

Variety of medicinal plants in a cultigenic ecosystem

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Abstract: As a result of plant diversity investigation in the “Metropolit Metodi Kusev” Forest Park cultigenic system and concurrent application of Regulation Acts of Bulgarian and international legislation, 239 species of medicinal plants are established. They are distributed in categories with respect to accessibility to usage, preservation conditions and their economic importance. 9 species with Nature preservation status, 2 Balkan endemics and 9 Tertiary relicts are registered. Quantitative and qualitative assessment of the populations of these with greater significance is made.

Introduction: The steady use of medicinal plants as a subject of the national politics dates back to the late 30s of the last century [10]. The recently developed National Strategy (1994) and The National Plan for Biologic Diversity Preservation [13] stimulate data base creation and scientifically grounded management of medicinal plants resources.

So far the emphasis in medicinal plants fund research is placed upon concrete species with economic significance [3],[5],[7], or on a survey of the territories with Nature preservation status [6].

The issues connected with the flora and vegetation in the cultigenic systems is poorly explored. Considered for a long time a priority of architectural and forestry practices, the analyses in them are reduced to a taxonomic estimation of ligneous and frutescent [4], and of grass vegetation [8]. At the same time their proximity to settlement systems of various grades presumes wide usage of the plant resources with most diverse economic significance, with the citizens unaware of the fund available, and of the legally restricted quantities, allowed to be used for personal needs.

Objects and Methods

A subject of the study is the “Mitropolit Metodi Kusev” Forest Park cultigenic ecosystem, located in the vicinities of Stara Zagora and taking an area of 992 hectares. The cultigenic system is part of the green shelter belt, situated to the North of the town. It includes a constant main body of 60 hectares of area (the Ayazmoto hill) and a peripheral zone of 932 hectares of area (including № 63 ÷ 65 and № 80 ÷ 83 adjoining sections according to the Forestry Management Plan).

The research comprises two vegetative periods: 2006 ÷ 2008. The route method is used for the establishment of the species diversity. A frame of an area of 1 m² is utilized when the number of populations is measured.

The Nature preservation status of the species is defined on the basis of the works of Bulgarian authors [1], [2] and Regulation Documents of Bulgarian and international legislation: Medicinal Plants Law (2000) and its rider (Official Gazette, issues 23 and 91/ 2002); Appendix № 4 of Biological Diversity Law (BDL) (promulgated in Official Gazette, issue 77/2002); Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES - 1990); Appendix I of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Conv.- 1991); IUCN Red List of Threatened Plants [11].

The differentiation of the particular groups of medicinal plants is grounded on investigations and recommendations [12], [14], connected with conservation of the phylogenetic fund.

Results:

As a result of the examination accomplished, 239 wild medicinal plants are specified, which represent 43% of plant diversity in the region and 31% of the taxa included in the Medicinal Plants Law and its rider. They are distributed in 58 families and 85 genera.

The diversity established is mainly based on the representatives of angiosperms (section *Magnoliophyta*). With the greatest number of species are *Fabaceae* Family (25 in number), *Asteraceae* Family (22), *Lamiaceae* Family (20), *Rosaceae* Family (17), and *Apiaceae* Family (10).

From the groups of important economic significance [9] those with the best representation are the medicinal plants (98 species), followed by the groups of melliferous plants (42 species), and nutritive plants (40 species). The essential oil plants (4 species) and technical plants (18 species) are comparatively poorly represented.

With regard to accessibility to usage of stores, wild medicinal plants in the Forest Park are referred to three categories:

In the first category - Medicinal plants, forbidden for gathering - 11 species are under complete prohibition - *Achillea clypeolata* Sibth., *Anthriscus cerefolium* (L.) Hoffm., *Cotinus coggygria* Scop. and *Smilax excelsa* L. - are among them.; 7 species are under partial prohibition - *Salvia tomentosa* Mill., *Rubia tinctorum* L., *Cnicus benedictus* L. and *Althaea officinalis* L. - are among them.

The second category - Medicinal plants, gathered for personal needs - is the most numerous of all and includes 112 species. Some of the most widely distributed and broadly used grass medicinal plants - *Thymus longidentatus* (Deg. et Urum.) Ronn., *Achillea clypeolata* Sibth. et Sm., *Teucrium chamaedrys* L., *Melissa officinalis* L., *Urtica dioica* L., *Taraxacum officinale* L. - belong to this category.

The third category includes species, which can be gathered freely for personal needs and business purposes. 5 species of all the 98 included are under restrictive regime of usage-*Paeonia peregrina* Mill., *Primula veris* L., *Vinca minor* L., *Xanthium spinosum* L. and *Xeranthemum annuum* L.

On the territory of the Forest Park *Bupleurum sp. div.*, *Echinops sp. div.*, *Crocus sp. div.*, *Asparagus sp. div.*, *Orchis sp. div.*, *Stipa sp. div.*, *Ruscus aculeatus* L., *Scilla bifolia* Mill., and *Primula veris* L. are under regime of conservation and controlled usage out of the species listed in Appendix № 4 of BDL. 9 species are with Nature preservation status according to the national and international Nature conservation registers: *Capsella bursa-pastoris* (L.) Medic. ssp. *thracica* (Vel.) Stoj. et Stef., *Euphorbia allepica* L. ([2]-endangered); *Anacamptis pyramidalis* (L.) Hartm., *Cyclamen hederifolium* Ait., *Galanthus nivalis* L., *Orchis morio* L., *O. simia* Lam. (CITES); *Capsella bursa-pastoris* (L.) Medic. ssp. *thracica* (Vel.) Stoj. et Stef. (IUCN-vulnerable); *Himanthoglossum hircinum* (L.) Spreng. (Bern Conv); *Acanthus spinosus* L., *Anacamptis pyramidalis* (L.) Hartm., *Capsella bursa-pastoris* (L.) Medic. ssp. *thracica* (Vel.) Stoj. et Stef., *Euphorbia allepica* L., *Galanthus nivalis* L., *Himanthoglossum hircinum* (L.) Spreng. (BDL, 2002).

About 80% of the medicinal species (mostly grass species - annual, biannual, and perennial) form dispersed populations with irregular spatial structure. Whenever diaspores get into favourable environment - i.e. suitable biological niche - the species forms higher density patches.

Populations of the following species represent interest to the study with respect to the Nature preservation aspect:

Anacamptis pyramidalis - the population prefers grass communities on open, sunny places. It forms various in numbers populations with uneven structure (Table 1.). Such are those observed in Section № 64 – along the way to the “Dabrava” kindergarten, under the cedar plantations in Section № 63, and those among the vineyards in wilderness in Section № 64.

Himanthoglossum hircinum - settled in open, bright places next to off-shoot woods of *Carpinus orientalis* Mill. in the adjoining territories, it also goes down within the boundaries of the Forest Park (found beside the Zoo and over the badminton ground). The species is represented by sole specimen in blossom.

Table 1. Characterization of two populations of *Anacamptis pyramidalis* (L.) Hartm.

habitat	To the right off the road to the Observatory	Over abandoned vineyard in Section №64
altitude	430 m	330 m
rock foundation	limestone	limestone
aspect	North-west	North-west
tilt	10 ⁰	8 ⁰
irrigation	Atmospheric moistening	Atmospheric moistening
area	35 m ²	1 m ²
numbers	127 specimen	5 specimen
condition	Very good, fructiferous	Very good, fructiferous

***Capsella bursa-pastoris* (L.) Medic. ssp *thracica* (Vel.) Stoj. et Stef.** - the subspecies forms scanty populations on considerable area. In grass communities their density reduces proportionally; on open, deprived of grass vegetation sections it forms local patches. It is widely distributed within the boundaries of the city.

Cyclamen hederifolium - within the borders of the Forest Park the species forms numerous populations in a heterogeneous forest with off-shoot origin of *Carpinus orientalis* Mill. and *Quercus cerris* L. behind the Observatory. The population has a tessellated structure, corresponding to the both ways of spreading of the species (Table 2). Habitat is shadowy, with mesophylic conditions.

Table2. Characterization of a fragment of the *Cyclamen hederifolium* Ait. population

habitat	Heterogeneous forest between the Observatory and the transformer
altitude	450 m
rock foundation	limestone
aspect	North-west
tilt	10 ⁰
irrigation	Atmospheric moistening
area	1 m ²
numbers	10 specimen
condition	Very good

Galanthus nivalis - two habitats of the species are registered in the vicinity of the "Hraninvest" mountain hostel, and in a forest composed of *Carpinus orientalis* Mill. over the Dabrava village. The populations are with an area of 10 ÷ 20 m² and consist of juvenile and reproductive specimen

Orchis simia - single specimen within the boundaries of the Forest Park are listed in the Northern slope of the "Kazlera" hill, along the crests of the highest parts of Sections №63 and №64 in communities composed of *Limodorum abortivum* (L.) Sm.(Table 3). It is spread all over the country along the left part of the road to the Dabrava village.

Табл.3. Characterization of a fragment of the *Orchis simia* Lam. population

habitat	To the left off the road to the Dabrava village
altitude	450 m
rock foundation	limestone
aspect	North
tilt	9 ⁰
irrigation	Atmospheric moistening
area	1 m ²
numbers	10 specimen
condition	Very good

Two Balkan endemics - *Achillea clypeolata* Sibth., *Thymus longidentatus* (Deg. et Urum.) Ronn. and 9 Tertiary relicts - *Acer tataricum* L., *Clematis vitalba* L.,

Corylus avellana L., *Cotinus coggygria* Scop., *Hedera helix* L., *Populus tremula* L., *Syringa vulgaris* L., *Thalictrum aquilegifolium* L., *Fraxinus ornus* L., *Carpinus orientalis* Mill. - are registered among the medicinal plants. The species belonging to the Balkan endemic element are spread in all parts and form steady populations on open and bright sections within the borders of the Forest Park and its adjoining regions. The Tertiary relicts are an obligatory element of the indigenous ligneous vegetation not only in the region, but also in the whole xerothermic oak belt.

Discussion:

The proximity of the analyzed territory to a big administrative center presumes high degree of usage of the natural resources in the region. The established 239 medicinal plants are an indicator of the phytogenofund high resource significance (by comparison the data for the "Rila" National Park - 141 species of medicinal plants, for the "Central Balkan" National Park - 166 species, and for the "Rila Monastery" Nature Park - 135 species can be pointed). Differentiation of the plant resources in groups according to their economic importance and the application of regulation documents, legalizing accessibility to usage, require clarification of the territory statute. Fundamental argument, supporting this thesis is the registration of 12 medicinal species with Nature preservation status, and their spreading all over the country as steady, self-reproductive populations.

Bibliography:

1. Andreev N, Antchev M, Bondev I (1992) Atlas of the endemic plants in Bulgaria. BAS, S, 204
2. Veltchev V (ed.) 1984. Red Data Book of People's Republic of Bulgaria BAS, S, I:447
3. Genova E, Rusakova V, Tcherneva Zh (1991) Phytocoenological and ecological peculiarities of bearberry (*Arctostaphylos uva-ursi* (L.) Spreng. in some regions of Bulgaria. Phytology 39: 33-53
4. Dimitrov D, Gusev Tch, Kimenov G, Boseva Yu (2005) Botanical characterization of the "Vrana" Park., "Trud" Publishing House, "Academy of ecology" Foundation, S, 91
5. Evstatieva L, Yankulov J (1980) Investigation of biological peculiarities of the species from the *Thalictrum* L. Genus., Peculiarities at growing and development of *Thalictrum minus* L. Phytology,14:60-69
6. Evstatieva L (2003) Biological diversity and medicinal plants resources in the "Rila Monastery" Nature Park In: Peev D (ed.) Swift ecological assessment of the "Rila Monastery" Nature Park Ari Art Ltd, 65-59
7. Kuzmanov B, Vitkova A (1978) Spreading of *Ruta graveolens* L. (rue) in Bulgaria. In: Symposium of works IV th National Conference of Botany BAS, 97-100
8. Pavlov D, Tashev A (1999) Floristic composition and phytocoenotic structure of grass communities in the "Vrana" Park In: Shehtov H, Asparuchov K, Delkov N, Iliev S, Yorova K, Kuleliev J, Kyutchukov G, Stilyanova E, Mihailov H, Shishkov I (ed.) Scientific works "Ecology and landscape architecture" series, UF – S, XXXVII: 125-131
9. Peev D, Antchev M, Ivanova D, Kozhuharov S, Petrova A, Tsoneva S (1994) Biological diversity of higher plants in Bulgaria In: Sakalyan M (ed.) National strategy for conservation of biological diversity, Bulvest Ltd, S, I: 73-124
10. Stoyanov N (1939) To the issue of medicinal herbs export. Prirodoznanie, I(3-4):137
11. Walter K, Gillett H (eds) (1988) 1997 IUCN Red List of Threatened Plants. Compiled by the World Conservation Monitoring Centre. IUCN - The World Cambridge, 862 pp
12. Hardalova R, Evstatieva L, Gusev Tch (1994) Characterization of the resources of the wild medicinal plants in Bulgaria and recommendations for their long term stable development. In: Sakalyan M (ed.) National strategy for conservation of biological diversity. Basic reports 2:41-72
13. Hisler P, Germer K (ed.) (2000) National plan for conservation of biological diversity, MEW, Sofia
14. <http://www.strandja.bg/uploads/docs/lechebni-rastenia.doc>