucas.  
*S. virgata*: Hscap, Euras.  
*S. viridis*: Thscap, St. Med.  
*Satureja graeca*: Chsuffr, St. Med.  
*S. juliana*: Chsuffr, St. Med.  
 \**S. nepeta*: Hscap, Eu. Med.  
 \**S. vulgaris* ssp. *orientalis*: Hscap, Circumbor.  
*Sideritis purpurea*: Thscap, Balkan  
*Stachys cretica* ssp. *cretica*: Hscap, Balkan  
 \**S. spinulosa*: Thscap, E. Med.  
 \**Teucrium capitatum*: Chsuffr, St. Med.  
 \**T. fruticans*: Nph, Adv.
- Lauraceae  
 \**Laurus nobilis*: Nph, St. Med.
- Leguminosae  
 \**Anagyris foetida*: Phcaesp, St. Med.  
*Anthyllis hermanniae*: Chfrut, St. Med.  
 \**A. vulneraria* ssp. *praepropera*: Hscap, Eu. Med.  
 \**Astragalus hamosus*: Thscap, Med.-Turan.  
*Bituminaria bituminosa*: Hscap, Eu. Med.  
*Calicotome villosa*: Phcaesp, St. Med.  
 \**Ceratonia siliqua*: Phscap, St. Med.  
*Cercis siliquastrum* ssp. *siliquastrum*: Phscap, Eu. Med.  
 \**Cicer arietinum*: Thscap, Adv.  
*Colutea arborescens*: Phcaesp, Eu. Med.  
 \**Coronilla scorpioides*: Thscap, Eu. Med.  
 \**Dorycnium hirsutum*: Chsuffr, Eu. Med.  
*D. rectum*: Hscap, St. Med.  
*Genista acanthoclada*: Nph, E. Med.  
*Glycyrrhiza glabra*: Grhiz, Med.-Turan.  
*Hedysarum spinosissimum* ssp. *capitatum* (*H. glomeratum*): Thscap, St. Med.  
 \**H. spinosissimum* ssp. *spinosissimum*: Thscap, St. Med.  
 \**Hippocrepis ciliata*: Thscap, St. Med.  
*H. emerus* ssp. *emeroides*: Nph, E. Med.  
*Hymenocarpus circinnatus*: Thscap, St. Med.  
 \**Lathyrus annuus*: Thscap, Med.-Turan.  
*L. aphaca*: Thscap, Eu. Med.  
*L. cicera*: Thscap, Med.-Turan.  
 \**L. clymenum*: Thscap, St. Med.  
 \**L. hirsutus*: Thscap, Eu. Med.  
 \**L. odoratus*: Thscap, Adv.  
*L. sativus*: Thscap, Adv.; (Bornmüller 1928: 202)  
 \**L. saxatilis*: Thscap, Eu. Med.  
 \**L. sphaericus*: Thscap, Med.-Turan.  
 \**Lens culinaris*: Thscap, Adv.  
*Lotus edulis*: Thscap, St. Med.  
 \**L. glaber* (*L. tenuis*): Hscap, Paleotemp.  
*L. ornithopodioides*: Thscap, St. Med.  
 \**L. peregrinus*: Thscap, E. Med.  
*L. tetragonolobus* (*Tetragonolobus purpureus*): Thscap, St. Med.  
 \**Medicago arabica*: Thscap, Eu. Med.  
 \**M. arborea*: Phcaesp, E. Med.  
 \**M. ciliaris*: Thscap, St. Med.  
*M. coronata*: Thscap, St. Med.  
 \**M. disciformis*: Thscap, St. Med.  
*M. littoralis*: Thscap, St. Med.  
 \**M. lupulina*: Thscap, Paleotemp.  
 \**M. minima*: Thscap, Paleotemp.  
 \**M. monspeliaca*: Thscap, Eu. Med.  
 \**M. murex*: Thscap, St. Med.  
 \**M. orbicularis*: Thscap, Eu. Med.  
 \**M. polymorpha*: Thscap, Subcosmop.  
 \**M. rigidula*: Thscap, Eu. Med.  
 \**M. sativa* ssp. *microcarpa*: Hscap, Adv.  
 \**M. sativa* ssp. *falcata*: Hscap, Euras.  
 \**M. sativa* ssp. *sativa*: Hscap, Paleotemp.  
 \**M. scutellata*: Thscap, Eu. Med.  
 \**M. truncatula*: Thscap, St. Med.  
 \**M. tuberculata*: Thscap, St. Med.  
 \**Melilotus indicus*: Thscap, Subcosmop.

- M. neapolitanus*: Thscap, St. Med.  
 \**M. officinalis*: Hbienn, Subcosmop.  
 \**M. sulcatus*: Thscap, St. Med.  
*Onobrychis aequidentata*: Thscap, E. Med.  
*O. caput-galli*: Thscap, St. Med.  
*Ononis pubescens*: Thscap, Med.-Turan.  
*O. reclinata*: Thscap, Med.-Turan.  
 \**O. spinosa* ssp. *antiquorum*: Chsuffr, Eu. Med.  
*O. viscosa* ssp. *breviflora*: Thscap, St. Med.  
 \**Robinia pseudoacacia*: Phscap, Adv.  
*Scorpiurus muricatus*: Thscap, Eu. Med.  
 \**Securigera cretica*: Thscap, E. Med.  
*S. securidaca*: Thscap, Eu. Med.  
*Spartium junceum*: Phcaesp, Eu. Med.  
 \**Trifolium angustifolium*: Thscap, Eu. Med.  
 \**T. arvense*: Thscap, Europ.-Caucas.  
 \**T. campestre*: Thscap, Europ.-Caucas.  
*T. cherleri*: Thscap, Eu. Med.  
 \**T. dalmaticum*: Thscap, Balkan  
*T. fragiferum*: Hrept, Paleotemp.  
 \**T. grandiflorum*: Thscap, E. Med.  
*T. lappaceum*: Thscap, Eu. Med.  
 \**T. lucanicum*: Thscap, Eu. Med.  
*T. nigrescens* ssp. *petrisavii*: Thscap, E. Med.  
*T. pallidum*: Thscap, Eu. Med.  
 \**T. patens*: Thrept, Eu. Med.  
*T. physodes*: Hscap, Eu. Med.  
*T. pratense*: Hscap, Subcosmop.  
 \**T. purpureum*: Thscap, St. Med.  
 \**T. repens*: Hrept, Subcosmop.  
*T. resupinatum*: Thrept, Paleotemp.  
*T. scabrum*: Thrept, Eu. Med.  
 \**T. spumosum*: Thscap, St. Med.  
 \**T. squamosum*: Thscap, Med.-Atl.  
*T. stellatum*: Thscap, Eu. Med.  
 \**T. subterraneum*: Thrept, Eu. Med.  
 \**T. suffocatum*: Thscap, Eu. Med.  
 \**T. tomentosum*: Thrept, Eu. Med.  
*Trigonella balansae* (*T. corniculata*): Thscap, St. Med.  
*Tripodion tetraphyllum*: Thscap, St. Med.  
*Vicia bithynica*: Thscap, Med.-Atl.  
 \**V. lutea*: Thscap, Med.-Atl.  
 \**V. parviflora*: Thscap, Med.-Atl.  
*V. sativa* ssp. *nigra*: Thscap, Subcosmop.  
 \**V. sativa* ssp. *sativa*: Thscap, Adv.  
*V. villosa* ssp. *eriocarpa*: Thscap, E. Med.  
*V. villosa* ssp. *microphylla*: Thscap, E. Med.  
 \**Wisteria sinensis*: Phlian, Adv.
- Linaceae  
 \**Linum bienne*: Hbienn, Med.-Atl.  
 \**L. corymbulosum*: Thscap, St. Med.  
 \**L. nodiflorum*: Thscap, Eu. Med.  
*L. pubescens* ssp. *sibthorpiatum*: Thscap, Greek
- L. strictum*: Thscap, St. Med.  
 \**L. usitatissimum*: Thscap, Adv.
- Lythraceae  
 \**Lythrum hyssopifolia*: Thscap, Subcosmop.  
*L. junceum*: Hscap, St. Med.  
 \**L. salicaria*: Hscap, Subcosmop.
- Malvaceae  
 \**Abutilon theophrasti*: Thscap, Subcosmop.  
 \**Alcea pallida* ssp. *cretica*: Hbienn, Balkan  
*A. rosea*: Hscap, Adv.; (Halácsy 1901: 263)  
 \**A. setosa*: Hscap, Adv.  
*Lavatera cretica*: Thscap, St. Med.  
 \**L. punctata*: Thscap, St. Med.  
*Malva cretica*: Thscap, St. Med.  
 \**M. nicaeensis*: Thscap, St. Med.  
 \**M. parviflora*: Thscap, Eu. Med.  
 \**M. sylvestris*: Hscap, Subcosmop.
- Meliaceae  
 \**Melia azedarach*: Phscap, Adv.
- Moraceae  
 \**Ficus carica*: Phscap, Med.-Turan.  
*Morus alba*: Phscap, Adv.
- Myrtaceae  
 \**Myrtus communis*: Phcaesp, St. Med.
- Nyctaginaceae  
 \**Mirabilis jalapa*: Gbulb, Adv.
- Oleaceae  
 \**Olea europaea*: Phscap, St. Med.  
 \**Phillyrea latifolia*: Phcaesp, St. Med.
- Onagraceae  
 \**Epilobium parviflorum*: Hscap, Paleotemp.
- Orobanchaceae  
*Orobanche minor*: Thpar, Subcosmop.  
 \**O. pubescens*: Thpar, E. Med.  
 \**O. ramosa* ssp. *mutelii*: Thpar, Med.-Turan.  
 \**O. ramosa* ssp. *ramosa*: Thpar, Paleotemp.
- Oxalidaceae  
 \**Oxalis articulata*: Grhiz, Adv.  
 \**O. corniculata*: Hrept, Cosmop.  
 \**O. debilis*: Gbulb, Adv.  
 \**O. pes-caprae*: Gbulb, Adv.
- Papaveraceae  
 \**Eschscholzia californica*: Thscap, Adv.  
*Fumaria capreolata*: Thscap, Eu. Med.  
 \**F. officinalis* ssp. *officinalis*: Thscap, Subcosmop.  
 \**F. parviflora*: Thscap, Med.-Turan.  
 \**Glaucium flavum*: Hscap, Eu. Med.  
*Papaver apulum*: Thscap, E. Med.  
*P. hybridum*: Thscap, Med.-Turan.  
 \**P. rhoeas*: Thscap, Paleotemp.  
 \**P. somniferum* ssp. *somniferum*: Thscap, Subcosmop.
- Passifloraceae

- \**Passiflora caerulea*: Phlian, Adv.  
 Plantaginaceae  
*Plantago afra*: Thscap, Med.-Turan.  
 \**P. albicans*: Chsuffr, St. Med.  
*P. bellardii*: Thscap, St. Med.  
 \**P. coronopus* ssp. *coronopus*: Hbienn, Eurosiber.  
 \**P. lagopus*: Thscap, St. Med.  
 \**P. lanceolata*: Hros, Cosmop.  
 \**P. major*: Hros, Subcosmop.  
 \**P. weldenii*: Thscap, St. Med.  
 Platanaceae  
*Platanus orientalis*: Phscap, Euras.  
 Plumbaginaceae  
 \**Limonium sinuatum*: Hscap, St. Med.  
 Polygalaceae  
 \**Polygala monspeliaca*: Thscap, St. Med.  
 Polygonaceae  
 \**Persicaria capitata*: Chrept, Adv.  
 \**P. lapathifolia* ssp. *lapathifolia*: Thscap, Cosmop.  
 \**P. maculosa*: Thscap, Subcosmop.  
 \**Polygonum arenarium*: Thrept, Eu. Med.  
 \**P. arenastrum*: Thrept, Subcosmop.  
 \**P. aviculare* ssp. *neglectum*: Thrept, Cosmop.  
 \**P. aviculare* ssp. *rurivagum*: Thrept, Subcosmop.  
 \**P. maritimum*: Hrept, Subcosmop.  
 \**Rumex bucephalophorus* ssp. *bucephalophorus*: Thscap, St. Med.  
*R. conglomeratus*: Hscap, Euras.  
 \**R. crispus*: Hscap, Cosmop.  
 \**R. cristatus*: Hscap, E. Med.  
 \**R. obtusifolius* ssp. *obtusifolius*: Hscap, Subcosmop.  
 \**R. pulcher* ssp. *pulcher*: Hscap, Eu. Med.  
 \**R. pulcher* ssp. *raulinii*: Hscap, E. Med.  
 \**R. pulcher* ssp. *woodsii*: Hscap, Eu. Med.  
 Portulacaceae  
 \**Portulaca oleracea*: Thscap, Subcosmop.  
 Primulaceae  
 \**Anagallis arvensis*: Thrept, Subcosmop.  
 \**A. foemina*: Thrept, Subcosmop.  
 \**Asterolinon linum-stellatum*: Thscap, St. Med.  
 \**Samolus valerandi*: Hscap, Subcosmop.  
 Punicaceae  
 \**Punica granatum*: Phscap, Euras.  
 Ranunculaceae  
*Anemone pavonina*: Gbulb, St. Med.  
 \**Clematis flammula*: Phlian, Eu. Med.  
 \**C. vitalba*: Phlian, Europ.-Caucas.  
 \**Consolida ajacis*: Thscap, Eu. Med.  
 \**Delphinium peregrinum*: Thscap, E. Med.  
 \**D. staphisagria*: Thscap, St. Med.  
 \**Nigella damascena*: Thscap, Eu. Med.  
 \**Ranunculus bulbosus* ssp. *aleae*: Hscap, Eu. Med.  
 \**R. ficaria*: Gbulb, Euras.  
*R. marginatus*: Thscap, St. Med.  
*R. muricatus*: Thscap, Med.-Turan.  
 Resedaceae  
 \**Reseda alba*: Thscap, Eu. Med.  
 \**R. lutea*: Hbienn, Europ.-Caucas.  
 \**R. phyteuma*: Thscap, Eu. Med.  
 Rhamnaceae  
 \**Paliurus spina-christi*: Phcaesp, Med.-Turan.  
 Rosaceae  
*Agrimonia eupatoria*: Hscap, Subcosmop.  
*Crataegus monogyna*: Phcaesp, Paleotemp.  
 \**Potentilla reptans*: Hros, Subcosmop.  
 \**Prunus divaricata*: Phcaesp, Euras.  
 \**Pyrus communis*: Phscap, Adv.  
 \**P. amygdaliformis*: Phscap, St. Med.  
 \**Rosa canina*: Nph, Paleotemp.  
*R. sempervirens*: Nph, St. Med.  
 \**Rubus ulmifolius*: Nph, Med.-Turan.  
 \**Sanguisorba minor* ssp. *magnolii*: Hscap, St. Med.  
*Sarcopoterium spinosum*: Nph, E. Med.  
 Rubiaceae  
 \**Crucianella latifolia*: Thscap, St. Med.  
 \**Galium aparine*: Thscap, Subcosmop.  
 \**G. intricatum*: Thscap, Balkan  
 \**G. murale*: Thscap, Eu. Med.  
 \**G. setaceum*: Thscap, Med.-Turan.  
*G. tricornutum*: Thscap, Med.-Turan.  
 \**G. verrucosum*: Thscap, St. Med.  
 \**G. verum*: Hscap, Euras.  
 \**Putoria calabrica*: Nph, St. Med.  
*Rubia peregrina*: Phlian, Med.-Atl.  
*Sherardia arvensis*: Thscap, Subcosmop.  
 \**Valantia hispida*: Thscap, St. Med.  
*V. muralis*: Thscap, St. Med.  
 Rutaceae  
 \**Ruta chalepensis*: Chsuffr, St. Med.  
 Salicaceae  
 \**Populus alba*: Phscap, Paleotemp.  
*Salix alba*: Phscap, Paleotemp.  
*S. amplexicaulis*: Phcaesp, E. Med.; (Halácsy 1894: 31)  
 \**S. elaeagnos*: Phcaesp, Europ.  
 Santalaceae  
*Osyris alba*: Nph, St. Med.  
 \**Thesium humile*: Thscap, St. Med.  
 Saxifragaceae  
*Saxifraga tridactylites*: Thscap, Eu. Med.  
 Scrophulariaceae  
 \**Antirrhinum majus*: Chfrut, Adv.

- \**A. siculum*: Chfrut, Adv.  
*Bellardia trixago*: Thscap, Subcosmop.  
 \**Cymbalaria muralis* ssp. *muralis*: Chrept, Adv.  
 \**Kickxia commutata* ssp. *graeca*: Hrept, E. Med.  
 \**K. elatine* ssp. *crinita*: Thscap, Med.-Turan.  
 \**K. spuria* ssp. *integrifolia*: Thscap, Eu. Med.  
 \**Linaria simplex*: Thscap, Eu. Med.  
 \**Misopates orontium*: Thscap, Paleotemp.  
*Parentucellia latifolia*: Thscap, Eu. Med.  
*P. viscosa*: Thscap, Med.-Atl.  
 \**Scrophularia canina* ssp. *bicolor*: Hscap, Eu. Med.  
*S. peregrina*: Thscap, St. Med.  
 \**Verbascum blattaria*: Hbienn, Cosmop.  
 \**V. macrurum*: Hbienn, E. Med.  
 \**V. sinuatum*: Hbienn, Eu. Med.  
*V. undulatum*: Hbienn, Balkan  
 \**Veronica anagallis-aquatica*: Thscap, Cosmop.  
*V. arvensis*: Thscap, Subcosmop.  
 \**V. cymbalaria*: Thscap, Eu. Med.  
 \**V. glauca* ssp. *chaubardii*: Thscap, Balkan  
*V. persica*: Thscap, Adv.  
 \**V. polita*: Thscap, Subcosmop.
- Simaroubaceae  
 \**Ailanthus altissima*: Phscap, Adv.
- Solanaceae  
*Cestrum parqui*: Nph, Adv.; (Bornmüller 1928: 300)  
 \**Datura innoxia*: Thscap, Adv.  
 \**D. stramonium*: Thscap, Adv.  
 \**Hyoscyamus albus*: Hbienn, Eu. Med.  
 \**Lycopersicon esculentum*: Thscap, Adv.  
 \**Nicotiana glauca*: Nph, Adv.  
 \**N. tabacum*: Thscap, Adv.  
*Petunia* × *hybrida*  
 \**Physalis angulata*: Thscap, Adv.  
 \**Solanum elaeagnifolium*: Hscap, Adv.  
 \**S. nigrum*: Thscap, Cosmop.  
 \**S. pseudocapsicum*: Thscap, Adv.  
 \**S. tuberosum*: Thscap, Adv.
- Tamaricaceae  
*Tamarix hampeana*: Phscap, E. Med.  
*T. smyrnensis*: Phcaesp, Europ.-Caucas.  
 \**T. tetrandra*: Phscap, Europ.-Caucas.
- Theligonaceae  
*Theligonum cynocrambe*: Thscap, Euras.
- Tropaeolaceae  
 \**Tropaeolum majus*: Thrept, Adv.
- Ulmaceae  
 \**Celtis australis*: Phscap, Eu. Med.  
 \**Ulmus minor*: Phscap, Europ.-Caucas.
- Umbelliferae  
 \**Ammi majus*: Thscap, Eu. Med.
- \**Apium graveolens*: Hscap, Adv.  
*A. nodiflorum*: Hydrad, Eu. Med.  
 \**Bifora testiculata*: Thscap, St. Med.  
*Bupleurum glumaceum*: Thscap, Balkan  
 \**B. lancifolium*: Thscap, Med.-Turan.  
 \**B. semicompositum*: Thscap, Med.-Turan.  
*Coriandrum sativum*: Thscap, Adv.  
 \**Daucus carota* ssp. *major*: Hbienn, Europ.  
 \**D. carota* ssp. *maritimus*: Hbienn, St. Med.  
 \**D. guttatus*: Thscap, E. Med.  
 \**Eryngium campestre*: Hscap, Paleotemp.  
 \**E. creticum*: Hscap, Med.-Turan.  
 \**E. maritimum*: Grhiz, Med.-Atl.  
 \**Foeniculum vulgare*: Hbienn, Med.-Turan.  
*Oenanthe pimpinelloides*: Hscap, Med.-Atl.  
 \**Opopanax chironium*: Hscap, St. Med.  
*Pimpinella anisum*: Thscap, Adv.; (Halácsy 1901: 684)  
*P. peregrina*: Hbienn, Med.-Turan.  
*Scaligeria cretica*: Hbienn, Balkan  
*Scandix pecten-veneris*: Thscap, Subcosmop.  
 \**Smyrniolum olusatrum*: Hbienn, Med.-Atl.  
*Tordylium apulum*: Thscap, St. Med.  
 \**Torilis arvensis* ssp. *arvensis*: Thscap, Subcosmop.  
 \**T. arvensis* ssp. *neglecta*: Thscap, Med.-Turan.  
 \**T. arvensis* ssp. *purpurea*: Thscap, Eu. Med.  
 \**T. leptophylla*: Thscap, Med.-Turan.  
*T. nodosa*: Thscap, Med.-Turan.
- Urticaceae  
 \**Parietaria judaica*: Hscap, Eu. Med.  
*P. lusitanica*: Thrept, St. Med.  
*Urtica dioica*: Hscap, Subcosmop.  
 \**U. membranacea*: Thscap, Med.-Turan.  
 \**U. urens*: Thscap, Subcosmop.
- Valerianaceae  
 \**Centranthus ruber* ssp. *sibthorpii*: Chsuffr, Balkan  
*Valerianella discoidea*: Thscap, St. Med.  
 \**V. eriocarpa*: Thscap, Med.-Atl.  
*V. muricata*: Thscap, Med.-Turan.  
*V. obtusiloba*: Thscap, E. Med.; (Bornmüller 1928: 287)
- Verbenaceae  
 \**Lantana camara*: Phcaesp, Adv.  
 \**Lippia canescens*: Chsuffr, Adv.  
 \**Verbena officinalis*: Hscap, Cosmop.  
 \**Vitex agnus-castus*: Phcaesp, Med.-Turan.
- Violaceae  
 \**Viola phitosiana*: Thscap, Greek
- Vitaceae  
 \**Vitis vinifera* s.l.: Phlian, Adv.
- Zygophyllaceae  
 \**Tribulus terrestris*: Thrept, Cosmop.

**Monocotyledones**

## Agavaceae

\**Agave americana*: Phcaesp, Adv.; Obs.

## Alismataceae

\**Alisma lanceolatum*: Hydrad, Subcosmop.

## Araceae

\**Arisarum vulgare*: Grhiz, St. Med.

*Arum italicum*: Grhiz, St. Med.

\**Dracunculus vulgaris*: Grhiz, St. Med.; Obs.

## Commelinaceae

\**Commelina communis*: Gbulb, Adv.

\**Tradescantia fluminensis*: Grhiz, Adv.

## Cyperaceae

\**Carex distachya*: Hcaesp, St. Med.

\**C. divisa*: Grhiz, Eurosiber.

\**C. divulsa* ssp. *divulsa*: Hcaesp, Eu. Med.

*C. flacca* ssp. *serrulata*: Grhiz, Med.-Turan.

\**C. otrubae*: Hcaesp, Med.-Atl.

\**Cladium mariscus*: Grhiz, Subcosmop.

\**Cyperus alternifolius*: Hcaesp, Adv.

\**C. longus*: Grhiz, Paleotemp.

*C. rotundus*: Grhiz, Subcosmop.

\**Scirpus holoschoenus*: Grhiz, Med.-Atl.

\**S. maritimus* ssp. *maritimus*: Grhiz, Cosmop.

## Dioscoreaceae

\**Tamus communis* ssp. *cretica*: Grad, St. Med.

## Gramineae

*Aegilops comosa* ssp. *heldreichii*: Thscap,  
Greek

*A. dichasians* (*A. caudata*): Thscap, E. Med.

*A. lorentii* (*A. biuncialis*): Thscap,  
Med.-Turan.

\**A. neglecta*: Thscap, Med.-Turan.

*Aira elegantissima*: Thscap, Eu. Med.

\**Alopecurus myosuroides*: Thscap, Subcosmop.

\**Andropogon distachyos*: Hcaesp, Paleotemp.

*Arundo donax*: Grhiz, Adv.

*A. plinii*: Grhiz, St. Med.

\**Avena barbata*: Thscap, Med.-Turan.

\**A. byzantina*: Thscap, Med.-Turan.

\**A. sterilis* ssp. *ludoviciana*: Thscap,  
Med.-Turan.

\**A. sterilis* ssp. *sterilis*: Thscap, Med.-Turan.

*Brachypodium distachyon*: Thscap,  
Med.-Turan.

\**B. retusum*: Hcaesp, St. Med.

\**B. sylvaticum* ssp. *glaucovirans*: Hcaesp,  
Eurosiber.

\**Briza humilis*: Thscap, E. Med.

\**B. maxima*: Thscap, Paleosubtrop.

\**B. minor*: Thscap, Subcosmop.

\**Bromus alopecuroides*: Thscap, St. Med.

\**B. chrysopogon* Viv.: Thscap, St. Med.

\**B. diandrus*: Thscap, Eu. Med.

\**B. fasciculatus*: Thscap, E. Med.

\**B. hordeaceus* L. ssp. *divaricatus* (Bonnier et  
Layens) Kerguelen: Thscap, Eu. Med.

*B. intermedius*: Thscap, Eu. Med.

\**B. japonicus*: Thscap, Paleotemp.

*B. madritensis*: Thscap, Eu. Med.

\**B. scoparius*: Thscap, Med.-Turan.

*B. squarrosus*: Thscap, Paleotemp.; (Halácsy  
1904: 398)

*B. sterilis*: Thscap, Med.-Turan.

\**B. tectorum*: Thscap, Paleotemp.

\**Catapodium marinum*: Thscap, Eu. Med.

*C. rigidum*: Thscap, Eu. Med.

\**Cynodon dactylon*: Grhiz, Cosmop.

\**Cynosurus echinatus*: Thscap, Med.-Turan.

*Dactylis glomerata*: ssp. *hispanica*: Hcaesp,  
Med.-Turan.

\**Dasyphyrum villosum*: Thscap, Med.-Turan.

\**Digitaria sanguinalis*: Thscap, Cosmop.

\**Echinochloa colonum*: Thscap, Adv.

\**E. crus-galli*: Thscap, Subcosmop.

\**Eleusine indica*: Thscap, Adv.

\**Elytrigia atherica* (Link) Carreras & Martinez:  
Grhiz, Med.-Atl.

\**E. juncea* (L.) Nevski: Grhiz, Eu. Med.

\**Eragrostis curvula* Nees: Hcaesp, Adv.

\**Festuca arundinacea*: Hcaesp, Paleotemp.

\**Gastridium ventricosum*: Thscap, Med.-Atl.

*Gaudinia fragilis*: Thscap, Eu. Med.

\**Hainardia cylindrica*: Thscap, Eu. Med.

\**Holcus lanatus*: Hcaesp, Circumbor.

*Hordeum bulbosum*: Hcaesp, Paleosubtrop.

\**H. distichon*: Thscap, Adv.

\**H. geniculatum* All.: Thscap, Subcosmop.

\**H. marinum*: Thscap, Eu. Med.

\**H. murinum* ssp. *glaucum*: Thscap, Circum-  
bor.

\**H. murinum* ssp. *leporinum*: Thscap,  
Eu. Med.

\**H. vulgare*: Thscap, Adv.

\**Hyparrhenia hirta*: Hcaesp, Paleotrop.

*Imperata cylindrica*: Grhiz, Cosmop.

\**Lagurus ovatus*: Thscap, Eu. Med.

\**Lamarckia aurea*: Thscap, Med.-Turan.

\**Lolium multiflorum*: Hscap, Eu. Med.

\**L. rigidum* ssp. *lepturoides*: Thscap, E. Med.

\**L. rigidum* ssp. *rigidum*: Thscap, Paleosub-  
trop.

\**L. temulentum*: Thscap, Subcosmop.

\**Melica ciliata* ssp. *ciliata*: Hcaesp,  
Med.-Turan.

\**Panicum repens*: Grhiz, Paleosubtrop.

\**Parapholis incurva*: Thscap, Med.-Atl.

- \**Paspalum dilatatum*: Hcaesp, Adv.  
 \**P. paspalodes*: Grhiz, Adv.  
 \**Pennisetum villosum*: Hcaesp, Adv.  
 \**Phalaris canariensis*: Thscap, Adv.  
 \**P. coeruleascens*: Hcaesp, St. Med.  
 \**P. minor*: Thscap, Paleosubtrop.  
*P. paradoxa*: Thscap, St. Med.  
 \**Phleum exaratum* Hochst. ex Griseb.:  
 Thscap, E. Med.  
 \**P. subulatum* ssp. *subulatum*: Thscap,  
 Med.-Turan.  
 \**Phragmites australis*: Grhiz, Subcosmop.  
 \**Piptatherum miliaceum* ssp. *miliaceum*:  
 Hcaesp, St. Med.  
 \**P. miliaceum* ssp. *thomasii*: Hcaesp,  
 Med.-Turan.  
 \**Poa annua*: Thscap, Cosmop.  
 \**P. bulbosa*: Hcaesp, Paleotemp.  
 \**P. infirma*: Thcaesp, Med.-Atl.  
 \**P. trivialis* ssp. *sylvicola*: Hcaesp, Paleotemp.  
 \**Polypogon monspeliensis*: Thscap, Paleosub-  
 trop.  
 \**P. viridis*: Hcaesp, Paleosubtrop.  
*Psilurus incurvus* (*P. aristatus*): Thscap,  
 Eu. Med.; (Bornmüller 1928: 333)  
 \**Rostraria cristata* (L.) Tzvelev: Thcaesp,  
 Subcosmop.  
 \**Setaria adhaerens*: Thscap, Subcosmop.  
 \**S. verticillata*: Thscap, Subcosmop.  
 \**S. viridis*: Thscap, Subcosmop.  
 \**Sorghum halepense*: Grhiz, Cosmop.  
 \**Stipa bromoides*: Hcaesp, St. Med.  
 \**S. capensis*: Thscap, Med.-Turan.  
 \**Trisetaria aurea* (Ten) Pignatti: Thscap,  
 St. Med.  
 \**Triticum durum*: Thscap, Adv.  
*Vulpia ciliata*: Thcaesp, Med.-Turan.  
 \**V. myuros*: Thcaesp, Subcosmop.  
 \**Zea mays*: Thscap, Adv.
- Iridaceae
- \**Gladiolus italicus*: Gbulb, Eu. Med.  
*Hermodactylus tuberosus*: Grhiz, E. Med.  
 \**Iris albicans*: Grhiz, Adv.  
*I. unguicularis* Poir. ssp. *carica* (W. Schulze)  
 Davis & Jury: Grhiz, E. Med.  
 \**Romulea columnae* ssp. *columnae*: Gbulb,  
 Med.-Atl.
- Juncaceae
- \**Juncus acutus* ssp. *acutus*: Hcaesp, Subcos-  
 mop.
- \**J. bufonius*: Thcaesp, Cosmop.  
 \**J. fontanesii* ssp. *fontanesii*: Grhiz, St. Med.  
 \**J. hybridus*: Thcaesp, Med.-Atl.  
 \**J. inflexus*: Grhiz, Paleotemp.
- Liliaceae
- \**Allium ampeloprasum*: Gbulb, Med.-Atl.  
 \**A. cepa*: Gbulb, Adv.  
 \**A. chamaespithum*: Gbulb, Balkan  
*A. dentiferum* Webb & Berthelot: Gbulb,  
 St. Med.  
 \**A. guttatum* ssp. *sardoum*: Gbulb, St. Med.  
 \**A. neapolitanum*: Gbulb, St. Med.  
 \**A. pallens*: Gbulb, St. Med.  
 \**A. roseum*: Gbulb, St. Med.  
*A. subhirsutum*: Gbulb, St. Med.  
 \**A. trifoliatum*: Gbulb, St. Med.  
 \**Asparagus acutifolius*: Chfrut, St. Med.  
 \**A. officinalis*: Grhiz, Adv.  
*Asphodelus aestivus*: Grhiz, St. Med.  
 \**A. fistulosus*: Hscap, St. Med.  
*Bellevalia dubia*: Gbulb, St. Med.  
*Gagea graeca*: Gbulb, E. Med.  
 \**Muscari commutatum*: Gbulb, E. Med.  
 \**M. comosum*: Gbulb, Eu. Med.  
 \**Nothoscordum inodorum*: Gbulb, Adv.  
 \**Ornithogalum collinum*: Gbulb, St. Med.  
 \**O. prasinantherum*: Gbulb, Greek  
 \**Scilla autumnalis*: Gbulb, Europ.-Caucas.  
 \**Smilax aspera*: Nph, Paleosubtrop.  
 \**Urginea maritima*: Gbulb, St. Med.
- Orchidaceae
- \**Anacamptis pyramidalis*: Gbulb, Europ.-Cau-  
 cas.  
*Barlia robertiana*: Gbulb, St. Med.  
*Ophrys lutea* ssp. *murbeckii*: Gbulb, St. Med.  
 \**O. mammosa*: Gbulb, E. Med.  
 \**O. spruneri*: Gbulb, Greek  
 \**Orchis coriophora*: Gbulb, Eu. Med.  
 \**O. italica*: Gbulb, St. Med.  
 \**O. laxiflora*: Gbulb, Eu. Med.  
 \**Serapias vomeracea* ssp. *vomeracea*: Gbulb,  
 Eu. Med.
- Sparganiaceae
- \**Sparganium erectum*: Hydrad, Euras.
- Typhaceae
- \**Typha angustifolia*: Grhiz, Circumbor.  
 \**T. domingensis*: Grhiz, Subtrop.

## Discussion and conclusions

Of the 808 taxa of vascular plants comprising the wild urban flora of Patras, 575 (71.2%) have been recorded from the area for the first time. 233 taxa are already known from bibliographical references and, 13 of these have not yet been confirmed nor definitely rejected. Further collection and the revision of the corresponding specimens will hopefully establish their status in the future.

The number of species appearing in the study area is thought to be considerably high in relation to its extent (ca. 55 km<sup>2</sup>). This fact is further strengthened if the speed at which the area has been degrading over the last years is taken into account. This decrease is due to great building activity which has resulted in the reduction of natural green spaces.

The great number of species is mainly due to the variety of biotopes existing in the study area such as wasteland, roadsides, archaeological sites, streamsides, shores, stone-walls, etc., as well as the two forests and a wetland within the urban boundaries. Besides this great variety in ecological environments and small-scale habitats which are included inside urban landscape, as parameters which contribute to the plenitude of species in cities, have been also referred to the central European cities by Sukopp (1983), Sukopp and Werner (1983). A relevant part can be attributed to the participation of adventive species in the flora of Patras, introduced either with, or without the help of man (see also Sukopp 1983, Sukopp and Werner 1983).

As it has already been mentioned, the study of an urban flora is taking place for the first time in Greece, while similar studies have been carried out on several cities mainly of central Europe such as Berlin, Vienna, Warsaw etc., during last decades. A preliminary attempt to compare the data of the city of Patras to those available of the central European cities, is being undertaken by this study; although the general conditions related to the city of Patras are significantly different from those of central European cities, as far as it concerns the parameters following:

- The climate is mediterranean and consequently much drier than this of central Europe.
- Patras as well as the most Greek cities is very densely constructed in its centre with very few open spaces and parks. On the contrary, its surroundings are very sparsely built, including stretches of cultivated land and natural to seminatural remains of the non-urban peripheral areas.

According to Klotz (1989) it is estimated, that cities of central Europe covering an area of ca. 100 km<sup>2</sup> and with a population of ca. 200,000 inhabitants, to have at least 900 plant species. Comparing this aspect to the numbers of the city of Patras (170,000 inhabitants, ca. 55 km<sup>2</sup>, 808 taxa), it seems that the number of taxa of the flora of Patras reaches in a great degree the number of taxa of a central European city with almost the same number of inhabitants; but this refers to a smaller area (about half the area of a central European city).

By the above mentioned fact it is obvious that Patras seems to have greater richness of species than central European cities. This is mainly due to:

- The known great compared to the central Europe richness of the Greek flora which in the case of Patras is now confirmed for the urban environment too.
- To the existence of many spot-formed remains in the partly built-up suburban area of the city, mainly of phrygic and macchie plant communities.
- To the non-systematic clearing of the green spaces within the city.

As to the comparison of the percentage of adventive species in the total flora of Patras to that of the central European cities, it seems that the adventive species in the city of Patras occupy a relatively low percentage (12.4%) of the total flora, while in the central European cities according to Brandes (1989), this amount is characteristically high with a range of 35–40% of the total flora. This fact indicates that the apophytization process in the urban flora of Patras is intense.

Examining the life-form spectrum, the high proportion of therophytes (53.7%) is mainly the result of the long dry period (Fig. 2) and, to a lesser degree, the “city” factor with a warmer and drier microclimate compared to the open country. For the urban environment in general the dominance of therophytes is mentioned and this is also valid for the cities of central Europe (Sukopp and Werner 1983). However in the case of Patras, because of the climate, this percentage appears to be considerably strengthened.

The chorological spectrum of the flora of the Patras area is not significantly divergent from those of areas of southern Greece (see also Christodoulakis 1986, Christodoulakis et al. 1991, Dimopoulos and Georgiadis 1992, Carlström 1987, Panitsa et al. 1994) where the Mediterranean elements dominate.

The high percentage of the Mediterranean elements in combination with the high percentage of therophytes, indicates the strong Mediterranean character of the flora of the studied area.

Two important categories of plants which can indicate the quality of the wild urban flora of Patras are the adventive and the endemic species. The adventive species, whose existence is closely connected with man-made and intensely disturbed environments, participate in a relatively small percentage (12.4%) as far the whole flora is concerned. However, this percentage varies considerably between the different urbanization zones, and in the most densely built-up areas of the inner city it reaches two times this number.

Most (18 taxa) of the 26 endemic taxa found (10 Greek & 16 Balkan), grow in small populations and sporadically in the remains of natural phrygana and macchie vegetation or in rocky, almost undisturbed habitats of the urban fringe area. The disturbance of these biotopes by human activities leads to the gradual lessening of these endemics and even to their local extinction. Examples of such species are the Greek endemics: *Scorzonera crocifolia*, *Ophrys spruneri*, *Ornithogalum prasinantherum* (Peloponnesian endemic), and the Balkan endemics: *Carlina corymbosa* subsp. *graeca*, *Sideritis purpurea*, *Galium intricatum*, *Bupleurum glumaceum*, *Scaligeria cretica* and *Campanula spatulata* subsp. *spruneriana*.

The growth of a small number of endemics seems to be favoured in man-made habitats. The following examples are very characteristic:

- The Balkan endemic *Umbilicus chloranthus* is exclusively found on stone-walls, in the city's castle, and on old roofs within the city.
- The Greek endemic *Erysimum graecum*, as well as the Balkan endemic *Verbascum undulatum*, which grow on disturbed ground and wasteland of the suburbs.
- The Balkan endemics *Petrorhagia obcordata* and *Veronica glauca* subsp. *chaubardii* found in very restricted populations and only in ruderal places.
- The Greek endemics *Taraxacum apollonis* and *Taraxacum* cf. *dialeptum* found exclusively on roadsides and pavements in the densely built-up urban environment.
- Finally, worthwhile mentioning, the appearance of the Greek endemic *Viola phitosiana* on roadsides in the centre of the city.

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