

# FLORA AND VEGETATION IN THE VICINITIES OF THE KOLENA DAM, STARA ZAGORA REGION

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## ABSTRACT

Lack of sufficient information with respect to the composition and structure of the plant cover in the Stara Zagora district is basic for the investigations of the higher flora in the surroundings of the Kolena dam. The systematic analysis made established presence of 207 plant species, distributed in 143 genera and 47 families. Research is complemented with determination of biological type spectrum and phyto-geographic belonging of the taxa. Meso-xerophytic and hygrophilous species from the list of the waterside vegetation in the vicinities of an artificial water basin are described.

18 species with Nature preserving status in accordance with Bulgarian and international legislation are registered, including 4 Balkan endemics and 10 Tertiary relics.

KEY WORDS: Stara Zagora Region, higher plants, artificial water basins, preservation significance taxa.

## INTRODUCTION

Water basins are wide spread on the territory of our country. They fulfill important part in various branches of our national economy.

Vegetation is one of the basic components of water ecosystems. Aquatic plants have substantial significance in determination of water basins productivity, of spreading and preservation of the ichtiofauna and the ornitofauna.

Some species with valuable scientific significance and Nature preserving status are established among the aquatic vegetation. Torfaceous (waterside) plants are subject to business use in many places, such as meadows and pastures. Though both categories are not always clearly distinctive, their existence is decisive for maintaining of the biological balance in aquatic ecosystems (Kotchev, Yordanov 1981).

Unfortunately, there is anthropogenic influence reported here too, expressed in systematic draining and drying up of natural water basins, which fundamentally changes the appearance of local flora and fauna.

The present study is aiming to compose and analyze the systematic, biologic and phyto-geographic spectrum of higher vegetation in the surroundings of the Kolena dam, Stara Zagora Region. Attention is also focused on the composition of the higher waterside meso-xerophilic and hygrophilous plants, as well as on the Nature preserving species.

## **OBJECTS AND METHODS**

The Kolena dam is situated on the land of the village of Kolena, Stara Zagora Region, in the foot of the Sarnena Sredna Gora Mountain, and it is 280 meters long. Its dam wall height is 38 meters. It takes 260 decares of submerged area. Its volume is 1 800 000 m<sup>3</sup>.

The artificial water basin forms specific abiotic conditions, favourable to the aquatic and waterside vegetation development.

Without any abrupt frontier, it turns to higher plants in the slopes of the Sarnena Sredna Gora Mountain. This very fact is a reason for accomplishing of an integral floristic analysis of

adjoining to the Kolena dam sections – №229, №230, №221, №219, №257, №255, №254, №253, №231 (according to the Forest Management Plan).

Records of the plants of the Stara Zagora Region can be found in the publications of Gantchev (1965); Bondev (1991); and in the publications of Radanova (2003), Radanova, Pavlov (2003); Radanova, Ivanova (2004) in the recent times.

The terrain explorations have been fulfilled during two vegetative periods – 2004÷2006.

The basic rock is limestone; the altitude varies from 250 to 500 meters; soils are maroon-leached, sandy-clayey, and medium to strongly rocky, on a sandstone or slate.

Inventory of the flora and vegetation in the vicinities of the Kolena dam, Stara Zagora Region is made using rout method with transect passages.

The works of Yordanov (ed.)(1963-1989); Kozhuharov (ed.)(1992); Petrova et all.(1999) are adopted as a taxonomic base for determination of species.

Floristic belonging of taxa is according to Walter (1954); Вальтер (1982); Stefanov (1943); Asyov et all. (2002).

## **RESULTS AND DISCUSSION**

The floristic analysis of higher vegetation made in the surroundings of the Kolena dam, Stara Zagora Region established the presence of 207 species, classified in 143 genera and 47 families. (**Table1.**)

The biggest part is taken by the angiosperms (*Magnoliophyta*). Class *Magnoliophyta* is included with 175 species from 40 families.

The following families are represented with the greatest number of species from this class: *Fabaceae* Family - 27 species (13,4%), *Asteraceae* Family - 15 species (7,5%), *Rosaceae* Family - 13 species (6,6%), *Brassicaceae* Family - 10 species (5%), *Lamiaceae* Family - 9 species (4,5%), *Scrophulariaceae* Family - 8 species (4%) (Fig.1).

It is the *Fagaceae* Family with its 6 species from the *Quercus* genus that is of interest from the ligneous species - *Quercus cerris* L., *Q. dalechampii* Ten., *Q. frainetto* Ten., *Q. pedunculiflora* C. Koch, *Q. petraea* (Mart.) Liebl., *Q. pubescens* Willd.

Class *Liliopsida* is well represented by 30 species from the *Liliaceae* Family and 12 species from the *Poaceae* Family.

The taxa from the *Carex* genus (*Cyperaceae* Family) - *Carex caryophyllea* Lathourr, *C. divulsa* Stokes., *C. praecox* Schreb., *C. panicea* L. , *C. riparia* Curt. and *Eleocharis palustris* (L.) R.Br. settle in the waterside zone as elements of the hygro-mesophytic group.

The hygophytic group is comparatively poorly represented – by *Mentha aquatica* L. and *Typha latifolia* L. only.

Significant part of the ligneous vegetation is with artificial origin, predominantly composed of *Pinus nigra* Arn. and sole specimen of *Cedrus atlantica* (Endl.) Carriere, *Abies alba* Mill. and *P. sylvestris* L. scattered all over the site, which makes poor its list of species diversity.

Analysis of biological groups reveals prevalent participation of perennial type – 114 species, followed by group of annual species – 37 taxa. (**Fig. 2**)

The woody type of the countryside supposes relatively good representation of the ligneous type – 20 species.

Comparatively poor is the representation of the intermediate biologic types - 24 species (12 %).

Data of the distribution of the flora analyzed with respect to the biological type shows the characteristics of the Northern hemisphere moderate zone floras.

The higher plants established in the site under investigation can be referred to 25 phyto-geographic regions and provinces.

It is the species with Euro - Asian origin that prevail – 32 species (16 %), followed by those with Euro – Mediterranean origin – 28 species (14 %), and with sub Mediterranean origin – 26 species (13 %).

The groups of Euro – Siberian and Ponto – Mediterranean flora elements are relatively well represented -15 species (8 %) and 13 species (7 %) correspondingly.

Cosmopolitan element participates with 13 taxa (6,5 %); the Boreal is included with 12 taxa (6 %) (**Fig. 3**).

18 species with Nature preserving status, including 4 Balkan endemics and 10 Tertiary relicts are registered in the vicinities of the Kolena dam (**Table 2**). The Tertiary relicts are usually included as dominants or edificators in ligneous communities, while the frutescent and grass species form independent populations in the undergrowth or on open glades (**Tables 3,4,5**).

The “Red Data Book of the People’s Republic of Bulgaria” protects one species in the rare category - *Fritillaria pontica* Wahl. and two species in the endangered category - *Tulipa splendens* Delip. and *Euphorbia lucida* Waldst. et Kit.

*Fritillaria pontica* Wahl. and *Cyclamen hederifolium* Ait. are under protection regime in conformity with the Biological Diversity Law, and *Fritillaria pontica* Wahl. is protected according to IUCN (1997).

## CONCLUSION

One of the basic prerequisites for correct protection and utilization of Natural resources is fundamental acquaintance with the plant communities’ development objective laws, especially those, connected with the anthropogenic activity.

Data associated with the change of composition and structure of vegetation cover in the lower altitude oak belt in the surroundings of big cities is particularly valuable in this direction.

The results of the higher flora research and registration of Nature preserving species in cultigenic ecosystem like the Kolena dam are a good basis for analysis of the anthropophytisation processes in the Stara Zagora Region. The taxa that was taken account of can be used as a data base for the Sarnena Sredna Gora Mountain plant diversity – a region unexplored with regard to the flora.

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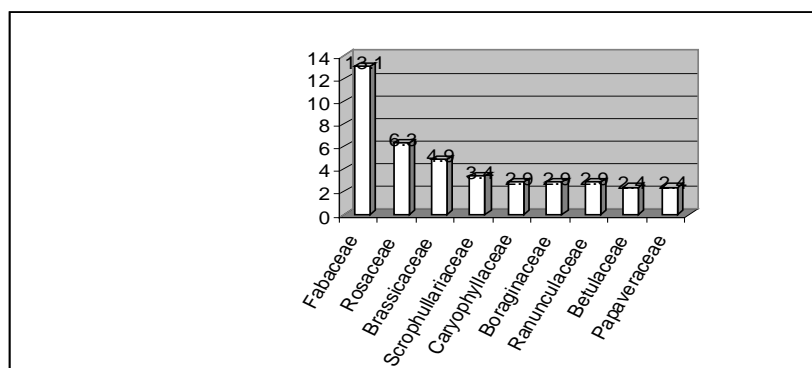
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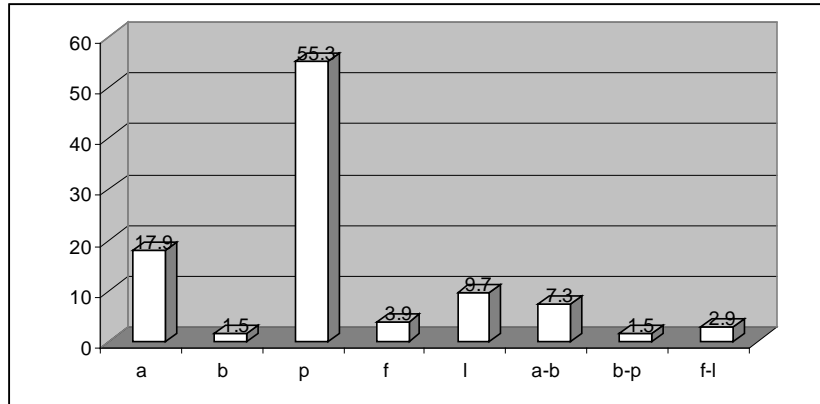
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**Table 1.** Taxonomic structure of the higher flora in the vicinities of the Kolena dam, Stara Zagora Region

<b>Taxonomic categories</b>	<b>Families</b>	<b>Genera</b>	<b>Species</b>
<i>Equisetophyta</i> section	<b>1</b>	<b>1</b>	<b>1</b>
<i>Pinophyta</i> section	<b>1</b>	<b>2</b>	<b>3</b>
<i>Magnoliophyta</i> section	<b>45</b>	<b>139</b>	<b>202</b>
<b>Class Magnoliopsida</b>	39	117	176
<b>Class Liliopsida</b>	6	22	28

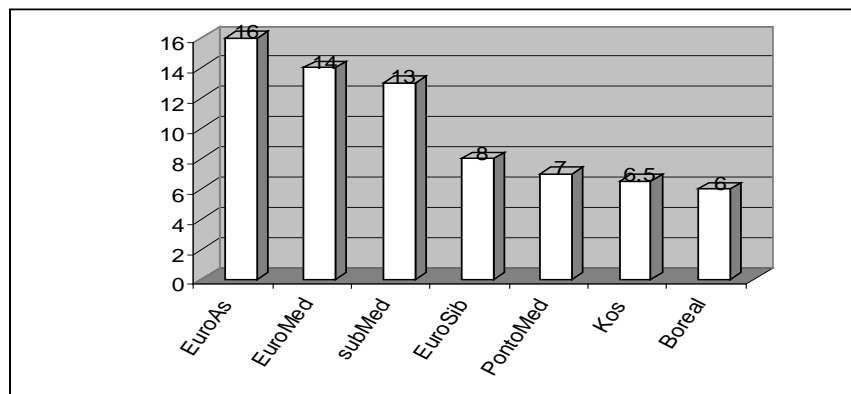


**Fig.1.** Species representation of class *Magnoliopsida* (more than 5 species, in %).

**Legend:**

a-annual; b- biannual; p- perennials;

l – ligneous; f – frutescent

**Fig.2.** Distribution of the species with respect to the biological groups**Fig. 3.** Phytogeographic representation (in % , more than 10 species)**Table 2.** Species with Nature Preserving Status

Taxon	Endemics and relicts	Red DB of PRB (1984)	BDL (2002)	IUCN (1997)
<i>Acanthus spinosus L.</i>	Be			
<i>Acer campestre L.</i>	Tr			
<i>Achillea clypeolata Sibth.et Sm.</i>	Be			
<i>Carpinus orientalis Mill.</i>	Tr			
<i>Clematis vitalba L.</i>	Tr			
<i>Coryllus avelana L.</i>	Tr			
<i>Cotinus coggygria Scop.</i>	Tr			
<i>Cyclamen hederifolium Ait.</i>			+	
<i>Dianthus moesiacus Vis. et Panč.</i>	Be			



Taxon	Endemics and relicts	Red DB of PRB (1984)	BDL (2002)	IUCN (1997)
<i>Euphorbia lucida</i> Waldst. et Kit.		E		
<i>Fraxinus ornus</i> L.	Tr			
<i>Fritillaria pontica</i> Wahl.		R	+	R
<i>Juglans regia</i> L.	Tr			
<i>Linum thracicum</i> (Griseb.) Deg.	Be			
<i>Quercus dalechampii</i> Ten.	Tr			
<i>Q. cerris</i> L.	Tr			
<i>Ruscus aculeatus</i> L.	Tr			
<i>Tulipa splendens</i> Delip.		E		

**Legend:**

Be –Balkan endemics; Tr – Tertiary relict; R – rare; E –endangered

**Table 3.** Fragment of the *Cyclamen hederifolium* Ait. population

habitat	Mixed deciduous forest in № 219 Section
altitude	350 m
rock foundation	limestone
aspect	North-East
tilt	14°
irrigation	atmospheric moistening
area	1m <sup>2</sup>
number	12 pcs
status	Very good, fructiferous

**Table 4.** Fragment of the *Dianthus moesiacus* Vis. et Panč. population

habitat	To the right of the highway in № 255 Section
altitude	350 m
rock foundation	limestone
aspect	South
tilt	14°
irrigation	atmospheric moistening
area	1m <sup>2</sup>
number	5 pcs
status	Very good, fructiferous

**Table 5.** Fragment of the *Ruscus aculeatus L.* population

habitat	Mixed deciduous forest in № 219 Section
altitude	400 m
rock foundation	limestone
aspect	North-East
tilt	16°
irrigation	atmospheric moistening
area	1m <sup>2</sup>
number	3 pcs
status	Very good, fructiferous