

New Faunistic Records of Spiders (Arachnida, Areneae) from the Fruška Gora Mountain, Northern Serbia

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Abstract: Erdelj is an abandoned limestone strip mine in Fruška Gora Mountain. During 2010, on the basis of previous studies, it was chosen for faunistic research of spiders. The material was collected by pitfall trapping from four sampling plots that corresponded to four habitat types. A total of 1,155 adults were caught and 111 species of 20 families were identified. Forty-seven species were recorded for the first time from the Fruška Gora Mountain, and 16 of them were recorded for the first time from Serbia. There were clear differences in the species composition between habitats. Each habitat had specific species and there were only two species common to all four habitats.

Keywords: first records, open habitats, Vojvodina Province

Introduction

The Fruška Gora Mountain is a south Pannonian Island Mountain with modest dimensions, approximately 80 km long and 15 km wide. The highest peak is Crveni čot, 537 m a. s. l. The northern and eastern boundaries of the mountain are the Danube Alluvial Plain, while the southern and western boundaries are the Srem Loess Plateau (MARKOVIĆ 2007). A part of the mountain area was proclaimed a National Park in 1960 (JOSIĆ, MATIĆ 2007).

Studies of the spider fauna on Fruška Gora Mountain were initiated by CHYZER, KULCZYŃSKI (1897), with 30 species randomly collected from the localities Vrđink and Ruma (see DELTSHEV *et al.* 2003). More than 80 years after that, SISOJEVIĆ, MILLER (1978) published a supplement to their entomological research as the first list of spider species, with 78 records from the locality Iriški Venac. Since then, no effort in faunistic or ecological studies on spiders has been done. DELTSHEV *et al.* (2003) published more records from the Fruška Gora Mountain that were connected to studies on particular species. Thus, the total number of spiders from the mountain

increased to 98. TOMIĆ, GRBIĆ (2008) then restarted faunistic studies and recorded 121 spider species of 28 families. Two years later, the list was expanded to 220 species (GRBIĆ, SAVIĆ 2010).

The Erdelj (listed there as the locality Komesarovac) was one of the collecting sites during the 2009 campaign (GRBIĆ, SAVIĆ 2010). Some traps were placed in a meadow-steppe and 26 species were recorded in total. According to that preliminary list of species, it was certain that Erdelj would be important for further faunistic studies. Thus, a new project was initiated with the intention of getting a greater insight into the species richness at this locality. In this article, we present faunistic results with 15 spider species recorded for the first time from Serbia.

Material and Methods

The Erdelj (45°11'22.0236"N, 019°42'30.0636"W) is one of the abandoned strip mines of limestone in the Fruška Gora Mountain. It is positioned on the north side of the mountain about 2 km south of the

Beočin Village. After active exploitation, 40 years ago, the process of spontaneous restoration of forest and meadow–steppe vegetation flowed rapidly but the management of the Fruška Gora National Park also planted a small pine forest as a restoration measure (JOSIĆ, MATIĆ 2007). Today, the dominant habitat types at the locality are typical mountain oak forests (*Rusco – Quercus – Carpinetum*), which make a substantial part of the protected zone of the National Park, and meadow-steppe (*Inulo – Chrisopogonetum grilli*), which is outside the park boundaries. Only a small part of the locality consists of planted pine trees (JOSIĆ, MATIĆ 2007).

The material was collected from four sampling plots that corresponded to four different habitat types (Fig. 1):

Meadow 1 (ME1), a meadow-steppe, *Inulo – Chrisopogonetum grilli*; descent uneven slope, inclination 6–10%; elevation from 180–360 m; irregularly grazed by a flock of 350 sheep. Vegetation cover at ground level 76–100%.

Meadow 2 (ME2), a plateau on top of the hill above meadow 1; around 360 m a. s. l.; almost the same vegetation; more moistened ground; also irregularly grazed by sheep. Vegetation cover at ground level 76–100%.

Deciduous forest (DEC), *Rusco – Quercus – Carpinetum* with high percentage of lime (*Tilia tomentosa*). Vegetation cover at ground level 5–25%.

Pine wood (PIN), planted small area of *Pinus nigra*, 40 years old. Vegetation cover at ground level lower than 1%.

The spiders were collected with pitfall traps. The traps were made of 2 dcl plastic juice cups, with an opening with diameter 6.5 cm and height 8.5 cm, half filled with vinegar, protected against rain with a roof of opaque plastic film (Fig. 2). Eight traps per plot were placed in a line, with 10 m distance between the traps. The exception was the plot Meadow 1 where 16 traps were placed, because of the larger size of the area and the expected high loss of traps due to sheep trampling. The traps were emptied weekly. The sampling period began on 30 April 2010 and it was aborted on 8 August 2010 due to high rates (60%) of trap destruction by trampling. The collected specimens were preserved in 70% ethanol. Determination of species was largely based on the *Araneae – Spiders of Europe* website (NENTWIG *et al.* 2015). The available literature for individual groups or species was also used but it was only mentioned where species were discussed. The nomenclature used followed The World Spider Catalogue (WSC,



Fig. 1. Map of locality Erdelj (Fruška Gora Mt.) with sampling plots in 2010

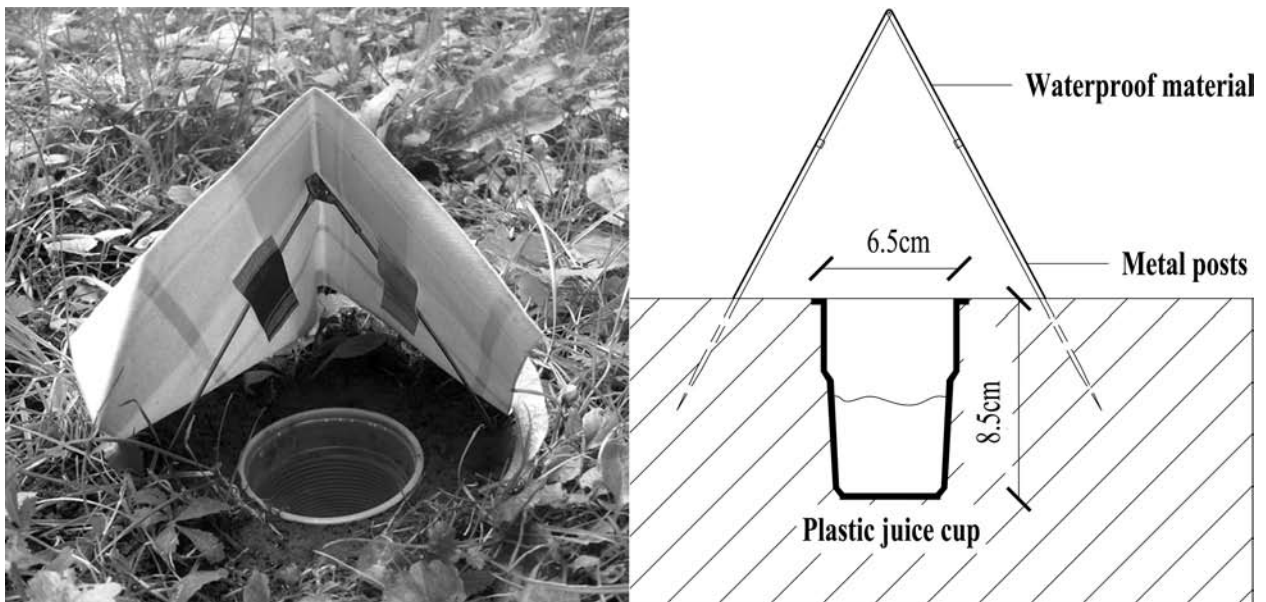


Fig. 2. Trap construction that was used at Erdelj (Fruška Gora Mt.) in 2010

2015). A reference collection was deposited at the Natural History Museum, Basel.

Results

Totally, 1,155 adults were caught (934 males and 221 female) and 111 species of 20 families were identified (Table 1). The most diverse families in the material were the Linyphiidae, with 31 recorded species (27.9%), followed by the Gnaphosidae (13, 11.7%), the Thomisidae (12, 10.8%) and the Lycosidae (11, 9.9%). Other families were represented with less than ten species, most of them by only one or two species. The dominating species were: *Pardosa hortensis* (Thorell, 1872) (256 individuals or 22.2%), *P. alacris* (C. L. Koch, 1833) (132, 11.4%), *Nemesia pannonica* Herman, 1879 (97, 8.4%) and *Alopecosa cuneata* (Clerck, 1757) (88, 7.6%). On the other hand, 38 species were recorded with only one individual and 18 species with only two individuals. These records represented about 50% of all species included in the study.

As described above, the project started with different numbers of pitfall traps per sampling plot. The number of active traps was also very variable as a result of pasturing, so interpreting the results was difficult. Nevertheless, some clear differences between the habitats were observed (Table 2). Species richness was by far the highest on ME1 with 76 species (710 individuals), followed by ME2 with 32 species (177 individuals), PIN with 30 species (187 individuals) and DEC with 19 species (81 individuals). The high species richness and number of individuals found from ME1 could be partly explained by the higher number of traps but was probably also

indicative of the high diversity at this habitat.

There was also a clear difference within the species composition in the four habitats (Table 2) with every habitat having some unique species, e.g. ME1 with 45 species caught only here which equals about 60% of all the species of this sampling plot. The open habitats ME1 and ME2 had much more species in common than the two woodland habitats. Only two species, *Pardosa alacris* and *Zodarion germanicum*, were caught from all four habitats.

According to the previous studies (TOMIĆ, GRBIĆ 2008, GRBIĆ, SAVIĆ 2010) only 47 species from our study (marked with one asterisk: * in Table 1), represented the first records for the spider fauna of the Fruška Gora Mountain. These species belonged to 12 families: Dictynidae (1), Dysderidae (1), Gnaphosidae (7), Hahniidae (1), Linyphiidae (22), Lycosidae (3), Mimetidae (1), Philodromidae (2), Phrurolithidae (1), Salticidae (4), Theridiidae (3) and Thomisidae (1). Furthermore, 16 of them were new records for the Serbian spider fauna (marked with two asterisks: ** in Table 1). In the list below all data of the actual captures, as well as the European distribution (according to NENTWIG *et al.* 2015) are given. The notes for species were given according to the relevant literature sources or to NENTWIG *et al.* (2015).

DICTYNIDAE

Lathys nielsenii (Schenkel, 1932)

Records: 4 ♂, 12.05.2010.

Distribution: Palearctic, found from only several countries in Europe.

Note: in sunny places with steppe characteristics and in open pine forest, very rare in Europe.

Table 1. List of spider species at the Erdelj on the Fruska Gora Mt. collected in 2010. Species marked with * are new records for the mountain (47), but with ** are new for Serbian fauna (16). Abbreviations of habitats: Meadow 1 (MED 1); Meadow 2 (MED 2); Deciduous forest (DEC); Pine wood (PIN)

FAMILY	SPECIES	MED1	MED2	DEC	PIN
		m/f	m/f	m/f	m/f
Agelenidae	<i>Histoipona torpida</i> (C. L. Koch, 1837)				1/0
	<i>Inermocoelotes inermis</i> (L. Koch, 1855)		0/1		0/1
	<i>Malthonica campestris</i> (C. L. Koch, 1834)			1/0	1/0
	<i>Urocoras longispinus</i> (Kulczyński, 1897)	0/1		0/1	4/3
Araneidae	<i>Agalenatea redii</i> (Scopoli, 1763)	0/1			
	<i>Argiope bruennichi</i> (Scopoli, 1772)	5/0			
	<i>Cyclosa conica</i> (Pallas, 1772)	0/1			0/2
	<i>Mangora acalypha</i> (Walckenaer, 1802)	2/2			
Clubionidae	<i>Clubiona comta</i> C. L. Koch, 1839			0/1	1/0
Dictynidae	<i>Lathys nielseni</i> (Schenkel, 1932) **	6/0			
Dysderidae	<i>Dysdera microdonta</i> Gasparo, 2014			1/0	
	<i>Harpactea rubicunda</i> (C. L. Koch, 1838)	2/1		1/0	3/0
	<i>Harpactea saeva</i> (Herman, 1879)				5/1
	<i>Harpactea sp.</i> **	4/0			
Gnaphosidae	<i>Drassodes lapidosus</i> (Walckenaer, 1802)	1/1			
	<i>Drassyllus praeficus</i> (L. Koch, 1866)	4/1	1/0		
	<i>Drassyllus villicus</i> (Thorell, 1875) *			1/2	
	<i>Gnaphosa lucifuga</i> Simon, 1879 *	1/0			
	<i>Haplodrassus signifer</i> (C. L. Koch, 1839) *	4/1			
	<i>Haplodrassus silvestris</i> (Blackwall, 1833)		1/0		
	<i>Micaria dives</i> (Lucas, 1846) **	1/0			
	<i>Micaria formicaria</i> (Sundevall, 1831)	1/0			
	<i>Trachyzelotes pedestris</i> (C. L. Koch, 1837)	1/1			
	<i>Zelotes aurantiacus</i> Miller, 1967 **	3/3	1/0		
	<i>Zelotes gracilis</i> (Canestrini, 1868)	3/1			
	<i>Zelotes hermani</i> (Chyzer, 1897) *		0/1		
	<i>Zelotes latreillei</i> (Simon, 1878) *		2/1		
	Hahniidae	<i>Hahnia nava</i> (Blackwall, 1841) *	24/0	1/1	
Linyphiidae	<i>Abacoproeces saltuum</i> (L. Koch, 1872)				13/5
	<i>Agyneta fuscipalpa</i> (C. L. Koch, 1836)	1/0	8/1		
	<i>Agyneta rurestris</i> (C. L. Koch, 1836) *	3/1	3/0		
	<i>Agyneta simplicatarsis</i> (Simon, 1884) **	5/1	11/2		
	<i>Bathypantes gracilis</i> (Blackwall, 1841)		1/0		
	<i>Ceratinella scabrosa</i> (O. P.-Cambridge, 1871) **			2/0	
	<i>Crosbyarachne silvestris</i> (Georgescu, 1973) *				1/0
	<i>Diplostyla concolor</i> (Wider, 1834)	1/0			
	<i>Erigonoplus globipes</i> (L. Koch, 1872) *	1/0			
	<i>Linyphia hortensis</i> Sundevall, 1830			1/0	2/0
	<i>Maso sundevalli</i> (Westring, 1851) *	1/0			
	<i>Mecynargus foveatus</i> (Dahl, 1912) **	1/0			
	<i>Metopobactrus ascitus</i> (Kulczyński, 1894) *				0/2
	<i>Micrargus subaequalis</i> (Westring, 1851) **	4/1	1/0		
	<i>Minicia marginella</i> (Wider, 1834)	1/2			
	<i>Neriere clathrata</i> (Sundevall, 1830) *	0/1			
	<i>Palliduphantes pillichi</i> (Kulczyński, 1915) **	0/3	0/1		
	<i>Panamomops affinis</i> Miller & Kratochvil, 1939 **			1/0	
	<i>Pelecopsis loksai</i> Szinetar & Samu, 2003 **	1/0			
	<i>Pelecopsis parallela</i> (Wider, 1834) *		1/0		
	<i>Pelecopsis radicolica</i> (L. Koch, 1872) *			2/0	
	<i>Sauron rayi</i> (Simon, 1881) **	4/2			
<i>Stemonyphantes lineatus</i> (Linnaeus, 1758) *	1/0				
<i>Syedra gracilis</i> (Menge, 1869) **	2/0	3/0			
<i>Tenuiphantes flavipes</i> (Blackwall, 1854)	0/1		2/0	49/15	
<i>Tenuiphantes floriana</i> (van Helsdingen, 1977)			9/3	0/3	
<i>Tenuiphantes tenebricola</i> (Wider, 1834) *			1/0	2/0	

Table 1. Continued

FAMILY	SPECIES	MED1	MED2	DEC	PIN
		m/f	m/f	m/f	m/f
	<i>Trichoncus affinis</i> Kulczyński, 1894				7/0
	<i>Trichoncus hackmani</i> Millidge, 1955 *	1/0			
	<i>Walckenaeria antica</i> (Wider, 1834) *		2/0		
	<i>Walckenaeria simplex</i> Chyzer, 1894				4/2
Liocranidae	<i>Agroeca cuprea</i> Menge, 1873				1/0
	<i>Argenna subnigra</i> (O. P.-Cambridge, 1861) *	0/1			
	<i>Liocranum rupicola</i> (Walckenaer, 1830)				1/0
	<i>Sagana rutilans</i> Thorell, 1875			0/1	
Lycosidae	<i>Alopecosa accentuata</i> (Latreille, 1817)	14/1	1/0		
	<i>Alopecosa cuneata</i> (Clerck, 1757) *	61/4	21/2		
	<i>Alopecosa mariae</i> (Dahl, 1908)	0/2	0/1		
	<i>Alopecosa pulverulenta</i> (Clerck, 1757) *	18/10	1/1		
	<i>Alopecosa trabalis</i> (Clerck, 1757)	38/6	12/1		
	<i>Aulonia albimana</i> (Walckenaer, 1805)	9/3			
	<i>Pardosa alacris</i> (C. L. Koch, 1833)	9/1	33/4	42/1	42/0
	<i>Pardosa hortensis</i> (Thorell, 1872)	167/53	33/2	1/0	
	<i>Trochosa ruricola</i> (De Geer, 1778) *	1/0			
	<i>Trochosa terricola</i> Thorell, 1856	5/3	1/0		1/0
	<i>Xerolycosa miniata</i> (C. L. Koch, 1834)	0/2			
Mimetidae	<i>Ero furcata</i> (Villers, 1789) *				0/1
Nemesiidae	<i>Nemesia pannonica</i> Herman, 1879	93/1	3/0		
Philodromidae	<i>Philodromus margaritatus</i> (Clerck, 1757) *				1/0
	<i>Thanatus arenarius</i> L. Koch, 1872	1/1	2/0		
	<i>Tibellus macellus</i> Simon, 1875 **	0/2		0/1	
Phrurolithidae	<i>Phrurolithus festivus</i> (C. L. Koch, 1835)	0/1			
	<i>Phrurolithus szilyi</i> Herman, 1879 *	1/0			
Pisauridae	<i>Pisaura mirabilis</i> (Clerck, 1757)	0/1			
Salticidae	<i>Euophrys frontalis</i> (Walckenaer, 1802) *	4/0			
	<i>Evarcha arcuata</i> (Clerck, 1757)	1/0			
	<i>Leptorchestes berolinensis</i> (C. L. Koch, 1846)	0/1			
	<i>Phlegra fasciata</i> (Hahn, 1826) *	1/1			
	<i>Talavera aequipes</i> (O. P.-Cambridge, 1871) *	3/2			
	<i>Talavera aperta</i> (Miller, 1971) **	1/1			
Sparassidae	<i>Micrommata virescens</i> (Clerck, 1757)	0/1			
Theridiidae	<i>Asagena phalerata</i> (Panzer, 1801) *	7/0	4/0		
	<i>Dipoena erythropus</i> (Simon, 1881)*				0/1
	<i>Enoplognatha latimana</i> Hippha & Oksala, 1982	0/1			
	<i>Enoplognatha thoracica</i> (Hahn, 1833)	2/0			2/0
	<i>Episinus maculipes</i> Cavanna, 1876 **	2/0			1/0
	<i>Episinus truncatus</i> Latreille, 1809	2/0			2/1
	<i>Neottiura suaveolens</i> (Simon, 1879)	1/0			
	<i>Phylloneta impressa</i> (L. Koch, 1881)	0/2			
	<i>Steatoda paykulliana</i> (Walckenaer, 1805)	2/14			
Thomisidae	<i>Cozyptila blackwalli</i> (Simon, 1875)			2/0	
	<i>Diaea livens</i> Simon, 1876				1/0
	<i>Ozyptila atomaria</i> (Panzer, 1801)	0/2			
	<i>Ozyptila claveata</i> (Walckenaer, 1837) *	1/1	1/0		
	<i>Ozyptila scabricula</i> (Westring, 1851)	2/0			
	<i>Runcinia grammica</i> (C. L. Koch, 1837)	2/2			
	<i>Synema globosum</i> (Fabricius, 1775)		1/0		
	<i>Thomisus onustus</i> Walckenaer, 1805	2/0			
	<i>Xysticus acerbus</i> Thorell, 1872	3/4	2/0		
	<i>Xysticus kempeleni</i> Thorell, 1872	4/1			
	<i>Xysticus kochi</i> Thorell, 1872	8/2	2/4		
	<i>Xysticus lanio</i> C. L. Koch, 1835				
Zodaridae	<i>Zodarion germanicum</i> (C. L. Koch, 1837)	4/0	1/0	4/0	1/1

Table 2. Trapping efficiency and species composition of spiders in four habitats at the Erdelj on the Fruška Gora Mt. in 2010

	HABITATS			
	Meadow 1	Meadow 2	Deciduous forest	Pine wood
Traps	16	8	8	8
Individuals	710	177	81	187
Males / Females	560 / 150	154 / 23	71 / 10	149 / 38
Species	76	32	19	30
Species unique for this habitat	45	6	7	15
Common species	22		10	
	2			

DYSDERIDAE

Harpactea sp.

Records: 2 ♂, 7.06.2010; 2 ♂ 20.06.2010.

Distribution: unknown.

Note: The species resembles *H. mcheidzeae* Dunin, 1992, *H. vagabunda* Dunin, 1991 (DUNIN 1992) and *H. mariae* Komnenov, 2013 (KOMNENOV 2013) but there are some clear differences. The genus *Harpactea* is very diverse, with 174 accepted species (WSC, 2015). Most species are considered endemic, and their distribution is confined to a limited area around the place of their first records (CHATZAKI, ARNEDO 2006, LAZAROV 2009, KUNT *et al.* 2013). A more detailed analysis of this species will be published elsewhere.

GNAPHOSIDAE

Micaria dives (Lucas, 1846)

Records: 1 ♂, 12.06.2010.

Distribution: Palaearctic, but it was not mentioned yet from most of the northern parts of Europe.

Note: one of the frequent species in the Mediterranean area.

Zelotes aurantiacus Miller, 1967

Records: 4 ♂, 2 ♀, 30.04.2010; 1 ♀ 10.07.2010.

Distribution: known from Germany to Russia to the east, and Turkey to the south; not recorded yet from the countries at the eastern border of the Adriatic Sea.

LINYPHIIDAE

Agyneta simplicatarsis (Simon, 1884)

Records: 1 ♂, 24.04.2010; 7 ♂, 2 ♀, 12.05.2010; 1 ♂, 27.05.2010; 1 ♂, 7.06.2010; 5 ♂, 1 ♀, 26.06.2010; 1 ♂, 10.07.2010.

Distribution: known from Central Europe to Russia; from the Balkans only from the eastern countries.

Note: usually found in very damp meadows, also on sea coasts; biology mostly unknown.

Ceratinella scabrosa (O. P.-Cambridge, 1871)

Records: 2 ♂, 12.05.2010.

Distribution: nearly in all of Europe, apart from the Iberian Peninsula and the Western Balkans but known from Hungary, Romania and Bulgaria.

Mecynargus foveatus (Dahl, 1912)

Records: 1 ♂, 12.6.2010.

Distribution: known from Central Europe to Russia; in the Balkans only from Bulgaria.

Note: in dry habitats, probably thermophile.

Rarely, it has been found in Europe.

Micrargus subaequalis (Westring, 1851)

Records: 1 ♀, 7.06.2010; 3 ♂, 12.06.2010; 2 ♂, 26.06.2010.

Distributions: almost from all European countries.

Palliduphantes pillichi (Kulczyński, 1915)

Records: 2 ♀, 12.05.2010; 1 ♀, 26.06.2010; 1 ♀, 10.07.2010.

Distribution: the eastern parts of Central Europe.

Note: the determination of this species based only on females would be quite difficult. We found some males from the same localities but these data are not published yet. According to the available literature the species seems to have some sibling species in the more western European countries (*Palliduphantes prope pillichi* sensu Thaler (1983), *Palliduphantes insignis* (O. P.-Cambridge, 1913) and *Palliduphantes arenicola* (Denis, 1962) but the status of this species complex probably is not clear yet (see THALER 1983 and POZZI, HAENGGI 1998).

Panamomops affinis Miller and Kratochvil, 1939

Records: 1 ♂, 12.05.2010.

Distribution: the mountains of Central Europe. This is the southernmost record for this species, not yet found in the countries surrounding Serbia.

Note: in general. rare for Europe.

Pelecopsis loksai Szinetar and Samu, 2003

Records: 1 ♂, 30.4.2010.

Distribution: Hungary and Macedonia.

Note: *Pelecopsis loksai* was described from Hungarian limestone rock grasslands of the southern slopes of two Pannonian mountains (SZINETAR, SAMU 2003). This very small species was so far collected only by a suction sampler and qualified as winter-mature species (SZINETAR, SAMU 2003). Our record was from a spring pitfall trap.

***Sauron rayi* (Simon, 1881)**

Records: 3 ♂, 1 ♀, 12.05.2010; 1 ♂, 1 ♀ 26.06.2010.

Distribution: mostly Central Europe, except for Switzerland, Austria, Czech Republic, Hungary, Bosnia and Herzegovina, Albania, Macedonia, Montenegro.

Note: rare for Europe.

***Syedra gracilis* (Menge, 1869)**

Records: 1 ♂, 24.4.2010; 2 ♂, 12.05.2010; 1 ♂, 7.06.2010; 1 ♂, 26.06.2010.

Distribution: Central and Northern Europe, not yet known in the southern parts of the Balkans.

Note: usually lives in detritus under trees and bushes, but very rare for Europe.

PHILODROMIDAE

***Tibellus macellus* Simon, 1875**

Records: 1 ♀, 12.05.2010; 2 ♀, 10.07.2010.

Distribution: Southern Europe but missing in several countries.

Note: determination based only on females could be problematic (EFIMIK 1999), but in a later project (2011 and 2012) males were caught too from the same locality (will be published later).

SALTICIDAE

***Talavera aperta* (Miller, 1971)**

Records: 1 ♂, 1 ♀, 12.06.2010.

Distribution: Central Europe; in the Balkans only from Bulgaria.

Note: rare for Europe.

THERIDIIDAE

***Episinus maculipes* Cavanna, 1876**

Records: 1 ♂, 1.8.2010.

Distribution: mostly from Southern Europe, but only scattered in the eastern parts.

Note: southern species, not common in the studied habitats.

Additional notes on two species

DYSDERIDAE

***Dysdera microdonta* Gasparo, 2014**

Records: 1 ♂, 12.05.2010.

Distribution: North-eastern Italy, Slovenia, Southern Austria and Serbia (REZAČ *et al.*, 2014).

Note: REZAČ *et al.* (2014) distinguished three sibling species in the *Dysdera ninni* Canestrini, 1868 complex: *D. ninnii*, *D. microdonta* and *D. moravica*. Our male (included in the material of REZAČ *et*

al., 2014) and a female of an earlier study from the Fruška Gora (GRBIĆ, SAVIĆ, 2010, sub *D. ninnii*) belonged to *D. microdonta*. Therefore, at the moment there is no confirmed record of *D. ninnii* for the Fruška Gora Mountain. The status of *D. ninnii* in the whole Serbia is not yet clear.

LYCOSIDAE

***Alopecosa accentuata* (Latreille, 1817)**

Records: 1 ♂, 24.4.2010; 12♂, 1♀ 30.4.2010; 2♂ 12.05.2010.

Distribution: all of Europe except for the far north.

Note: The species was already recorded at the locality Popovica by GRBIĆ, SAVIĆ (2010) but was not indicated by them as a new record for the Serbian fauna. Here, we include it as an act of formal registration for the fauna of Serbia.

Discussion

With the 47 species presented here as new to Fruška Gora Mountain the actual number equaled now 267. We could speculate that the taxa presented in this paper might represent only a fraction of what could be expected for this region. The reasons for that might be the brief collecting period, the fact that a lot of the traps were disturbed or destroyed (up to 60% during some periods) and only four types of habitats were sampled. To be able to produce more detailed results than species compositional differences between habitats a further project was initiated in 2011 with other types of traps.

It appeared that the number of new records for Serbia was high for the small area sampled, but most of the species were already known from the surrounding countries (NENTWIG *et al.* 2015), thus their presence at the Erdelj was not unexpected.

Conservation is one of the major goals in the National Park of Fruška Gora Mountain. While the two forest habitats described here make part of the protected area, the meadow is outside its boundaries. Nevertheless, 14 of the 15 species that were new for Serbia (86.6%) were found from this meadow. This lead us to consider this area of interest for nature protection and we recommend that the project be continued. In contrast, the woodland sites showed lower species numbers and more wide-spread species. We, therefore, expect it to be reasonable to suggest an enlargement of the protected zone to keep this meadow open.

One distinctive and easily recognised spider species at the site was *Nemesia pannonica* Herman, 1879. As a member of an ancient spider family, Nemesidae, it has special ecological requirements for

soil type and structures on sloped hills. There it builds burrows in which it lives. Normally only males are seen wandering around at certain times in the year looking for mates, while females mostly rest within their burrows (DECAE 2005). Because of the specific way of life (DECAE 2005) we consider that the species could be very vulnerable to intensive agriculture such as those performed in the lowlands around the

Erdelj locality. In our study we collected 97 individuals indicating that this species was well adapted to the conditions in the locality. As spiders normally react quite quickly to changes in the environment (GACK *et al.* 1999), careful observations of the abundance of this species could help us to estimate any impacts of changes in landuse at this site. We therefore recommend this species to be used as a bioindicator species.

References

- CHATZAKI M., M.A. ARNEDO 2006. Taxonomic revision of the epigeal representatives of the spider subfamily Harpactinae (Araneae: Dysderidae) on the island of Crete. – *Zootaxa*, **1169**: 1-32.
- DECAE A. E., 2005. Trapdoorspiders of the genus *Nemesia* Audouin, 1826 on Majorca and Ibiza: taxonomy, distribution and behaviour (Araneae, Mygalomorphae, Nemesiidae). – *Bulletin of the British Arachnological Society*, **13**: 145-168
- DELTSHEV C., B. ČURČIĆ and G. BLAGOEV 2003. The Spiders of Serbia. Institute of zoology, Faculty of Biology, University of Belgrade, Belgrade, Yugoslavia, 832 p.
- DUNIN P. M. 1992. The spider family Dysderidae of the Caucasian fauna (Arachnida Aranei Haplogynae). – *Arthropoda Selecta*, **1** (3): 35-76.
- EFIMIK V.E. 1999. A review of the spider genus *Tibellus* Simon, 1875 of the East Palaearctic (Aranei: Philodromidae). – *Arthropoda Selecta*, **8**: 103-124.
- GACK C., A. KOBEL-LAMPARSKI and F. LAMPARSKI 1999. Spinnenzönosen als Indikatoren von Entwicklungsschritten in einer Bergbaufolgelandschaft. – *Arachnologische Mitteilungen*, **18**: 1-16
- GRBIĆ G., D. SAVIĆ 2010. Contribution to the knowledge of the spider fauna (Arachnida, Araneae) on the Fruška Gora Mt. – *Acta Entomologica Serbica*, **15**(2): 243-260.
- JOSIĆ L.J., G. MATIĆ 2007. Nacionalni park Fruška gora. in: Jovanović, N. & J. Nedić (eds.): Fruška Gora (Zavod za udžbenike) Beograd, 523-535. (In Serbian, with English and Russian summaries).
- KOMNENOV M. 2013. Spider fauna of the Osogovo Mt. Range, Northwestern Macedonia. Fauna Balkana. University of Novi Sad, Serbia, **2**: 1-267.
- KUNT K. B., R.S. ÖZKUTUK and M. ELVERICI 2013. *Harpactea ballarini* sp. nov., a new dysderid (Araneae, Dysderidae) spider from Turkey. – *Turkish Journal of Zoology*, **37**: 238-241.
- LAZAROV S., 2009. A new spider species from Bulgaria *Harpactea terveli* sp.n. (Araneae, Dysderidae). – *International Journal of Academic Research*, **1** (2): 96-98.
- MARKOVIĆ S. 2007. Prirodne odlike. in: Jovanović, N. & J. Nedić (eds.): Fruška gora. Zavod za udžbenike, Beograd, 21-57. (In Serbian, with English and Russian summaries)
- NENTWIG W., T. BLICK, D. GLOOR, A. HAENGGI and C. KROPP 2015. "araneae- spiders of Europe" [Internet]. [version 2. 2015, cited January 28. 2015]. Available at: <http://www.araneae.unibe.ch>
- WSC. 2015. The World Spider Catalog. Natural History Museum Bern. [Internet]. [version 16. 2015, cited January 28. 2015]. Available at: <http://www.wsc.nmbe.ch>
- POZZI S., A. HAENGGI 1998. Araignées nouvelles ou peu connues de la Suisse (Arachnida: Araneae). – *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, **71**: 33-47.
- SZINETÁR C., F. SAMU 2003. *Pelecopsis loksai* sp. n., a new erigonine spider from Hungary (Araneae: Linyphiidae). – *Bulletin of the British Arachnological Society* **12**: 412-414.
- SISOJEVIĆ, P., F. MILLER 1978. Prilog poznavanju pauka (Araneida) Fruške gore. – *Zbornik za prirodne nauke*, Matica srpska, Novi Sad, **54**: 243-253.
- THALER K. 1983. Bemerkenswerte Spinnenfunde in Nordtirol (Österreich) und Nachbarländern: Deckennetspinnen, Linyphiidae (Arachnida: Aranei). – *Veröffentlichungen des Museum Ferdinandeum in Innsbruck*, **63**: 135-167.
- TOMIĆ V., G. GRBIĆ 2008. Preliminary notes on spider fauna of mt. Fruška Gora. Invertebrates (Invertebrata) of The Fruška Gora mountain, I. Matica Srpska, Novi Sad, 57-64.

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