DATA ON SPIDER FAUNA (ARACHNIDA: ARANEAE) FROM THE NATURE RESERVE SPRINGS FROM CORBII CIUNGI (DÂMBOVIŢA)

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Abstract. The paper presents the results of the research carried out on the spider fauna of the Nature Reserve Springs from Corbii Ciungi, Dâmboviţa County, during April-December 2012. There were identified 74 species of spider belonging to 19 families, of which only four species: *Ceratinella major* KULCZYŃSKI, 1894, *Tetragnatha dearmata* (THORELL, 1873), *Zelotes gracilis* (CANESTRINI, 1868) and *Mendoza canestrini* (CANESTRINI & PAVESI, 1868) can be considered relatively rare for the Romanian fauna. The families Lycosidae, as number of specimens and Linyphiidae, as number of species and genera, were the dominant families. The spider fauna of the reserve was dominated by four species: *Trochosa ruricola* (DE GEER, 1778) (20.55 %), *Pardosa prativaga* (L. KOCH, 1870) (18.00%), *Pachygnatha degeeri* SUNDEVALL, 1830 (9.20%) and *Piratula hygrophila* (THORELL, 1872) (8.71%). The sex ratio was relatively balanced. Diversity and equitability values were comprised between 1.00 and 1.30, respectively between 0.66 and 0.77. From biogeographical point of view we found the presence of a large number of Palearctic species. The estimation of the conservation status of the Nature Reserve Springs from Corbii Ciungi, according to the spider fauna, emphasizes an unfavourable conservation status.

Keywords: spider, fauna, abundance, dominance, diversity, reserve, conservation.

Rezumat. Date asupra faunei de aranee din Rezervaţia Naturală Izvoarele de la Corbii Ciungi. Lucrarea prezintă rezultatele cercetărilor întreprinse asupra faunei de aranee din Rezervaţia Naturală Izvoarele de la Corbii Ciungi, judeţul Dâmboviţa, în perioada aprilie-decembrie 2012. Au fost identificate 74 de specii de aranee încadrate în 19 familii, dintre care patru specii: *Ceratinella major* KULCZYŃSKI, 1894, *Tetragnatha dearmata* (THORELL, 1873), *Zelotes gracilis* (CANESTRINI, 1868) şi *Mendoza canestrini* (CANESTRINI & PAVESI, 1868) pot fi considerate relative rare pentru fauna României. Familiile Lycosidae, ca număr de exemplare şi Linyphiidae, ca număr de specii şi genuri, au fost familiile dominante. Fauna de aranee din rezervaţie a fost dominată de patru specii: *Trochosa ruricola* (DE GEER, 1778) (20,55%), *Pardosa prativaga* (L. KOCH, 1870) (18,00%), *Pachygnatha degeeri* SUNDEVALL, 1830 (9,20%) şi *Piratula hygrophila* (THORELL, 1872) (8,71%). Valorile diversităţii şi echitabilităţii au fost cuprinse între 1,00 şi 1,30, respectiv între 0,66 şi 0,77. Din punct de vedere biogeografic am constatat prezenţa unui număr mare de specii Palearctice. Estimarea stării de conservare a Rezervaţiei Naturale Izvoarele de la Corbii Ciungi, prin prisma faunei de aranee, a arătat o stare de conservare necorespunzătoare a habitatelor investigate.

Cuvinte cheie: aranee, faună, abundenţă, dominanţă, diversitate, rezervaţie, conservare.

INTRODUCTION

The paper aims to provide an inventory of spider species of the Nature Reserve Springs from Corbii Ciungi (Dâmboviţa County) and some of the structural features of spider fauna of this area.

Beginning with year 1959, L. Botoşăneanu and Şt. Negrea performed a systematic study on springs and groundwater fauna of the Romanian Plain. The most interesting discovery, made during this research, was the finding at Neajlov Valley, near the village Corbii Ciungi, of a complex of springs, marshes and creeks collectors, with cold water, relatively stenothermal all year and neutral pH.

The rich biological material collected in two years (14 May 1959 - 5 April 1961) from this area, formed the basis of publication of the first faunal lists, which highlighted extraordinary diversity of the springs complex and relict character of many species found here (BOTOŞĂNEANU & NEGREA, 1961; BOTOŞĂNEANU & NEGREA, 1962). Initial data were then supplemented and included in a monograph paper, which presents the results of a research conducted on the 70 springs or complex of springs from the Romanian Plain (MOTAŞ et al., 1962). For the complex of springs from Corbii Ciungi 73 over specific taxa were mentioned, most hydrobionts (aquatic macroinvertebrates).

Based on these faunal data, completed by the floristic data, the authorities made the decision to declare the complex of springs from Corbii Ciungi reserve, on the 24th of June 1966, through the decision of People's Council of Argeş Region, under the title: *Nature Reserve Springs from Corbii Ciungi*, with an area of about 8 hectares.

In the period 2005-2007, under the coordination of C. Ciubuc (CIUBUC, 2007), it was made the last study on the fauna of the complex of springs from Corbii Ciungi. This was the first time when such captures were made in the riparian area, adjacent springs and creeks collectors, but with this occasion, there were inventoried beetles only.

MATERIALS AND METHODS

The complex of springs is located in the Romanian Plain, in the lower basin of the Argeş River, on the left bank of the Neajlov Valley, about 800 meters from the Neajlov River and about 2 km from the exit of the village Corbii Mari, to village Izvoru (the former village Corbii Ciungi), on the right side of the National Road 61, (about 200 meters from it), average altitude of 110 meters. The complex consists of a large number of springs: reocrene, limnocrene and helocrene, performed on an arc of circle with a length of about 600 meters; these are grouped into two complexes

(fountains), separated from a marshy area which substitutes the "watershed" (NEGREA & NEGREA, 1999): Fountain of Lisandru Vlăduţ in the west and Fountain of Cacaleţilor in the east. These form two creeks of about 800-1000 m ~~of~~ length each; they are close to their front sections then they divide in a divergent path and thus an area of about 90,000 m^2 is created between them; then they reunite for shedding the River Neajlov (Fig. 1).

For the catching of spiders three collecting stations were established (Fig. 1). **Station 1 (SR1)** was located near the creek Lisandru Vlăduţ, in open area, herbaceous vegetation and shrub layer poorly individualized, represented by the isolated specimens: *Rosa canina* (LINNAEUS, 1753), *Crataegus monogyna* (JACQ., 1775) and *Euonymus europaeus* (LINNAEUS, 1753). **Station 2 (SR2)** was set in the proximity of the creek Cacaleţilor, at the edge of a selvage formed of very young specimens of: *Salix* sp. and *Alnus glutinosa* (LINNAEUS, 1754), accompanied by *Cornus sanguinea* (LINNAEUS, 1753). **Station 3 (SR3)** was placed in a tree vegetation area, formed of young specimens of *A. glutinosa* (LINNAEUS, 1754), around a spring.

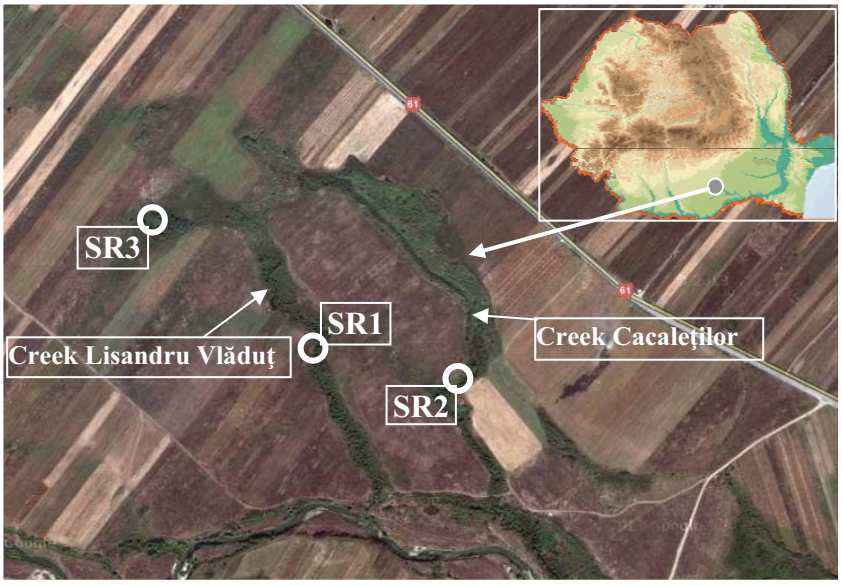


Figure 1. Location of the wetland complex Springs from Corbii Ciungi and of the collecting stations (http://maps.google.ro).

The capture of the spiders was done using wet pitfall traps (interception traps), used for collecting the invertebrates active at ground level. There were used plastic tumblers (buried in the ground), with a capacity of 500 cm^3, opening diameter of 9 cm, the height of 12 cm and opening surface area of 63.58 cm^2. In each trap, there were placed 150 cm^3 formaldehyde solutions (4%), approximately 1/3 of the vessel volume. In each station 5 pitfalls were installed. They were set in line, 5 m distant one from another, perpendicular to the thread/surface water; the first trap was installed very close to the water limit. The material was monthly collected, from April to December (2012). These pitfalls have operated in the field for 255 days.

RESULTS AND DISCUSSIONS

After the collecting, sorting and determination of the spiders there were obtained 1,094 specimens, of whom 1,021 specimens were determined down to species level; the remaining 73 specimens were identified down to genus or family, due to the impossibility of establishing exactly the species for the immature specimens. There were 1,012 specimens identified to species level: 577 were males (56.51%) and 444 females (43.49%). In terms of systematics, the material was classified in: 19 families, 57 genera and 74 species. The full list of the spider species collected in the Nature Reserve Springs from Corbii Ciungi, with data on the number of males and females collected from each station, relative abundance, class dominance, spread and originality of habitat is presented in Table 1.

Table 1. List of spider species identified in the Nature Reserve Springs from Corbii Ciungi.

No.	Taxa	SR1	SR2	SR3	Sum	Ar %	Class	Spread	Originality of habitat
	Ord. ARANEAE								
	Fam. Dysderidae								
1	***Dysdera crocata*** C. L. KOCH, 1838	4♂, 1♀	21♂, 3♀		29 ex.	2.84	D3	COS	A, SN
	Fam. Mimetidae								
2	***Ero furcata*** (VILLERS, 1789)	1♂			1 ex.	0.10	D1	PAL	CL, SN
	Fam. Theridiidae								
3	***Enoplognatha ovata*** (CLERCK, 1757)			1♀	1 ex.	0.10	D1	HOL	CL, SN, DI
	Fam. Linyphiidae								
4	***Bathyphantes gracilis*** (BLACKWALL, 1841)			1♂, 1♀	2 ex.	0.20	D1	HOL	CL, SN, DI

5	***Centromerus sylvaticus*** (BLACKWALL, 1841)	1♂, 2♀			3 ex.	0.29	D1	HOL	CL, SN, DI
6	***Ceratinella major*** KULCZYŃSKI, 1894			2♀	2 ex.	0.20	D1	PAL	CL
7	***Dicymbium nigrum*** (BLACKWALL, 1834)		2♂		2 ex.	0.20	D1	PAL	CL, SN, DI
8	***Diplostyla concolor*** (WIDER, 1834)	6♂, 7♀	3♂, 8♀	1♂	25 ex.	2.45	D3	HOL	CL, SN
9	***Meioneta rurestris*** (C.L.KOCH, 1836)	1♂	2♂, 1♀		4 ex.	0.39	D1	PAL	CL, SN, DI
10	***Neriene clathrata*** (SUNDEVALL, 1830)		1♀	1♀	2 ex.	0.20	D1	HOL	CL, SN
11	***Oedothorax apicatus*** (BLACKWALL, 1841)			4♂, 2♀	6 ex.	0.59	D1	PAL	CL, SN, DI
12	***O. fuscus*** (BLACKWALL, 1841)	6♂			6 ex.	0.59	D1	PAL	CL, SN, DI
13	***O. retusus*** (WESTRING, 1851)	7♂, 3♀			10 ex.	0.98	D1	PAL	CL, SN, DI
14	***Pocadicnemis pumila*** (BLACKWALL, 1841)			1♂, 1♀	2 ex.	0.20	D1	HOL	CL, SN
15	***Tenuiphantes flavipes*** (BLACKWALL 1854)	2♂, 1♀			3 ex.	0.29	D1	PAL	CL, SN
16	***T. tenuis*** (BLACKWALL, 1852)			1♂	1 ex.	0.10	D1	PAL	CL, SN, DI
17	***Troxochrus scabriculus*** (WESTRING, 1851)	1♂, 1♀			2 ex.	0.20	D1	PAL	CL, SN, DI
18	***Walckenaeria antica*** (WIDER, 1834)		1♀		1 ex.	0.10	D1	PAL	CL, SN
	Fam. Tetragnathidae								
19	***Pachygnatha degeeri*** SUNDEVALL, 1830	30♂, 31♀	8♂, 5♀	12♂, 8♀	94 ex.	9.20	D4	PAL	CL, SN, DI
20	***Tetragnatha dearmata*** (THORELL, 1873)	1♀			1 ex.	0.10	D1	HOL	CL, SN
21	***T. extensa*** (LINNAEUS, 1758)	1♂		2♀	3 ex.	0.29	D1	HOL	CL, SN
22	***T. montana*** SIMON, 1874	2♂, 2♀	1♂, 2♀	1♀	8 ex.	0.78	D1	PAL	CL, SN
	Fam. Araneidae								
23	***Araneus quadratus*** CLERCK, 1757	1♂			1 ex.	0.10	D1	PAL	CL, SN
24	***Argiope bruennichi*** (SCOPOLI, 1772)	3♂, 4♀	5♀		12 ex.	1.17	D2	PAL	CL, SN, DI
25	***Hyposinga sanguinea*** (C. L. KOCH, 1844)	1♀			1 ex.	0.10	D1	PAL	CL, SN
26	***Larinioides cornutus*** (CLERCK, 1757)	1♂, 2♀		3♂	6 ex.	0.59	D1	HOL	CL, SN
27	***Nuctenea umbratica*** (CLERCK, 1757)		1♀	1♂, 1♀	3 ex.	0.29	D1	ETU	CL, SN, A
28	***Singa nitidula*** C. L. KOCH, 1844		1♀	1♀	2 ex.	0.20	D1	PAL	CL, SN
	Fam. Lycosidae								
29	***Alopecosa pulverulenta*** (CLERCK, 1757)	4♂, 2♀	4♂, 3♀		13 ex.	1.27	D2	PAL	CL, SN, DI
30	***Arctosa leopardus*** (SUNDEVALL, 1833)	1♀	1♂, 2♀	1♂, 1♀	6 ex.	0.59	D1	PAL	CL, SN
31	***Aulonia albimana*** (WALCKENAER, 1805)	12♂, 6♀	24♂, 5♀	1♀	48 ex.	4.70	D3	PAL	CL, SN
32	***Hogna radiata*** (LATREILLE, 1817)	2♂, 1♀			3 ex.	0.29	D1	MCA	
33	***Pardosa agrestis*** (WESTRING, 1861)	1♂, 3♀	3♀		7 ex.	0.68	D1	PAL	SN, DI
34	***P. amentata*** (CLERCK, 1757)	1♀			1 ex.	0.10	D1	EUS	CL, SN, DI
35	***P. hortensis*** (THORELL, 1872)	1♂			1 ex.	0.10	D1	PAL	CL, SN, DI
36	***P. paludicola*** (CLERCK, 1757)	1♀	4♂, 2♀	2♀	9 ex.	0.88	D1	PAL	CL, SN, DI
37	***P. prativaga*** (L. KOCH, 1870)	28♂, 29♀	46♂, 40♀	7♂, 34♀	184 ex.	18.00	D5	EUS	CL, SN, DI
38	***Piratula hygrophila*** (THORELL, 1872)	13♂, 2♀	14♂, 5♀	37♂, 18♀	89 ex.	8.71	D4	PAL	CL, SN
39	***P. latitans*** (BLACKWALL, 1841)	23♂, 6♀	2♂, 4♀	1♂, 2♀	38 ex.	3.72	D3	ETU	CL, SN
40	***Trochosa robusta*** (SIMON, 1876)	2♂, 5♀	3♂, 3♀	1♂, 2♀	16 ex.	1.57	D2	PAL	CL, SN
41	***T. ruricola*** (DE GEER, 1778)	40♂, 25♀	38♂, 31♀	43♂, 33♀	210 ex.	20.55	D5	HOL	CL, SN, DI
	Fam. Pisauridae								
42	***Pisaura mirabilis*** (CLERCK, 1757)	1♂, 1♀			2 ex.	0.20	D1	PAL	CL, SN, DI
	Fam. Oxyopidae								
43	***Oxyopes ramosus*** (MARTINI & GOEZE, 1778)	2♀			2 ex.	0.20	D1	PAL	CL, SN
	Fam. Zoridae								
44	***Zora spinimana*** (SUNDEVALL, 1833)	1♂	1♀		2 ex.	0.20	D1	PAL	CL, SN, DI
	Fam. Agelenidae								
45	***Allagelena gracilens*** KOCH 1841			1♂	1 ex.	0.10	D1	MCA	CL, SN, A
	Fam. Hahniidae								
46	***Antistea elegans*** (BLACKWALL, 1841)			4♂, 4♀	8 ex.	0.78	D1	PAL	CL, SN
47	***Hahnia nava*** (BLACKWALL, 1841)	2♂			2 ex.	0.20	D1	PAL	CL, SN
	Fam. Liocranidae								
48	***Agroeca cuprea*** MENGE, 1873		1♂, 1♀	1♂	3 ex.	0.29	D1	ECA	CL
	Fam. Clubionidae								
49	***Clubiona diversa*** O.P.-CAMBRIDGE, 1862	1♀			1 ex.	0.10	D1	PAL	CL
50	***C. lutescens*** WESTRING, 1851			1♀	1 ex.	0.10	D1	HOL	CL, SN, DI
	Fam. Corinnidae								
51	***Phrurolithus festivus*** (C. L. KOCH, 1835)	1♂	1♀		2 ex.	0.20	D1	PAL	CL, SN
	Fam. Gnaphosidae								
52	***Drassodes pubescens*** (THORELL, 1856)	1♂, 1♀			2 ex.	0.20	D1	PAL	CL, SN
53	***Drassyllus pusillus*** (C. L.KOCH, 1833)	2♂, 1♀	2♂, 1♀		6 ex.	0.59	D1	PAL	CL, SN, DI
54	***Micaria pulicaria*** (SUNDEVALL, 1831)	2♂, 1♀	1♀		4 ex.	0.39	D1	HOL	CL, SN
55	***Trachyzelotes pedestris*** (C. L. KOCH, 1837)	3♂	9♂, 2♀	4♂, 2♀	20 ex.	1.96	D2	ETU	CL, SN
56	***Zelotes apricorum*** (L. KOCH, 1876)	1♂		1♀	2 ex.	0.20	D1	ETU	CL, SN
57	***Z. gracilis*** (CANESTRINI, 1868)	2♂			2 ex.	0.20	D1	EUS	CL, SN
58	***Z. latreillei*** (SIMON, 1878)	2♂, 3♀	2♂, 5♀	3♂, 2♀	17 ex.	1.66	D2	PAL	CL, SN, DI
	Fam. Philodromidae								
59	***Thanatus arenarius*** L. KOCH, 1872	1♂			1 ex.	0.10	D1	ETU	CL
60	***T. atratus*** SIMON, 1875	1♀	3♂		4 ex.	0.39	D1	PAL	CL
61	***Tibellus oblongus*** (WALCKENAER, 1802)			1♀	1 ex.	0.10	D1	HOL	CL, SN
	Fam. Thomisidae								
62	***Ebrechtella tricuspidata*** (FABRICIUS, 1775)	1♂			1 ex.	0.10	D1	PAL	CL, SN

63	***Ozyptila praticola*** (C. L. KOCH, 1837)	3♂, 4♀	19♂, 3♀	2♂, 1♀	32 ex.	3.13	D3	HOL	CL, SN
64	***Xysticus acerbus*** THORELL, 1872		1♀		1 ex.	0.10	D1	ECA	CL
65	***X. kochi*** THORELL, 1872		1♂		1 ex.	0.10	D1	ECA	CL, SN, DI
	Fam. Salticidae								
66	***Euophrys frontalis*** (WALCKENAER, 1802)	2♂, 1♀	3♂, 1♀	1♂	8 ex.	0.78	D1	PAL	CL, SN
67	***Evarcha arcuata*** (CLERCK, 1757)	1♀	3♀		5 ex.	0.49	D1	PAL	CL, SN
68	***E. falcata*** (CLERCK, 1757)		1♂, 2♀		3 ex.	0.29	D1	PAL	CL, SN
69	***Heliophanus cupreus*** (WALCKENAER, 1802)	2♂			2 ex.	0.20	D1	PAL	CL, SN
70	***Mendoza canestrini*** (CANESTRINI & PAVESI, 1868), (syn. *Marpissa canestrinii*)	1♀			1 ex.	0.10	D1	PAL	CL
71	***Myrmarachne formicaria*** (DE GEER, 1778)	1♂, 1♀	2♀		4 ex.	0.39	D1	PAL	CL
72	***Neon levis*** (SIMON, 1871)	1♂, 5♀	2♂, 2♀	1♂	11 ex.	1.08	D1	PAL	CL
73	***Pseudeuophry erratica*** (WALCKENAER, 1826)		3♂, 3♀		6 ex.	0.59	D1	PAL	CL, SN
74	***Talavera aequipes*** (O. P.- CAMBRIDGE, 1871)		3♂, 2♀		5 ex.	0.49	D1	PAL	CL, SN
	Total	**224♂, 162♀**	**222♂, 157♀**	**131♂, 125♀**	**577♂, 444♀**	**100**			
		386 ex.	**379 ex.**	**256 ex.**	**1,021 ex.**				
	No. species	**53**	**39**	**33**					

Legend: ♂-male, ♀-female. CL - climax, habitats unchanged or very slightly affected by human action; SN - semi-natural habitats; DI – strong disturbed habitats, degraded; A - artificial habitats).

From the fauna point of view, spider species collected from the Nature Reserve Springs from Corbii Ciungi are generally common species, not cited in any of the categories: species of community interest, IUCN species, endemic species and species mentioned in the Annex OUG 57/2007 or species present on red lists in Romania. However, we want to draw attention on some species of spider we can consider relatively rare for the Romanian fauna:

Ceratinella major KULCZYŃSKI, 1894, from the family Linyphiidae, is a relatively rare species found in scree forests, with moderate humidity, in semi-open or partially shaded places, between 200 meters and 500 meters altitude. It is active at the ground level, under rocks, rarely found in the litter. It is an endangered species in Poland and near threatened in Germany.

Tetragnatha dearmata (THORELL, 1873) from the family Tetragnathidae. It is a relatively rare species, present in different types of forests and open areas, mostly on bushes near waters, at altitudes between 100 meters and 400 meters. It prefers semi-open, partly shaded and shaded places. Adults are present from May until June/July. The species is considered endangered in Slovakia and near threatened in Germany.

Zelotes gracilis (CANESTRINI, 1868), from the family Gnaphosidae, is a rare species, which prefer steppes, sandy zones with scrubby patch; found at ground level, in open or partially shaded areas, in dry places. On altitude, the species can be found from 100 meters to 500 meters altitude. Adults are active from May to August. In the Czech Republic, it is considered an endangered species and near threatened in Slovakia. Collected personally on Lecşoare hill (near Ştefăneşti city, Argeş), from a sunny slope with south-western exhibition, about 400 altitude (LOTREAN, 2010).

Mendoza canestrini (CANESTRINI & PAVESI, 1868), from the family Salticidae. It is a relatively rare species, present in wetlands, among the reeds near water, retreat in spun reed tips, at altitudes between 100 meters and 500 meters. It prefers semi-open places. The species is considered critically endangered in the Czech Republic and vulnerable in Slovakia.

In terms of the sex ratio, in the collected material, 56.51% were male and 43.49% were females. The sex ratio, for the 36 spider species for which both sexes were collected, in 21 cases (28.37%), it was favourable for males, for 15 species (20.27%) it was favourable to females and for 11 species (14.86%) it was relatively balanced, being very close to the theoretical value of 1:1. For the rest of the species, 27 species (36.49%), there were collected either males, in most cases, or females. The analysis of data on sex ratio showed that it was relatively balanced; overall ratio is to 1.3:1.

From the quantitative point of view, most of the collected specimens belonged to the family Lycosidae (61.15%), followed by the families: Tetragnathidae (10.37%), Linyphiidae (6.95%), Gnaphosidae (5.19%), and Salticidae (4.40%). The rest of the spider families had weights less than 4%.

The hierarchy changes if we consider the number of genera and species. From this point of view, most genera and species belonged to the family Linyphiidae (21.05%, respectively 20.00%), followed by the families: Lycosidae (12.28% for genera and 17.33% for species), Salticidae (14.04% for genera, 12.00% for species), Araneidae (10.53% for genera and 8.00% for species), Gnaphosidae (8.77% for genera and 9.33% for species) and Thomisidae (5.26%, respectively 5.33%). The rest of the spider families had weights below 5%, as well as the number of genera and/or the number of species.

The values of the relative abundance calculated for each species in all three stationeries indicated that two species, i.e. *Trochosa ruricola* (DE GEER, 1778) and *Pardosa prativaga* (L. KOCH, 1870) were eudominant species. They were followed by two dominant species, *Pachygnatha degeeri* SUNDEVALL, 1830 and *Piratula hygrophila* (THORELL, 1872), and five subdominant species: *Aulonia albimana* (WALCKENAER, 1805), *Piratula latitans* (BLACKWALL, 1841), *Ozyptila praticola* (C. L. KOCH, 1837), *Dysdera crocata* C. L. KOCH, 1838, and *Diplostyla concolor* (WIDER, 1834). The rest of the spiders species were recedent (4 species) and under-recedent (61 species).

Eudominant species for SR1 station were: *Trochosa ruricola* (DE GEER, 1778), *Pachygnatha degeeri* SUNDEVALL, 1830 and *Pardosa prativaga* (L. KOCH, 1870), followed by *Piratula latitans* (BLACKWALL, 1841)

as dominant species and *Aulonia albimana* (WALCKENAER, 1805), *Piratula hygrophila* (THORELL, 1872), *Diplostyla concolor* (WIDER, 1834) and *Oedothorax retusus* (WESTRING, 1851) as subdominant species.

Two species were eudominant in SR2, *Pardosa prativaga* (L. KOCH, 1870) and *Trochosa ruricola* (DE GEER, 1778). In this station four species had the dominant species status: *Aulonia albimana* (WALCKENAER, 1805), *Dysdera crocata* C. L. KOCH, 1838, *Ozyptila praticola* (C. L. KOCH, 1837) and *Piratula hygrophila* (THORELL, 1872). *Pachygnatha degeeri* SUNDEVALL, 1830, *Diplostyla concolor* (WIDER, 1834) and *Trachyzelotes pedestris* (C. L. KOCH, 1837) represented subdominant species.

Three eudominant species were recorded in SR3: *Trochosa ruricola* (DE GEER, 1778), *Piratula hygrophila* (THORELL, 1872) and *Pardosa prativaga* (L. KOCH, 1870) followed by one dominant species, *Pachygnatha degeeri* SUNDEVALL, 1830, and three subdominant species: *Antistea elegans* (BLACKWALL, 1841), *Oedothorax apicatus* (BLACKWALL, 1841) and *Trachyzelotes pedestris* (C. L. KOCH, 1837).

Arranging spider species in descending order according to relative abundance values (Fig. 2) allowed the identification of species forming the core of the spider fauna from the Nature Reserve Springs from Corbii Ciungi. There are differences from one habitat to another, but the same species of spider are eudominant or dominant in all three collecting station. It is amended depending on the particularities of the habitat and position of the dominant species and species group which accompany them. *Trochosa ruricola* (DE GEER, 1778) was an eudominant species in all three collecting stations and also for all the reserve level. Optimal humidity of this species is over 95%, while optimum temperature is about 24^0C (FHUN & NICULESCU-BURLACU, 1971). It is a mesophilic, photophilous, eurytherme and hygrophilous species, which prefer open areas, wetlands, grassy areas, near water. In the collecting station SR3, previous species was accompanied by *Piratula hygrophila* (THORELL, 1872). It is a species with a very small ecological valence, hygrophilous, which prefer shady places, under trees and shrubs, where the soil is covered with *Sphagnum* sp. Most specimens were collected in the pitfalls traps installed near a spring (SR3), in a marshy area covered with young specimens of *Alnus glutinosa* (LINNAEUS, 1754). The species is characteristic for this type of habitat, moist and shady, which in the past probably occupied wider areas of the reserve surface. In SR1 and SR2 station, the species were collected in close proximity of water in shady areas, covered with shrubs. *Pardosa prativaga* (L. KOCH, 1870) is a hygrophilous and thermophilous species, found in open grassy places. This species had eudominant species status in all three habitats investigated. The eudominant and dominant species group is completed by three species frequently found in open areas: *Piratula latitans* (BLACKWALL, 1841), *Pachygnatha degeeri* SUNDEVALL, 1830 and *Aulonia albimana* (WALCKENAER, 1805). Of the three, the first is a species with a small ecological valence, hygrophilous and photophilous, characteristic for open wetlands. It was the dominant species only in the SR1. The other two species, *Dysdera crocata* C. L. KOCH, 1838 and *Ozyptila praticola* (C. L. KOCH, 1837), dominated in the SR2 station, cannot be considered riparian species, because they were frequently encountered in different types of habitats in lowlands. Of the species listed above only *Piratula hygrophila* (THORELL, 1872) is considered an enlightening species for oligotrophic bogs (URÁK, 2008), being a typical element of peat lands.

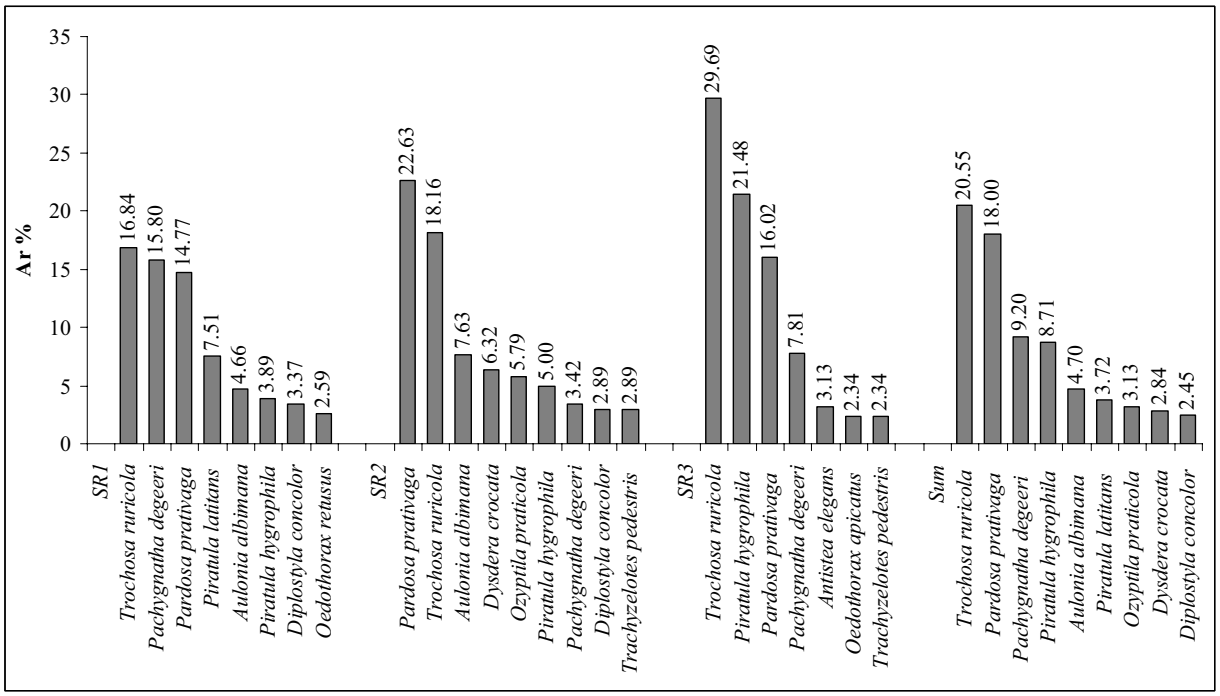
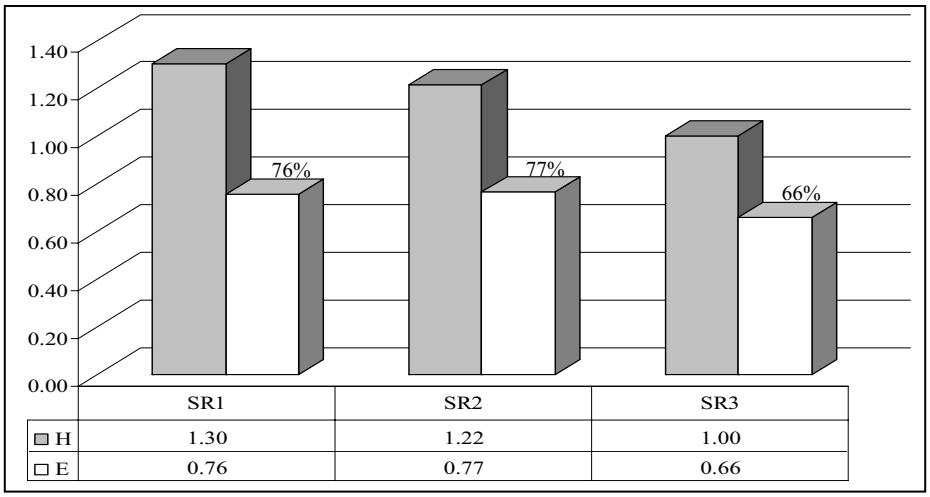


Figure 2. The hierarchy of the values of the relative abundance for the spiders species identified in the Nature Reserve Springs from Corbii Ciungi (species with Ar > 2%).

The hierarchy of the stations depending on the diversity and equitability values was established using the Shannon index. The Shannon diversity index ranged from 1.00 to 1.30 and equitability from 0.66 to 0.77 (Fig. 3). The highest values of the diversity index were recorded in the SR1 station, where the majority of the species were identified. The lowest values of both parameters were observed in the sites where only one species was highly predominant, i.e. SR3 station, where there were identified the fewest species. For SR2 the values obtained were very close to those calculated for SR1. In SR3, the small values calculated for the index of diversity Shannon could be explained because the investigated habitat is of "insular" type, having clear limits and characteristic biotope conditions, different from those of the adjacent areas. The other stationeries became "open" as a result of the clearings and consequently they "continue" in the neighbourhood areas. This fact permitted the increasing of the number of species as a result of the invasion of the riparian habitats by characteristic species for open areas, frequently met in ruderal and agricultural areas, expansive and tolerant open landscape species.



	SR1	SR2	SR3
H	1.30	1.22	1.00
E	0.76	0.77	0.66

Figure 3. The values of the diversity (H) and the equitability (E) for the spiders fauna in the three collecting stations from the Nature Reserve Springs from Corbii Ciungi.

Generally, the values of this index vary between 1.5 and 3.5 (VARVARA & ZUGRAVU, 2006; URÁK, 2008), results that for all the investigated habitats the Shannon index had small values. These low values of diversity are characteristic of relatively homogeneous habitats, pioneer or degraded, in which one, two, rarely three species, well adapted to the environmental conditions of that habitat dominates the other species from studied group.

In accordance to their current spreading, the 74 species of spider identified in the Nature Reserve Springs from Corbii Ciungi, were classified into 7 zoogeographical groups (DELTSHEV, 2005). In terms of number of spider species for each zoogeographical groups, I found the presence of large numbers of Palearctic species, more than half (62.00%) of the identified species belonging to this category. These were followed by: the Holarctic species (19%), European-Turanian species (7.00%), European-Siberian and European Central-Asian species (4.00%, each). The rest of the zoogeographical elements had less than 4% of weight (Fig. 4). It is noted that, from the zoogeographical structure of the spider fauna, the species with the small areas of distribution are missing ("continental and subcontinental" species).

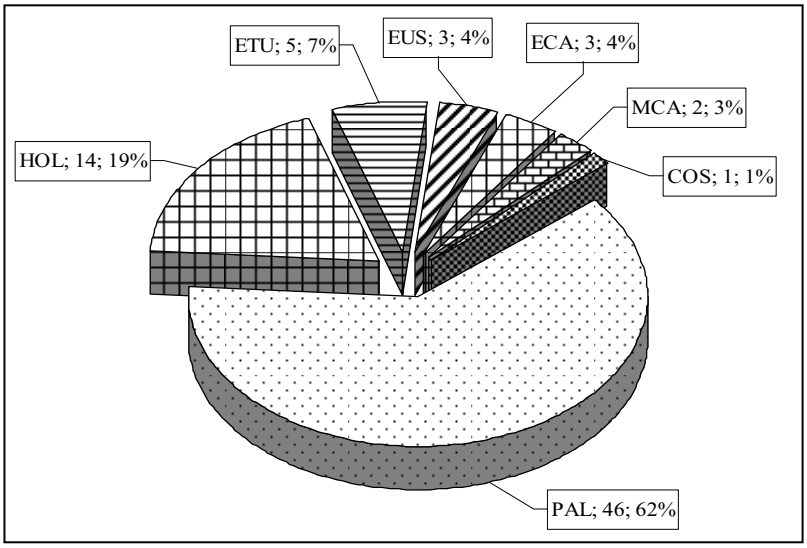


Figure 4. Distribution of the spiders species on zoogeographical groups (PAL – Palearctic, HOL – Holarctic, ETU – European-Turanian, ECA – European Central-Asian, EUS – European-Siberian, MCA – Mediterranean-Central Asian, COS – Cosmopolitan).

For grouping the habitats, according to the spider fauna, I used the Jaccard index, based on the presence/absence of the species (Fig. 5). From this viewpoint the SR3 station clearly detaches from the other investigated habitats. The similarity to the others habitats, SR1 and SR2, was 38.26%. Low similarity with the rest of habitats was determined by the presence of young trees that form a compact cluster (a grove), probably the result of natural regeneration. This habitat is damp and dark, fact that is reflected in the structure of the spider fauna. Between SR1 and SR2 the similarity was 43.63%. The difference between the two habitats is determined by the presence, in the case of SR2 station, of thin selvedge shrubs which partially cover a very wet area, but also by the existence of ruderal and cultivated land very close to the water limit. This explains the presence in the samples of species with different ecological requirements: *Trochosa ruricola* (DE GEER, 1778), *Piratula hygrophila* (THORELL, 1872), *Pardosa prativaga* (L. KOCH, 1870) and *Diplostyla concolor* (WIDER, 1834), hygrophilous species, alongside xerophytes species such as *Trachyzelotes pedestris* (C. L. KOCH, 1837) and *Dysdera crocata* C. L. KOCH, 1838.

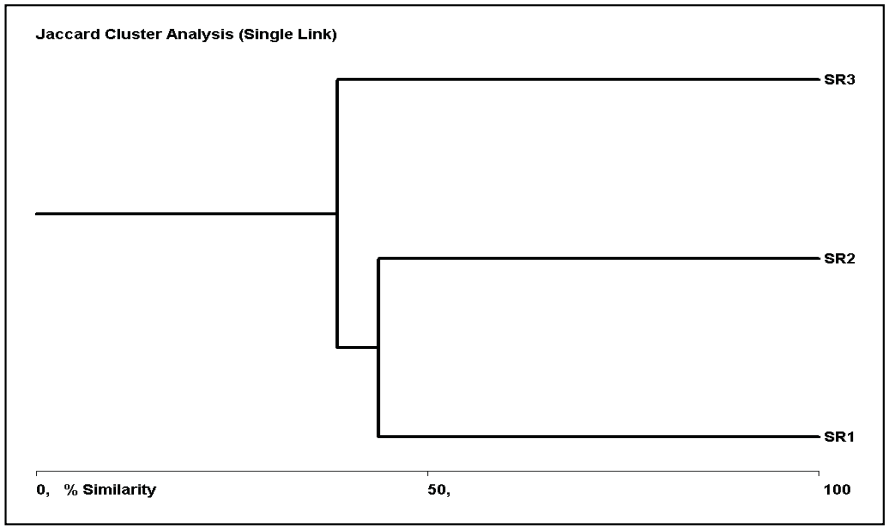


Figure 5. The similarity of studied habitats according to the specific composition of spider fauna.

In order to estimate the degree of conservation of the studied area, I considered useful grouping the identified spider species depending on their tolerance to the originality of habitat (degree of degradation of the habitats) that they populate, according to the classification proposed by Buchar and Růžička (BUCHAR & RŮŽIČKA, 2002). The species from the well preserved or merely disturbed (semi-natural) habitats represents only 62.16% of all identified species (Fig. 6). This was observed for all three investigated habitats. The percentage of the cumulative values for the two categories (CL + CL, SN) ranged between 64.15% (SR1) and 61.54% (SR2). The presented value indicates an inadequate conservation status of the investigated habitats.

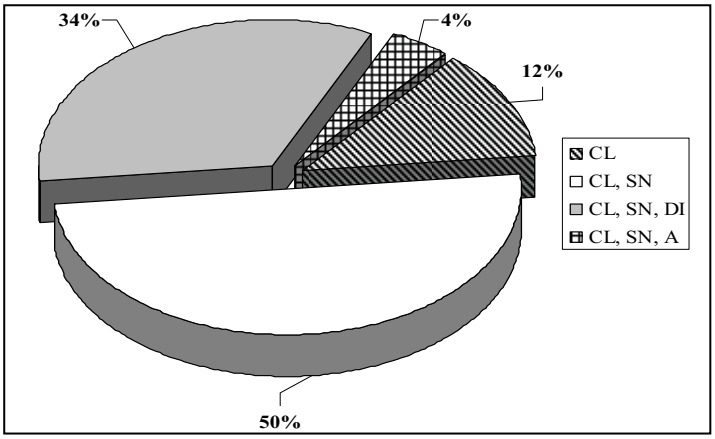


Figure 6. Grouping the spider species, collected from the Nature Reserve Springs from Corbii Ciungi, according to their preferences to the originality of habitat (CL - climax, habitats unchanged or very slightly affected by human action; SN - semi-natural habitats; DI - strong disturbed habitats, degraded; A - artificial habitats).

This feature is a result of the anthropogenic activities (agriculture, grazing and fires) which determined the fragmentation, the diminution and even the disappearance of the original riparian habitats that covered the complex of springs and creeks collectors down to the shedding in the Neajlov River. At present (2012), the surface of the reserve decreased to about 5 ha, because of the expansion of crops and grazing. It was grubbed up "riverside coppice-looking jungle" (NEGREA & NEGREA, 1999) that covered the complex of springs and creeks collectors down to the shedding in the Neajlov River. This

type of habitat had a great importance in maintaining low water temperatures and thus the protection of cold water aquatic species, some of these species being relict species. Some of them have disappeared due to the degradation of their habitats; they have not been found during the last research (year 2012). Others are in a strong numerical decline.

CONCLUSIONS

This is the first study of the spider fauna from the Nature Reserve Springs from Corbii Ciungi; the study led to the identification of 74 species of spider, grouped in 57 genera and 19 families. All species are at the first citation for this area. From the point of view of fauna only four species: *Ceratinella major* KULCZYŃSKI, 1894, *Tetragnatha dearmata* (THORELL, 1873), *Zelotes gracilis* (CANESTRINI, 1868) and *Mendoza canestrini* (CANESTRINI & PAVESI, 1868) can be considered relatively rare for the Romanian fauna.

The families Linyphiidae (20.0%) and Lycosidae (17.33%) were the best represented, as species. As individuals, the hierarchy is reversed ascertaining the numerical dominance of the species from the family Lycosidae (61.15%), followed by families Tetragnathidae (10.37%) and Linyphiidae (6.95%).

The small biodiversity and equitability values, as well as the way the domination exercising, show the existence of some spider associations characteristic for the pioneer or degraded habitats.

Grouping species of spiders according to their distribution area showed the net dominance of widely spread elements, Palearctic and Holarctic species, which totalized nearly 80% of the identified species.

The values less than 50% of the Jaccard similarity index reflect a low similarity of the studied habitats through the spider fauna, which indicates a high heterogeneity of the studied area.

According to the originality of the habitat only 12.16% of the spider species are considered climax species. These indicate that all the types of investigated habitats are not well-preserved and classify this area among those which need urgent protection measures. From a conservative viewpoint we remarked the spiders association from the station SR3, which differs from the others. This association characterizes a type of habitat that resembles the most ~~with~~ the original riparian habitats of the reserve. From this viewpoint such a habitat can be considered a regeneration centre for "riverside coppice-looking jungle", which must be protected.

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Received: March 28, 2013
Accepted: May 24, 2013