

# FLORISTIC ANALYSIS OF THE PLANT COVER IN THE NORTHERN PART OF THE FOREST SHELTER BELT OF STARA ZAGORA, BULGARIA

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## ABSTRACT

As a result of a study of the northern part of the green shelter belt of Stara Zagora, Bulgaria 364 plant taxa, belonging to 70 families and 238 genera of the Magnoliophyta section have been registered.

The taxa registered belong to 39 phyto-geographic regions and provinces. Species of Euro-Asian and sub Mediterranean origin prevail, which is in conformity with the fundamental trends for the dissemination of the flora and vegetation in the Southern Bulgaria (Gantchev, 1965; Bondev, 1991).

Notwithstanding the fact that the region is anthropogenically overburdened, the following is established: 4 endemics; 13 relicts; 2 species included in IUCN; 9 species, incorporated in "The Red Book of the People's Republic of Bulgaria"; 6 species protected by the Bio Diversity Law of Republic of Bulgaria.

145 medicinal plants species are registered on the territory under surveillance.

**KEY WORDS:** green shelter belt, Nature preserving, high plants

## INTRODUCTION

The green shelter belts represent the intermediate connecting link between the natural eco-systems and the strongly urbanized environment in towns.

In spite of their anthropogenic origin, the natural resources found in them fulfill important social and ecological functions (Baev, Matev 1985).

The components of aboriginal vegetation are included in various degree in the natural landscape, altered by the active afforestation undertakings.

Analyzing the floristic variety in the northern part of the Stara Zagora green shelter belt, the current study aims to establish the objective laws with which the distribution of the

natural vegetation in the district is in conformity with, and to find out to what degree biological diversity is influenced by the anthropological progression.

## **MATERIALS AND METHODS**

Subject to the present investigation is the plant cover in part of the Stara Zagora green shelter belt in sections № 63 to 65 according to the Forest Management Plan, situated to the north of the town with aggregate area of 249,3 hectares. **(Fig. 1).**

Altitude varies in the scope of 300 ÷ 550 m, tilts is in the range of 6°-27°. Sections with eastern, southern and south-eastern aspects prevail.

There are two types of soils: humus – carbonized, sandy-clayey, heavily stony, shallow and maroon-leached, sandy-clayey, medium stony, average depth. The basic rock is lime-stone. Considerable part of the territory (58%) remains unaffected by erosion. In the sections № 63 and № 64 erosion processes of the second degree are observed

With respect to the climate the region belongs to an area with transitional-continental climate and Mediterranean influence (Gantchev, 1965; Bondev, 1991).

Historical sources for the Stara Zagora past and its surroundings witness for uncontrollable clearing of the primary ligneous vegetation on these places already at the times of the Turkish yoke.

The urban sprawl and the growth of industrialization that followed increased the negative consequences of urbanization in the region.

Investigations are conducted in the 2002-2004 time span.

The transect method is used for the determination of the species diversity.

The works of Yordanov(ed.)(1963-1989); Kozhuharov(ed.)(1992); Petrova et all. are adopted as a taxonomic base for the determination of species.

Floristic belonging of taxa is defined in conformity with Stefanov (1943); Asyov & all. (2002).

Population evaluation of conservation significant species is carried out by means of test sites with different sizes with the aim of more detailed coverage of the quantitative parameters. The publications of Veltchev (ed.)(1984), Peev & all. (2000) and other normative

documents from Bulgarian and international legislation, such as Walter, K. & Gillett, H. (Eds.) (1988), CITES (1990), Medicinal Plants Law (2000), and Bio Diversity Law (2002) have been taken into consideration for the determination of the conservation significance of the species.

As a result of the study a collection of 672 herbarium materials was created.

## RESULTS

As a result of the floristic analysis made, 238 genera and 364 species of spermatophytes, belonging to 70 families have been registered.

Representatives of class Dicotyledonous (*Magnoliopsida*) are predominant - 296 species (81,3%), belonging to 189 genera and 61 families, followed by class Monocotyledonous (*Liliopsida*) – 56 species (15,4%) , distributed in 46 genera and 7 families.

The coniferous plants (class *Pinopsida*) includes 5 species, 3 genera and 2 families.

From the class Dicotyledonous the *Fabaceae* Family - 42 species , the *Brassicaceae* Family - 25 species and the *Lamiaceae* Family - 23 species are best included. Well represented are the *Asteraceae* Family – 20 species, the *Scrophulariaceae* Family – 15 species, the *Boraginaceae* Family -16 species, the *Ranunculaceae* Family -15 species, the *Rosaceae* Family -15 species, the *Rubiaceae* Family -12 species , and the *Caryophyllaceae* Family -10 species (**Fig.2**).

From the class *Monocotyledonous* representatives of the *Poaceae* Family (9,5%) and the *Liliaceae* Family (3,6%) prevail.

45 families are represented with 1 ÷ 3 species.

A comparative characteristic of the percentage interrelation among the 15 most frequently encountered families in the Bulgarian flora and their representation in the territory under surveillance is made in **Table 1**.

In vital forms spectrum (Raunkiaer, 1934), it is the perennial grass species that prevail- 187 taxa (51,3 %), followed by the annual species – 93 taxa (25,5%), the ligneous

species – 18 taxa (4,9 %), the frutescent species – 11 taxa (3%) and the biennial species – 11 taxa (2,7 %).

The various abiotic conditions offer suitable niches for the development of intermediate biological forms: annual and biennial – 27 species (7,4 %); annual and perennial – 4 species (1,1%); biennial and perennial – 9 species (2,5%); frutescent-ligneous type forms – 4 species (1,1%).

The registered 364 taxa belong to 39 phyto-geographical regions and provinces. The greatest number of species is with Euro-Asian origin (15,6 %) and sub-Mediterranean (15,1 %), followed by those with Euro-Mediterranean (9,9 %) and Mediterranean (6,04 %) origin **(Fig. 3)**.

26 floristic regions are represented by 1 to 3 species.

The dense ligneous cover creates at some places favourable conditions for evolving of mesophyllic species of Boreal origin (14 species – 3,8 %), of sub-Boreal origin (15 species – 4,1 %) and of Euro-Siberian origin (21 species – 5,7 %).

The number of cosmopolitan species is insignificant – 17 species (4,7 %), and the Balkan element is included with 11 species in different variations.

25 species in aggregate can be defined as conservation significant taxa. Their distribution is as follows: 2 species are included in the IUSN list; 2 species are subject of CITES; 6 species are included in “The Red Book of the People’s Republic of Bulgaria” (4 of them in the “rare species” category and 2 in the “endangered species “ category); 6 species are protected by the Bio Diversity Law of Republic of Bulgaria; 13 relicts; 4 endemics.

145 medicinal plants have been established on the territory.

It becomes obvious from the data presented that the terrain offers suitable conditions for the progressive development of the populations. Particular impression makes the great number of the *Anacamptis pyramidalis* (L.) Hartm. population on the hill crest glade in section № 65. Except for the above mentioned species, leguminous plants, such as *Vicia lathyroides* (1,I), *Medicago minima* (2,II), *Coronilla scorpioides* (2,II), *Trifolium arvense* (2,II) and various grass species - *Nonea pulla* (1,II), *Asperula cynanchica* (1,I) , *Euphorbia*

*oblongata*.(1,II), *Fragaria vesca* (2,II) , *Thymus striatus* (3,II), *Polygala hospita* (1,II), *Ranunculus millefoliatus*.(1,I), *Teucrium polium*.(2,II), *Ferulago sylvatica* (1,I), *Brachypodium distachyon* (1,I) participate as a constituent part in the grass community.

*Anacamptis pyramidalis* Mill is abundant in the lower altitude areas, and in the grass stand except for the already listed species, *Achillea clypeolata* (2,II), *Rumex acetosa* (2,I), *Teucrium chamaedrys* (3,II), *Filipendula vulgaris* (1,II), *Alopecurus myosuroides* (1,I), and *Digitalis lanata* (1,I) are included. A second floor of low structure offshoot specimen of *Fraxinus ornus* L. and *Cotinus coggygria* Scop is also formed.

### **DISCUSSION:**

The spermatic plants registered compose 49,6 % of the families in the Bulgarian flora, 27,4% of genera and 10,1 % of species diversity in the country.

Distribution of vital forms is typical for the summer green fall of the leaf forests of the moderate zones, where the perennial grass species are the prevailing ones in the derivative cenoses.

The percentage interrelation among the species in the region (**Table 1**) differs from the typical for Bulgaria, a possible reason for which are the cultigenic origin of the eco system and the specific abiotic conditions in the vicinity of the populated area.

As a whole, the thermophylic xerophytes and xero-mesophytes that a typical for the arid Mediterranean regions and those of Central Asia and Europe prevail. The xerothermic sub-Mediterranean and Euro sub-Mediterranean elements form mono-dominant and mixed communities on different floors of the plant cenoses.

The more moderate xero-mesophyllic Euro-Asian and European species show good adaptability in the conditions of the forest under tree cover in the mixed deciduous communities. The prevailing participation of sub-Mediterranean, Euro-Asian and Euro-Mediterranean species supports the common trend of distribution of the thermophylic xerophytes in the southern parts of our country, defined by Stefanov, 1943; Gantchev, 1965; Stanev, 1986; Bondev, 1991.

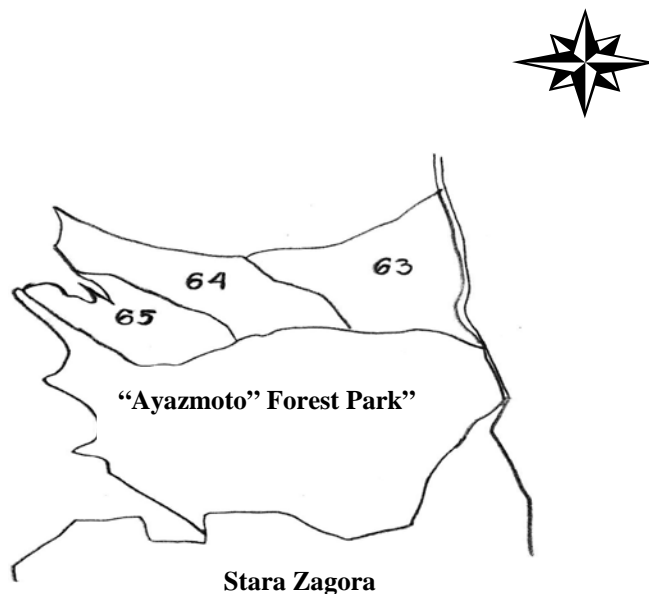
Permanent processes of the aboriginal vegetation recovery are registered in the region, a proof for which is the diversity of medicinal and conservation significant species, Tertiary relicts and Balkan endemics.

## CONCLUSION

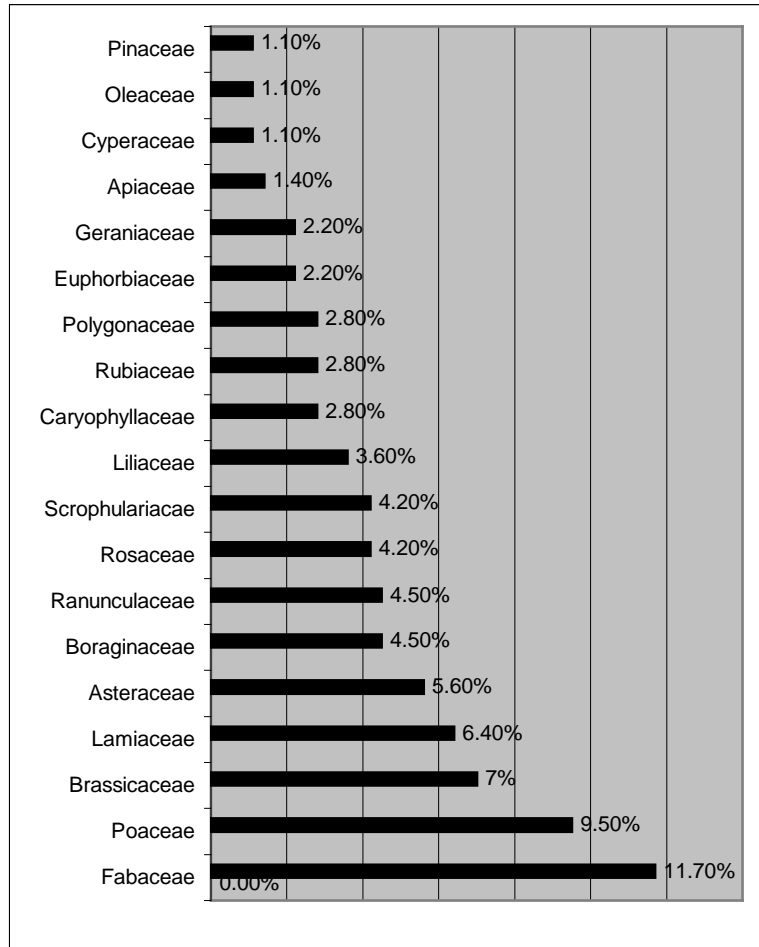
The creation of green shelter belts around built-up areas is expression of human pursuit to make up for the digressive changes in the environment, provoked by its own activity. Cultigenic landscape in the northern part of Stara Zagora completely supports this trend.

Analysis of phyto-geographic belonging of the registered taxa is in conformity with the objective laws, typical for the distribution of the thermophilic xerophytes in the southern parts of the country.

Domination of the perennial biological type and the presence of medicinal and conservation significant species shows the processes of restoration of the bio diversity in the region on one hand, and localizing of their populations requires introduction of protective measures connected with their preservation on the other.



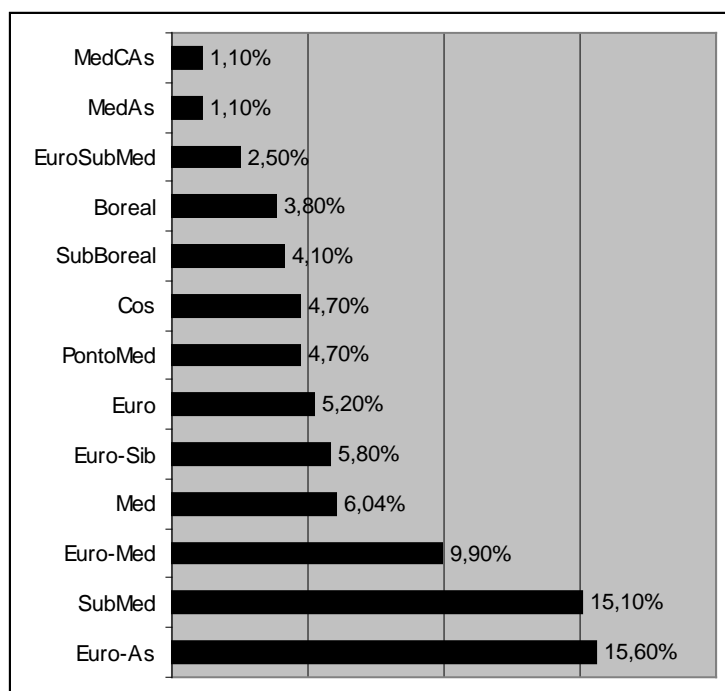
**Fig.1.** Geographical location of the sections №63, №64 and №65 with respect to Stara Zagora (A scale 1:25 000)



**Fig. 2.** Quantitative interrelation of *Spermatophyte* plants in sections № 63, 64 and 65 with respect to the families (% , more than 4 species).

№	Family	Percentage from the total number of species in Bulgaria	Percentage from the number of species in sections № 63, 64, 65
1	<i>Asteraceae</i>	13,8	5,6
2	<i>Fabaceae</i>	7,9	11,7
3	<i>Poaceae</i>	7,6	9,5
4	<i>Rosaceae</i>	5,9	4,2
5	<i>Caryophyllaceae</i>	5,4	2,8
6	<i>Brassicaceae</i>	5,1	7,0
7	<i>Scrophulariaceae</i>	4,6	4,2
8	<i>Lamiaceae</i>	4,0	6,4
9	<i>Apiaceae</i>	3,9	1,4
10	<i>Liliaceae</i>	3,2	3,6
11	<i>Cyperaceae</i>	2,9	1,1
12	<i>Ranunculaceae</i>	2,8	4,2
13	<i>Boraginaceae</i>	2,2	4,5
14	<i>Rubiaceae</i>	1,5	2,8
15	<i>Orchidaceae</i>	1,4	0,6

**Табл.1.** Interrelation of species of the 15 most distributed families in Bulgaria and in sections № 63, 64 ,65.



**Fig.3.** Phyto-geographic representation of the more important floristic regions (% , with more than 4 species)

#### REFERENCES:

- Asyov, B., D.Dimitrov, Z. Vasilev, A. Petrova. 2002. Conspectus of high flora of Bulgaria. Horology and floristic elements, BSBCP, 422.
- Baev, A., A. Matev.1985. Forest and mountain eco-systems. Zemizdat,Sofia.
- Bondev,I. 1991. Vegetation in Bulgaria. A map of a scale 1: 600 000. Univ. Ed., S, 184.
- Gantchev, I. 1965. Residual forests in the Stara Zagora field and its peripheral hills (formation, successions and floristic analysis). I. Proceedings of Botany Institute, Bulgarian Academy of Science, 14, 19-87.
- Jordanov, D.(ed.). 1963-1989. Flora of People's Republic of Bulgaria. Vol. I-IX, Bulgarian Academy of Science , S.
- Kozuharov, S. (ed.) 1992. Guide to high plants in Bulgaria. Science and Art., S., 787.





<i>Cotinus coggygia Scop.</i>	h	Med-As	TR					+	
<b>Apiaceae Family</b>									
<i>Anthriscus cerefolium (L.) Hoffm.</i>	a							+	
<i>Conium maculatum L.</i>	a-b	Euro-As						+	
<i>Eryngium campestre L.</i>	p	Pont-Med						+	
<i>Ferulago sylvatica (Beserr.) Reich</i>	p	subMed						+	
<i>Orlaya grandiflora (L.) Hoffm.</i>	a	Ap-Bal							
<b>Araceae Family</b>									
<i>Arum maculatum L.</i>	p	Euro-subMed						+	
<b>Asphodelaceae Family</b>									
<i>Asphodeline liburnica (Scop.) Reichenb.</i>	p	Pont-Med							
<b>Asteraceae Family</b>									
<i>Achillea clypeolata Sm.</i>	p	Bal	BE					+	
<i>A. millefolium L.</i>	p	Euro-Sib						+	
<i>Anthemis arvensis L.</i>	a	Euro-Med							
<i>Bellis perennis L.</i>	p	Euro-As						+	
<i>Carthamus lanatus L.</i>	a-b	subMed						+	
<i>Centaurea calcitrapa L.</i>	b	Med						+	
<i>C. cyanus L.</i>	a-b	Euro-Med						+	
<i>C. napulifera Rochel</i>	p	Pann-Bal							
<i>C. orientalis Mill.</i>	p	Pont-Med							
<i>C. salonitana Vis.</i>	p	Pont-Med							
<i>C. scabiosa L.</i>	p	Euro-Sib							
<i>Cirsium arvense(L.) Scop.</i>	b	Euro-As							
<i>Crupina vulgaris Cass.</i>	a	subMed							
<i>Echinops microcephallus Sibth. et Sm.</i>	p	subMed							
<i>Hypochaeris glabra L.</i>	a	Euro-Med							
<i>Jurinea mollis (L.) Rchb.</i>	p	subMed							
<i>Tanacetum vulgare L.</i>	p	Euro-Sib						+	
<i>Lactuca saligna L.</i>	a-b	Pont-OT							
<i>Scorzonera hispanica L.</i>	p	Med							
<i>Xanthium spinosum L.</i>	a	Cos						+	
<b>Betulaceae Family</b>									
<i>Betula pendula Roth.</i>	t	Euro-Sib						+	
<i>Carpinus orientalis Mill.</i>	h-t	subMed	TR						
<i>Corylus avellana L.</i>		Med-CAs	TR					+	
<b>Boraginaceae Family</b>									
<i>Alkanna primuliflora Griseb.</i>	p	Bal		R			R		+
<i>Anchusa stylosa Bieb.</i>	a	subMed		R	+				
<i>Asperugo procumbens L.</i>	a	Euro-As							
<i>Buglossoides arvensis L.</i>	a	Euro-As						+	

<i>B. purpureocaerulea</i> (L.) <i>Johnst.</i>	p	Euro-As						+	
<i>Cerintho glabra</i> Mill.	p	subMed						+	
<i>C. minor</i> L.	a-b	Pont-Med						+	
<i>Echium vulgare</i> L.	b-p	Euro-As						+	
<i>E. italicum</i> L.	b	subMed						+	
<i>Heliotropium europaeum</i> L.	a	subMed						+	
<i>Lithospermum officinale</i> L.	p	Euro-As						+	
<i>Myosotis arvensis</i> (L.) <i>Hill.</i>	b	Euro-As							
<i>Nonea atra</i> Griseb.	a	Bal							
<i>N. pulla</i> (L.) DC	a	subMed							
<i>Onosma echioides</i> L.	p	Med							
<i>Pulmonaria officinalis</i> L.	p	Euro						+	
<b>Brassicaceae Family</b>									
<i>Alliaria petiolata</i> (M.B.) <i>Cavara et Grande</i>	a-b	Euro-As						+	
<i>Alyssum desertorum</i> <i>Stapf.</i>	a	Euro-Med							
<i>Arabis hirsuta</i> (L.) Scop.	b-p	Boreal							
<i>A. sagittata</i> (Bertol.) DC.	b	Euro-Med							
<i>A. turrita</i> L.	b-p	subMed							
<i>Barbarea stricta</i> Andrz.	b	Euro-As							
<i>Bunias orientalis</i> L.	b-p	Euro-Sib							
<i>Calepina irregularis</i> (Asso.) Thell.	a-b	Med							
<i>Camelina alyssum</i> (Mill.) Thell.	a-b	Euro-As							
<i>Capsella bursa-pastoris</i> (L.) Medic	a-b	Cos						+	
<i>Cardamine bulbifera</i> (L.) Crantz.	p	subBoreal						+	
<i>C. greca</i> L.	a-b	Med							
<i>Cardaria draba</i> (L.) Desv.	p	Euro-Med							
<i>Erophila verna</i> (L.) Chevall.	a	Euro- Med-CAs							
<i>Erysimum diffusum</i> Ehrh.	b-p	subBoreal							
<i>Eryngium campestre</i> L.	p	Pont-Med							
<i>Lepidium campestre</i> (L.) R.Br.	a-b	Euro- sMed						+	
<i>Neslia paniculata</i> (L.) Desv.	a	As							
<i>Rorippa prolifera</i> (Heuff) Neilr	a-b	Bal-Dac							
<i>Sinapis arvensis</i> L.	a	Med							
<i>Sisymbrium orientale</i> L.	a-b	Euro-As							

<i>S. polyceratium L.</i>	a	Med						
<i>Teesdalia coronopifolia (J.P.Berg) Thell.</i>	a	subMed- CAs						
<i>Thlaspi praecox Wulf.</i>	p	subMed						
<i>Turritis glabra L.</i>								
<b>Campanulaceae Family</b>								
<i>Campanula persicifolia L.</i>	p	Euro-Sib					+	
<b>Cannabaceae Family</b>								
<i>Cannabis sativa L.</i>	a	Adv						
<b>Caryophyllaceae Family</b>								
<i>Cerastium glomeratum Thuill.</i>	a	Cos						
<i>Dianthus giganteus D' Urv.</i>	p	subMed						
<i>Holosteum umbellatum L.</i>	a	Euro-As						
<i>Minuartia setacea (Thuill.) Hayek.</i>	p	Pont					+	
<i>Moehringia trinervia (L.) Claiv.</i>	a	Euro-As						
<i>Petrorhagia prolifera (L.) Ball.</i>	a	Pont-Med						
<i>Saponaria officinalis L.</i>	p	Euro-Sib					+	
<i>S. holostea L.</i>	p	Euro-Sib						
<i>S. media (L.) Vill.</i>	a-b	Cos					+	
<i>Viscaria vulgaris Röhl.</i>	p						+	
<b>Chenopodiaceae Family</b>								
<i>Chenopodium album L.</i>	a	Cos					+	
<i>Kochia prostrata (L.) Schr.</i>	p	Euro-As						
<b>Cistaceae Family</b>								
<i>Helianthemum nummularium (L.) Miller.</i>	p	Alp-Med						
<b>Convolvulaceae Family</b>								
<i>Convolvulus arvensis L.</i>	p	Cos					+	
<i>C. cantabrica L.</i>	p	Pont						
<b>Cornaceae Family</b>								
<i>Cornus mas L.</i>	h	subMed						
<b>Crassulaceae Family</b>								
<i>Sedum acre L.</i>	p	Euro-Med					+	
<b>Cupressaceae Family</b>								
<i>Cupressus sempervirens L.</i>	t	subMed						
<b>Cuscutaceae Family</b>								
<i>Cuscuta europaea L.</i>	a	subBoreal						
<i>C. epithymum (L.) L.</i>	a	Euro						
<b>Cyperaceae Family</b>								
<i>Carex acutiformis Ehrh.</i>	p	Cos						

<i>C. digitata</i> L.	p	Euro-Sib						
<i>C. hordeistichos</i> Vill.	p	subBoreal						
<i>C. panicea</i> L.	p	Boreal						
<b>Dioscoreaceae Family</b>								
<i>Tamus communis</i> L.	p	subMed					+	
<b>Dipsacaceae Family</b>								
<i>Dipsacus lacinatus</i> L.	b	Euro-Med						
<i>Scabiosa columbaria</i> L.	b	Euro-Med						
<i>S. ochroleuca</i> L.	b-p	Euro-Sib					+	
<b>Euphorbiaceae Family</b>								
<i>Euphorbia aleppica</i> L.	a	Med		E				+
<i>E. cyparissias</i> L.	p	Euro					+	
<i>E. helioscopia</i> L.	a	Euro-As						
<i>E. myrsynites</i> L.	p	subMed					+	
<i>E. oblongata</i> Griseb.	p	Med						
<i>E. salicifolia</i> Host.	p	subMed						
<i>E. serrulata</i> Thuil.	a	sMed-As						
<i>Merculialis ovata</i> Sternb.	p	subMed						
<b>Fabaceae Family</b>								
<i>Astragalus onobrychis</i> L.	p	Euro-As						
<i>Bituminaria bituminosa</i> (L.) Stirt.	p	Pont-Med					+	
<i>Chamaecytisus hirsutus</i> (L.) Link.	p	Euro-Sib					+	
<i>Colutea arborescens</i> L.	p	subMed					+	
<i>Coronilla scorpioides</i> (L.) Koch.	a	subMed					+	
<i>C. varia</i> L.	p	Euro-Med					+	
<i>Dorycnium herbaceum</i> Vill.	p	Euro-Med						
<i>Genista depressa</i> Bieb.	p	subMed						
<i>G. ovata</i> Waldst. et Kit.	p	Euro					+	
<i>G. tinctoria</i> L.	h	Euro-Sib					+	
<i>Lathyrus annuus</i> L.	a	Euro-As						
<i>L. aphaca</i> L.	a	subBoreal						
<i>L. laxyflorus</i> (Desf.) O. Kuntze	p	subMed						
<i>L. sphaericus</i> Retz.	a	Euro-As						
<i>L. sativus</i> L.	a	subMed					+	
<i>L. vernus</i> (L.) Bernh.	p	Euro-Sib					+	
<i>Lens nigricans</i> (M.B.) Godr.	a	Pont-Med						
<i>Lotus corniculatus</i> L.	p	Euro-Med					+	
<i>Medicago falcata</i> L.	p	Euro-As						
<i>M. lupulina</i> L.	a-p	Euro-As						
<i>M. minima</i> (L.) Bart.	a	Euro-As						
<i>M. orbiculais</i> All.	a	Euro-Med						
<i>Melilotus alba</i> Med.	a	subBoreal						

<i>M. officinalis</i> (L.) Pall.	a	subMed					+	
<i>Onobrychis alba</i> (Waldst.et Kit.) Desv.	p	subMed						
<i>Ononis pusilla</i> L.	p	subMed						
<i>O. spinosa</i> L.	p	Euro-As					+	
<i>Robinia pseudoacacia</i> L.	t	Am						
<i>Trifolium arvense</i> L.	a	Euro-Sib					+	
<i>T. aureum</i> Poll.	a	Euro-Sib						
<i>T. hirtum</i> All.	a	Med						
<i>T. incarnatum</i> L.	a-b	subMed						
<i>T. medium</i> L.	p	Euro-As						
<i>T. pratense</i> L.	p	subBoreal					+	
<i>T. repens</i> L.	p	Euro-Sib					+	
<i>Vicia cracca</i> L.	p	Euro-As					+	
<i>V. dalmatica</i> A. Kern.	p	subMed						
<i>V. lathyroides</i> L.	a	Euro-Med						
<i>V. narbonensis</i> L.	a-b	Euro-As						
<i>V. pannonica</i> Crantz.	a	Euro-Med						
<i>V. peregrina</i> L.	a	Euro-As						
<i>V. sativa</i> L.	a	Euro-Med					+	
<b>Fagaceae Family</b>								
<i>Quercus cerris</i> L.	t	Euro-subMed	TR					
<i>Q. frainetto</i> Ten.	t	Euro					+	
<i>Q. petraea</i> (Matt.) Liebl.	t	Euro						
<i>Q. pubescens</i> Willd.	t	Euro-subMed						
<b>Fumariaceae Family</b>								
<i>Corydalis bulbosa</i> (L.) DC	p	Euro-Med					+	
<i>Fumaria officinalis</i> L.	a	Euro-Sib					+	
<b>Geraniaceae Family</b>								
<i>Erodium ciconium</i> (L.) L 'Hér	a-b	subMed						
<i>E. cicutarium</i> (L.)L' Her	a-b	subBoreal					+	
<i>Geranium brutium</i> Gasparr	a-b	Med						
<i>G. molle</i> L.	a-b	Euro-Med						
<i>G. pusillum</i> L.	a-b	Euro-Med						
<i>G. pyrenaicum</i> Burm.	p	subMed					+	
<i>G. rotundifolium</i> L.	a	Euro-As						
<i>G. sanguineum</i> L.	p	Euro					+	
<b>Globulariaceae Family</b>								
<i>Globularia aphyllanthes</i> Crantz.	p	Euro					+	
<b>Hypericaceae Family</b>								
<i>Hypericum rumeliacum</i> Boiss.	p		BE					
<i>Hypericum perforatum</i> L.	p	Cos					+	

<b>Iridaceae Family</b>							
<i>Crocus aureus</i> Silth.et Sm.	p	Euro-Pont					
<i>C. biflorus</i> Mill.	p	Med	TR, BE				
<i>Iris pumila</i> L.	p	subMed				+	
<i>I. sintenisii</i> Janka	p	Med					
<b>Juglandaceae Family</b>							
<i>Juglans regia</i> L.	t	As	TR				
<b>Juncaceae Family</b>							
<i>Luzula sylvatica</i> (Huds.) Gaud.	p	Euro					
<b>Lamiaceae Family</b>							
<i>Acinos rotundifolius</i> Pers.	a	Med-CAs					
<i>Ajuga chamaepytis</i> Schreber	a-b	Pont-Med				+	
<i>A. genevensis</i> L.	p	sPont					
<i>A. laxmanii</i> (L.) Benth.	p	SSib				+	
<i>A. pyramidalis</i> L.	p	Euro-Med					
<i>Glechoma hederaceae</i> L.	p	Euro-As					
<i>Lamium amplexicaule</i> L.	a	Euro-As					
<i>L. purpureum</i> L.	a	Euro-Med				+	
<i>Marrubium parviflorum</i> Fischer et Meyer	p	Med				+	
<i>M. peregrinum</i> L.	p	subMed					
<i>Melissa officinalis</i> L.	p	subMed					
<i>Mentha spicata</i> L.	p	Euro				+	
<i>Origanum vulgare</i> L.	p	Euro-As				+	
<i>Prunella vulgaris</i> L.	p	Cos				+	
<i>Salvia pratensis</i> L.	p	Euro-Med				+	
<i>S. sclarea</i> L.	b-p	Med-As				+	
<i>S. verticillata</i> L.	p	subMed				+	
<i>Sideritis montana</i> L.	a	subMed					
<i>Stachys germanica</i> L.	p	Euro-subMed				+	
<i>S. recta</i> L.	p	Euro-Med				+	
<i>Teucrium chamaedrys</i> L.	p	subMed				+	
<i>T. polium</i> L.	p	Pont-Med				+	
<i>Thymus striatus</i> Vahl .	p	subMed					
<b>Liliaceae Family</b>							
<i>Allium rotundum</i> L.	p	Euro-OT				+	
<i>A. vineale</i> L.	p	Euro-Nam					
<i>Asparagus officinalis</i> L.	p	Euro				+	
<i>Gagea lutea</i> (L.) Ker.Gaw.	p	Euro-As					
<i>Galanthus nivalis</i> L.			BE				
<i>Fritillaria pontica</i> Wahl.	p	Med		R		R	+
<i>Hyacinthella leucophaea</i> (C.Koch.) Schur.	p	Pont-Med					

<i>Muscari botryoides</i> (L.) Mill.	p	Med						
<i>Ornithogalum narbonense</i> L.	p	Med						
<i>O. umbellatum</i> L.	p	Pont-subMed						
<i>Polygonatum odoratum</i> (Mill.) Pruce	p	Euro-Sib						
<i>Scilla bifolia</i> L.	p	Pont-subMed					+	
<i>Ruscus aculeatus</i> L.	p	SPont	TR					
<b>Linaceae Family</b>								
<i>Linum catharticum</i> L.	a	subBoreal					+	
<i>L. usitatissimum</i> L.	a							
<b>Malvaceae Family</b>								
<i>Althaea cannabina</i> L.	p	Med-As						
<i>A. officinalis</i> L.	p	Boreal					+	
<i>Malva sylvestris</i> L.	a-p	Cos					+	
<b>Oleaceae Family</b>								
<i>Fraxinus excelsior</i> L.	t	Euro-Med					+	
<i>F. ornus</i> L.	t	subMed	TR				+	
<i>Jasminum fruticans</i> L.	h	Pont-CAs						
<i>Syrigna vulgaris</i> L.	h	Carp-Bal	TR					
<b>Onagraceae Family</b>								
<i>Epilobium hirsutum</i> L.	p	Boreal						
<i>E. parviflorum</i> Schreb.	p	subBoreal						
<b>Orchidaceae Family</b>								
<i>Anacamptis pyramidalis</i> (L.) Rich.	p	subMed					+	+
<i>Limodorum abortivum</i> (L.) Swattz.	p	Med		R				+
<b>Oxalidaceae Family</b>								
<i>Oxalis acetocella</i> L.	p	subBoreal					+	
<b>Paeoniaceae Family</b>								
<i>Paeonia peregrina</i> Mill.	p	subMed						
<b>Papaveraceae Family</b>								
<i>Chelidonium majus</i> L.	p	Euro-As					+	
<i>Glaucium corniculatum</i> (L.) J.H.Rudolph.	a-b	Euro-As						
<i>Papaver rhoeas</i> L.	a	Euro-Sib						
<b>Pinaceae Family</b>								
<i>Cedrus atlantica</i> Manetti	t	Med						
<i>C. deodara</i> Lond.	t	subMed						
<i>Pinus nigra</i> Arn.	t	subMed						
<i>P. sylvestris</i> L.	t	subBoreal					+	
<b>Plantaginaceae Family</b>								
<i>Plantago lanceolata</i> L.	p	Cos					+	
<i>P. major</i> L.	p	Boreal					+	
<i>P. media</i> L.	p	Boreal					+	



<b>Poaceae Family</b>								
<i>Aegilops cylindrica</i> Host.	a	Euro-As						
<i>A. triuncialis</i> L.	a	Euro-As						
<i>Alopecurus myosuroides</i> Huds.	a	Euro-As						
<i>Arrhenatherum elatius</i> (L.) Mert.	p	Euro-As						
<i>Avena fatua</i> L.	a	Boreal						
<i>Brachypodium distachyon</i> (L.) P.B.	a							
<i>B. sylvaticum</i> (Huds.) Beauv.	p	SSib						
<i>Bromus mollis</i> L.	a	Boreal						
<i>B. sterilis</i> L.	a	Boreal						
<i>B. tectorum</i> L.	a	Boreal						
<i>Chrysopogon grillus</i> (L.) Trin	p	Pont-Med						
<i>Cynodon dactylon</i> (L.) Pers.	p	Cos						
<i>Cynosurus echinatus</i> L.	p	subMed						
<i>Dactylis glomerata</i> L.	p	Euro-As						
<i>Dasypyrum villosum</i> (L)Cand	p	subMed						
<i>Deschampsia caespitosa</i> (L.) Beauv.	p	Boreal						
<i>Dichanthium ischaemum</i> (L.) Roberty.	p	sMed-As						
<i>Festuca pseudovina</i> Hack.	p	subMed						
<i>Hordeum murinum</i> L.	p	Med-CAs						
<i>Koeleria glaucovirens</i> Domin	p							
<i>K. nitidula</i> Vel.	p	Pont						
<i>Lolium temulentum</i> L.	a	Boreal					+	
<i>L. multiflorum</i> Lam.	a-p	subMed						
<i>Melica altissima</i> L.	p	Pont-CAs						
<i>M. ciliata</i> L.	p	Euro-subMed						
<i>Milium effisum</i> L.	p	subBoreal						
<i>Oryzopsis virescens</i> (Trin.) Beck.	p							
<i>Phleum graecum</i> Boiss.et Heldr.	a	subMed-As						
<i>P. pratense</i> L.	p	Euro-subMed						
<i>Poa bulbosa</i> L.	p	Euro-As						
<i>P. pratensis</i> L.	p	Cos						
<i>Psilurus incurvus</i> (Gouan.) Schinz.	a	subMed						

<i>Stipa pennata</i> L.	p	Euro					
<i>Vulpia ciliata</i> Dum.	a	Med-CAs					
<b>Polygalaceae Family</b>							
<i>Polygala hospita</i> Heuff.	p	Pann-Bal					
<i>P. major</i> Jacq.	p	Euro-Sib				+	
<b>Polygonaceae Family</b>							
<i>Bilderdykia convolvulus</i> (L.) Dum.	a	Euro-As					
<i>Persicaria hydropiper</i> (L.) Spach.	a	Euro-As				+	
<i>Polygonum aviculare</i> L.	a	Cos				+	
<i>P. rurivagum</i> Boreau.	a	subBoreal					
<i>Rumex acetosa</i> L.	p	Boreal					
<i>R. acetosella</i> L.	p	Euro-subMed					
<i>R. crispus</i> L.	p	Boreal				+	
<i>R. patientia</i> L.	p	Euro-As				+	
<i>R. pulcher</i> L.	p	Euro-As				+	
<b>Portulacaceae Family</b>							
<i>Portulaca oleracea</i> L.	a	Adv				+	
<b>Primulaceae Family</b>							
<i>Anagalis arvensis</i> L.	a-b	Cos				+	
<i>Androsace maxima</i> L.	a	Euro-As					
<i>Primula veris</i> L.	p	Euro-Med				+	
<b>Ranunculaceae Family</b>							
<i>Adonis aestivalis</i> L.	a	Euro-subMed				+	
<i>Clematis vitalba</i> L.	h	Euro	TR			+	
<i>C. viticella</i> L.	h	Pont-Med					
<i>Consolida regalis</i> S.F.Gray.	a	Euro-Med				+	
<i>Helleborus odoratus</i> Waldst. et Kit.	p	Euro-sMed				+	
<i>Isopyrum thalictroides</i> L.	p	Euro				+	
<i>Ranunculus acris</i> L.	p	Cos					
<i>R. arvensis</i> L.	a	Euro-Med					
<i>R. lanuginosus</i> L.	p	Euro					
<i>R. millefoliatus</i> Vahl.	p	subMed					
<i>R. neapolitanus</i> Ten.	p	Med					
<i>R. polyanthemos</i> L.	p	Euro-subMed				+	
<i>R. repens</i> L.	p	subMed				+	
<i>Ruscus aculeatus</i> L.	h	sPont	TR			+	
<i>Thalictrum aquilegifolium</i> L.	p	Euro-As	TR			+	
<b>Resedaceae Family</b>							
<i>Reseda lutea</i> L.	a-p	subBoreal				+	
<b>Rhamnaceae Family</b>							
<i>Paliurus spina-christi</i>	h	Euro-As				+	

<i>Mill.</i>								
<b>Rosaceae Family</b>								
<i>Agrimonia eupatoria L.</i>	p	Euro-Med					+	
<i>Amygdalus communis L.</i>	t							
<i>Crataegus monogyna Jacq.</i>	h-t	subBoreal					+	
<i>Filipendula vulgaris Moench.</i>	p	Euro-Med					+	
<i>Fragaria vesca L.</i>	p	subBoreal					+	
<i>Geum urbanum L.</i>	p	subBoreal					+	
<i>Padus mahaleb (L.) Borkh.</i>	t	subMed-OT						
<i>Potentilla argentea L.</i>	p	sPont						
<i>P. laciniosa Nestler</i>	p	subMed						
<i>P. mollicrinis (Borb.) Stanckov.</i>	p	Pont-Med						
<i>P. pilosa Willd.</i>	p	Euro						
<i>Rosa canina L.</i>	h	subMed						
<i>Rubus caesius L.</i>	h	Euro-As					+	
<i>Sanguisorba officinalis L.</i>	p	subBoreal					+	
<i>Sorbus torminalis (L.) Crantz.</i>	t	Pont-Med						
<b>Rubiaceae Family</b>								
<i>Asperula cynanchica L.</i>	p	Euro-Med						
<i>A. tenella Heuffei</i>	p	subMed						
<i>Crucianella angustifolia L.</i>	a	Med						
<i>Cruciata glabra(L.) Ehrend.</i>	p	sMed-CAs						
<i>C. laevipes Opiz.</i>	p							
<i>Galium aparine L.</i>	a	Euro-As						
<i>G. tricornutum Dandy</i>	a	Euro-As						
<i>G. verum L.</i>	p	Euro-As					+	
<i>Rubia tinctorum L.</i>	p	Med					+	
<i>Sherardia arvensis L.</i>	a	Med						
<b>Rutaceae Family</b>								
<i>Dictamnus albus L.</i>	p	Euro-As					+	
<b>Salicaceae Family</b>								
<i>Populus nigra L.</i>	t	Euro-As						
<i>Salix alba L.</i>	t	Euro-As					+	
<b>Santalaceae Family</b>								
<i>Thesium simplex Vel.</i>	p	Bal-Dac						
<b>Scrophulariaceae Family</b>								
<i>Digitalis lanata Ehrh.</i>	p	subMed					+	
<i>Euphrasia liburnica Wettst.</i>	a	Carp-Bal						

<i>Linaria grandiflora</i> Desf.	p	Bal-Anat						
<i>Melampyrum arvense</i> L.	a	Euro-Med						
<i>M. cristatum</i> L.	a	Euro-Sib						
<i>Orobanche minor</i> Sm.	p	Med						
<i>O. crenata</i> Forssk.	a-b	Med						
<i>Scrophularia canina</i> L.	p	Euro-Med					+	
<i>Verbascum phlomoides</i> L.	b	Euro					+	
<i>V. densiflorum</i> Bertol.	b	subMed					+	
<i>V. xanthophoeniceum</i> Griseb.	b-p	Bal-Anat						
<i>Veronica austriaca</i> L.	p	Euro-Med					+	
<i>V. chamaedrys</i> L.	p	Euro-As					+	
<i>V. hederifolia</i> L.	a-b	Euro-Med						
<i>V. officinalis</i> L.	p	Euro-Sib					+	
<b>Simarubaceae Family</b>								
<i>Ailanthus altissima</i> (Mill.) Swingle	t	Ch						
<b>Solanaceae Family</b>								
<i>Datura stramonium</i> L.	a	Am (Adv)					+	
<i>Solanum dulcamara</i> L.	p	Euro-As					+	
<i>S. nigrum</i> L.	a	Cos					+	
<b>Tilliaceae Family</b>								
<i>Tilia tomentosa</i> Moench.	t	Euro-Med					+	
<b>Ulmaceae Family</b>								
<i>Ulmus minor</i> Mill.	t	Euro-Med						
<b>Urticaceae Family</b>								
<i>Parietaria lusitanica</i> L.	a	Med-As					+	
<i>Urtica dioica</i> L.	p	Boreal						
<i>U. urens</i> L.	a	Boreal					+	
<b>Valerianaceae Family</b>								
<i>Valerianella pumila</i> (L.) DC	a	Pont-Med						
<i>V. turgida</i> (Stev.) Betcke.	a	subMed						
<b>Verbenaceae Family</b>								
<i>Verbena officinalis</i> Voss.	p	Cos					+	
<b>Violaceae Family</b>								
<i>Viola arvensis</i> Murr.	a	Euro						
<i>V. tricolor</i> L.	a-b	Euro-As					+	
<i>V. odorata</i> L.	p	Euro-Med					+	
<b>Vitaceae Family</b>								
<i>Vitis vinifera</i> L.	a	subMed						

**Legend:**

**a-** annual species; **b-**biennial species; **p-** perennial species ; **h** – a frutex; **t-** a tree

**TR** – Tertiary Relict; **BE** – Balkan Endemics; **E** – Endangered; **R**- rare

**RB of PRB** - Red Book of People's Republic of Bulgaria

**BDL**- Bio Diversity Law

**MPL**- Medicinal Plants Law

**CITES**- Convention of International Trade with Endangered Species of the wild flora and fauna

**IUCN** – 1997 IUCN Red List of Threatened Plants.

**Floristic elements:** **Adv**- adventive; **Alp**- Alpine; **Ant**- Anatolian; **Ap**- Apenninian; **Am**- American; **As**- Asian; **Bal**- Balkan; **Boreal**- Boreal; **C**-Central; **N** - Northern; **Ch**- Chinese; **Dac**- Dacian; **Eur**- European; **Cos**- Cosmopolitan; **Med**- Mediterranean; **OT**- Oriental- Turanian; **Pann**- Pannonian; **Pont**- Pontic; **S**- Southern; **Sib**- Siberian; **sub**- sub