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SPIDERS (ARANEAE) OF HŮRKA U HRANIC NATIONAL NATURE RESERVE (MORAVIA, CZECH REPUBLIC)

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Abstract

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Spiders of Hůrka u Hranic National Nature Reserve were investigated during the year 2011. Several capture methods were used during the vegetation season (from April to November) in many various habitats of this territory. Altogether, 92 species from 27 families were recorded, including very rare and remarcable species. Majority of such species prefer thermophilous habitats: *Atypus affinis* Eichwald, 1830, *Dysdera czechica* Řezáč, in prep., *Theridion melanurum* Hahn, 1831, *Agroeca cuprea* Menge, 1873, *Drassyllus villicus* (Thorell, 1875), *Zodarion germanicum* (C. L. Koch, 1837) and *Dipoena melanogaster* (C. L. Koch, 1837). Some species are also listed in the Red List of threatened species in the Czech Republic: *Cheiracanthium elegans* Thorell, 1875 in category endangered (EN), *Cozyptila blackwalli* (Simon, 1875) and *Leptorchestes berolinensis* (C. L. Koch, 1846) in category vulnerable (VU). Altogether, 144 spider species are now known from the reserve; they represent 16.6% of araneofauna of the Czech Republic.

Keywords: Spiders, Araneae, Hůrka u Hranic NNR, faunistics

INTRODUCTION

The spider fauna of Hůrka u Hranic Nature National Reserve (NNR) was investigated for the first time by Majkus (1988) as a part of the Hranický kras karst area. He investigated the whole area also in following years (Majkus, 1991). Majkus (1988, 1991) recorded altogether 52 spider species which belong to 16 families from Hůrka u Hranic NNR (previously SPR Hůrka). There are also data from R. Mlejnek (unpublished, V. Růžička det. et coll.) from the Hranická propast abyss. This author found there 10 spider species from four families. The most important record was *Saloca kulczynskii* Miller & Kratochvíl, 1939 (R. Mlejnek lgt., V. Růžička det.). Further unpublished data came from collecting of J. Mikula and I. H. Tuf from the years 2005–2007 (J. Mikula & I. H. Tuf lgt., V. Růžička det., unpubl.). They used subterranean pitfall traps in Hůrka u Hranic NNR. They found 24 spider species belonging to 10 families. Their most important records were *Saloca diceros* (O. P.-Cambridge, 1871) and *Centromerus cavernarum* (L. Koch, 1872). Material of spiders from this locality was also included in a study which was focused on vertical distribution of spiders in soil (Laška *et al*., 2011). The last data of spiders of Hůrka u Hranic NNR were published by Tuf *et al*. (2009). They investigated invertebrates in the south part of the locality and found 62 spider species from 20 families. The most important finding was *Atypus affinis* Eichwald, 1830. Altogether, there were 109 spider species from 24 families recorded in the previous studies mentioned above. Spider fauna of the nearest protected area, Zbrašovské aragonitové jeskyně NNR, was investigated recently by Niedobová & Hula (2012).

The aim of this study was to investigate spider fauna of this area for AOPK ČR (Czech Nature Protection Agency) to improve our knowledge of spiders within this remarkable territory and compare changes in spider community with previous studies.

MATERIALS AND METHODS

Study Site

Hůrka u Hranic NNR is a part of the Hranický kras karst area, which is situated in Olomouc Region. The territory belongs to the land register of the town of Hranice na Moravě; the nearest settlement is the town of Teplice nad Bečvou. The Hůrka u Hranic NNR was established in 1952 for protection of flora, fauna and karst phenomena, and it takes 37.45 ha. Karst phenomena are represented especially by the Hranická propast abyss, the deepest abyss (depth 289.5 m) in the Czech Republic. Geological base of the NNR is limestone, Culm shales, greywackes and conglomerates. Various geological basements enabled the development of various biotopes with a broad diversity of plant communities. The altitude of protected area is 258–370 m a.s.l. (AOPK ČR, 2014).

The locality belongs to the faunistic square 6472. The territory was divided into five parts due to investigation by pitfall traps (T1–T5) and into 27 places, where other collecting methods were used (1–27) (Fig. 1):

T1 – edge of a sink hole in the southern part of reservation, GPS coordinates: 49°31'52.385"N, 17°45'1.932"E. Deciduous forest on the scree-slope with karst phenomena. Typical trees are beeches (*Fagus sylvatica* L.), lime trees (*Tilia* sp.) and European hornbeams (*Carpinus betulus* L.).

T2 – margin of beech windbrake, GPS coordinates: 49°32'0.653"N, 17°44'58.813"E. Various vegetation, especially various grasses, e.g. *Luzula* sp., *Scirpus* sp.

T3 – western slope of the NNR with oak trees [*Quercus robur* L., *Quercus petraea* (Matt.) Liebl.] and European hornbeams, GPS coordinates: 49°32'8.469"N, 17°44'54.923"E. Various thermophilic vegetation.

T4 – western slope of NNR with acid Oak wood, near the view point of St. Jan, GPS coordinates: 49°32'17.536"N, 17°44'46.125"E. Light acidophilous oak wood forest with rock outcrops.

T5 – scree slope in the north-east part of NNR with deciduous forest, GPS coordinates: 49°32'26.179"N, 17°45'1.317"E. Main tree species are beeches, European hornbeams, maples (*Acer* sp.) and some trees of spruce (*Picea abies* L.).

1 – GPS coordinates: 49°31'52.385"N, 17°45'1.932"E. Deciduous forest on the scree-slope with karst phenomena. Hand collecting.

2 – GPS coordinates: 49°31'52.739"N, 17°45'0.633"E. Deciduous forest on the scree-slope with karst phenomena. Hand collecting and sieving.

3 – GPS coordinates: 49°31'56.021"N, 17°45'2.211"E. Rock slope of Hranická propast. Hand collecting.

4 – GPS coordinates: 49°31'55.939"N, 17°45'2.281"E. Bottom rock slope of Hranická propast. Hand collecting.

5 – GPS coordinates: 49°31'56.472"N, 17°44'59.623"E. Deciduous forest with karst phenomena. Hand collecting.

6 – GPS coordinates: 49°31'59.549"N, 17°45'0.269"E. Margin of beech windbrake. Hand collecting and vegetation sweeping.

7 – GPS coordinates: 49°32'0.653"N, 17°44'58.813"E. Beech windbrake. Hand collecting and vegetation sweeping.

8 – GPS coordinates: 49°32'11.234"N, 17°44'53.062"E. Deciduous forest. Hand collecting.

9 – GPS coordinates: 49°32'11.234"N, 17°44'53.062"E. Western slope of reserve with oak trees. Hand collecting and sieving.

10 – GPS coordinates: 49°32'11.778"N, 17°44'54.710"E. Western slope of reserve with oak trees. Hand collecting and shrubs beating.

11 – GPS coordinates: 49°32'13.899"N, 17°44'51.321"E. Light deciduous forest. Hand collecting.

12 – GPS coordinates: 49°32'13.989"N, 17°44'48.912"E. Light deciduous forest. Hand collecting.

13 – GPS coordinates: 49°32'14.013"N, 17°44'51.302"E. Light deciduous forest. Hand collecting.

14 – GPS coordinates: 49°32'17.053"N, 17°44'46.023"E. Western slope of NNR with acid Oak wood. Hand collecting and sieving.

15 – GPS coordinates: 49°32'17.536"N, 17°44'46.125"E. Western slope of NNR with acid Oak wood and termophilic vegetation. Hand collecting.

16 – GPS coordinates: 49°32'17.622"N, 17°44'43.890"E. Western slope of NNR with acid Oak wood and termophilic vegetation. Hand collecting and vegetation sweeping.

17 – GPS coordinates: 49°32'22.089"N, 17°44'43.295"E. Deciduous forest with pine. Hand collecting.

18 – GPS coordinates: 49°32'22.795"N, 17°44'56.523"E. Beech forest. Hand collecting.

19 – GPS coordinates: 49°32'23.601"N, 17°44'43.031"E. Deciduous forest with pine. Hand collecting and vegetation sweeping.

20 – GPS coordinates: 49°32'26.179"N, 17°45'1.317"E. Beech forest with rock. Hand collecting.

21 – GPS coordinates: 49°32'3.357"N, 17°44'55.407"E. Deciduous forest with shrubs. Hand collecting and shrubs beating.

22 – GPS coordinates: 49°32'5.029"N, 17°44'57.267"E. Margin of deciduous forest. Shrubs beating and sweeping.

23 – GPS coordinates: 49°32'5.721"N, 17°45'2.905"E. Light deciduous forest. Hand collecting.

24 – GPS coordinates: 49°32'6.130"N, 17°45'5.441"E. Light deciduous forest. Hand collecting.

25 – GPS coordinates: 49°32'6.330"N, 17°45'4.556"E. Light deciduous forest. Hand collecting.

1: *General view of the whole Hůrka u Hranic NNR (source: AOPK ČR): T1–T5 are particular pairs of pitfall traps. 1–27 are places where other collecting methods were used. For details, see Material and Methods: Study site.*

26 – GPS coordinates: 49°32'8.469"N, 17°44'54.923"E. Oak-hornbeam forest. Hand collecting and sieving.

27 – GPS coordinates: 49°32'31.147"N, 17°44'56.693"E. Deciduous forest with rocks. Hand collecting.

Collecting Methods, Determination and Species Evaluation

We used AOPK methodology for spider collecting (Řezáč, 2009) including pitfall traps, vegetation sweeping, shrubs and trees beating, detritus sifting, and hand-collecting. Two pitfall traps were arranged on fife localities (T1–T5) from June to October 2011. Each pitfall trap consisted of two 0.5l plastic cups (diameter 9 cm) filled with 60% Fridex or saturated salt solution as a fixative fluid. Spiders from pitfall traps and other methods were irregularly collected on 1th April, 15th May, 8th June, 22th June, 9th July, 3th August, 28th August, 9th September and 26th October. Collected spiders were preserved in 70% alcohol.

The majority of spiders were determined by Ondřej Machač according to the basic arachnological literature (Miller, 1971; Roberts, 1987, 1995; Heimer & Nentwig, 1991; Nentwig *et al*., 2013, Řezáč, 2012), *Cheiracanthium elegans* Thorell, 1875 was revised by Jan Dolanský (East Bohemian Museum Pardubice). Nomenclature follows Platnick (2014) and Řezáč (2012). All material is deposited in Ondřej Machač collection.

Particular species rarity was evaluated according to Buchar & Růžička (2002). The Red List of threatened species in the Czech Republic (Růžička, 2005) (further "the Red List") was used for subsequent evaluation.

RESULTS

There were 331 adult spiders collected in the Hůrka u Hranic NNR. The spiders belong to 92 species and 27 families (Tab. I).

The most spider species belong to the families Linyphiidae (19 species) and Theridiidae (11 species). There were three species mentioned in the Red List collected – category endangered (EN): *Cheiracanthium elegans*, category vulnerable (VU): *Cozyptila blackwalli* (Simon, 1875) and *Leptorchestes berolinensis* (C. L. Koch, 1846). These species were recorded for the faunistic square 6472 for the first time, as well as *Drassyllus villicus* (Thorell, 1875).

The most important spider communities were found in the light oak wood forest and in the forest of oaks and European hornbeams in the western slope of NNR – T3 and T4 and localities 14–16). In these habitats, thermophylous spiders occur which need well-preserved forest steppes: *Atypus affinis*, *Cozyptila blackwalli*, *Drassyllus villicus*, *Cheiracanthium elegans*, *Leptorchestes berolinensis* and *Zodarion germanicum* (C. L. Koch, 1837). These species are very rare for the area of the north and central Moravia, for majority of them, the Hůrka u Hranic NNR is northernmost point of their known occurrence in the Czech Republic. Rock outcrops are also very important habitats of valuable spider species. We can find there *Labulla thoracica* (Wider, 1834). Deciduous forest is a suitable habitat for *Walckenaeria obtusa* Blackwall, 1836, *Walckenaeria atrotibialis* O. P.-Cambridge, 1878 and *Harpactea hombergi* (Scopoli, 1763). *Philodromus dispar* Walckenaer, 1826 and *Theridion melanurum* Hahn, 1831 were recorded on shrubs.

Commented List of Remarkable and Interesting Species

Abbreviations of collecting methods: PtT1 – pitfall traps in T1 (edge of the sink hole in the southern part of reservation), PtT2 – pitfall traps in T2 (margin of beech windbrake), PtT3 – pitfall traps in T3 (western slope of reserve with Oak trees and Hornbeams), PtT4 – pitfall traps in T4 (western slope of reserve with acid Oak wood, near the view point of St. Jan), PtT5 – pitfall traps in T5 (scree slope in the north-east part of reserve with deciduous forest), Sw 1–27 – sweeping on vegetation on marked locality, Bt 1–27 beating from shrubs and trees on marked locality, Sf 1–27 sifting detritus on marked locality, Hc 1–27 hand collecting on marked locality.

Atypidae

Atypus affinis Eichwald, 1830

A scarce species of climax habitats which occurs in forest and rock steppes. More abundant in Bohemia than in Moravia (Buchar & Růžička, 2002). Occurrence of *Atypus affinis* was published for the first time from the northern Moravia territory by Majkus (1988, 1991) on the edge of a limestone quarry. 1♀, 1. 4. 2011, Hc 26.

Dysderidae

Dysdera czechica Řezáč, in prep.

Abundant in the eastern part of our country. It occurs on south xerotermic slopes with oak forests and oak-hornbeam forests (Řezáč, 2012). Previously, *Dysdera erythrina* was recorded from this localioty (Majkus, 1988, 1991; Tuf *et al*., 2009). Later, *Dystera lantosqensis* was found here (Mikula and Tuf, unpubl.). According to Řezáč (2012), only *Dysdera czechica* occur in the east part of the Czech Republic. *Dysdera erythrina* is a typical species for the western part of the Czech Republic. Řezáč (2012) separated *Dysdera czechica* from *Dysdera erythrina*. We suppose that *Dysdera erythrina* and *Dysdera lantosquensis* previously recorded from this faunistic square were probably *Dysdera czechica*. 1♂, 23. 8.–9. 9. 2011, Pt T4; 1♂, 1♀ 23. 8.–9. 9. 2011, Pt T1; 1♂, 9. 9.–26. 10. 2011, Pt T4.

Theridiidae

Dipoena melanogaster (C. L. Koch, 1837)

A scarce species living on trees, bushes and herbs in xerothermic habitats and in oak-hornbeam forests (Buchar & Růžička, 2002). This species was recorded previously from the region by Niedobová & Hula (2012). 3♂, 1♀, 8. 6. 2011, Sw 11.

Theridion melanurum Hahn, 1831

A rare species, which occurs in deciduous forests and houses. It occurs in northern part of Moravia, in Rychlebské hory Mts. (Buchar & Růžička, 2002) and also in southern part of Moravia (Bryja *et al*., 2005). This species was recorded previously from

the region by Niedobová & Hula (2012). 1♂, 8. 6. 2011, Hc 10.

Eutichuridae

Cheiracanthium elegans Thorell, 1875

A very rare species living on grass and bushes in forest steppes (Buchar & Růžička, 2002). This species is known especially from south Moravia (Buchar & Růžička, 2002; Bryja *et al.*, 2005). Material of this species was recently revised by Dolanský (2011) who published records of this species from eight faunistic squares from Moravia including this record. *Cheiracanthium elegans* is listed in the Red List as an endangered species (EN). 1♂, 8. 6. 2011, Hc 11.

Liocranidae

Agroeca cuprea Menge, 1873

A scarce species of well-preserved rock and forest steppes (Buchar & Růžička, 2002). The species was already known in the region from the Obora Natural Monument (Majkus 1988, 1991). 1♀, 9. 7.–3. 8. 2011, Pt T4.

Gnaphosidae

Drassyllus villicus (Thorell, 1875)

A are species living on rock and forest steppes, under stones. The species occurs namely in the warmest part of Czech Republic (Buchar & Růžička, 2002; Bryja *et al.*, 2005). This record is the northernmost one of this species in Moravia (Fig. 2). *Drassyllus villicus* has never been recorded from this faunistic square before. 2♂, 1♀, 8. 6.–22. 6. 2011, Pt T4, 1♂, 8. 6. 2011, Hc 26.

Zodariidae

Zodarion germanicum (C. L. Koch, 1837)

Probably a scarce species living in rock and forest steppes, among grass and lichens in xerothermic habitats (Buchar & Růžička, 2002). Occurrence of this species is closely associated with ants (Pekár *et al.*, 2008). Occurrence of this species was already published from the region by Majkus (1988) from the Obora NM. 4♂, 2♀, 22. 6.–9. 7. 2011, Pt T4; 2♂, 9. 7.–3. 8. 2011, Pt T4.

Thomisidae

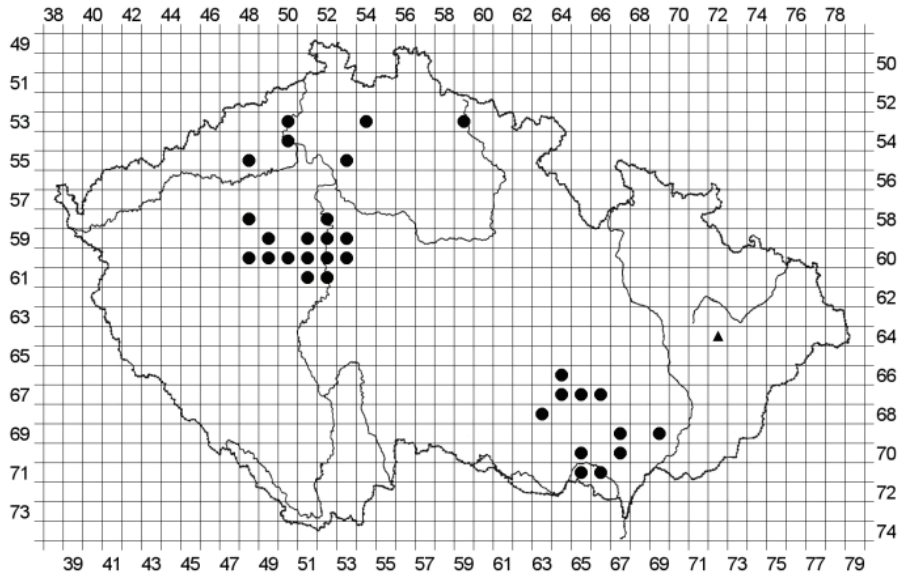
Cozyptila blackwalli (Simon, 1875)

A rare species in scree forests, under stones (Buchar & Růžička, 2002). This record is the northernmost one for this species in Moravia (Fig. 3). The species is listed in the Red List as vulnerable (VU). 2♂, 2♀, 23. 8.–9. 9. 2011, Pt T4; 2♂, 23. 8. 2011, Hc 14.

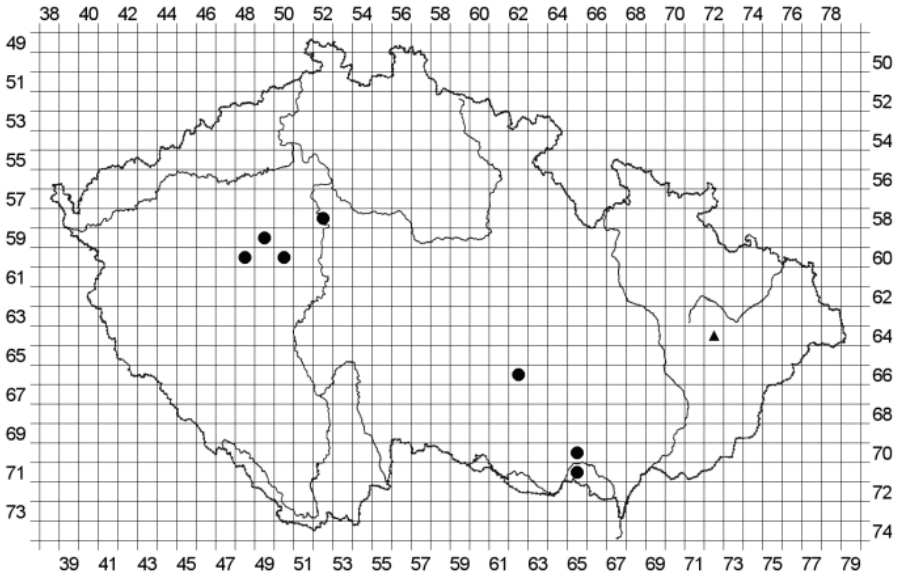
Salticidae

Leptorchestes berolinensis (C. L. Koch, 1846)

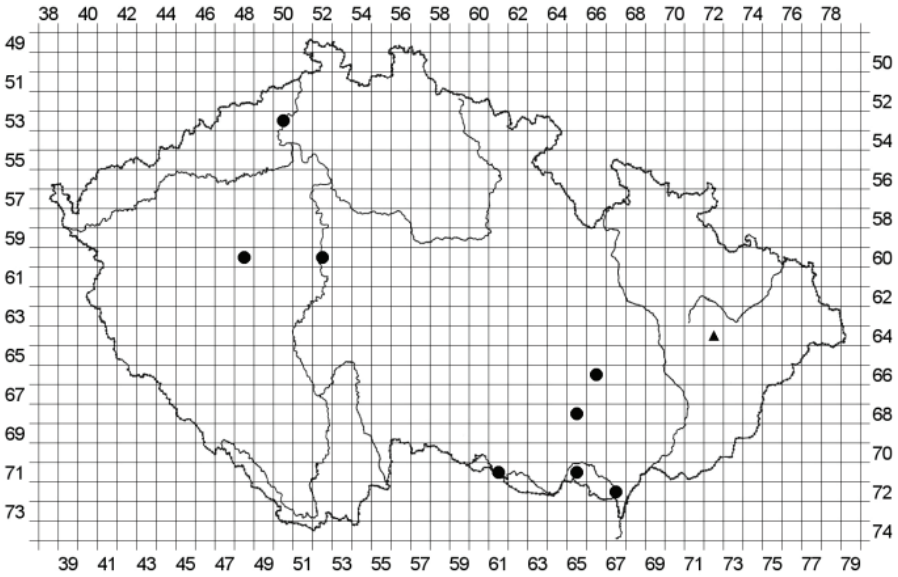
A rare species jumping on vegetation in sun-exposed forests and rock margins (Buchar & Růžička, 2002), as well as on sunny exposed bark of solitary oaks and wooden fences (Bryja *et al.*, 2005). This record is the northernmost one of the species in Moravia (Fig. 4). *Leptorchestes berolinensis* is listed in the Red List as a vulnerable species (VU). 2♂, 8. 6. 2011, Hc 15.



2: *Map of all published records of Drassyllus villicus in the Czech Republic: full circles are data published by Buchar & Růžička (2002); triangle is a position of the Hůrka u Hranic NNR. The map was created by the BioLib tool (BioLib, 2013).*



3: *Map of all published records of Cozyptila blackwalli in the Czech Republic: full circles are data published by Buchar & Růžička (2002); triangle is a position of the Hůrka u Hranic NNR. The map was created by the BioLib tool (BioLib, 2013).*



4: *Map of all published records of Leptorchestes berolinensis in the Czech Republic: full circles are data published by Buchar & Růžička (2002); triangle is a position of the Hůrka u Hranic NNR. The map was created by the BioLib tool (BioLib, 2013).*

DISCUSSION

The area of the Hůrka u Hranic NNR and its surrounding were previously studied by many arachnologist but most of their results were not published. This area is very interesting due to occurrence of many thermophilous species in spite of position in the middle part of Moravia. On the other hand, psychrophilous species can also be found there. The extraordinary species diversity is formed there by a characteristic morpholoy with various habitats – from very cold and wet to very hot and dry. Previous investigations show that using of special collecting methods (especially subterranean pitfall traps, sifting in Hranická propast abyss) enrich our knowledges of spider fauna of further remarkable species, e.g. *Saloca kulczynski*, *Saloca diceros* and *Centromerus cavernarum* (J. Mikula, I. H. Tuf, R. Mlejnek lgt., V. Růžička det., unpubl.).

Number of all recorded species (92) is relatively high in comparison with previous studies. Majkus (1988, 1991) found 52 spider species, Mlejnek (unpubl.) 10 species, Mikula & Tuf (unpubl.) 24 species

and Tuf *et al*. (2009) 62 species. This study enrich knowledge of araneofauna in the NNR significantly, there were 35 spider species found in addition to previously recorded species. On the other hand, 50 spider species were not confirmed (Tab. I). The reason is probably using of other collecting methods in previous studies. Altogether, 143 spider species is known from this area and they represent 16.6% of araneofauna of the Czech Republic.

The closest investigated territory is Zbrašovské aragonitové jeskyně NNM (Niedobová & Hula, 2012) on the opposite bank of Bečva River. There were 71 spider species found from 20 families. There were also thermophilous species (*Dipoena melanogaster, Dysdera czechica*, *Ceratinella major*) recorded. Czech karst territories are among the best explored areas. Thus, comparison of numbers of species is possible. In Macošká and Vilémovická stráň scree-slopes (Moravský kras karst PLA), 171 spider species from 22 families were recorded (Niedobová *et al*., 2011). Spiders communities of the Bohemian Karst Protected Landscape Area are one of the best investigated in the Czech Republic. The last studies from this area summarized 450 spider species in last 115 years (Kůrka *et al*., 2010, Dolejš *et al*., 2012).

I: *List of all collected spiders from Hůrka u Hranic NNR. Abbreviations of originality of habitat (Orig.) are according to Buchar & Růžička (2002): C – Climax habitats, SN – Seminatural habitats, D – Disturbed habitats, A – Artificial habitats. Bold letters means data that are characteristic of the species significantly.*

Family and species	Orig.	Number of individuals found in this study	Species found in previous studies (yes/no)
Atypidae			
Atypus affinis Eichwald, 1830	C	1	yes
Pholcidae			
Pholcus opilionoides (Schrank, 1781)	C, SN, A	1	yes
Segestiidae			
Segestria senoculata (Linné, 1758)	C, SN	2	yes
Dysderidae			
Dysdera czechica Řezáč in prep.	C, SN	4	no
Dysdera erythrina (Walckenaer, 1802)	**C**, (A)		yes
Dysdera erythrina lantosquensis Simon, 1882	C, **SN**		yes
Harpactea hombergi (Scopoli, 1763)	C, SN	3	yes
Harpactea lepida (C. L. Koch, 1838)	C, SN	5	yes
Harpactea rubicunda (C. L. Koch, 1838)	C, SN, A	5	yes
Mimetidae			
Ero furcata (Villers, 1789)	C, SN	2	yes
Nesticidae			
Nesticus cellulans (Clerck, 1757)	C, SN, A	1	yes
Theridiidae			
Dipoena melanogaster (C. L. Koch, 1837)	**C**, SN	4	no
Enoplognatha ovata (Clerck, 1757)	C, **SN**, D	2	yes
Episinus angulatus (Blackwall, 1836)	C, SN	1	yes
Episinus truncatus Latreille, 1809	**C**, SN	1	no
Neottiura bimaculata (Linné, 1767)	C, SN, D	1	yes
Paidiscura pallens (Blackwall, 1834)	C, SN	1	no
Parasteatoda lunata (Clerck, 1757)	C, SN	1	no
Phylloneta impressa (L. Koch, 1881)	C, SN, D	1	yes
Platnickina tincta (Walckenaer, 1802)	C, SN		yes
Robertus lividus (Blackwall, 1836)	C, SN	1	yes
Steatoda bipunctata (Linné, 1758)	C, SN, A		yes
Theridion melanurum Hahn, 1831	C, SN, A	1	no
Theridion varians Hahn, 1833	C, SN, D	1	no
Linyphiidae			
Agyneta rurestris (C. L. Koch, 1836)	C, SN, D		yes
Centromerus arcanus (O. P.-Cambridge, 1873)	**C**, SN		yes
Centromerus cavernarum (L. Koch, 1872)	C		yes

Family and species	Orig.	Number of individuals found in this study	Species found in previous studies (yes/no)
Centromerus sylvaticus (Blackwall, 1841)	C, SN, D		yes
Ceratinella brevis (Wider, 1834)	**C**, SN		yes
Diplocephalus latifrons (O. P.-Cambridge, 1863)	**C**, SN		yes
Diplocephalus picinus (Blackwall, 1841)	C, SN		yes
Diplostyla concolor (Wider, 1834)	C, SN	10	yes
Dismodicus bifrons (Blackwall, 1841)	C, SN		yes
Drapetisca socialis (Sundevall, 1833)	C, SN	1	yes
Entelecara acuminata (Wider, 1834)	C, SN	3	yes
Erigone atra Blackwall, 1833	C, SN, D	1	yes
Erigone dentipalpis (Wider, 1834)	C, SN, D		yes
Gnathonarium dentatum (Wider, 1834)	C, SN		yes
Gonatium rubellum (Blackwall, 1841)	**C**, SN		yes
Helophora insignis (Blackwall, 1841)	C		yes
Labulla thoracica (Wider, 1834)	**C**, SN	1	no
Lepthyphantes minutus (Blackwall, 1833)	C, SN	1	no
Linyphia hortensis Sundevall, 1830	C, SN	1	yes
Linyphia triangularis (Clerck, 1757)	C, SN, D	3	yes
Macrargus rufus (Wider, 1834)	C, SN		yes
Micrargus apertus (O. P.-Cambridge, 1871)	C		yes
Micrargus herbigradus (Blackwall, 1854)	C, SN	1	yes
Microlinyphia pusilla (Sundevall, 1830)	C, SN	2	no
Neriene clathrata (Sundevall, 1830)	C, SN		yes
Neriene emphana (Walckenaer, 1841)	C, SN		yes
Neriene peltata (Wider, 1834)	C, SN		yes
Neriene radiata (Walckenaer, 1841)	C, SN	2	yes
Oedothorax agrestis (Blackwall, 1853)	**C**, SN	2	no
Oedothorax apicatus (Blackwall, 1850)	C, SN, D		yes
Palliduphantes alutatius (Simon, 1884)	C, SN		yes
Porrhomma microphtalmum (O. P.-Cambridge, 1871)	C, SN, D		yes
Saloca diceros (O. P.-Cambridge, 1871)	C		yes
Saloca kulczynskii Miller & Kratochvíl, 1939	C		yes
Tapinocyba insecta (L. Koch, 1869)	C, SN	2	no
Tenuiphantes alacris (Blackwall, 1853)	C, SN	1	no
Tenuiphantes cristatus (Menge, 1866)	C, SN	3	yes
Tenuiphantes flavipes (Blackwall, 1854)	C, SN	6	yes
Tenuiphantes tenebricola (Wider, 1834)	C, SN		yes
Tenuiphantes tenuis (Blackwall, 1852)	C, SN, D		yes
Thyreosthenius parasiticus (Westring, 1851)	C, SN, A		yes
Trematocephalus cristatus (Wider, 1834)	C, SN	4	yes
Walckenaeria atrotibialis (O. P.-Cambridge, 1878)	C, SN	1	no
Walckenaeria corniculans (O. P.-Cambridge, 1875)	C, SN		yes
Walckenaeria dysderoides (Wider, 1834)	C, SN		yes
Walckenaeria furcillata (Menge, 1869)	C, SN		yes
Walckenaeria obtusa Blackwall, 1836	C, SN	1	no
Tetragnathidae			
Metellina mengei (Blackwall, 1870)	C, SN	1	yes
Metellina merianae (Scopoli, 1763)	C, SN, A	2	yes
Metellina segmentata (Clerck, 1757)	C, SN, D	2	yes
Pachygnatha listeri Sundevall, 1830	C, SN	2	yes

Family and species	Orig.	Number of individuals found in this study	Species found in previous studies (yes/no)
Tetragnatha dearmata Thorell, 1873	C, SN		yes
Tetragnatha pinicola L. Koch, 1870	C, SN	1	yes
Araneidae			
Araneus diadematus Clerck, 1757	C, SN, A		yes
Araniella cucurbitina (Clerck, 1757)	C, SN, D	1	yes
Cercidia prominens (Westring, 1851)	**C**, SN	2	no
Cyclosa conica (Pallas, 1772)	C, SN	1	no
Mangora acalypha (Walckenaer, 1802)	C, SN, D	2	yes
Nuctenea umbratica (Clerck, 1757)	C, SN, A	1	yes
Lycosidae			
Alopecosa pulverulenta (Clerck, 1757)	C, SN, D	1	no
Pardosa lugubris (Walckenaer, 1802)	C, SN, D	56	yes
Trochosa terricola Thorell, 1856	C, SN, D	13	yes
Xerolycosa nemoralis (Westring, 1861)	C, SN	5	yes
Miturgidae			
Zora spinimana (Sundevall, 1833)	C, SN, D	1	no
Agelenidae			
Agelena labyrinthica (Clerck, 1757)	C, SN		yes
Coelotes terrestris (Wider, 1834)	C, SN	24	yes
Histopona torpida (C. L. Koch, 1834)	C, SN	28	yes
Inermocoelotes inermis (L. Koch, 1855)	C, SN		yes
Tegenaria ferruginea (Panzer, 1804)	C, SN, **A**		yes
Tegenaria silvestris L. Koch, 1872	C, SN	6	yes
Cybaeidae			
Cybeus angustriarum L. Koch, 1868	**C**, SN	12	yes
Hahnidae			
Hahnia nava (Blackwall, 1841)	**C**, SN		yes
Dictynidae			
Cicurina cicur (Fabricius, 1793)	C, SN	11	yes
Dictyna uncinata Thorell, 1856	C, SN	1	yes
Nigma flavescens (Walckenaer, 1830)	C, SN	1	yes
Nigma walckenaeri (Roewer, 1951)	SN, A	1	no
Amaurobiidae			
Amaurobius fenestralis (Ström, 1768)	C, SN	3	yes
Amaurobius ferox (Walckenaer, 1830)	A	1	yes
Amourobius jugorum L. Koch, 1868	C		yes
Eutichuridae			
Cheiracanthium elegans Thorell, 1875	C	1	no
Anyphaenidae			
Anyphaena accentuata (Walckenaer, 1802)	C, SN	3	yes
Liocranidae			
Agroeca brunnea (Blackwall, 1833)	C, SN	4	no
Agroeca cuprea Menge, 1873	C	1	no
Apostenus fuscus Westring, 1851	C, SN	1	no
Phrurolithidae			
Phrurolithus festivus (C. L. Koch, 1835)	C, SN	3	yes
Clubionidae			
Clubiona brevipes Blackwall, 1841	C, SN		yes
Clubiona comta C. L. Koch, 1839	C, SN	1	no

Family and species	Orig.	Number of individuals found in this study	Species found in previous studies (yes/no)
Clubiona lutescens Westring, 1851	C, SN		yes
Clubiona pallidula (Clerck, 1757)	C, SN	1	no
Zodariidae			
Zodarion germanicum (C. L. Koch, 1837)	**C**, SN	5	yes
Gnaphosidae			
Drassodes cupreus (Blackwall, 1834)	**C**, SN	1	yes
Drassyllus villicus (Thorell, 1875)	C	4	no
Haplodrassus silvestris (Blackwall, 1833)	C, SN	1	no
Zelotes electus (C. L. Koch, 1839)	**C**, SN		yes
Zelotes subterraneus (C. L. Koch, 1833)	C, SN, D	18	yes
Philodromidae			
Philodromus albidus Kulczyński, 1911	C, SN	3	no
Philodromus aureolus (Clerck, 1757)	C, SN	1	yes
Philodromus collinus C. L. Koch, 1835	C, SN	1	yes
Philodromus dispar Walckenaer, 1826	C, SN	1	yes
Tibellus oblongus (Walckenaer, 1802)	C, SN	1	no
Thomisidae			
Cozyptila blackwalli Lehtinen & Marusik, 2005	**C**, SN	6	no
Diaea dorsata (Fabricius, 1777)	C, SN	1	yes
Misumena vatia (Clerck, 1757)	C, SN	1	no
Ozyptila praticola (C. L. Koch, 1837)	C, SN		yes
Pistius truncatus (Pallas, 1772)	C, SN		yes
Xysticus acerbus Thorell, 1872	C		yes
Xysticus audax (Schrank, 1803)	C, SN		yes
Xysticus luctator L. Koch, 1870	C, SN	1	no
Xysticus ulmi (Hahn, 1831)	C, SN		yes
Salticidae			
Aelurillus v-insignitus (Clerck, 1757)	C, SN		yes
Ballus chylybeius (Walckenaer, 1802)	C, SN	1	yes
Euophrys frontalis (Walckenaer, 1802)	C, SN	1	yes
Evarcha falcata (Clerck, 1757)	C, SN	1	no
Heliophanus cupreus (Walckenaer, 1802)	C, SN	1	yes
Leptorchestes berolinensis (C. L. Koch, 1846)	C	2	no
Marpissa nivoyi (Lucas, 1846)	C		yes
Neon reticulatus (Blackwall, 1853)	C, SN		yes
Salticus zebraneus (C. L. Koch, 1837)	C, SN	1	no
Sibianor aurocinctus (Ohlert, 1865)	C, SN		yes

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REFERENCES

AOPK ČR. 2013. *NPR Hůrka u Hranic*. [Online]. Available at: http://drusop.nature.cz/ost/chrobjekty/zchru/index.php?frame&SHOW_ONE=1&ID=125. [Accessed: 2014, January 23].

BIOLIB. 2013. *BioLib.cz – Nástroj na kreslení síťových map*. [Online]. Available at: http://www.biolib.cz/cz/tooltaxonmap/id1/. [Accessed: 2014, January 26].

BRYJA, V., SVATOŇ, J., CHYTIL, J., MAJKUS, Z., RŮŽIČKA, V., KASAL, P., DOLANSKÝ, J., BUCHAR, J., CHVÁTALOVÁ, I., ŘEZÁČ, M., KUBCOVÁ, L., ERHART, J. & FENCLOVÁ, I. 2005. Spiders (Araneae) of the Lower Morava Biosphere Reserve and closely adjacent localities (Czech republic). *Acta Mus. Moraviae, Sci. biol.,* 90: 13–184.

BUCHAR, J. and RŮŽIČKA, V. 2002. *Catalogue of Spiders of the Czech Republic*. Praha: Peres.

DOLANSKÝ, J. 2011. Rozšíření a stanovištní nároky zápřednic rodu *Cheiracantium* (Araneae, Miturgidae) v Česku. *Vč. Sbor. Přír. – Práce a studie,* 18: 125–140.

DOLEJŠ, P., HLAVÁČ, J. and MORAVEC, J. 2012. *Velkolom Čertovy schody – západ. Fauna sanovaných a rekultivovaných ploch lomu.* Monitorovací studie, XV. etapa (2012). Ms. deposited in Národní muzeum (Praha).

HEIMER, S. and NENTWIG, W. 1991. *Spinnen Mitteleuropas.* Berlin und Hamburg: Paul Parey.

KŮRKA, A., BUCHAR, J., KUBCOVÁ, L. and ŘEZÁČ, M. 2010. Pavouci (Araneae) chráněné krajinné oblasti Český kras. *Bohemia centralis,* 30: 5–100.

LAŠKA, V., KOPECKÝ, O., RŮŽIČKA, V., MIKULA, J., VÉLE, A., ŠARAPATKA, B. and TUF, I. H. 2011. Vertical distribution of spiders in soil. *J. Arachnol.*, 39: 393–398.

MAJKUS, Z. 1988. *Inventarizační průzkum pavoučí fauny rezervací SPR Hůrka, SPR Velká Kobylanka, SPR Nad Kostelíčkem, SPR V Oboře.* Ms. deposited in AOPK ČR (Olomouc).

MAJKUS, Z. 1991. Fauna pavouků (Araneae) z území Hranického krasu. *Acta Fac. Paedog.(Ostrava)*, 21: 27–39.

MILLER, F. 1971. Řád Pavouci – Araneida, p. 51–306. In: DANIEL, M. and ČERNÝ, V. (eds). *Klíč zvířeny ČSSR, díl IV.* ČSAV, Praha.

NENTWIG, W., HANNGI, A., KROPF, C. and BLICK, T. 2013. *Spinnen Mitteleuropas/Central European Spiders. An internet identification key*. [Online]. Available at: http://www.araneae.unibe.ch/. [Accessed: 2013, June 20].

NIEDOBOVÁ, J. and HULA, V. 2012. Spiders of Zbrašovské aragonitové jeskyně National Nature Monument (Moravia, Czech Republic). *Acta Univ. Agric. Silvic. Mendelianae Brun.,* 60(6): 275–280.

NIEDOBOVÁ, J., HULA, V. and ŠŤASTNÁ, P. 2011. Spiders (Araneida) from the slopes of Macošská stráň and Vilémovická stráň (Moravský kras Protected Landscape Area, Czech Republic). *Acta Mus. Moraviae, Sci. biol.,* 96(1): 1–27.

PEKÁR, S., TOFT, S., HRUŠKOVÁ, M. and MAYNTZ, D. 2008. Dietary and prey-capture adaptations by which Zodarion germanicum, an ant-eating spider (Araneae: Zodariidae), specialises on the Formicinae. *Naturwissenschaften,* 95(3): 233–239.

PLATNICK, N. I. 2014. *The World Spider Catalog, Version 15*. American Museum of Natural History. [Online]. Available at: http://research.amnh.org/iz/spiders/catalog_15.0/index.html [Accessed: 2014, September 20].

ROBERTS, M. J. 1987. *The Spiders of Great Britain and Ireland, Linyphiidae and Check List.* Volume 2. Colchester: Harley Books.

ROBERTS, M. J. 1995. *Spiders of Britain & Northern Europe, Collins Field Guide*. London: Harper Collins Publishers.

RŮŽIČKA, V. 2005. Araneae (pavouci) (Araneae (Spiders)), p. 76–82. In: FARKAČ, J., KRÁL, D. & ŠKORPÍK, M. (eds). 2005. *Červený seznam ohrožených druhů České republiky. Bezobratlí.* Praha: AOPK ČR.

ŘEŽÁČ, M. 2009. Metodika inventarizace druhů pavouků (rozšíření monitoringu společenstev pavouků pomocí zemních pastí), p. 140–153. In: JANÁČKOVÁ, H., ŠTORKÁNOVÁ, A. and VÍTEK, O. (eds). *Metodika inventarizačních průzkumů maloplošných zvláště chráněných území. Praha:* AOPK ČR.

ŘEZÁČ, M. 2012. Rozšíření a stanovištní nároky pavouků šestiček rodu *Dysdera* (Araneae, Dysderidae) v Česku. *Příroda,* 30: 117–162.

TUF, I. H., TRNKA, F. AND MACHAČ, O. 2009. *Výsledky inventarizačního výzkumu vybraných skupin bezobratlých živočichů v jižní části NPR Hůrka u Hranic* Ms. deposited in AOPK ČR in Olomouc, 28 pp.

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