THE AVIFAUNA OF THE ALPINE AND SUBALPINE ZONES FROM IEZER-PĂPUŞA MASSIFBETWEEN THE 20-TH OF JULY AND 8-TH OF SEPTEMBER 2007

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Abstract. Between the 20-th of July and the 8-th of September 2007, a team from the Argeş County Museum and Piteşti University catalogued the species and habitats of communitarian interest from Iezer-Păpuşa Massif, in concordance to the foresight of the Habitat Directive and Birds Directive in order to propose the alpine and subalpine zone of this massif as a future Nature 2000 site. The researches took place in the alpine and subalpine of the Iezerul Mare, Păpuşa and Bătrâna Peaks. The climate is temperate Central-European, having the features of a climate of the mountain zones. All the studied peaks have all the floors of vegetation, the only exception being represented by Păpuşa Peak, which does not have the subalpine floor. In the alpine and subalpine floor from Iezer-Păpuşa Massif, 33 species of birds were identified that belong to 4 orders. In accordance with the index of similarity, there is a medium similarity of the three studied zones: 28 species were seen on Iezer, 21 species on Bătrâna and 8 species on Păpuşa. Remarkable is the presence of some species like *Aquila chrysaetos* and *Charadrius morinellus. Circus aeruginosus, Falco subbuteo* and Merops *apiaster* were in passage. According to frequency, the most common species are: *Anthus spinoletta, Corvus corax* and *Loxia curvirostra. Falco* tinnunculus, *Prunella collaris* and *Carduelis cannabina* are certainly breeding and *Charadrius morinellus*, *Turdus torquatus* and *Oenanthe oenanthe* are probably breeding.

Key words: Birds Directive, Iezer-Păpuşa Massif

Rezumat. **Avifauna alpinului şi subalpinului din Masivul Iezer-Păpuşa, în perioada 20 iulie – 8 septembrie 2007.** În perioada 20 iulie – 8 septembrie 2007, o echipă de specialişti de la Muzeul Judeţean Argeş şi de la Universitatea din Piteşti, a realizat inventarierea speciilor şi habitatelor de interes comunitar din Masivul Iezer-Păpuşa, în concordanţă cu prevederile Directivei Habitate şi Directivei Păsări, în vederea propunerii alpinului şi subalpinului din acest masiv ca viitor sit Natura 2000. Au fost cercetate vârfurile Iezerul Mare, Păpuşa şi Bătrâna. Clima acestora este temperat central-europeană, cu trăsăturile unui climat de munte iar flora prezintă toate etajele de vegetaţie, cu excepţia vârfului Păpuşa, lipsit de etajul subalpin. În urma observaţiilor efectuate în alpin şi subalpin, s-au identificat 33 de specii de păsări care aparţin la 4 ordine. Conform indicelui de similaritate specifică, asemănarea dintre cele trei vârfuri este medie, 28 de specii fiind văzute pe Vf. Iezer, 21 pe Vf. Bătrâna şi 8 pe Vf. Păpuşa. De remarcat este prezenţa acvilei de munte (*Aquila chrysaetos*) şi a prundăraşului de munte (*Charadrius morinellus*) iar, în migraţie, a eretelui de trestie (*Circus aeruginosus*), şoimului rândunelelor (*Falco subbuteo*) şi prigoriei (*Merops apiaster*). Cele mai frecvente specii în observaţii sunt: *Anthus spinoletta, Corvus corax* şi *Loxia curvirostra. Falco tinnunculus, Prunella collaris* şi *Carduelis cannabina* sunt sigur cuibăritoare iar *Charadrius morinellus*, *Turdus torquatus* şi *Oenanthe oenanthe* sunt probabil cuibăritoare.

Cuvinte cheie:Directiva Păsări, Masivul Iezer-Păpuşa

INTRODUCTION

Between the 20-th of July and the 8-th of September 2007, within the Project Life05Nat/Ro/000176 "Alpine, Subalpine and Forestry Habitat from Romania", in collaboration with WWF Danube Carpathians Program, a team whose members are Valeriu Alexiu (coordinator), Nicolae Lotrean, Cristina Constantinescu and Adrian Mestecăneanu from the Argeş County Museum and Monica Neblea from Piteşti University catalogued the species and habitats of communitarian interest from Iezer-Păpuşa Massif, in concordance to the foresight of the Habitat Directive and Birds Directive in order to propose the alpine and subalpine zone of this massif as a future Nature 2000 site.

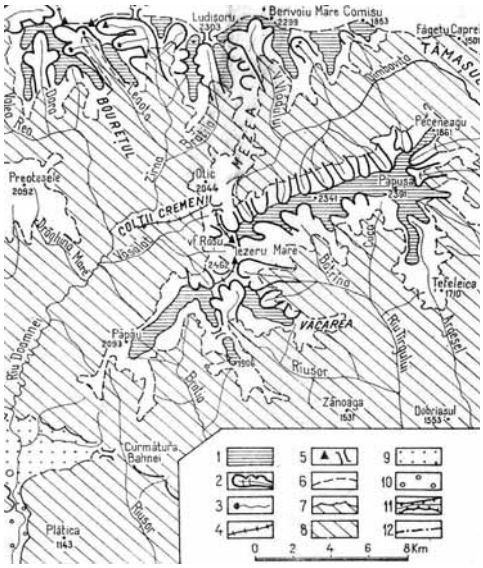

Figure 1. The map of the Iezer-Păpuşa Massif Harta Masivului Iezer-Păpuşa: 1 – surfaces of smoothing of over 2000 m; 2 – glacial circus, valleys and threshold; 3 – lakes situated in punchbowls having glacial origin; 4 – sharpened ridges and indenteds; 5 – pyramidal peaks, saddle; 6 – rounded peaks; 7 – the alpine and subalpine zones; 8 – forestry zones; 9 – intramontane depression; 10 – sub – Carpathians depressions; 11 – gorges; 12 – the border of Argeş County.

MATERIAL AND METHODS

The researches took place in the alpine and subalpine of the Iezerul Mare, Păpuşa and Bătrâna Peaks.

Placed between Făgăraş Mountains (West and North-West) and Piatra Craiului and Leaota Mountains (East and South-East), the Iezer-Păpuşa Massif (400 km^2) belongs to the medium surface massifs from Romanian Carpathians. Its highest peak is Vârful Roşu (2469 m); then as it follows: Iezerul Mare (2461 m), Păpuşa (2391 m) and Bătrâna (2345 m). Geologically, the Iezer-Păpuşa Massif is made of crystalline rocks, the most of the ridge belonging to Cumpăna series and the most of the secondary ridges being carved in the crystalline of the Leaota series. There is a clear contrast between the Northern and Western slopes and the Southern and Eastern ones. The first have steep walls with big sediments of detritus and the second ones have wide and leisurely slopes. In the high zones there is a typical glacial relief. The glacial Lake Iezer is situated in the glacial hollow situated at the foot of Iezerul Mare Peak. The Iezer Lake is the only glacial lake from Iezer-Păpuşa Massif. Most of the Rivers Doamnei and Dâmboviţa tributaries originated in the massif. They represent a rich hydrographic web (Fig. 1).

The climate is temperate Central-European, having the features of a climate of the mountain zones and thermodynamics perturbation provoked by relief. The annual average temperatures vary from 6°C at the feet of the mountain to negative values on the peaks. The isotherm is 0 °C at 1950 m, suitable to the maximum limit of the arborescet vegetation. The average value of the rainfall is 800 mm at low altitude and 1400 mm at high altitude (BARCO & NEDELCU, 1974).

Regarding the vegetation, I must say that the mountain floor is best represented. It is situated between 600 (500) m and 1600 (1700) m, and it is formed of pure beech brush or mix deciduous in the lower zone and pure spruce fir brush in the higher zone. The next floor is the subalpine floor which consists of rare individuals of Spruce Fir and Arolla Pine and especially of the grove of Juniper tree. Over 2200 m shrubbery, alpine pastures and association of rocks formed the alpine floor. All the studied peaks have all these floors of vegetation, the only exception being represented by Păpuşa Peak, which does not have the subalpine floor (ALEXIU V., 1998).

RESULTS AND DISCUTIONS

The researches effected between 20-th of July and the 8-th of September in the accentor floor, which correspond to alpine and subalpine floor from Iezer-Păpuşa Massif, 33 species of birds were identified. They belong to 4 orders: **Falconiformes**, with 2 families: Accipitridae (5 species) and Falconidae (2 species), **Charadriiformes**, with a families: Charadriidae (1 species), **Coraciiformes**, with a families: Meropidae (1 species) and **Passeriformes** with 9 families: Hirundinidae (2 species), Motacillidae (3 species), Corvidae (2 species), Troglodytidae (1 species), Prunellidae (2 species), Sylviidae (3 species), Turdidae (5 species), Paridae (1 species) and Fringillidae (5 species). Remarkable is the presence of 3 individuals of Golden Eagle (*Aquila chrysaetos*) (LINNAEUS), 1758, seen above Păpuşa Peak, and one Dotterel (*Charadrius morinellus*) LINNAEUS, 1758, observed in the zone of Iezer Lake. 5 species were seen in migration: one male of Marsh Harrier (*Circus aeruginosus*) (LINNAEUS), 1758, flying toward South-South-West, along Tambura-Frăcea ridge and avoiding Bătrâna Peak, one individual of Hobby (*Falco subbuteo*) LINNAEUS, 1758, seen in Grădişteanu-Păpuşa zone, 40 individuals of European Bee-eater (*Merops apiaster*) LINNAEUS, 1758, seen a low high while they went toward South-West above the grassland Plaiul lui Pătru, a few individuals of Barn Swallow (*Hirundo rustica*) LINNAEUS, 1758, and some dozens of House Martin (*Delichon urbica*) (LINNAEUS), 1758.

Among the observed species, 28 species were seen on Iezer, 21 species on Bătrâna and 8 species on Păpuşa (Table 1). In order to determine the degree of similitude of the three zones, I used the index of specific similarity: Ss = (2***c****100)/(**a**+**b**) in which c is the number of the species belonging to both zones and a and b the total number of species identified on the compared surfaces. The value of the index represents: 0% - total difference, under 25% - low similarity, between 25,1% and 75% medium similarity, over 75,1% - high similarity and 100% total similarity. The conclusion is that the similarity between Bătrâna Mountain and Iezer Mountain (which are one next to another and the floors of vegetation are similar) and an index close to a low similarity is noticed between Păpuşa Mountain and Iezer Mountain (distant in space and having different floors of vegetation) (Table 2). Considering their habitats, 22 species on Iezer, 17 species on Bătrâna and no species on Păpuşa (because here the Juniper tree floor does not exist) were identified in the grove of Juniper trees and 17 species on Iezer, 12 species on Bătrâna and 8 species on Păpuşa were identified in the alpine pasture. Globally, 24 species were identified in the grove of Juniper trees and 25 species in the alpine pasture, specifying that 7 species (*Buteo buteo* (LINNAEUS), 1758*, Accipiter gentiles* (LINNAEUS), 1758*, Accipiter nisus* (LINNAEUS), 1758*, Falco tinnunculus* LINNAEUS, 1758*, Hirundo rustica, Delichon urbica* and *Corvus corax* LINNAEUS, 1758) have been observed upon the wing in the Juniper tree floor. 13 such species have been observed in the alpine pastures floor (*Aquila chrysaetos, Buteo buteo, Circus aeruginosus, Falco tinnunculus, Falco subbuteo, Merops apiaster, Hirundo rustica, Delichon urbica, Nucifraga caryocatactes* (LINNAEUS), 1758*, Phylloscopus collybita* (VIEILLOT), 1817*, Loxia curvirostra* LINNAEUS, 1758*, Carduelis spinus* (LINNAEUS), 1758 and *Pyrrhula pyrrhula* (LINNAEUS), 1758).

Aquila chrysaetos, *Charadrius morinellus*, *Anthus spinoletta* (LINNAEUS), 1758 and *Prunella collaris* (SCOPOLI), 1769 are the characteristic species for the alpine pastures floor (the floor of the Juniper tree has not got its own forms). Here forestry species get into: *Buteo buteo, Accipiter gentilis, Accipiter nisus, Nucifraga caryocatactes, Prunella modularis* (LINNAEUS), 1758*, Phylloscopus collybita, Turdus torquatus* LINNAEUS, 1758*, Fringilla coelebs* LINNAEUS, 1758*, Loxia curvirostra, Carduelis spinus, Pyrrhula pyrrhula, Troglodytees troglodytes* (LINNAEUS), 1758*, Sylvia curruca* (LINNAEUS), 1758*, Regulus regulus* (LINNAEUS), 1758*, Erithacus rubecula* (LINNAEUS), 1758 and *Parus ater* LINNAEUS, 1758 . In the Juniper tree floor a vertical rancing in tiers of the species of birds exists. Such species as: *Erithacus rubecula, Parus ater* or *Regulus regulus* are met at the skirt of the forest; other species such as *Prunella modularis* and *Phylloscopus collybita* are widely spread; and species like *Anthus spinoletta* and *Phoenicurus ochruros* (GMELIN, S.G.), 1774 are met in the area of interfering with the alpine pasture or the rocks. Species like *Charadrius morinellus*, *Motacilla cinerea* TUNSTALL, 1771 and *Motacilla alba* LINNAEUS, 1758 prefer the water vicinity and species like *Aquila chrysaetos* and *Falco tinnunculus* prefer the rocky walls and the pastures and species like *Anthus spinoletta* and *Carduelis cannabina* (LINNAEUS), 1758 prefer the pastures. *Prunella collaris, Phoenicurus ochruros* and *Oenanthe oenanthe* (LINNAEUS), 1758 prefer the debris and the rocks. A series of birds travels every day from the inferior to the superior floors for feeding themselves: *Buteo buteo, Accipiter gentilis, Accipiter nisus, Corvus corax, Turdus viscivorus* LINNAEUS, 1758*, Loxia curvirostra* etc.

In accordance with the frequency: 10 species (30,30%) are very rare, 12 species (36,36%) are rare, 6 species (9,09%) are relatively rare, 2 species (6,06%) are relatively common and 3 species (9,09%) are common (Table 1), (Fig.

2). The very rare species appear in less than 10% of the effected observations, the rare species in 10,1 – 30% of the effected observations, relatively rare species in 30,1 – 50% of the effected observations, relatively common species in 50,1 – 70% of the effected observations and common species in 70,1 – 100% of the observations.

In accordance with their breeding, 13 species (39,39%) are not breeding, 10 species (30,30%) are probably breeding and 10 species (30,30% are certainly breeding (Table 1), (Fig. 3).

According to the ornithological floor occupied during breeding, were they are mostly spread, 5 species (15,15%) belonging to Accentor Floor, 17 species (51,52%) belonging to Tetraonid Floor, 4 species (12,12%) belonging to Columbid Floor, 2 species (6,06%) are ubiquitarian species, 4 species (12,12%) are interzonal species and one species (3,03%) belongs to Great Bustard Floor (Table 1), (Fig. 4).

According to the Birds Directive, I identified 3 species belonging to Annex I (*Aquila chrysaetos, Circus aeruginosus,* şi *Charadrius morinellus*). Special safety measures of protection regarding the habitat in order to ensure the surviving and the reproduction of those species in their area of distribution had been provided. One species (*Turdus viscivorus*) belongs to the Annex II/2 and it could be hunted only in the States of the E. U. for which it is mentioned (Table 1).

According to the biogeographically origins, 13 species (39,39%) are European – E, 11 species (33,33%) are Transpalearctic – Tp, 3 species (9,09%) are Siberian – S, 2 species (6,06%) are Mongolian – Mo, 2 species (6,06%) are Tibetan –Ti, 1 species (3,03%) is Arctic – A and 1 species (3,03%) is Mediterranean – M (Table 1), (Fig. 5).

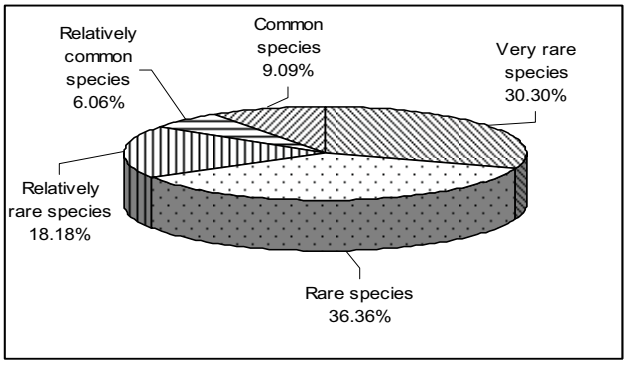

Figure 2. The frequency of the species of birds
Figura 2. Frecvența speciilor de păsări

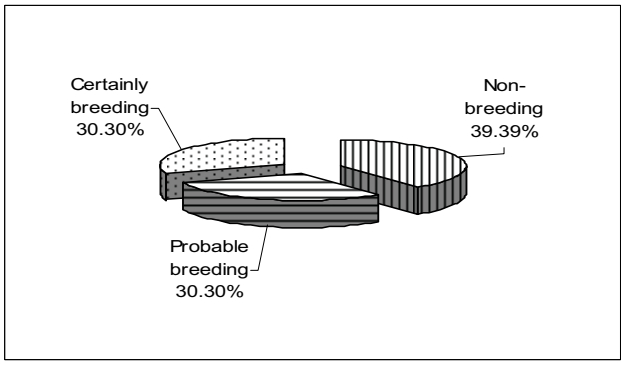

Figure 3. The distribution of the species by breeding
Figura 3. Distribuția speciilor după cuibărire

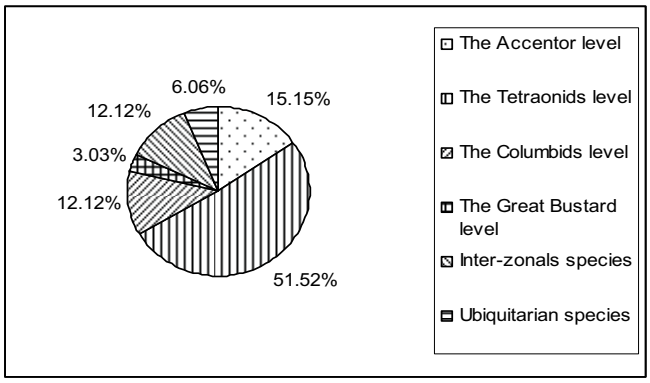

Figure 4. The distribution of the species in accordance with the ornithological floors during breeding
Figura 4. Distribuția speciilor după etajele ornitologice din timpul cuibăririi

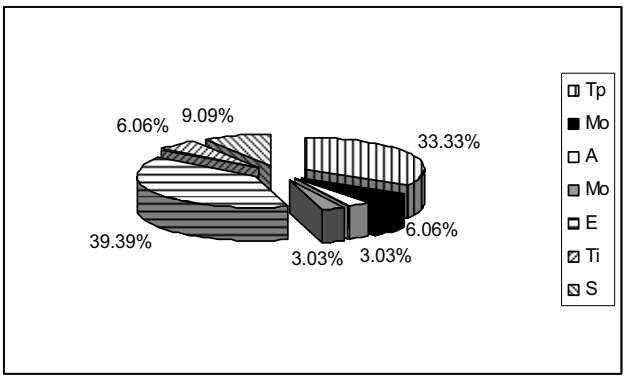

Figure 5. The distribution of the species according to the biogeographically origin
Figura 5. Distribuția speciilor după originea biogeografică

CONCLUSIONS

33 species of birds have been identified in the alpine and subalpine zones of the Iezer-Păpuşa Massif between the 20-th of July and the 8-th of September 2007.

It was ascertained the presence of some species like *Aquila chrysaetos* which probably came from the Făgăraş Mountain and *Charadrius morinellus* probably hatching in the vicinity of Iezer Lake and *Circus aeruginosus*, *Falco subbuteo* and *Merops apiaster* which were in passage.

In accordance with the index of similarity, there is a medium similarity of the three studied zones, the most similar being Bătrâna Mountain and Iezer Mountain (neighboring and having similar vegetation floors).

According to frequency, the most common species are: *Anthus spinoletta, Corvus corax* and *Loxia curvirostra* and the rarest are: *Aquila chrysaetos, Charadrius morinellus* şi *Prunella collaris.*

Among the breeding species in the alpine and subalpine zone of the Iezer-Păpuşa Massif, *Falco tinnunculus, Prunella collaris* and *Carduelis cannabina* are certainly breeding and *Charadrius morinellus, Turdus torquatus* and *Oenanthe oenanthe* are probably breeding.

As a result of the studies done in the zone, I hope that the alpine and subalpine zones of the Iezer-Păpuşa Massif to be declared Nature 2000 sites.

Table 1. The bird species observed during 20-th July – 8-th September in the Iezer- Păpuşa Massif
Tabel 1. Speciile de păsări observate în perioada 20 iulie – 8 septembrie în Masivul Iezer-Păpuşa

No.	Species	Presence			Frequency	Breeding	Ornithological floor during breeding	Bird Diorective	Biogeographically origin	Observations
		Iezer	Bătrâna	Păpuşa						
1	*Aquila chrysaetos*			p	Fr	Nc	B	AI	Tp	3ex., 2 August, Păpuşa Peak
2	*Buteo buteo*	j	j, p		R	Nc	T	-	Tp	
3	*Accipiter gentilis*	j	j		R	Nc	C	-	Tp	
4	*Accipiter nisus*	j			Fr	Nc	T	-	Tp	
5	*Circus aeruginosus*		p		Fr	Nc	D	AI	Mo	1 ex., 8 September, Bătrâna Peak
6	*Falco tinnunculus*	j, p	j	p	Rr	Sc	I	-	Tp	
7	*Falco subbuteo*			p	Fr	Nc	C	-	Tp	1 ex., 2 August, Păpuşa Peak
8	*Charadrius morinellus*	p			Fr	Pc	B	AI	A	1 ex., 20 July, Iezer Lake
9	*Merops apiaster*		p		Fr	Nc	C	-	M	40 ex., 8 September, Bătrâna Peak
10	*Hirundo rustica*		j,p	p	R	Nc	I	-	Tp	
11	*Delichon urbica*	j, p	j, p	p	Rr	Nc	I	-	Tp	
12	*Motacilla cinerea*	j, p			R	Sc	T	-	E	2 juv., 28 July, Iezer Lake
13	*Motacilla alba*	p			Fr	Pc	U	-	E	
14	*Anthus spinoletta*	j, p	j, p	p	C	Sc	B	-	Ti	
15	*Corvus corax*	j, p	j, p	p	C	Nc	T	-	Tp	
16	*Nucifraga caryocatactes*	j	p		R	Nc	T	-	S	
17	*Troglodytees troglodytes*	j	j		R	Pc	T	-	E	
18	*Prunella modularis*	j, p	j		Rc	Sc	T	-	E	
19	*Prunella collaris*	p			Fr	Sc	B	-	Ti	3 juv., 28 July, Iezer Lake
20	*Phylloscopus collybita*	j	j, p		Rr	Sc	T	-	Tp	
21	*Sylvia curruca*	j	j		R	Pc	T	-	E	
22	*Regulus regulus*	j			Fr	Pc	T	-	E	
23	*Erithacus rubecula*	j	j		Rr	Sc	T	-	E	
24	*Turdus torquatus*	j, p			R	Pc	T	-	E	
25	*Turdus viscivorus*	p			R	Nc	T	AII/2	E	
26	*Phoenicurus ochruros*	j,p	j		Rc	Sc	B	-	Mo	
27	*Oenanthe oenanthe*	p	p	p	R	Pc	I	-	Tp	
28	*Parus ater*	j	j		Rr	Pc	T	-	E	
29	*Fringilla coelebs*	j	j, p		R	Pc	U	-	E	
30	*Loxia curvirostra*	j, p	j, p		C	Pc	T	-	S	
31	*Carduelis spinus*	j, p			R	Pc	T	-	E	
32	*Carduelis cannabina*	p			Fr	Sc	C	-	E	3 juv., 18 September, Iezer Lake
33	*Pyrrhula pyrrhula*	j, p	j		Rr	Nc	T	-	S	
	Total species	28	21	8						
	The Juniper tree floor species	22	17	-						
	The alpine pasture species	17	12	8						

Legend:
j - Juniper tree floor, p – alpine pasture; Fr – very rare species, R – rare species, Rr – relatively rare species, Rc – relatively common species, C – common species; Nc – non breeding species, Pc – probable breeding species, Sc – certainly breeding species; B – Accentor Floor, T – Tetraonid Floor, Columbid Floor, D – Great Bustard Floor, I – inter-zonal species, U – ubiquitarian species; Tp – Transpalearctic species, Mo – Mongolian species, A – Arctic species, M – Mediterranean species, E – European species, Ti – Tibetan species, S – Siberian species.

Table 2. The values of the index of similarity specific for the three studied surfaces.
Valorile indicelui de similaritate specifică pentru cele trei suprafeţe studiate

Location	Iezer Mountain	Bătrâna Mountain	Păpuşa Mountain
Iezer Mountain	-	73,46	27,77
Bătrâna Mountain	(18 sp.)	-	41,37
Păpuşa Mountain	(5 sp.)	(6 sp.)	-

Legend: () – species which are common for the two compared habitats.

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