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RIPARIAN VEGETATIONS OF MIDDLE AND LOWER ZONES OF SHKUMBINI RIVER, ALBANIA

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plant associations,
geographical element,
abundance – dominance,
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SYNOPSIS

In this article some data are given on the riparian vegetations in the environments of the upper and middle part of Shkumbini river valley. The geobotanical study of this zone is realized using botanical surveys, based on fulfilling of the surveys schedules, where are given the plant associations which are found in the area being studied.
Based on the data gathered, is held on the spectrum of the floristic elements and of the biological forms for the riparian vegetation of this zone which includes plant associations with *Platanus orientalis L., Populus nigra L., Salix fragilis L.* The plant association of *Carpinus orientalis – Quercus petraea* continues over the vegetation of the lower edge of the river and in the same way the association of *Cynodon dactylon – Medicago lupulina* is described too.

INTRODUCTION

Plants and vegetations represent important natural ecosystems and the Shkumbini river valley is distinguished for having a variety of these, with their particular scientific, economic, ecologic, aesthetic, curative and cultural values. (Naqellari, 2000). This riparian biodiversity is the result of the suitable climatic, topographical, geological conditions which have influenced in its plant physiognomy.

The object of the study is flora and vegetation in the riparian environments of the upper and middle part of Shkumbini river valley, with the following aims:

- the evidence of flora and vegetations in this zone,
- the determination of the main plants associations,
- environmental valuation and the human influence on concrete natural situation.

The riparian vegetation of this valley appertains to the forest and mediterranean brushwood zone and includes shrubs and arboreal hygrophilous species, such as oriental plane (*Platanus orientalis)*, poplars (*Populus sp. div.)*, willows (*Salix sp. div.)*, alders *(Alnus sp. div.)*, etc. which are found in areas between aquatic plants and other plants species farther away from the river.

In the upper parts of this zone we meet plant associations as those with forsythia *(Forsythia europaea Deg. et Bald.)*, hornbeam *(Carpinus sp. div.)*, while the lower parts of it, are characterizied from evergreen shrubs such as the heath *(Erica arborea L.)*, boxwood *(Buxus sempervires L.)*, juniper *(Juniperus sp*. div.).

MATERIAL AND METHODS

To study the flora and the plant coverage of a zone, the most known used methods are the two ones (Buzo, 1991), (Naqellari, 1999):

PHYSIOGNOMIC METHOD, called structural method, is based on the outer morphological construction of plants cover and in the vital forms. According to this method the plants are grouped in some forms which are based on the height of the vegetative buds from the earth surface. The Raunchier classification is used here. (Vangjeli, 2003). Based on vital forms, is held on the biological spectrum which is a good reflector of the climatic conditions.

FLORISTIC METHOD is based on the identification of plant species which are present in their habitats. The process is divided in three phases: completing the surveys; evaluating of the plant species abundance – dominance; the determination of the species which were in the analysed place.

This determination is realized by identifying and nominating them using the appopriate literature. (Demiri, 1983, 1979, 1979), (Group of authors, 2000), (Mitrushi, 1966), (Tutin et al, 1964-1980). This study is realised working according to a methodology devided in three phases:

PREPARATORY PHASE

In this phase general zone conditions were taken into consideration like physical, geographical, geological and climatic conditions. The necessary material was accumulated and the surveys schedules and the plan of field work were compiled.

THE PHASE OF THE FIELD WORK

In this phase terrain surveys were made in different seasons, also were definite the sample surfaces to survey different points of the vegetation according the appropriate methods. For each sample surfaces were gathered data on:

- the general plant cover represented in percentage;

- floral composition with the data on abundance – dominance;
- the placing of the floor plant;
- the habitat, etc.

Also in this phase were fulfilled the schedules and the plant material or herbs accumulated from the terrain was elaborated and denominated according to the data given from the terrain surveys. For every plant species was signed abundance – dominance (A-B) according to Braun – Blanquet scale.

THE PHASE OF THE WORK IN LABORATORY

Here the gathered plant species were determined and classified then the data were elaborated and were pull out the plant association, the floristic list was compiled, and the biological and floristic spectrum was determined. The determination of the presence was made according to Braun – Blanquet scale. The material is illustrated with graphics, tables and photos.

RESULTS AND DISCUSSIONS

Platanus orientalis – Populus nigra ASSOCIATION

The plant associations with *Platanus orientalis* (Fig. 1) are characteristic for this valley. This plant association is present in alluvial soils, till 500 m above sea level. Plant species with the greatest abundance – dominance and presence are: *Platanus orientalis* 5 V; *Alnus glutinosa (L) Gaertn*. 1 V; *Salix fragilis* + V; *Carpinus orientalis Mill.* + V; *Trifolium campestre Schreb*. + IV; *Teucrium chamaedrys L*. + III; *Colutea arborescens L.* + II.

Figure 1: Plant association of *Platanus orientalis* – Librazhd

Figure 2: Plant association of *Salix* sp. div. – Polis

Plant associations with *Salix fragilis* (Fig. 2) are found along the river bed, streams edge by being included in the vegetation of the upper and lower part of the

river bed. Species with a bigger abundance – dominance and presence are: *Platanus orientalis* 5 V; *Salix fragilis* 1 V; *Carpinus orientalis* + V; *Alnus glutinosa* 1 V; *Colutea arborescens* + III.

Table 1. Platanus orientalis – Populus nigra association

Geographical element	Vital forms	Surveys number	1	2	3	4	5	6	Presence
		Altitude	220	190	350	400	420	450	
		Exposure	North	North	South - West	South - West	South	South-East	
		Inclination	10˚	8˚	10˚	12˚	10˚	11˚	
		Mother rock	serpentine	serpentine	serpentine	serpentine	ultrabasic	ultrabasic	
		Abundace-Dominance	80	80	82	85	75	80	
		Surface m²	400	400	400	400	400	400	
		Number of species	20	20	18	16	16	17	
SubBalkanic	Phanerophytes	*Platanus orientalis L.*	5	5	4	5	5	5	V
Paleote-mporal	Phanerophytes	*Populus nigra L.*	2	2	3	+	+	1	V
Paleote-mporal	Phanerophytes	*Alnus glutinosa (L) Gaertn.*	1	2	1	+	+	1	V
EuroSiberian	Phanerophytes	*Salix fragilis L.*	+	+	+	+	+	1	V
Euro-Caucasian	Phanerophytes	*Ulmus campestris L.*	+	+	+	+	-	+	V
Pontic	Phanerophytes	*Carpinus orientalis Mill.*	+	+	+	-	+	+	V
EuroAsian	Hemicrypto-phytes	*Festuca pratensis Huds.*	+	-	+	-	+	+	IV
Mediterra-nean – Turanian	Therophytes	*Bromus sterilis L.*	-	+	+	+	+	-	IV
Paleotempor al	Hemicrypto-phytes	*Dactylis glomerata L.*	+	+	-	+	+	-	IV
Paleote-mporal	Hemicrypto-phytes	*Brachypodium sylvaticum (Huds.) P. B.*	-	+	+	+	-	+	IV
Paleosu-btropical	Therophytes	*Briza maxima L.*	+	+	+	-	-	+	IV
Paleote-mporal	Therophytes	*Trifolium campestre Schreb.*	+	+	+	-	-	+	IV
Euro – Mediterra-nean	Therophytes	*Trifolium angustifolium L.*	+	-	+	-	+	+	IV
Euro - Central	Hemicrypto-phytes	*Trifolium rubens L.*	+	-	+	+	-	+	IV

Euro – Medite-rranean	Chamaephytes	*Teucrium chamaedrys L.*	+	+	+	-	+	-	IV
Euro - Siberian	Hemicrypto-phytes	*Veronica officinalis L*	-	+	-	+	+	+	IV
Circum-boreal	Hemicrypto-phytes	*Prunella vulgaris L.*	+	+	-	+	+	-	IV
Euro – Medite-rranean	Nano Phanerophytes	*Rubus ulmifolius Schot.*	+	-	+	+	+	-	IV
SouthEast-European	Geophytes	*Helleborus odorus Waldst. et Kit.*	+	+	+	-	-	+	IV
EuroAsian	Hemicrypto-phytes	*Galium verum L.*	+	+	+	-	+	-	IV
Medite-rranean	Phanerophytes -Nano Phanerophytes	*Erica arborea L.*	+	+	-	+	-	-	III
Euro – Medite-rranean	Phanerophytes	*Colutea arborescens L.*	+	+	-	+	-	-	III
Euro – Medite-rranean	Therophytes	*Chenopodium vulvaria L.*	-	+	+	-	-	+	III
SubCosmo-politan	Hemicrypto-phytes	*Urtica dioica L.*	-	+	-	+	+	-	III
Circum-boreal	Hemicrypto-phytes	*Geum urbanum L.*	-	-	+	+	-	+	III
EuroCentral	Hemicrypto-phytes	*Thymus praecox Opiz*	+	-	-	-	+	+	III

The surveys on table 1 appertain as below:

1 – Polis village 220m above sea level, Gostima grit, alluvial earth, serpentine mother rock.

2 – Miraka village 190m above sea level, alluvial earth, serpentine mother rock.

3 – Hotolisht village 350m above sea level, alluvial earth, serpentine mother rock.

4 – Xhyra village 400m above sea level, alluvial earth, serpentine mother rock.

5 – Quksi village 420m above sea level, alluvial earth, ultrabasic mother rock.

6 – Karkavec village 450m above sea level, alluvial earth, ultrabasic mother rock.

In the spectrum of the floristic element (Figure 3), we see that the species Paleotemporal and Euro – Mediterranean have the higher percentage, which is the result of the geographical position and climatic conditions of the area in question.

The spectrum of the vital forms (Figure 4) shows that the higher percentage is presented by Hemichryptophytes and Phanerophytes forms, which show the plants adaptation with the climatic conditions of the area being studied.

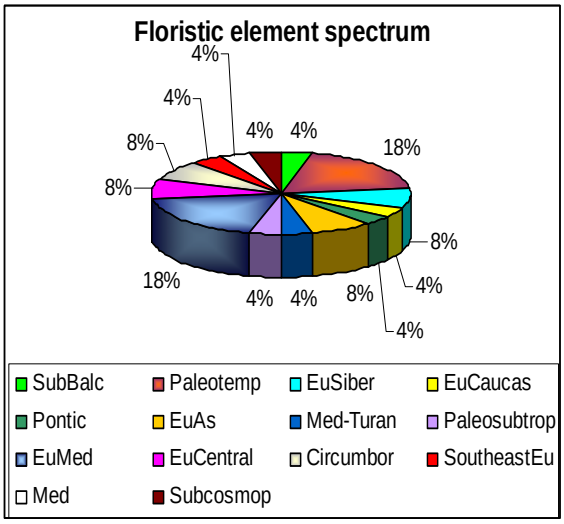

Figure 3: Graphical spectrum of the floristic element

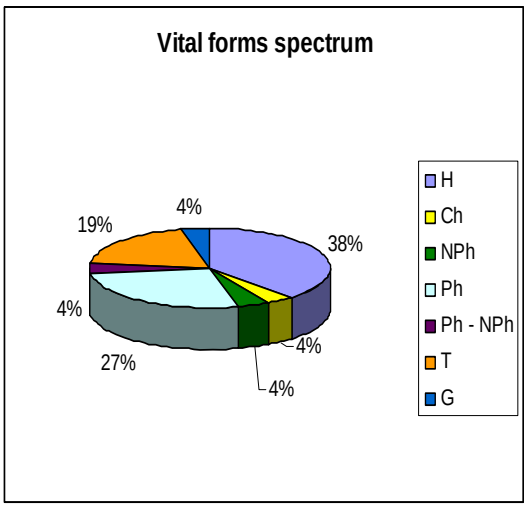

Figure 4: Graphical spectrum of the vital forms.

Carpinus orientalis – Quercus petraea ASSOCIATION

This plant association has a large extension and goes on the vegetation of the lower riverbed, saying that it represent a crossing bridge from a vegetations zone to the next one. The plant associations with *Carpinus orientalis* (Figure 5) are layed in brown earths and the plant species with a higher presence and a higher abundance – dominance are: *Carpinus orientalis* 4V; *Quercus petraea (Matt.) Liebl.* 1V*: Juniperus oxycedrus L.* 1V; *Buxus sempervirens L.* 4IV;

The plant association with *Buxus sempervires* (Figure 6) notably manifest itself in Bregu Bushit (Polis village). The plant species with a higher presence and a higher abundance – dominance are: *Carpinus orientalis* 4V; *Juniperus oxycedrus* 1V; *Buxus sempervirens* 4IV;

Fig. 5 Plant association of *Carpinus orientalis* – Hotolisht.

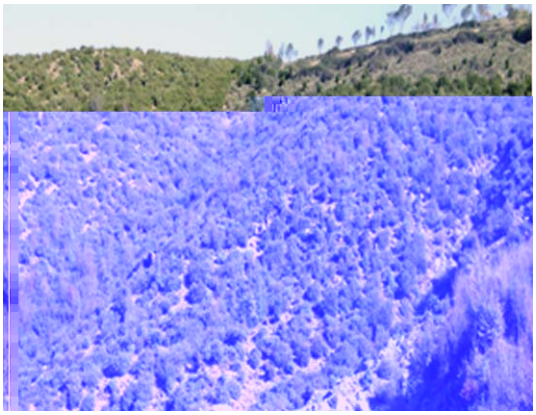

Fig. 6 Plant association of *Buxus sempervirens* – Polis

The plant association with *Juniperus oxycedrus* (Figure 7) have a large extension too, horizontally and vertically as well. Also it continues in Miraka, Polis stretching till to the oak plantation zone. The plant species with a higher presence and a higher abundance – dominance are: *Juniperus oxycedrus* 1V; *Buxus sempervires* 4IV; *Carpinus orientalis* 1V.

Figures 7 a,b: Plant association of *Juniperus oxycedrus* – Polis.

The surveys on table 2. appertain as below:

1 – Miraka village 350m above sea level, gray brown earth, flysch mother rock.
2 – Polis Qendra village 650m above sea level, brown earth, serpentine mother rock.
3 – Miraka village 250m above sea level, brown earth, serpentine mother rock.
4 – Xhyra village 650m above sea level, brown earth, calcareous mother rock.
5 – Hotolisht village 400m above sea level, gray brown earth, flysch mother rock.
6 – Stranik (Stravaj) village 850m above sea level, reddish brown earth, calcareous mother rock.

Table 2. Carpinus orientalis – Quercus petraea association.

Geographical element	Vital forms	Surveys number	1	2	3	4	5	6	Presence
		Altitude	350	650	250	650	400	850	
		Exposure	South - West	North - East	North - West	North - East	North - West	North - East	
		Inclination	22°	26°	20°	18°	23°	25°	
		Mother rock	flysch	serpe-ntine	serpe-ntine	calcar-eous	flysch	calcar-eous	
		Abundace-Dominance	80	60	70	80	85	78	
		Surface m²	25	25	25	25	25	25	
		Number of species	19	17	17	15	17	20	
Pontic	Phanerophytes	*Carpinus orientalis Mill.*	5	1	4	1	2	4	V
European	Phanerophytes	*Quercus petraea (Matt.) Liebl.*	1	-	1	2	1	2	V
Euro - Mediterranean	Phanerophytes	*Juniperus oxycedrus L.*	+	1	+	+	1	+	V
SubMediterra-nean – SubAtlantic	Nano Phanerophytes	*Buxus sempervires L.*	-	4	1	4	4	-	IV
EuroNorth Mediterranean - Pontic	Phanerophytes	*Fraxinus ornus L.*	1	-	1	1	-	+	IV
EuroAsian	Nano Phanerophytes	*Rosa canina L.*	+	-	+	+	-	+	IV
Euro - Mediterranean	Phanerophytes	*Colutea arborescens L.*	+	+	+	-	+	-	IV
Paleotemp	Hemicrypto-phytes	*Dactylis glomerata L*	-	+	+	-	+	+	IV
EuroAsian	Hemicrypto-phytes	*Brachypodium pinnatum (L.) P. B.*	+	-	-	+	+	+	IV
Subcosmopolitan	Therophytes / Hemicrypto-phytes	*Bromus hordaceus L.*	+	+	+	-	-	+	IV
WestMedite-rranean	Chamaephytes	*Satureja montana L.*	+	+	-	+	-	+	IV
EuroAsian	Hemicrypto-phytes	*Festuca pratensis Huds.*	+	+	-	+	+	-	IV
EuroAsian	Hemicrypto-phytes	*Melilotus officinalis (L.) Pallns*	-	+	+	-	+	+	IV
Paleotemporal	Hemicrypto-phytes	*Lotus corniculatus L.*	+	+	-	+-	-	+	IV
Paleotemporal	Therophytes	*Trifolium arvense L.*	+	+	-	-	+	+	IV
Paleotemporal	Therophytes	*Trifolium striatum L.*	+	+	-	+	+	+	IV

Eeastmedite-rranean	Hemicrypto-phytes	*Trifolium physodes Stev.*	-	-	+	+	+	+	IV
EuroMedite-rranean	Chamaephytes	*Ononis spinosa L.*	+	+	-	-	+	+	IV
EuroMedite-rranean	Therophytes	*Chenopodium vulvaria L.*	+	-	-	+	+	+	IV
Euro-Caucasian	Liane	*Clematis vitalba L.*	+	+	+	-	-	+	IV
Subcosmopolitan	Hemicrypto-phytes	*Urtica dioica L.*	-	+	+	+	+	-	IV
EuroSiberian	Hemicrypto-phytes	*Fragaria vesca L.*	-	+	+	-	+	+	IV
CentralEuropean	Hemicrypto-phytes	*Thymus praecox Opiz*	+	-	+	-	+	+	IV
Mediterranean	Chamaephytes	*Teucrium polium L.*	+	-	+	+	-	+	IV
Mediterranean	Phanerophytes	*Phyllirea latifolia L.*	2	-	1	-	-	+	III
Endemic	Phanerophytes	*Forsythia europaea Deg. et Bald*	-	2	-	-	-	-	I

The elements: Paleotemporal, Euro – Asian and Euro – Mediterranean have a higher percentage as shown in Figure 8.

The spectrum of the vital forms (Figure 9) shows that the Hemicryptophytes forms have the higher percentage.

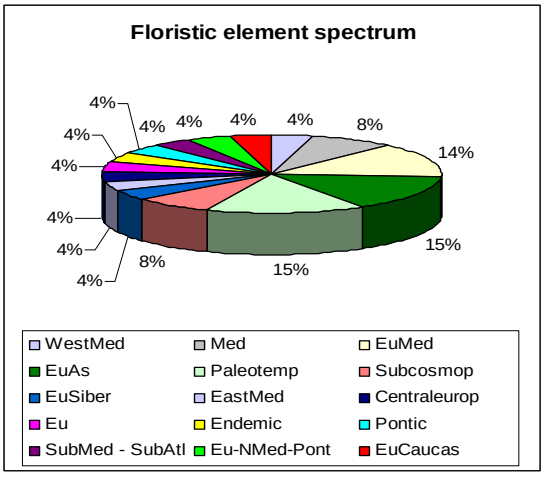

Figure8: Graphical spectrum of the floristic element

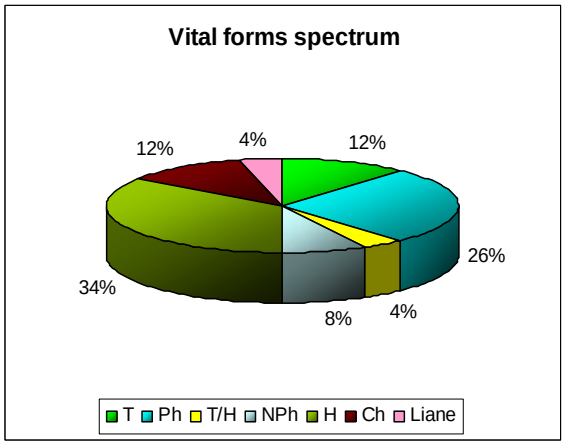

Figure 9: Graphical spectrum of the vital forms.

Cynodon dactylon – Medicago lupulina ASSOCIATION

This association is found in brown, grey – brown and reddish brown earths, in an altitude from 400m to 800m above the sea level. It is observed a wide spread this association and the plant species with a higher presence and a higher abundance – dominance are as follows: *Cynodon dactylon (L.) Pers.* 1V; *Medicago lupulina L.* 1V; *Lolium perene L.* 1V; *Trifolium pratense L*. 1V; *Phleum pratense L.* 1V; *Agropyrum intermedium (Host) P. B.* +V; *Dactylis glomerata L*. +V; *Melissa officinalis L.* +V; *Helleborus odorus Waldst. et Kit.* +V (Figure 10); *Urtica dioica L.* +V.

The surveys were done on fields, and in the table given below are not included cultivated plants, vegetables ones and fruit trees.

Figure 10: Plant association of *Helleborus odorus* – Kuturman.

The surveys on table 3. appertain as below:

1 – Gostima village Polis 400m above sea level, brown earth, serpentine mother rock.

2 – Hotolisht village 650m above sea level, brown earth, ultrabasic mother rock.

3 – Stravaj village 720m above sea level, reddish brown earth, calcareous mother rock.

4 – Rrajca – Sutaj village 800m above sea level, gray brown earth, serpentine mother rock.

5 – Dorzi village 680m above sea level, reddish brown earth, ultrabasic mother rock.

6 – Kuturman village 520m above sea level, brown earth, serpentine mother rock.

In the spectrum of the floristic element (Figure 11) it is the Paleotemporal element, which reflects the higher percentage.

The Hemicryptophytes forms are dominant in percentage, as is seen in the spectrum of the vital forms (Figure 12).

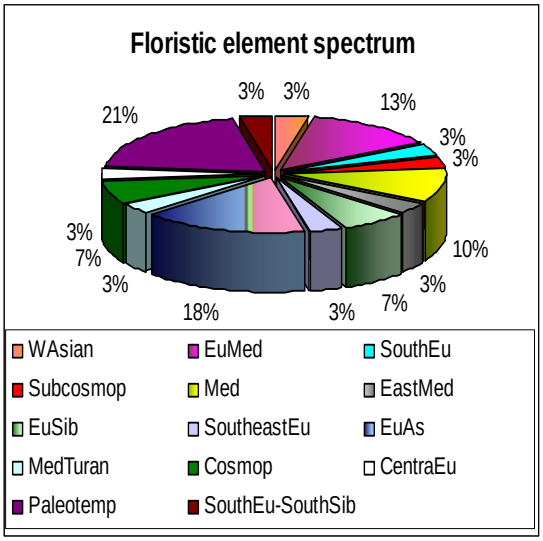

Figure 11: Graphical spectrum of the floristic element.

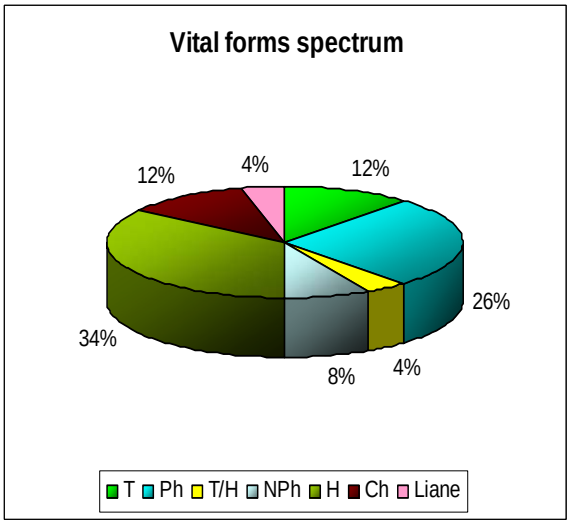

Figure 12: Graphical spectrum of the vital forms.

Table 3. Cynodon dactylon – Medicago lupulina association.

Geographical element	Vital forms	Surveys number	1	2	3	4	5	6	Presece
		Altitude	400	650	720	800	680	520	
		Exposure	North - West	North - East	South - East	South - West	North - West	South-East	
		Inclination	14˚	18˚	17˚	16˚	14˚	15˚	
		Mother rock	serpentine	ultrabasic	calcareous	serpentine	ultrabasic	serpentine	
		Abundace-Dominance	80	82	80	78	80	92	
		Surface m²	5	5	5	5	5	5	
		Number of species	21	24	20	21	21	20	
Cosmopolitan	Geophytes / Hemicrypto-phytes	*Cynodon dactylon (L.) Pers*	1	1	1	2	1	1	V
Paleotemporal	Therophytes	*Medicago lupulina L.*	1	2	1	+	1	+	V
EuroAsian	Hemicrypto-phytes	*Lolium perene L.*	1	1	+	1	+	1	V
CentralEuropean	Hemicrypto-phytes	*Phleum pratense L.*	1	+	1	+	1	+	V
EuroSiberian	Hemicrypto-phytes	*Trifolium pratense L.*	1	+	+	1	+	1	V
South European–South Siberian	Geophytes	*Agropyrum intermedium (Host) P. B.*	1	+	+	+	2	+	V
Paleotemporal	Hemicrypto-phytes	*Dactylis glomerata L.*	+	+	+	+	+	+	V

Euro Mediterranean	Therophytes	*Trifolium subterranum L.*	+	+	+	+	+	+	V
Paleotemporal	Hemicrypto-phytes	*Brachypodium sylvaticum (Huds.) P. B.*	+	+	1	+	-	+	V
WestAsian	Hemicrypto-phytes	*Melissa officinalis L.*	+	+	+	+	-	+	V
SouthEast European	Geophytes	*Helleborus odorus Waldst. et Kit.*	+	+	+	-	+	+	V
Subcosmopolitan	Hemicrypto-phytes	*Urtica dioica L.*	+	+	-	+	+	+	V
EuroAsian	Hemicrypto-phytes	*Anthoxanthum odoratum L.*	+	1	+	-	+	-	IV
Mediterranean	Hemicrypto-phytes	*Festuca paniculata Schinz et Thell.*	-	+	-	1	+	+	IV
Mediterranean Turanian	Therophytes	*Bromus sterilis L.*	-	+	-	+	+	+	IV
Paleotemporal	Therophytes	*Trifolium striatum L.*	+	+	-	+	-	+	IV
EuroSiberian	Hemicrypto-phytes	*Malva sylvestris L.*	+	-	+	+	-	+	IV
Euro Mediterranean	Hemicrypto-phytes	*Thymus longicaulis C. Presl.*	+	-	+	+	+	-	IV
Euro Mediterranean	Chamaephytes	*Teucrium chamaedrus L.*	+	-	+	+	-	+	IV
Paleotemporal	Hemicrypto-phytes	*Lotus corniculatus L.*	+	+	+	-	+	-	IV
Paleotemporal	Therophytes	*Trifolium campestre Schreb.*	+	+	-	+	-	+	IV
Cosmopolitan	Geophytes	*Pteridium aquilinum Kuhn.*	+	-	+	-	1	-	III
East Mediterranean	Therophytes	*Papaver rhoeas L.*	+	-	+	+	-	-	III
EuroAsian	Nano Phanerophytes	*Rosa canina L.*	-	+	-	-	+	+	III
Euro Mediterranean	Hemicrypto-phytes	*Galium lucidum All.*	-	+	-	+	+	-	III
EuroAsian	Hemicrypto-phytes	*Plantago lanceolata L.*	+	-	-	-	+	+	III
Mediterranean	Hemicrypto-phytes	*Asperula aristata L.*	-	+	+	-	+	-	III
SouthEuropean	Hemicrypto-phytes	*Centaurea alba L.*	-	+	-	+	-	+	III
EuroAsian	Hemicrypto-phytes	*Vicia cracca L.*	-	+	+	-	-	-	II
Mediterranean	Therophytes	*Hymenocarpus circinnatus (L.) Savi*	-	+	-	-	+	-	II

CONCLUSION

In this article are presented and described 3 plant associations illustrated with the appropriate tables, graphics and photos. The data given in this study represent the accordance of the habitats needs with the environmental and climatic conditions of the studied area. We also can say that its vegetation serves as an indicator of climate, geomorphology and geographic position.

The study area lays along the river bed and its riparian vegetation, in the environments of the middle and lower parts of it also makes part on the forest and mediterranean brushwoods zone and represents itself with plant associations like those with *Platanus orientalis,* which has a stretch on both sides of the river flow. They are combined with P*opulus sp.* and also we see other plant associations.

Based on this, we can say that the area in study has a large variety of the floristic and phytocenosis richness, where we presented only a small part of it. The plant species characteristic for this area exept the other values, contributes and in another important function: in the preservation from the erosion.

In general, although the current environmental situation appears good, there are areas at risk. Among them, most threatened are those near the residential areas where this valley represents higher losses and contamination due to human impact.

Among the causes of the danger of them are: the uses of the facilities along the valley to extract solid materials as in Miraka and Quksi, inappropriate constructios, plant cuttings, etc.

To preserve this genetic fund it is recommended that it should be preserved and protected by showing care for further improvement as a reducing environmental pollution, because its loss doesn't affect not only the scientific aspect but also the human one.

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