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Mediterranean floristic element and its influence in the alliance *Ostryo-Carpinion orientalis* HT. 1954 in Kosovo

Abstract

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Kosovo plain is influenced by continental climate, whereas Dukagjini plain, by modified Submediterranean and Mediterranean climate coming from Adriatic Sea through the river valley Drini i Bardhë. Geographical position, relief, distance from the sea and other factors have influenced in the alliance *Ostryo-Carpinion orientalis* in Kosovo to be rich with habitats and species that belong to Mediterranean floristic element. This alliance is extended throughout the whole territory of Kosovo up to 900 m altitude.

The objective of the study is research of the Mediterranean floristic element and its influence in the phytocenosis which belongs to the alliance *Ostryo-Carpinion orientalis*.

Some of the species which belong to Mediterranean floristic element are: *Colutea arborescens*, *Asparagus tenuifolius, Pyrus amigdaliformis, Acanthus balcanicus, Juniperus oxycedrus, Coronilla emeroides, Paliurus spina-christi, Syringa vulgaris, Scutelaria orientalis, Euphorbia myrsinites, Teucrium polium,* etc.

Introduction

The Kosovo phytogeographic position predetermines conditions for the presence of Submediterranean as well as Mediterranean floristic elements. Species which belong to these floristic elements have influence in the structure of the associations with Mediterranean and Submediterranean character (Rexhepi 1982, 1983, 1994, 1997, 2007; Rexhepi & al. 2009; Millaku & al. 2008).

This paper deals with Mediterranean floristic elements and its influence in the alliance *Ostryo-Carpinion orientalis* Ht. in Kosovo.

The alliance *Ostryo-carpinion orientalis* belongs to the order *Quercetalia pubescentis*. In Kosova's territory this alliance includes 4 associations: *Carpinetum orientalis scardicum, Dioscoreo-Carpinetum orientalis, Quercetum trojanae dukagjini* and *Ostryo-Quercetum pubescentis*.

Mediterranean species in Kosovo have migrated especially across the valley of the river Drini i Bardhë (from Adriatic Sea) and across the valley of the river Lepenci (from Aegean Sea) (Fig. 1).

According to our research of the alliance *Ostryo-Carpinion orientalis* in Kosova we have noticed that Mediterranean species have more influence in the associations which are present in the Dukagjini Region compared to Kosovas' Region.

Materials and Methods

Flora is investigated applying the Central-European methods (Ehrendorfer 1973). The floral composition of these 4 associations from alliance *Ostryo-Carpinion orientalis* in Kosovo is analyzed in detail in the synecological-vegetational research.

Vegetation is investigated according to the principles of the Zürich-Montpellier School (Braun-Blanquet 1964).

The species are also analyzed according to the biological forms according to Raunkier (1905). The floral geoelements are determined according to Greuter (2008), Horvat & al. (1974) and Rexhepi (1994, 2007) (Table 1, Fig. 2 & 3).

Results

Geographical position, relief, distance from the sea and other factors have influenced in the alliance *Ostryo-Carpinion orientalis* in Kosovo to be rich with habitats and species that belong to Mediterranean floristic element. This alliance is extended throughout the whole territory of Kosovo up to 900 m altitude.

The alliance *Ostryo-Carpinion orientalis* in Kosovo apply to 4 associations*: Carpinetum orientalis scardicum, Dioscoreo-Carpinetum orientalis, Quercetum trojanae dukagjini* and *Ostryo-Quercetum pubescentis*.

Within the framework of these associations are noticed 40 Mediterranean species.

In the association *Cerpinetum orientalis scardicum* their Mediterranean influence exert these species *Colutea arborescens, Pyrus amigdaliformis, P. pyraster, Asparagus tenuifolius, Acanthus balcanicus, Silene italica, Teucrium chamaedrys, Euphorbia myrsinites, Himantoglosum hircinum, Physospermum cornubiense, Muscari racemosum, Scilla autumnalis, Luzula forsteri, Valeraianella coronata, Marrubium peregrinum, Prunella laciniata, Bromus squarrosus, Iris graminea, Orlaya grandiflora* and *Coronilla scorpioides*.

In the association *Dioscoreo-Carpinetum orientalis* their Mediterranean influence exert these species: *Colutea arborescens, Pyrus amigdaliformis, P. pyraster, Pistacia terebinthus, Clematis flammula, Tamus communis, Asparagus tenuifolius, Acanthus balcanicus, Teucrium chamaedrys, Physospermum cornubiense, Cephalanthera rubra* and *Galanthus nivalis*.

In the association *Quercetum trojanae dukagjini,* by Rexhepi (1982) their Mediterranean influence exert these species: *Colutea arborescens, Pyrus amigdaliformis, P. pyraster, Pistacia terebinthus, Juniperus oxycedrus, Acanthus balcanicus, Clematis flammula, Teucrium chamaedrys, Euphorbia myrsinites, Physospermum cornubiense, Muscari racemosum, Valeraianella coronata, Prunella laciniata, Bromus squarrosus, Orlaya grandiflora, Coronilla scorpioides, Cephalanthera rubra*, *Teucrium poliumm* and

Nigella damascena. During 2009-2010 on the habitats of *Quercus trojana* in Kosovo we have found some new species which belong to the Mediterranean floristic element: *Cardamine graeca, Crataegus lacinata, Paeonia corallina, Asperula cynanchica, Tremastelma palestinum, Echinaria capitata, Convolvulus althaeiodes, Echium italicum, Arcethobium oxycedri, Ranunculus garganicus, Scilla bifolia* and *Trifolium angustifolium.*

In the association *Ostryo-Quercetum pubescentis* their Mediterranean influence exert these species: *Colutea arborescens, Pyrus pyraster, Asparagus tenuifolius* and *Teucrium chamaedrys*.

During 2009-2010 we have surveyed habitats of *Quercus trojana* in Kosovo where we have found some new species which belong to the Mediterranean floristic element and these species were not present in this association in 1982 where this association was researched. These species have migrated in this association as result of global warming and anthropogenic factor. These species are: *Cardamine graeca, Crataegus laciniata, Paeonia corallina, Asperula cynanchica, Tremastelma palestinum, Echinaria capitata, Convolvulus althaeiodes, Echium italicum, Arcethobium oxycedri, Ranunculus garganicus, Scilla bifolia* and *Trifolium angustifolium.*

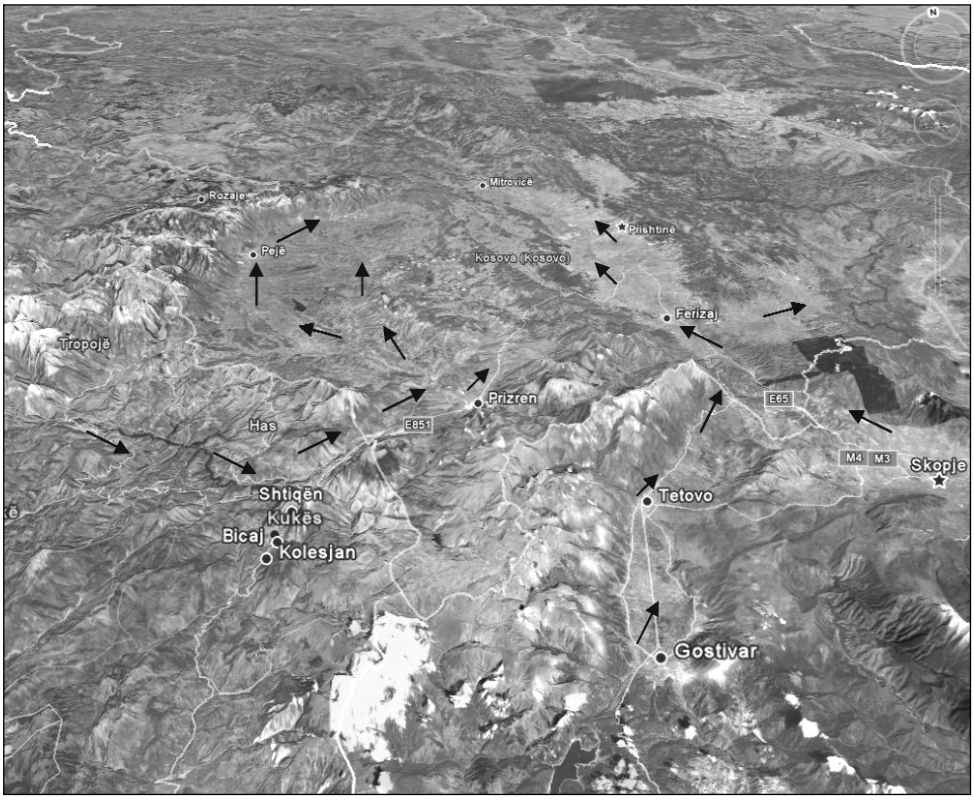

Fig. 1. Mediterranean impact on the flora and vegetation of Kosova.

Table 1. Mediterranean species from the alliance *Ostryo-carpinion orientalis* Ht. 1950 in Kosovo.

	C.o.sc.	D.-C.o.	Q.t.d.	O.-C.p.
A				
P. *Colutea arborescens*	IV (+ - 1)^{a}	II (+ - 1)^{al}	IV (+ - 2)^{al}	III (+)^{al}
P. *Pyrus amigdaliformis*	III (+)^{al}	II (+)^{al}	III (+ - 2)^{a}	
P. *Pyrus pyraster*	IV (+ - 1)^{o}	II (+)^{c}	II (+)^{o}	II (+)^{o}
P. *Pistacia terebinthus*		I (+)^{a}	III (+ - 2)^{c}	
B				
P. *Juniperus oxucedrus*			I (+ - 2)^{al}	
CH. *Clematis flammula*		II (+ - 1)^{a}	II (+)^{a}	
G. *Tamus communis*		II(+ - 1)^{c}		
C				
G. *Asparagus tenuifolius*	III (+ - 1)^{al}	I (+)^{c}		II (+)^{al}
H. *Acanthus balcanicus*	II (+)^{al}	IV (+ - 2)^{a}	III (+ - 2)^{a}	
H. *Silene italica*	II (+)^{o}			
CH. *Teucrium chamaedrys*	V (+ - 1)^{c}	IV (+ - 2)^{c}	II(+ - 2)^{c}	V (+ - 1)^{c}
G. *Euphorbia myrsinites*	IV (+ - 1)^{c}		III (+ - 2)^{a}	
G. *Himantoglosum hircinum*	III (+ - 1)^{c}			
T. *Physospermum cornubiense*	III (+)^{c}	III (+ - 2)^{c}	I (+ - 2)^{c}	
G. *Muscari racemosum*	III (+ - 1)^{c}		I (+)^{c}	
G. *Scilla autumnalis*	III (+ - 1)^{c}			
H. *Luzula forsteri*	III (+)^{c}			
T. *Valeraianella coronata*	II (+ - 1)^{c}		I (+)^{c}	
G. *Marrubium peregrinum*	II (+)^{c}			
H. *Prunella laciniata*	II (+ - 1)^{c}			
H. *Bromus squarrosus*	II (+ - 1)^{c}		I (+)^{c}	
G. *Iris graminea*	II (+)^{c}			
T. *Orlaya grandiflora*	I (+)^{c}		I (+)^{c}	
T. *Coronilla scorpioides*	I (+)^{c}		I (+)^{c}	
G. *Cephalanthera rubra*		I (+)^{c}	I (+)^{o}	
CH. *Teucrium polium*			III(+ - 2)^{c}	
T. *Nigella damascena*			I (+)^{c}	
G. *Galanthus nivalis*		I (+)^{c}		

C.o.sc. (*Carpinetum orientalis scardicum*)
D.-C.o. (*Dioscoreo-Carpinetum orientalis*)
Q.t.d. (*Quercetum trojanae dukagjini*)
O.-Q.p. (*Ostryo-Quercetum pubescentis*)
A-tree layer, B-shrub layer, C-herbal
(...)a characteristic species of association
(...)al characteristic species of alliance
(...)o characteristic species of ordo

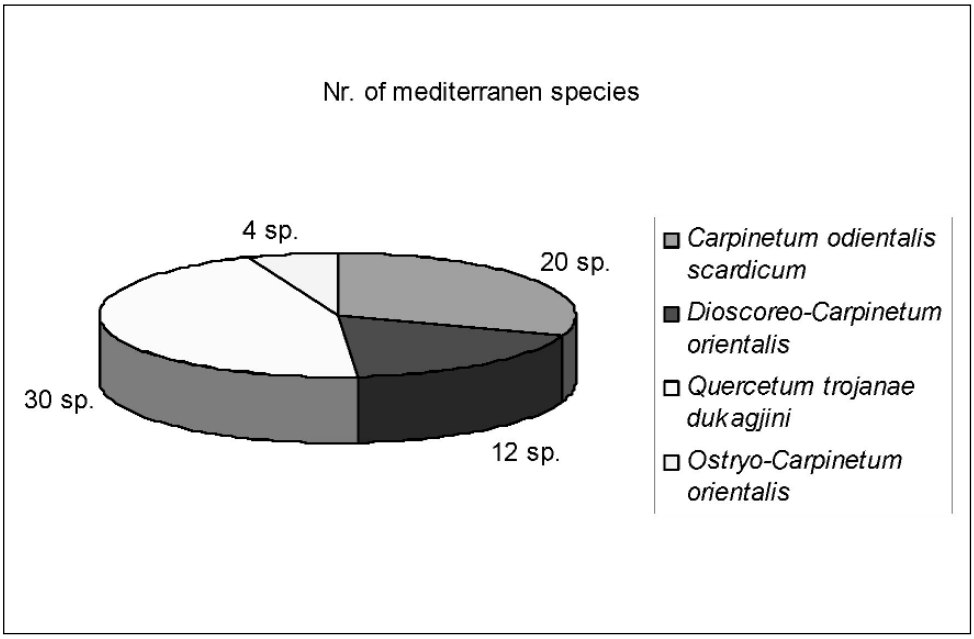

Fig. 2. Mediterranean impact in the associations of the alliance *Ostryo-carpinion orientalis* Ht. 1950 in Kosovo.

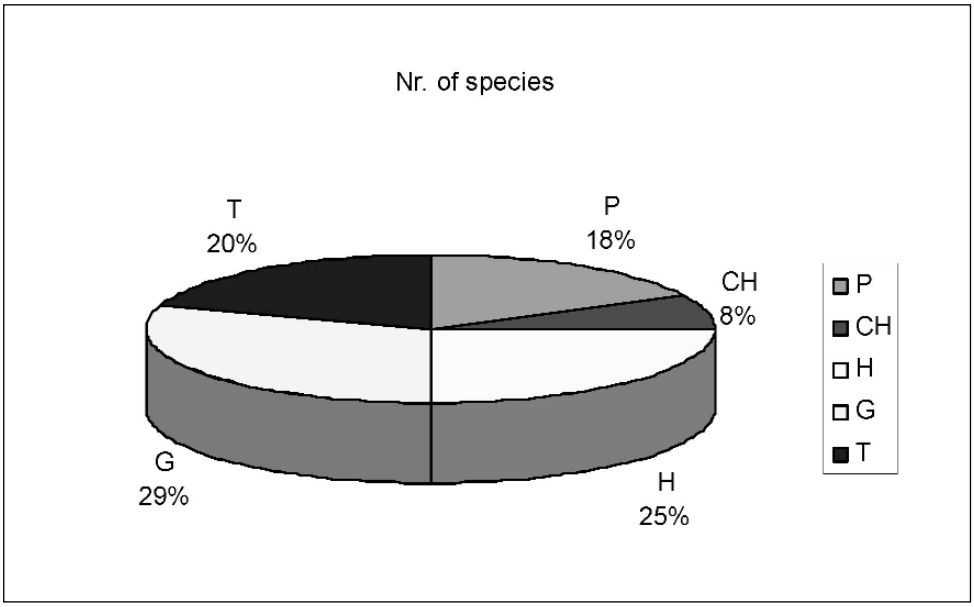

Fig. 3. Life forms of Mediterranean species from the alliance *Ostryo-carpinion orientalis* Ht. 1950 in Kosovo.

Conclusions

The alliance *Ostryo-carpinion orientalis* in Kosovo is extended throughout the whole territory of Kosovo up to 900 m altitude. This alliance includes 4 associations: *Carpinetum orientalis scardicum, Dioscoreo-Carpinetum orientalis, Quercetum trojanae dukagjini* and *Ostryo-Quercetum pubescentis*.

Mediterranean species have more influence in the Dukagjini Region compared to Kosova's Region.

In the association *Carpinetum orientalis scardicum* there are found 20 Mediterranean species, 30 Mediterranean species in the *Quercetum trojanae dukagjini,* 12 in the *Dioscoreo-Carpinetum orientalis* and 4 species in the *Ostryo-Quercetum pubescentis*.

From 40 Mediterranean species which are present in this alliance, 29% are Geophytes, 25 % are Hemicriptophyta, 20 % Terrophyta, 18% Phanerophyta while Chamaephyta 8 %.

As a result of global warming and anthropogenic factor in the association *Quercetum trojanae dukagjini,* during 28 years (1982-2010) have migrated these Mediterranean species: *Cardamine graeca, Crataegus laciniata, Paeonia corallina, Asperula cynanchica, Tremastelma palestinum, Echinaria capitata, Convolvulus althaeiodes, Echium italicum, Arcethobium oxycedri, Ranunculus garganicus, Scilla bifolia* and *Trifolium angustifolium.*

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