

Comparative ecological and animal geography malacological screening of ravine forests in the Bükk and Mecsek mountains

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ABSTRACT: The authors carried out a comparison between two types of ravine forests to be found in the north and south of Hungary, in two different flora areas (Matricum, Praeillyricum). The ratio was found similar both regarding the distribution of type habitat and of the sum values of fauna areas. In contrast to 48 species in six places of collecting in the Bükk, 43 species in 11 places in the Mecsek were found. Equally 7,80% difference was discovered between continental and subatlantic fauna areas. Ecologically shrubby forest (B) forest dwellers (HF) dominate and the groups of types of habitation were proportionally similar. As to animal geography in the Bükk East-Siberian and Holarctic (1.1, 1.4), Illyr-Moeziac (5.1.2.2) fauna areas are dominant, elements of difference are the existence of Boreo-montaneous (10.2) and Carpathian connections (9.1, 9.2, 9.3, 9.4) and the non-existence of Atlanto-Mediterranean fauna areas. In the Mecsek the element of differentiation is the presence of 1.4, 5.1, 5.2.2 dominating fauna areas and that of the Atlanto Mediterranean (7) one. On the whole a more marked similarity can be pointed out ecologically. A similarity with plant coenosis is the frequency in the Bükk of Balcanic and Boreal elements while in the Mecsek Illyr and Submediterranean elements (Soó 1964), What responds to differences in malacologic animal geography.

Introduction

The authors regard it very important to carry out comparative study of places with similar ecological conditions - in the present case of ravine forests. A comparison of this kind can answer ecological and animal geographic distribution of species distribution, furthermore similarities and differences in plant associations.

Substance and method

Examinations were carried out in both places with 10x25x25 cm quadrat method. (In Bükk by Bába and in Mecsek by Tóth.) In the Bükk Phyllitidi-Aceretum subcarpathicum Zólyomi 1954 association at 3-3 points in Leány-valley and Ablakoskő-valley at 550-750 height, between 1984-1986. In the Mecsek in 11 ravine forests of Scutellario-Aceretum (HORVÁTH Ö. 1958) Soó et Borhidi 1962 at the height of 220-400 m above sea level in the years 1998-1999. The examined forests are: Püspökszentlászló: Bába-valley, Hosszúhetény: Takanyó-valley, Hidasi-valley, Sin-pit, Vékény: Németszőlő, Vékényi-valley, Kárász:

Határ-side, Váralja: Farkas-pit, Óbánya: Óbányai-valley, Mecseknádasd: Réka-valley, Máza: Kantina. In the Mecsek associations before 1981 there was a kind of forestry at two places (KEVEY 1993). In the fifties Gebhardt (VARGA 1989) found 14 species more in Takanyó- valley and Sin-pit than was found in 1999. Therefore the list of species underwent correction.

Evaluation was carried out by ecological and animal geographical methods. The ecological method is characterised by types of habitation on the basis of Lóék. Water-side ubiquitous (RU) shrubby forest dwellers (B), forest dwellers (HF), steppe dwellers (St). The applied animal geographical method was area-analytical diversification (BÁBA 1982). 1.1 East-Siberian, 1.2 West-Siberian, 1.3 Eurosiberian, 1.4 Holarctic polycentric, 2.2 Turkestan, 3. Kaspi-Sarmata, 5.3 Ponto-Pannon, 10.2 Boreo-Mountaneous. Subatlantic fauna areas: 5.1 Illyr, 5.2.1 Thracic, 5.2.2 Illyr-moeziac, 6. Adriatic-mediterranean, 7. Atlantic mediterranean, 8. Holomediterranean, 9.1 Carpathian, 9.2 Carpathian-Sudeta, 9.3 Carpathian-baltic, 9.4 Alpine-Carpathian.

Botanical characterisation of ravine forests

The examined ravine forests are in seeping watery parts of deep rocky valleys, the soil is limy, mouldy (SOÓ 1964; JAKUCS 1967; BARTHA et al 1995; KEVEY 1993). On lime rendzine they play the role of defending forests. In both areas *Acer pseudoplatanus* is constant. The Bükk ravine forests are in a hornbeam-oak-beech zone (JAKUCS 1967). In an area with continental climate they are to be found in the Matricum flora area where East-Balkan, Dealpi-Boreal elements are characteristic (SOÓ 1964). The Mecsek ravine forests belong to the Preillyricum flora area, are richer in Illyr and Atlantic submediterranean elements (SOÓ 1964). Ravine forests in the Mecsek are not so deep as those in the Bükk (KEVEY 1993). As to tree stratum *Caspinus betulus*, *Fagus sylvatica* can dominate and the percentage of Fagetalia and Caspinion species is high (KEVEY 1993).

Species found

74 species were found in the ravine forests of the two mountains, of these *Limax* sp. cannot be economically and animal geographically identified. In the Mecsek 21 species while in The Bükk 31 ones were found which could not be detected in the other respective area. In the Mecsek ravine valleys 43, while in The Bükk 48 species were found. /Table 1/

Distribution of habitat

The four types of habitat is equally distributed in the two different ravine forests. Riparian ubiquitous (RU), steppe dwellers (St) represent the lowest percentage, bush forest dwellers (B) yield in both ravine forest types a lower value than swamp dwellers with their marked need of dampness. (Fig. 1) In the Mecsek ravine forests the ratio of RU and B groups is higher than in the Bükk. With different composition of species the similarity of ecological conditions is shown by the similar ratio of habitat types.

1. 1. Scutellario-Aceretum and 2. Phyllitidi-Aceretum habitat and their animal ecology composition

	1		2						
VP	4	9.30	2	4.16					
BE	13	30.23	9	18.75					
E	21	48.83	32	66.66					
S	5	11.62	5	10.41					
	43		48				1		2
1.1	1	2.32	5	10.41	5.1	6	13.95	2	4.16
1.2	2	4.65	1	2.08	5.2.1	3	6.97	4	8.33
1.3	2	4.65	1	2.08	5.2.2	6	13.95	11	22.91
1.4	5	11.62	3	6.25	6.	4	9.30	4	8.33
2.1	1	2.32	1	2.08	7.	3	6.97	-	-
.2.	1	2.32	-	-	8.	4	9.52	4	8.33
3.	2	4.65	1	2.08	9.1	-	-	2	4.16
5.3	1	2.32	-	-	9.2	-	-	2	4.16
10.2	-	-	1	2.08	9.3	1	2.32	4	8.33
					9.4	-	-	2	4.16
Σ kont.	15	34.88	13	27.08	Σ subat.	28	63.0	35	72.91

Table 1. Species in ravine forests of the mountains Bükk and Mecsek

Ecological distribution

The sum of percentage values of continental and subatlantic fauna areas is very similar (Fig 2.) what indicates similarity in the economical conditions of habitat in spite of the geographical distances. In the groups of continental and subatlantic fauna areas the difference is 7,8% both in the Bükk and Mecsek. While the difference of species is 2 in the continental fauna areas, there are seven species differences within the subatlantic fauna areas. Concerning the distribution of single continental and subatlantic fauna areas it is relative. Of the continental fauna areas in the Mecsek the 1.4 Holarctic ubiquist fauna area is dominating, in the Bükk the East-Siberian (1.1) and Holarctic (1.4) are the majority. 1.1-1.4 fauna areas can be grouped in the Sibirian-Asiatic group, their summed up values in the Mecsek are 23,24%, in the Bükk 20,82%. As a difference it can be observed the presence of 10.2 Boero-Montaneous fauna area in the Bükk, and 5.3 Ponto-Pannon one in the Mecsek. The higher percentage of the Mecsek continental fauna areas (1.4 and 3. Kaspi-Sarmata) can be ascribed to the forestry activity.

Of the subatlantic fauna areas markedly dominant are in the Mecsek Illyr (5.1), Illyr-Moeziac (5.2.2) and Holomediterranean (8) as well as the Atlantic fauna area (6, 97%) what is in harmony with the economical characterisation. The effects are better felt in the Bükk mountain: the four Carpathian fauna areas amount to 20,81% (9.1-9.4). Thrazian (5.2.1.) and Illyr-Moezian (5.2.2) amount to 22,91%, the Adriato and Holomediterranean fauna areas are dominant.

Summary

The composition of species in the two different flora areas is different. The distribution of type of habitat they are proportionally similar, in both the shrub- and forest-dwellers dominate. Ratios of types of habitat say for ecological similarity. Animal ecological distribution

is similar to those described in plant ecology: in the Mecsek in areas closer to the balcan the characterisic element is the presence of Illyr, Thraziac, Illyr-Moeziac and Atlanto-Mediterranean elements, in the Bükk in areas closer to the Carpaths and Alps species with Carpathian connection (9.1-9.4) and of Boreo-Mountaneous (10.2) fauna areas and of Balcanic Illyr-Moeziac fauna area are characteristic.

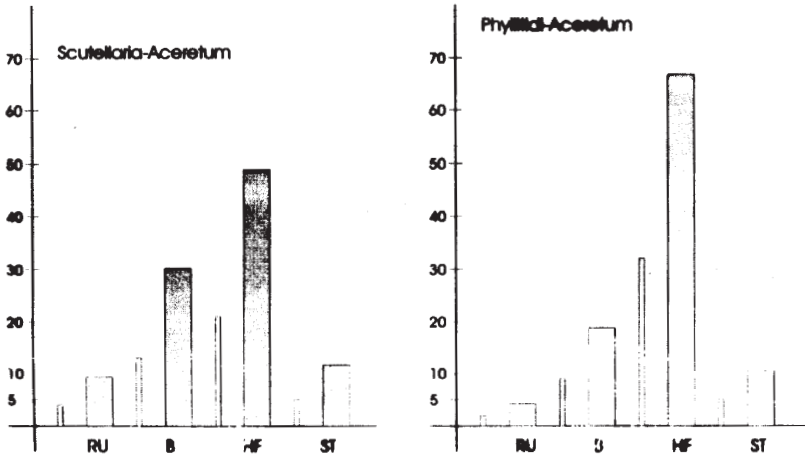


Figure 1. Distribution of habitat type (number and percent of species) in ravine forests of Bükk and Mecsek

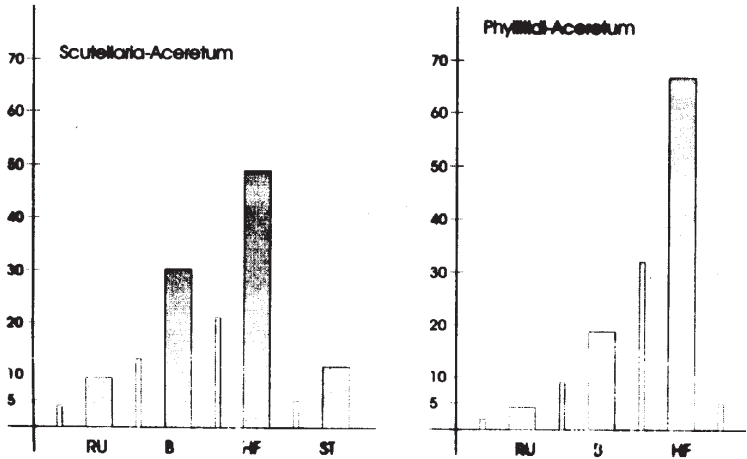


Fig. 2. Number of species and percentage of continental and subatlantic fauna areas in Mecsek and Bükk mountains

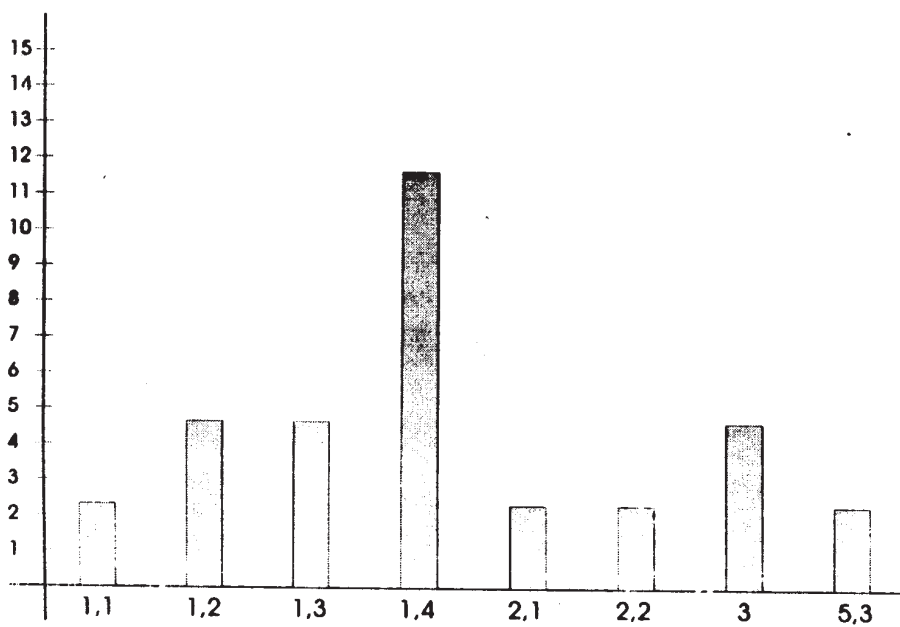
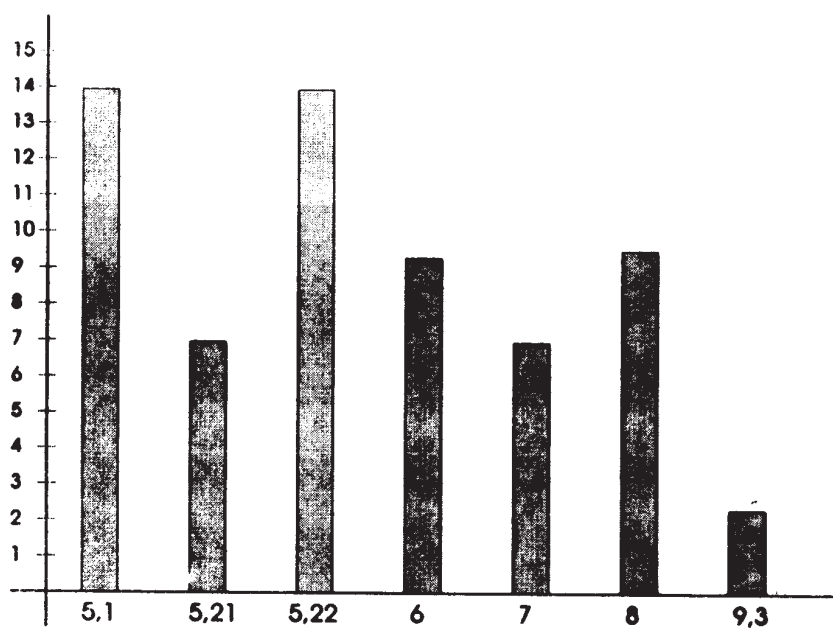


Fig. 3. Distribution of Scutellario-Aceretum fauna area in Mecsek

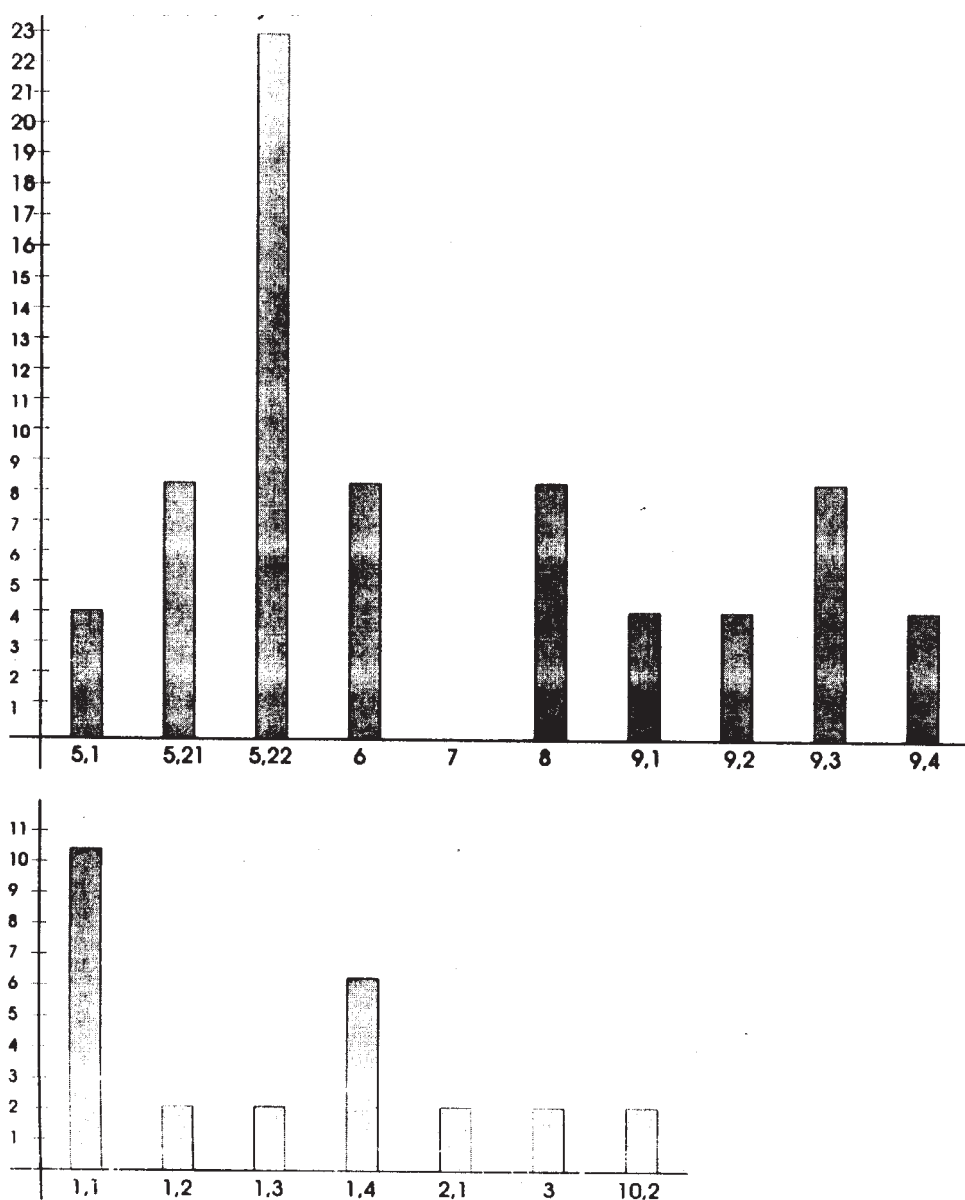


Fig. 4. Phyllitidi-Aceretum fauna areas in the Bükk mountain

Table 5. Effect of forestry on the distribution of fauna areas

			Scutellario-Aceretum	Phyllitidi-Aceretum subc
7.	BE	<i>Pomatias elegans</i> (O. F. Müller 1774)	+	-
5.2.1	E	<i>Acicula polita</i> (Hartmann 1840)	-	+
1.1	VP	<i>Carychium minimum</i> (O. F. Müller 1774)	+	-
8.	VP	<i>Carychium tridentatum</i> (Risso 1826)	-	+
1.2	VP	<i>Succinea oblonga</i> Draparnaud 1801	+	-
1.4	BE	<i>Cochlicopa lubrica</i> (O. F. Müller 1774)	+	-
2.2	S	<i>Cochlicopa lubricella</i> (Porro 1838)	+	-
1.1	VP	<i>Columella edentula</i> (Draparnaud 1805)	-	+
8.	E	<i>Vertigo pusilla</i> O. F. Müller 1774	-	+
1.2	S	<i>Vertigo pygmaea</i> (Draparnaud 1801)	+	-
1.1	E	<i>Vertigo alpestris</i> Alder 1838	-	+
5.2.2	E	<i>Orcula dolium</i> (Draparnaud 1801)	-	+
2.1	E	<i>Sphyradium doliolum</i> (Bruguere 1792)	+	+
5.2.1	S	<i>Granaria frumentum</i> (Draparnaud 1801)	-	+
5.2.2	S	<i>Chondrina clienta</i> (Westerlund 1883)	-	+
6.	S	<i>Pupilla triplicata</i> (Studer 1820)	-	+
5.1	S	<i>Spelaediscus triarius</i> (Rossm ässler 1839)	-	+
1.4	S	<i>Vallonia costata</i> (O. F. Müller 1774)	-	+
1.4	S	<i>Vallonia pulchella</i> (O. F. Müller 1774)	+	-
1.4	E	<i>Acanthinula aculeata</i> (O. F. Müller 1774)	+	-
8.	E	<i>Ena obscura</i> (O. F. Müller 1774)	+	+
10.2	E	<i>Ena montana</i> (Draparnaud 1801)	-	+
1.1	BE	<i>Punctum pygmaeum</i> (Draparnaud 1801)	-	+
6.	BE	<i>Discus rotundatus</i> (O. F. Müller 1774)	+	-
5.2.2	E	<i>Discus perspectivus</i> (Megerle von Mühlfeld 1816)	-	+
1.1	E	<i>Arion subfuscus</i> (Draparnaud 1805)	-	+
7.	E	<i>Arion circumscriptus</i> Johnston 1828	+	-
1.4	BE	<i>Vitrina pellucida</i> (O. F. Müller 1774)	+	+
7.	E	<i>Semilimax semilimax</i> (Ferussac 1802)	+	-
5.2.2	E	<i>Vitrea diaphana</i> (Studer 1820)	+	+
6.	BE	<i>Vitrea crystallina</i> (O. F. Müller 1774)	+	+
8.	BE	<i>Vitrea contracta</i> (Westerlund 1871)	+	+
1.2	BE	<i>Aegopinella pura</i> (Alder 1830)	-	+
5.2.1	BE	<i>Aegopinella minor</i> (Stabile 1864)	+	+
5.1	BE	<i>Aegopinella ressmanni</i> (Westerlund 1883)	+	-
9.1	E	<i>Oxychilus orientalis</i> (Clessin 1887)	-	+
5.2.2	E	<i>Oxychilus depressus</i> (Sterki 1880)	-	+
5.2.1	E	<i>Oxychilus glaber</i> (Rossm ässler 1835)	+	+
8.	E	<i>Oxychilus draparnaudi</i> (Beck 1837)	+	-
5.2.1	S	<i>Oxychilus inopinatus</i> (Uli ény 1827)	+	-
5.2.2	E	<i>Dandebardia rufa</i> (Draparnaud 1805)	-	+
5.2.2	E	<i>Dandebardia brevipes</i> (Draparnaud 1805)	-	+
1.4	VP	<i>Zonitoides nitidus</i> (O. F. Müller 1774)	+	-
		<i>Limax</i> sp	-	+
6.	E	<i>Limax cinereoniger</i> Wolf 1803	-	+
9.2	E	<i>Bielzia coerulans</i> (M. Bielz 1851)	-	+
1.3	VP	<i>Deroceras laeve</i> (O. F. Müller 1774)	+	-
1.3	BE	<i>Deroceras agreste</i> (O. F. Müller 1774)	+	-
1.3	BE	<i>Deroceras reticulatum</i> (O. F. Müller 1774)	+	+
1.4	BE	<i>Euconulus fulvus</i> (O. F. Müller 1774)	-	+
8.	S	<i>Ceciloides acicula</i> (O. F. Müller 1774)	+	-

6.	E	Cochlodina laminata (Montagu 1803)	+	+
9.1	E	Cochlodina cerata (Rossmässler 1836)	-	+
9.3	E	Cochlodina orthostroma (Menke 1928)	+	+
5.1	E	Macrogastra ventricosa (Draparnaud 1801)	+	-
5.1	E	Macrogastra plicatula (Draparnaud 1801)	+	
9.3	E	Macrogastra latestriata (A. Schmidt 1857)	-	+
5.1	E	Clausilia dubia Draparnaud 1805	+	+
5.2.2	E	Clausilia pumila C. Pfeiffer 1828	-	+
5.2.2	E	Laciniaria plicata (Draparnaud 1801)	+	+
5.2.2	E	Balca biphcata (Montagu 1803)	+	+
9.3	E	Bulgarica cana (Held 1836)	-	+
1.1	E	Bradybaena fruticum (O. F. Müller 1774)	-	+
5.2.2	E	Perforatella incarnata (O. F. Müller 1774)	+	+
9.2	E	Perforatella vicina (Rossmässler 1842)	-	+
5.2.2	BE	Trichia hispida (Linné 1758)	+	+
9.4	E	Trichia unidentata (Draparnaud 1805)	-	+
5.1	E	Trichia erjavecii (Brusina 1870)	+	-
5.1	E	Trichia filicina (C. Pfeiffer 1841)	+	-
3.	BE	Euomphalia strigella (Draparnaud 1801)	+	+
6.	E	Helicodonta obvoluta (O. F. Müller 1774)	+	-
9.3	E	Chilostoma faustinum (Rossmässler 1835)	-	+
9.4	E	Isognomostoma isognomostoma (Schröter 1784)	-	+
3.	BE	Cepaea vindobonensis (Ferussac 1821)	+	-
5.3	BE	Helix pomatia Linné 1758	+	-
		Fajszám	42	48

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