

Characteristics of medicinal plants in protected area “Dabeto” village Novi izvor (Bulgaria)

Stoyan Georgiev¹, Koycho Koev^{2*}, Teodora Barakova¹, Nikolay Kochev³

¹Field Crops Institute – Chirpan, 2 Georgi Dimitrov Blvd, 6200 Chirpan, Bulgaria

²University of Plovdiv, Faculty of Biology, 24 Tsar Assen Str., 4000 Plovdiv, Bulgaria

³Primary school “Hristo Botev”, 1 A Hristo Botev Str., 4112 Krumovo, Bulgaria

*E-mail: koev_k@mail.bg

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Abstract

The present study examines the medicinal plants in the protected area PA “Dabeto”, Novi izvor village in the region of Plovdiv. The received data is based on a three-year research of the flora in the protected zone. Ecobiological characteristic of the medicinal plants is made, and the species are distributed by biological groups, by life forms, by floral elements, and by time of flowering. The plants are classified by ecological groups according their regard towards the water, the light and the heat as a factor. Conclusions for the presence by percentage of medicinal flora in the protected area are made.

Key words: protected area “Dabeto”; NATURE 2000; medical flora

INTRODUCTION

The purpose of the current research is to create a list and to make floristic analysis and ecological and biological characteristic of the medical plants (MP) within the borders of the protected area PA “Dabeto”, Novi izvor village the region of Plovdiv.

The subject of the research is the medical plants in the PA “Dabeto”, Novi izvor village, municipality of Asenovgrad (10,3 ha), located in the Upper Thracian Plane. The protected area is stated with Order № RD-650/ 23.11.2000 from Ministry of Environment and Water (MOEW) aiming to protect a century-old oak forest. The area of the protected area is updated with an Order RD-852/ 07.11.2006 from MOEW. The commented territory is part of the NATURA 2000 zone BG0000438 „Reka Chinardere”.

The protected area is located in the field of Plovdiv of the Upper Thracian Plain. According to phytogeographical subdivision (Bondev, 1991) the territory of the commented object is at the borders of the floristic region Thracian Plain.

According to the physiographic division of Bulgaria (Galabov, 1982) the examined territory falls in the Kraishtensko – Tundjanska (transitional) zone, region of the upper Thracian Plain, in the Western sub-region which is in the field of Plovdiv.

Based on the climatic zoning of the country (Galabov, 1982) the territory of the PA “Dabeto”, is in the Eastern Thracian sub-region of the climatic region of Eastern Central Bulgaria, Transitional – continental climatic sub-region of the European –continental climatic region. It is characterized with relatively mild winter and hot summer, with well-defined drought especially in the months August-September, which are the driest months of the year. The average annual rainfall is 551 l/km², which defines the area as a place with little annual rainfall (Galabov, 1982). The average annual temperature is around 12.1 °C, which matches the indicated temperature for the country between 11 and 12°C (Galabov, 1982). The average air humidity is 72% and matches the average for the country (Galabov, 1982).

The soils are mainly alluvial meadows, where at some places are mixed with clay and black resinous.

Targeted floristic studies were not carried out in the protected area.

MATERIAL AND METHODS

The diversity of medicinal flora in PA “Dabeto” is studied by systematic observations and collecting of material during the vegetative seasons of 2014-2016. The periodicity of the visits is conformed to the climatic conditions in the region and the determined by their phyto-rhythmic. The earliest aggregates are from the beginning of February 2014, and the latest – from the end of September 2016. This allows the most complete taxonomic diversity of the medicinal flora in the reserve and its seasonal dynamics. The determination of the species is made by means of Flora of Bulgaria (Yordanov, edit. 1963-1979; Velchev, edit. 1982-1989), Flora of Bulgaria (Kozhuharov, 1995), and Flora of Bulgaria (Stoyanov et al., 1966-1967), Identifier of Trees and Shrubs in Bulgaria (Gramatikov, 1992), Identifier of Plants in Bulgaria (Delipavlov & Cheshmedzhiev, edit. 2011).

The processing of herbarium materials and characteristics of medicinal flora were carried out by standard methods (Gusev et al., 1995). Characteristic of medicinal plants was done according to biological types and life forms of Raunkiaer (1934). Floral elements were characterized by the classification of B. Stefanov (1943) and the adapted to the flora of Bulgaria classification of Walter (Asyov & Petrova, 2012). The identified taxa are divided into ecological groups in terms of the most important ecological factors – water, temperature and light. An account and analysis of the flowering period for all identified species were done. The names of the plants are by The Euro + Med PlantBase – the information resource for Euro-Mediterranean plant diversity (2011), Identifier of Plants in Bulgaria (Delipavlov & Cheshmedzhiev, 2011).

RESULTS OF THE RESEARCH

The results from the resent analysis summarize the data from the terrain researches and based on the literature analysis of publications for medi-

cal plants of Bulgarian flora (Annex 1 to the Law for medical plants, 200, 2006; Nikolov, 2007; Tashchev & Tsavkov 2008; Landjev, 2010; Delipavlov & Cheshmedzhiev, edit. 2011), was established, that in PA “Dabeto” there are 100 species of medical plants from 83 genera and 40 families, which is 2.8% from the species, 9.8% from the genera and 33.3% from the families in the Bulgarian flora (Asiova and Petrova 2012).

Systematic list of the medical plants in PA “Dabeto”

Pinophyta

Cupressaceae: *Jniperus communis* L.

Liliopsida

Alliaceae: *Allium rotundum* L.; Iridaceae: *Iris graminea* L.; Liliaceae: *Polygonatum odoratum* (Mill.) Druce, *Scilla autumnalis* L.; Poaceae: *Cynodon dactylon* (L.) Pers.

Magnoliopsida

Aceraceae: *Acer tataricum* L.; Apiaceae: *Eryngium campestre* L.; Asteraceae: *Achillea millefolium* L., *Arctium minus* (Hill) Bernh., *Artemisia vulgaris* L., *Carduus acantoides* L., *Carlina vulgaris* L., *Centaurea calcitrapa* L., *Centaurea solstitialis* L., *Chamomilla recutita* (L.) Rauschert, *Cichorium intybus* L., *Inula germanica* L., *Lactuca serriola* L., *Matricaria trichophylla* (Boiss.) Boiss., *Taraxacum officinale* Weber, *Tragopogon pratensis* L., *Tussilago farfara* L.; Aristolochiaceae: *Aristolochia clematitis* L.; Boraginaceae: *Anchusa officinalis* L., *Echium italicum* L.; Brassicaceae: *Brassica nigra* (L.) Koch, *Capsella bursa-pastoris* (L.) Medic., *Rorippa sylvestris* (L.) Besser, *Thlaspi arvense* L.; Cannabaceae: *Cannabis sativa* L., *Humulus lupulus* L.; Caprifoliaceae: *Sambucus ebulus* L., *Sambucus nigra* L.; Caryophyllaceae: *Stellaria media* (L.) Vill.; Chenopodiaceae: *Chenopodium album* L.; Convolvulaceae: *Convolvulus arvensis* L.; Cornaceae: *Cornus sanguinea* L.; Fabaceae: *Lotus corniculatus* L., *Melilotus alba* Medic., *Melilotus officinalis* (L.) Pallas, *Trifolium pratense* L., *Trifolium repens* L., *Vicia cracca* L., *Vicia grandiflora* Scop.; Fagaceae: *Quercus robur* L.; Fumariaceae: *Fumaria officinalis* L.; Geraniaceae: *Erodium cicutarium* (L.) L'Her; Hypericaceae: *Hypericum perforatum* L.; Lamiaceae: *Acinos suaveolens* (Sibth. & Sm.) G. Don f., *Ajuga chia* Schreber, *Ajuga rep-*

tans L., *Ballota nigra* L., *Betonica officinalis* L., *Clinopodium vulgare* L., *Glechoma hederacea* L., *Lamium purpureum* L., *Mentha aquatica* L., *Mentha pulegium* L., *Salvia aethiopsis* L., *Salvia nemorosa* L., *Teucrium chamaedrys* L., *Teucrium polium* L., *Thymus pannonicus* All.; **Lythraceae**: *Lythrum salicaria* L., *Lythrum vigratum* L.; **Malvaceae**: *Malva sylvestris* L.; **Papaveraceae**: *Papaver rhoeas* L.; **Plantaginaceae**: *Plantago lanceolata* L., *Plantago major* L.; **Polygonaceae**: *Persicaria hydropiper* (L.)Opiz, *Polygonum aviculare* L., *Rumex crispus* L.; **Primulaceae**: *Lysimachia nummularia* L.; **Ranunculaceae**: *Clematis vitalba* L., *Consolida hispanica* (Costa) Greuter & Burder, *Consolida regalis* S.F.Gray, *Ranunculus repens* L., *Ranunculus sceleratus* L.; **Resedaceae**: *Reseda inodora* Reichenb.; **Rosaceae**: *Agrimonia eupatoria* L., *Crataegus monogyna* Jacq., *Geum urbanum* L., *Potentilla argentea* L., *Potentilla reptans* L., *Rosa canina* L., *Rubus caesius* L.; **Rubiaceae**: *Galium aparine* L., *Galium verum* L.; **Salicaceae**: *Salix alba* L., *Salix fragilis* L.; **Scrophulariaceae**: *Veronica anagallis-aquatica* L.; **Solanaceae**: *Datura stramonium* L., *Hyoscyamus niger* L., *Solanum dulcamara* L., *Solanum nigrum* L.; **Ulmaceae**: *Ulmus minor* Miller; **Urticaceae**: *Urtica dioica* L.; **Verbenaceae**: *Verbena officinalis* L.; **Zygophyllaceae**: *Tribulus terrestris* L.

These plants resemble 13.4% from all species included in Annex 1 to the Law for the medical plants (200, 2006). All species belong to Magnoliophyta

division. From the seed plants in the area 1 species belong to Pinophyta, 5 species belong to Class Liliopsida, distributed into 5 genera and 4 families, and the rest 94 species belong to Class Magnoliopsida, distributed into 77 genera and 35 families.

Richest in medical species families in the PA are: Asteraceae and Lamiaceae with 15 species, Fabaceae with 8 species and Rosaceae with 7 species.

The distribution of the taxon according to biological types shows that with the most significant presence are the perennial herbaceous species – 51 or 51.0% of all the medical plants, followed by the annual – 18 species (18.0%), trees and shrubs with 4 species (4.0%) each. The rest of the species belong to the transitional biological types (Table 1).

According to the biological spectrum of the studied species, most are hemicryptophytes (H) – 46 species or 46.0% of the total number of plants in the protected area, followed by therophytes (Th) – 18 species (18.0%), phanerophytes (Ph) – 10 species (10.0%), cryptophytes (Cr) – 5 species (5.0%) and chamephytes (Ch) which are only 1 species (1.0%). The remaining species are of transitional life forms – among them the most – 12 species (12.0%) are these which can be hemicryptophytes or therophytes (H-Th), depending on the habitat conditions.

The distribution of medical plants in phytogeographic centers according to the classification of B. Stefanov (1943), shows that the greatest part – 45.0% are thermophytes from the Southern Continental Center, followed by the thermophytes from

Table 1. Distribution of the medical plants from PA “Dabeto” according to biological types

Biological type	Number of taxa	% from MP in PA “Dabeto”
tree	4	4
tree-shrub	1	1
shrub-tree	2	2
shrub	4	4
perennial	51	51
biennial-perennial	5	5
biennial	5	5
annual-perennial	2	2
annual-biennial	9	9
annual	18	18
Total	100	100

the Northern Continental Center – 28.0%, the mesotherms of Silvo boreal Center - with 13.0%, thermophytes and mesotherms from the Mountainous Center – 11.0%, plants from other phytogeographic centers – 2.0%, and least are the thermophytes from Mediterranean Centre – 1.0%.

According to their mobility the analyzed plants are distributed as follows: the stationary species 12 (12.0%), the moving ones with secondary expanded areas – 33 species (33.0%) and the species that have appeared by secondary displacement – 55 plants (55.0%) (Stefanov, 1943). These data is evidence of significant anthropogenic interference within the territory of the reserve in the past.

Analyzing medical plants by floral elements, distributed according to the classification of Walter, shows that geo-elements with European component – 51 species or 51.0% are the greatest part, as among them most are Euro-Asian (*Eur-As*) – 22 species (22.0 %), Euro Mediterranean (*Eur-Med*) – 16 species (16.0%), Euro-Siberian (*Eur-Sib*) with 6 species (6.0 %), European (*Eur*) – 5 species (5.0%) and Euro-Tuman – 2 species (2.0%). Second is the group of species with Mediterranean component – 34 species or 34.0%, among them most are Euro Mediterranean (*Eur-Med*) with 16 species (16.0 %), followed by sub-Mediterranean (*subMed*) with 11

species (11.0 %), Pontic-Mediterranean (*Pont-Med*) – 4 species (4%), and Mediterranean (*Med*) – 3 species (3.0%). There is a large amount of Cosmopolitan (*Kos*) plants – 15 species (15.0%), (Table 2).

The distribution of the studied plants according to their period of flowering shows that the most active period is from May to July. During this period 95 taxa blossom, 95.0 % of all the plants. Among them, most species blossom in June-August – 17 species, May-August and June-September – 13 species each, May-June and May-September – 7 species each etc.

According to their relation to water the medicinal plants in the explored area dominating are the mezophytes with 55 species (55.0%), followed by the hygrophytes and xerophytes with 12 species (12.0%) each, xeromezophytes – 7 species (7.0%) and hygromezophytes and mezohygrophytes with 6 species (6.0%) each.

The analysis of the medical plants distribution in terms of the light factor shows prevalence of heliophytes that are most of the species (96%), and the rest are hemi-schyophytes (6.0%) as there are no schyophytes.

According to their relation to heat, the species are divided into only 2 groups. Thermophytes go to the bigger group with 84 species (84.0%), and the

Table 2. Distribution of the medical plants from PA “Dabeto” by floral elements according to the adapted classification of Walter (Asyov & Petrova, 2012)

Floral elements by Walter (2012)	Number of taxa	% from MP in PZ “Yazovir Konush”
<i>Adv</i>	2	2
<i>Boreal</i>	5	5
<i>Eur</i>	5	5
<i>Eur-As</i>	22	22
<i>Eur-Med</i>	16	16
<i>Eur-OT</i>	2	2
<i>Eur-Sib</i>	6	6
<i>Kos</i>	15	15
<i>Med</i>	3	3
<i>Pont</i>	1	1
<i>Pont-Med</i>	4	4
<i>subBoreal</i>	8	8
<i>subMed</i>	11	11
Total	100	100

rest 16 species (16.0%) refer to the group of mesotherms. The dominance of thermophilic species is directly related to the influence of the Mediterranean climate, penetrating along the Maritsa River (Galabov, 1982).

CONCLUSION

The research held in the period 2014-2016 of the medicinal plants in PA "Dabeto" shows that there are 100 species plants from 83 genera and 40 families. Among these plants the majority are the perennial herbaceous species, the hemicryptophytes, the species with European and Mediterranean origin, the thermophytes, the mezophytes and the heliophytes which mainly blossom in the period May-July. The comparatively big participation of secondary and cosmopolite plants within the borders of the examined area is evidence for the considerable anthropogenic interference in the processes occurring in the plant cover of the protected area.

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