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Floristical Investigation of "Yazovir Konush" NATURA 2000 Site (BG0002015), Southern Bulgaria

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Abstract. "Yazovir Konush" NATURA 2000 site (BG0002015) is situated near Konush village, Plovdiv district and occupies an area of 0.376 ha. It was established for protection of the habitats of bird species, included in Biological Diversity Act and Bird Directive as a part of NATURA 2000 network of Bulgaria. Vascular plant diversity was investigated during 2012-2014 field working seasons using transect and semi-stationary sampling methods. All species were categorized by biological groups, life forms and floristic elements. The plants were classified by ecological groups according to their preference to water, light and heat conditions. A total of 172 vascular plants were identified. They belong to 50 families and 133 genera. One hundred and three species are medicinal plants, which comprise more than 59.8% of the total flora of the study area. The richest families are *Fabaceae*, *Asteraceae*, *Lamiaceae*, *Poaceae*, *Brassicaceae* and *Rosaceae*. Among the richest genera are *Vicia*, *Carex*, *Veronica*, *Rumex*, *Lathyrus*, *Trifolium* and *Potentilla*, which comprise more than 14.5% of the total flora of the study area. Only 2 species in the floristical composition with conservation status were identified (*Cephalanthera damasonium* and *C. rubra*). The ecological analysis showed that the flora of the investigated area is dominated by hemicriptophytes (41.3%), followed by terophytes (26.7%). Mesophyte and heliophyte species are predominant, whereas Euro-Asiatic and Euro-Mediterranean floristic elements are the most widely distributed floristic elements in the study area.

Key words: Protected zone "Yazovir Konush", NATURA 2000, vascular plants, wetland flora.

Introduction

"Yazovir Konush" NATURA 2000 Site (BG0002015) was declared with Order № RD-367/16.06.2008 from the Ministry of Environment and Water (MOEW) aiming to protect, support and restore habitats of bird species, included in the Biological Diversity Act. It is situated in the Thracian plane, near Konush village, Asenovgrad municipality (Fig. 1) and covers an area of 0.376 ha.

According to the morphografic division of Bulgaria the study area falls into Southern part (Thracian lowland) of the Transitional zone of mountains and basins (STEFANOV, 2002). The area belongs to the Transitional-Continental climate zone, which is characterized by mild climate (VELEV, 2002). The precipitation maximum occurs in July and November and its minimum is in August and February (VELEV 2002). The average annual rainfall is 551 l/km^2, which is relatively low, compared to other areas. The average annual temperature is around 12.1° C, whereas the average air humidity is 72%.

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According to the floristic division of Bulgaria (JORDANOV, 1963-1979) the territory of "Yazovir Konush" NATURA 2000 site falls into the Thracian Lowland floristic region. On the territory of this wetland area the natural vegetation is presented by macrophyte communities of *Phragmites australis*, *Typha angustifolia* and *T. latifolia*. This NATURA 2000 site is surrounded by farmlands, former landfill, orchards, pastures and meadows.

The aim of this study is to reveal the floristical diversity on the territory of "Yazovir Konush" NATURA 2000 Site (BG0002015), which has not been investigated before.

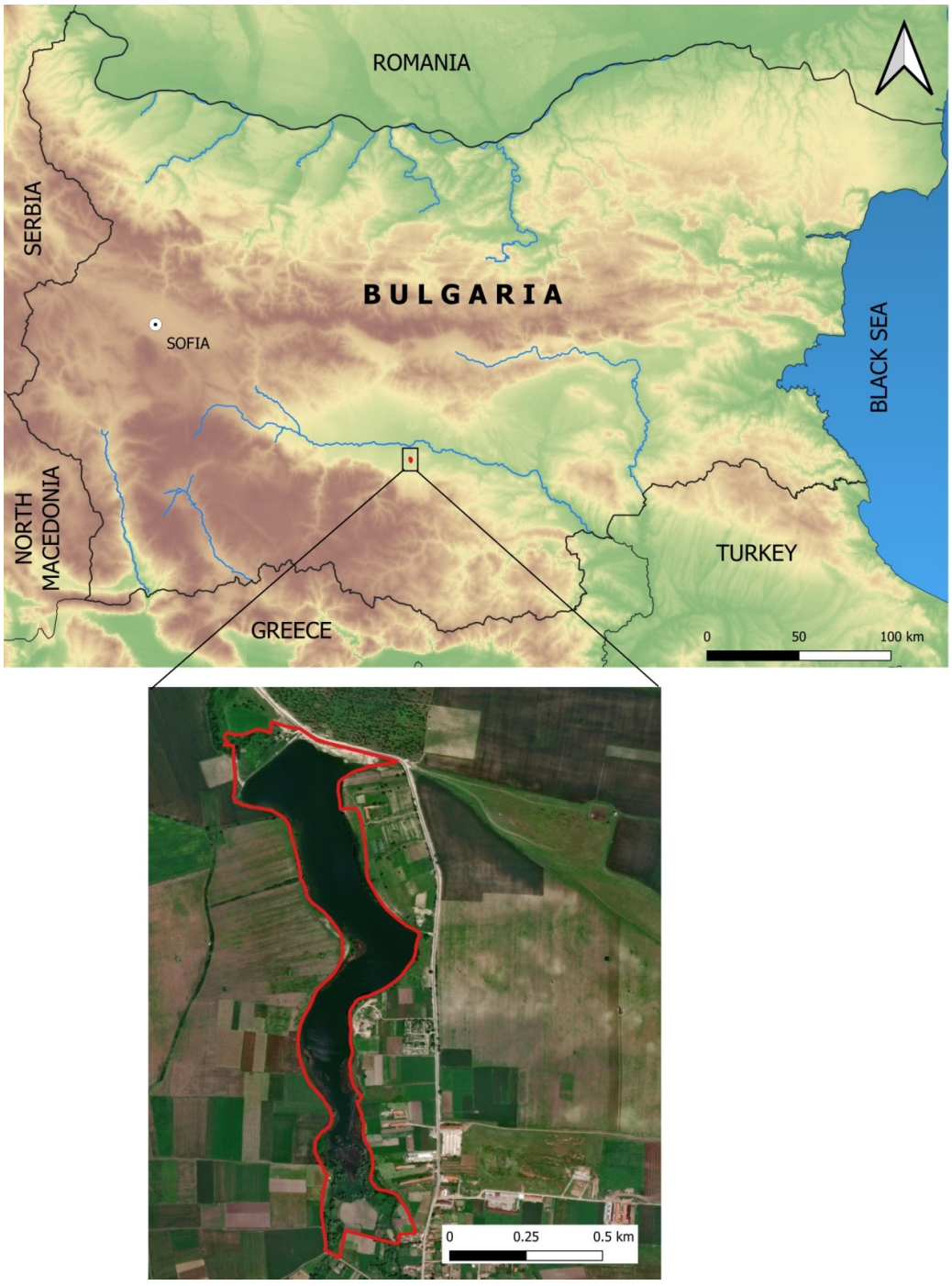

Fig. 1. Indicative map of the studied area.

Material and Methods

Vascular plant diversity was investigated during the 2012-2014 field working seasons (February-September) using transect and semi-stationary sampling methods. Transects and representative sites were selected, in order to cover all habitat types. About 150 herbarium specimens from different parts of the protected area were collected.

Species determination was carried out according to DELIPAVLOV & CHESHMEDZHIEV (2011), KOZHUHAROV (1995), JORDANOV (1963-1979), VELCHEV (1982-1989). The processing of herbarium materials and characteristics of flora were carried out by standard methods (GUSEV *et al.*, 2004; APOSTOLOVA-STOYANOVA & STOYANOV, 2009). The biological spectrum of the flora was determined by life forms according to RAUNKIAER (1934). Determination of floristic elements followed ASSYOV & PETROVA (2012). Analysis of the flowering period for all identified species was conducted according to DELIPAVLOV & CHESHMEDZHIEV (2011), KOZHUHAROV (1995), JORDANOV (1963-1979), VELCHEV (1982-1989). The conservation significance of the species was determined according to: Red List of Bulgarian vascular plants (PETROVA & VLADIMIROV, 2009), List of Balkan endemics in Bulgaria (PETROVA & VLADIMIROV, 2010), List of Bulgarian endemics (PETROVA, 2006), Biological Diversity Act (2002), Red Data Book of the Republic of Bulgaria (PEEV, 2015), CITES (2009), Directive 92/43/EEC (EC, 1992) and Bern Converntion (1979). Alien species were determined according to PETROVA *et al.* (2012) and PETROVA & VLADIMIROV (2018), whereas medicinal plants were determined according to Medicinal Plants Act (2000).

General information about the number of families, genera and species from Bulgarian flora (e.g. PETROVA & VLADIMIROV, 2018) was used for comparison of the local floristic diversity vs. national floristic diversity.

The floritstic list was arranged alphabetically by family names, within the framework of the respective classes and divisions (Table 1). Information about the life form type, flowering period, floristic element, medicinal plant affiliation and ecological characteristics was provided for every species using ecological indicator values for 6 parameters (light, temperature, continentality, moisture, pH and value). They were determined according to ELLENBERG *et al.* (1991), PIGHATTI *et al.* (2005), CHYTRÝ *et al.* (2018). For the species which were not included in those literature sources ecological indicators were determined using information from DELIPAVLOV & CHESHMEDZHIEV (2011) and personal knowledge. When there is insufficient data about a species it is marked with a ND abbreviation in Table 1.

Results and Discussion

As a result of the current study 172 vascular plants (without bryophytes), belonging to 49 families and 130 genera were determined (Table 1). They account for 4.23% of all of the species in Bulgaria, 14.1% of the genera, and 30.8% of the families. Most of the determined species belonged to *Magnoliopsida*, which is represented by 39 families (79.6 % of the total number of families in the investigated studied), 102 genera (78.5% of the total number of genera) and 137 species (79.7% of the total number of species). *Liliopsida* is represented by 10 families (20.4 %), 28 genera (21.5 %) and 35 species (20.3 %).

The families with the highest number of genera (Table 1) are: *Asteraceae* (16), *Poaceae* (14), *Lamiaceae* (12), *Fabaceae* (8), *Brassicaceae* (7), *Rosaceae* (6) and *Boraginaceae* (4). The species richest families are (Table 1): *Fabaceae* (18), *Asteraceae* (17), *Poaceae* (15), *Lamiaceae* (15), *Brassicaceae* (8), *Rosaceae* (8), *Cyperaceae* (7) and *Boraginaceae* (6).

The species-richest genera (number of species ≥ 3) are: *Vicia* (5), *Carex* (4), *Veronica* (4), *Rumex* (3), *Lathyrus* (3), *Trifolium* (3) and *Potentilla* (3).

In the life-form spectrum of the flora of "Yazovir Konush" hemicriptophytes are widest distributed group presented by 75 species (43.6% of all species found in the investigated area), followed by therophytes (44

species/25.6%), therophytes-hemicryptophytes (30/17.5%) and phanerophytes (12/7%). Geophytes and chamaephytes are represented respectively by 10 and 1 species or 5.8 and 0.6%.

Table 1. A list of the vascular plants found in "Yazovir Konush" NATURA 2000 site (BG0002015). The following abbreviations were used: Floristic elements – FE; Life form – LF; Flowering period – FP; Medicinal plants - MP; Light – L.; Temperature – T; Continentality – C; Moisture – M; Nitrogen – N; G – geophytes; H – hemicryptophytes; Ch – chamephytes; Ph – phanerophytes; TR – terophytes.

Taxon	FE	LF	FP	MP	L	T	C	M	pH	N
Liliopsida										
Alliaceae										
Allium rotundum L.	Euro-OT	G	V-VI	M	7	7	6	4	8	4
Araceae										
Arum elongatum Steven	Pont-OT	G	IV-VI		3	6	2	7	7	8
Butomaceae										
Butomus umbellatus L.	Eur-As	G	VII-IX	M	6	6	5	1	ND	7
Cyperaceae										
Carex acutiformis Ehrh.	Kos	H	IV-VI		7	5	3	9	7	5
C. caryophyllea Latourr.	Boreal	H	II-V		8	5	3	4	ND	2
C. hirta L.	Boreal	H	IV-VI		7	6	3	6	ND	5
C. vulpina L.	Eur	H	V-VII		9	6	5	8	ND	5
Cyperus glomeratus L.	Eur-As	H	VI-IX		9	8	5	1	1	5
Pycreus flavescens (L.) Rchb.	Kos	H	VII-IX		9	6	4	7	5	4
Iridaceae										
Crocus flavus West.	Euro-Pont	G	II-IV		9	5	5	1	ND	ND
Iris pseudacorus L.	Eur	G	V-VI	M	7	6	3	9	ND	7
Juncaceae										
Juncus atratus Krock.	subMed	H	VII-IX		8	7	8	9	7	4
J. effusus L.	subBoreal	H	VI-VIII		8	5	3	7	3	4
Liliaceae										
Gagea villosa (Bieb.) Duby	Eur-As	G	II-IV		6	7	5	4	6	5
Ornithogalum umbellatum L.	Pont-subMed	G	IV-V		6	6	4	5	7	7
Muscari botryoides (L.) Mill.	Med	G	III-V		7	5	4	5	ND	ND
Orchidaceae										
Cephalanthera damasonium (Mill.) Druce	subMed	G	V-VII		3	6	2	4	7	4
C. rubra (L.) Richard	Eur-As	G	V-VII		4	5	4	3	8	4
Poaceae										
Agrostis capillaris L.	Boreal	H	VI-IX		7	5	3	6	4	4
Alopecurus pratensis L.	Eur-As	H	V-VII		6	5	5	6	6	7
Avena fatua L.	Boreal	TR	V-VII		6	6	6	5	7	ND
Bromus arvensis L.	Eur-As	TR-H	V-VII		6	6	4	4	8	4

B. sterilis L.	Boreal	TR	V-VII		7	6	4	4	ND	5
Chrysopogon gryllus (L.) Trin.	Pont-Med	H	V-VIII		9	7	8	3	7	3
Cynodon dactylon (L.) Pers.	Kos	H	VI-IX	M	8	7	3	4	ND	5
Dactylis glomerata L.	Eur-As	H	V-VIII		7	6	3	5	5	6
Festuca valesiaca Schleich. ex Gaudin	Pont	H	VI-VIII		8	7	7	2	7	2
Hordeum murinum L.	Boreal	TR	V-VI		8	7	4	4	7	5
Lolium perenne L.	Eur-As	H	VI-IX		8	6	3	5	7	7
Paspalum paspaloides (Michx) Scribn.	Adv (Paleo)	H	VI-IX		8	8	ND	1	0	8
Phragmites australis (Cav.) Trin. ex Steud.	Kos	H	VII-IX		7	5	ND	1	7	7
Poa trivialis L.	Boreal	H	V-VIII		6	ND	3	7	ND	7
Triticum aestivum L.	Adv	Tr	V-VI		ND	ND	ND	ND	ND	ND
Typhaceae										
Typha angustifolia L.	Kos	H	VI-VII	M	8	7	5	1	7	7
T. latifolia L.	Kos	H	VI-VIII	M	8	6	5	1	7	8
Magnoliopsida										
Aceraceae										
Acer tataricum L.	subMed	P	V-VI	M	5	5	ND	4	ND	ND
Apiaceae										
Conium maculatum L.	Eur-As	TR-H	VI-VIII	M	8	6	5	6	5	8
Eryngium campestre L.	Pont-Med	H	VI-VIII	M	9	7	5	3	8	3
Orlaya grandiflora (L.) Hoffm.	Ap-Bal	TR	V-VII		7	7	2	3	9	4
Aristolochiaceae										
Aristolochia clematitis L.	Euro-Med	H	V-VII	M	6	7	3	4	8	8
Asteraceae										
Achillea millefolium L.	Euro-Sib	H	V-IX	M	8	ND	ND	4	ND	5
Anthemis arvensis L.	Euro-Med	TR	VI-IX		7	6	5	4	6	6
Arctium minus (Bernh.) Hill.	Eur-As	TR-H	VI-VIII	M	9	5	3	5	ND	8
Artemisia vulgaris L.	subBoreal	H	VI-VIII	M	7	6	8	6	ND	8
Carduus acanthoides L.	Eur	TR-H	VI-VIII	M	9	5	6	4	8	7
Carlina vulgaris L.	Euro-Med	TR-H	VI-IX	M	7	5	3	4	7	3
Centaurea calcitrapa L.	Med	TR-H	VI-IX	M	8	7	3	5	ND	6
C. solstitialis L.	Euro-Med	H	VII-IX	M	8	6	6	4	7	6
Chamomilla recutita (L.) Rausch.	Eur-As	TR	V-VIII	M	7	5	5	6	5	5
Cichorium intybus L.	Euro-Sib	H	VI-IX	M	9	6	5	4	8	5
Cirsium arvense (L.) Scop.	Eur-As	H	V-X		8	5	ND	4	ND	7
Inula germanica L.	subMed	H	VI-IX	M	8	7	6	3	8	2
Lactuca serriola L.	Eur-As	TR-H	VI-IX	M	9	7	7	4	6	4
Matricaria trichophylla (Boiss.) Boiss	Med	TR-H	V-VII	M	8	6	ND	5	ND	ND

Taraxacum officinale L.	Euro-Med	H	IV-IX	M	7	ND	ND	5	ND	7
Tragopogon pratensis L.	Euro-Med	H-TR	VI-VIII	M	7	6	3	4	7	6
Tussilago farfara L.	Eur-As	H	VII-X	M	8	7	3	6	8	7
Boraginaceae										
Anchusa officinalis L.	Pont-Med	H-TR	VI-VII	M	9	7	5	3	7	5
A. thessala Boiss. et Spruner	Pont-Med	TR	V-VI		9	8	ND	1	ND	ND
Cynoglossum creticum Mill.	Med-CAs	H-TR	V-VI		9	9	5	3	ND	7
Echium italicum L.	subMed	H-TR	V-VI	M	9	8	5	3	3	4
Myosotis cyanea (Boiss. & Heldr.) Peev et N. Andreev	Med-SAs	H-TR	V-VII		6	5	3	5	ND	7
M. ramosissima Rochel	subMed	TR	V-VI		9	6	5	2	7	1
Brassicaceae										
Arabidopsis thaliana (L.) Heynh.	subBoreal	TR-H	IV-V		6	6	3	4	4	4
Brassica nigra (L.) Koch	Kos	TR	V-X	M	8	7	5	8	8	7
Capsella bursa-pastoris (L.) Medicus	Kos	TR-H	I-XI	M	7	ND	5	5	5	6
Cardaria draba (L.) Desv.	Euro-Med	H	IV-X	M	8	7	7	3	8	4
Erophila verna (L.) Chevall.	Euro-Med-CAs	TR	III-V		8	6	3	2	4	2
Rorippa amphibia (L.) Besser	Eur-As	H	V-VII		7	6	7	1	ND	4
R. sylvestris (L.) Besser	Eur-As	H	V-X	M	6	6	5	8	8	6
Thlaspi arvense L.	Eur-As	H-TR	IV-VI	M	6	5	5	5	7	6
Campanulaceae										
Campanula sparsa Friv.	Bal	TR	V-VII		5	5	ND	5	ND	ND
Cannabaceae										
Cannabis sativa L.	Adv	TR	VI-VII	M	8	7	5	5	5	5
Humulus lupulus L.	Euro-Sib	H	V-VIII	M	7	6	3	8	6	8
Caprifoliaceae										
Sambucus ebulus L.	Euro-Med	H	V-VIII	M	8	6	3	5	8	7
S. nigra L.	Euro-Med	P	IV-VI	M	7	5	3	5	ND	9
Caryophyllaceae										
Holosteum umbellatum L.	Eur-As	TR	II-V		8	6	5	3	2	2
Silene italica (L.) Pers.	Euro-Med	H-TR	V-VII		5	7	5	4	6	5
Stellaria media (L.) Vill.	Kos	TR-H	I-XII	M	6	ND	ND	4	7	8
Chenopodiaceae										
Chenopodium album L.	Kos	TR	VI-IX	M	7	7	5	4	5	7
Convolvulaceae										
Calystegia sylvatica (Kit.) Griseb.	Med	H	V-VIII		7	8	6	7	5	7
Convolvulus arvensis L.	Kos	H	V-X	M	7	6	5	4	7	5
Cornaceae										
Cornus sanguinea L.	subMed	P	V-VI	M	7	5	4	5	7	ND

Dipsacaceae										
Scabiosa argentea L.	Bal-Anat	H-TR	VI-IX		9	8	6	2	7	2
Euphorbiaceae										
Euphorbia helioscopia L.	Eur-As	TR	IV-X		6	9	3	5	7	7
Fabaceae										
Astragalus onobrychis L.	Eur-As	H	V-VIII		8	7	6	2	9	1
Lathyrus aphaca L.	subBoreal	TR	V-VII		7	7	3	3	8	3
L. cicera L.	subMed	TR	V-VI		8	8	5	3	5	2
L. hirsutus L.	Euro-Med	TR	IV-VII		7	6	4	4	7	ND
Lotus corniculatus L.	Euro-Med	H	V-IX	M	7	ND	3	4	7	3
Medicago minima (L.) Bart.	Eur-As	TR	V-VI		9	7	3	3	8	2
M. sativa L.	Adv (CAs)	H	VI-VIII		8	6	6	4	7	3
Melilotus alba Medicus	subBoreal	TR	VI-IX	M	9	6	6	3	7	4
M. officinalis (L.) Pall.	Eur-As	TR	VI-VIII	M	8	6	6	3	8	3
Onobrychis gracilis Besser	Pont-Med	H	V-VII		9	7	ND	5	ND	ND
Trifolium hybridum L.	Euro-Med	H	V-IX		7	6	5	6	7	5
T. pratense L.	subBoreal	H	V-VII	M	7	ND	3	5	ND	ND
T. repens L.	Euro-Sib	H	V-X	M	8	ND	ND	5	6	6
Vicia cracca L.	Eur-As	H	VI-VIII	M	7	5	ND	6	ND	ND
V. grandiflora Scop.	subMed	TR-H	IV-VI	M	7	7	6	4	5	4
V. hirsuta (L.) Gray	Euro-Med	TR	V-VII		7	6	5	4	ND	4
V. peregrina L.	Eur-As	TR	IV-VI		7	7	4	4	5	4
V. striata Bieb.	Euro-Med	TR	V-VII		7	6	6	4	6	5
Fagaceae										
Quercus robur L.	subMed	P	V	M	7	6	6	6	5	6
Papaveraceae										
Fumaria officinalis L.	Euro-Sib	TR	IV-VI	M	6	6	3	5	6	7
Papaver rhoeas L.	Euro-Sib	TR	IV-IX	M	6	6	3	5	7	6
Geraniaceae										
Erodium cicutarium (L.) L'Her.	subBoreal	TR	IV-IX	M	8	6	4	4	5	4
Geranium dissectum L.	Eur-As	TR	IV-VII		6	6	3	5	8	5
G. molle L.	Euro-Med	TR-H	IV-VII		7	6	3	4	5	4
Hypericaceae										
Hypericum perforatum L.	Kos	H	V-VIII	M	7	6	5	4	6	4
Lamiaceae										
Acinos suaveolens (Sibth. et Sm.) G. Don	subMed	H	V-VII	M	8	8	6	3	7	2
Ajuga chia Schreber	Pont-Med	TR-H	IV-VII	M	7	8	2	4	9	2
A. reptans L.	Euro-Med	H	IV-VI	M	6	ND	2	6	6	6
Ballota nigra L.	Euro-Med	H	VI-IX	M	8	6	5	5	ND	8
Betonica officinalis L.	subMed	H	VI-VIII	M	7	6	5	6	4	3
Clinopodium vulgare L.	subBoreal	H	V-VII	M	7	5	3	4	7	3
Glechoma hederacea L.	Eur-As	H	IV-VI	M	6	6	3	6	5	7

Lamium purpureum L.	Euro-Med	TR	III-VIII	M	7	5	3	5	7	7
Mentha aquatica L.	Boreal	H	VI-X	M	7	5	3	9	7	5
M. pulegium L.	Eur-As	H	VI-IX	M	8	7	5	7	ND	2
Salvia aethiopis L.	Eur-As	H-TR	V-VIII	M	7	6	6	3	3	2
S. nemorosa L.	Euro-OT	H	V-IX	M	7	7	6	4	9	4
Stachys palustris L.	Boreal	H	VI-VIII		7	5	ND	7	7	6
Teucrium chamaedrys L.	subMed	H	IV-V	M	7	6	4	2	8	1
T. polium L.	Pont-Med	H	IV-VIII	M	9	8	4	2	X	1
Thymus pannonicus All.	Eur	H	V-IX	M	7	6	6	4	5	3
Lythraceae										
Lythrum salicaria L.	subBoreal	H	VI-VIII	M	7	5	5	8	6	ND
L. virgatum L.	Eur-As	H	VI-VIII	M	7	8	6	7	3	4
Malvaceae										
Malva sylvestris L.	Kos	H-TR	V-IX	M	8	6	3	4	7	8
Plantaginaceae										
Plantago lanceolata L.	Kos	H	V-VIII	M	6	7	3	ND	ND	ND
P. major L.	Boreal	H-TR	VI-IX	M	8	ND	ND	5	ND	6
Polygonaceae										
Persicaria hydropiper (L.) Opiz	Eur-As	TR	VII-X	M	7	6	ND	8	5	8
Polygonum aviculare L.	Kos	TR	V-X	M	7	6	5	4	6	6
Rumex acetosella L.	Euro-subMed	H	V-VII		8	5	5	5	1	2
R. crispus L.	Boreal	H	VII-VIII	M	7	5	3	7	ND	6
R. palustris Sm.	Eur-As	TR	VI-IX		8	7	3	9	9	8
Primulaceae										
Lysimachia nummularia L.	Eur	TR-H	VI-VII	M	4	6	4	6	ND	ND
Ranunculaceae										
Clematis vitalba L.	Eur	P	VI-VIII	M	7	6	3	5	7	7
Consolida hispanica (Costa) Greuter et Burdet	Med	TR	VI-VIII	M	9	7	ND	2	ND	ND
C. regalis S. F. Gray	Euro-Med	TR	V-IX	M	6	7	6	4	8	5
Ranunculus repens L.	subMed	H	V-VIII	M	8	6	ND	1	8	2
R. sceleratus L.	Euro-Med	TR-H	IV-VIII	M	9	6	ND	9	7	9
Resedaceae										
Reseda inodora Rchb.	Euro-Med	H-TR	VI-VII	M	8	7	ND	2	ND	ND
Rosaceae										
Agrimonia eupatoria L.	Euro-Med	H	VI-VIII	M	7	6	4	4	8	4
Crataegus monogyna Jacq.	subBoreal	P	V-VI	M	7	5	3	4	8	4
Geum urbanum L.	subBoreal	H	V-VII	M	4	5	5	5	6	7
Potentilla argentea L.	SPont	H	V-IX	M	9	6	3	2	3	1
P. pedata Willd.	Med	H	V-VII		9	7	3	3	7	3
P. reptans L.	Kos	H	VI-VIII	M	6	6	3	6	7	5
Rosa canina L.	subMed	P	V-VIII	M	8	5	3	4	ND	ND

Rubus caesius L.	Eur-As	Ch	V-VIII	M	6	5	4	7	8	7
Rubiaceae										
Galium aparine L.	Eur-As	TR	V-VI	M	7	6	3	4	6	8
G. verum L.	Eur-As	H	VI-VIII	M	7	6	6	4	7	3
Salicaceae										
Populus deltoides H. Marsh	Adv	P	IV-VI		ND	ND	ND	ND	ND	ND
Salix alba L.	Eur-As	P	III-V	M	5	6	6	8	8	7
S. fragilis L.	Eur-As	P	III-V	M	5	5	3	8	6	6
Scrophulariaceae										
Verbascum blattaria L.	Euro-Sib	TR-H	VI-VII		8	7	7	3	7	6
Veronica anagalis-aquatica L.	Boreal	H	V-VIII	M	7	6	3	9	7	6
V. hederifolia L.	Euro-Med	TR	II-V		6	6	3	5	7	7
V. sublobata M. A. Fisch.	Eur	TR	IV-V		5	4	5	5	5	5
V. triloba (Opiz) A. Kern.	subMed	TR	III-IV		7	8	5	3	7	2
Solanaceae										
Datura stramonium L.	Am (Adv)	TR	VI-X	M	8	6	5	4	7	8
Hyoscyamus niger L.	Eur-As	TR-H	V-VIII	M	8	6	5	4	7	9
Solanum dulcamara L.	Eur-As	H	VI-VIII	M	7	5	ND	8	ND	8
S. nigrum L.	Kos	TR	VI-IX	M	7	6	3	5	7	8
Ulmaceae										
Ulmus minor Mill.	Euro-Med	P	III-IV	M	5	7	5	ND	8	ND
Urticaceae										
Urtica dioica L.	Boreal	H	VI-IX	M	ND	ND	ND	6	7	9
Valerianaceae										
Valerianella microcarpa Loisel.	Euro-Med	TR	IV-VII		9	9	4	2	5	1
Verbenaceae										
Verbena officinalis Voss.	Kos	H	V-VIII	M	9	6	3	5	7	7
Violaceae										
Viola arvensis Murr.	Eur	TR	IV-X		6	5	5	2	ND	ND
Vitaceae										
Vitis vinifera L.	subMed	P	V-VI	M	9	8	3	4	7	6
Zygophyllaceae										
Tribulus terrestris L.	Eur-As	TR	V-VIII	M	8	8	6	2	5	3

A total of 27 floristic element groups are found in the flora of Yazovir Konush NATURA 2000 Site (Table 2). Euro-Asiatic and Euro-Mediterranean groups dominate in the flora with 39 species (22.7%) and 26 (15.1%). Groups of Boreal and subBoreal species are also well-presented with 13 species (7.6%) and 11 (6.4%) although low altitude because they includes specie which have wide range of distribution in the country such as *Carex hirta*, *Juncus effusus*, *Artemisia vulgaris*, *Erodium cicutarium*, *Plantago major*, etc.

In the floristic composition only 2 species with conservation concern were identified (*Cephalantera damasonium* and *C. rubra*), which are included in Appendix 2 of CITES (2009). Also totally 103 or 59.8% of all identified species are determined as medicinal plants (Table 1).

Table 2. Floristic elements in the flora of "Yazovir Konush" NATURA 2000 Site (BG0002015).

Floristic element	Number of species	% of all species
Adv	3	1.7
Adv (CAs)	1	0.6
Adv (Paleo)	1	0.6
Am (Adv)	1	0.6
Ap-Bal	1	0.6
Bal	1	0.6
Bal-Anat	1	0.6
Boreal	13	7.6
Eur	8	4.7
Eur-As	39	22.7
Euro-Med	26	15.1
Euro-Med-CAs	1	0.6
Euro-OT	2	1.2
Euro-Pont	1	0.6
Euro-Sib	7	4.1
Euro-subMed	1	0.6
Kos	18	10.5
Med	6	3.5
Med-CAs	1	0.6
Med-SAs	1	0.6
Pont	1	0.6
Pont-Med	7	4.1
Pont-OT	1	0.6
Pont-subMed	1	0.6
SPont	1	0.6
subBoreal	11	6.4
subMed	17	9.9

The distribution of the vascular plants according to their period of flowering shows that the most active period is from May to July (Table 1). During that period 135 (78.5%) are blossom. Among them, most species blossom in June-August – 17 species, May-August & June-September – 13, May-June & May-September – 7, etc.

Researched flora shows quite diverse floristic composition. The flora of "Yazovir Konush" NATURA 2000 site includes some wetland plants such as *Typha latifolia*, *T. angustifolia*, *Phragmites australis*, *Butomus umbellatus*, *Iris pseudacorus*, *Juncus effusus*, etc. On the other side some ruderal species were also found (e.g. *Capsella bursa-pastori*, *Cirsium arvense*, *Centaurea calcitrapa*, *Papaver rhoes*, *Centaurea cyanus*) and mesophyric and xerophytic species widespread in neighbouring habitats.

The ecological structure of the flora of "Yazovir Konush" NATURA 2000 site shows the following characteristics:

- Dominance of half-light (sciophytes) and full-light species (heliophytes) (presenting 157 species or 81.9%), which are developed on fresh to average moisture soils (119 species or 69.2%). The group of full-light species has widest distribution. The group of half-light species includes predominantly species, which are found in low-herb layer in macrophyte and grassland communities or ruderal species, which are periodically shade from field crops neighbouring with "Yazovir Konush" NATURA 2000. On the other hand mesophytic and xero-mesophytic species are dominants in the species composition.
- According to nutrient availability of species most common are moderately nutrient rich and nutrient rich species (95 or 55.2%).
- In the species composition a great variety exists in terms of soil reaction preference (pH). The group of slightly acidic to slightly basic species (pH = 7) is presented with 51 species or 29.7%. Groups of acidophilous and calciphilous species includes similar number of species 36 (20.9%) and 30 (17.4%) respectively. Data is missing for 42 species (24.4%).
- Group of moderately thermophilous to thermophilous flora is presented by 141 species (81.9%). Those species are restricted to warm habitats in Bulgaria and southern Europe.

Conclusions

"Yazovir Konush" NATURA 2000 site (BG0002015) covers a relatively small area of

0.376 ha, but is characterized by a great variety of vascular plants diversity presented by 172 species, belonging to 50 families and 133 genera. Of these, 59.8% are medicinal plants and only 2 species (*Cephalantera damasonium* and *C. rubra*) are with conservation concern.

A total of 27 floristic element groups are found in the flora of "Yazovir Konush" NATURA 2000 Site. Euro-Asiatic and Euro-Mediterranean groups dominate in the flora, which shows strong Mediterranean influence in the study area.

The ecological analysis showed that the flora of the investigated area is dominated by hemicriptophytes (41.3%), following by terophytes (26.7%). From ecological point of view predominate mesophytes and heliophytes species.

The study of the flora and vegetation of the wetlands is important for restoring and maintaining natural habitats of this type, which are subjected to strong anthropogenic influence. This is closely related to the protection of the populations of the animals found in them.

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