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SPIDERS OF POLANSKÁ NIVA NATIONAL NATURE RESERVE

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Abstract

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Spiders of Polanská niva National Nature Reserve were investigated during 2013. Several capture methods were used from March to September. Altogether, 85 species from 14 families were recorded. The most interesting species are *Arctosa maculata* (Hahn, 1822) and *Micaria nivosa* L. Koch, 1866 (both are vunerable according to the Red List of threatened species in the Czech Republic). The other remarkable species were: *Kaestneria pullata* (O. P.- Cambridge, 1863), *Donacochara speciosa* (Thorell, 1875), *Hylyphantes graminilola* (Sundevall, 1830), *Singa nitidula* C. L. Koch, 1844 and *Trochosa spinipalpis* F. O. P.- Cambridge. Evaluation of spider community shows, that 8.2 % spider species prefer naturally like habitats.

Keywords: spiders, Araneae, Polanská niva National Nature Reserve, floodplain forest, faunistics

INTRODUCTION

Investigated area, Polanská niva NNR is situated in the Poodří PLA. Spider fauna of Poodří PLA was investigated by Majkus (1985) and Bryja and Majkus (1999), they recorded there 177 spider species. A check-list of spider fauna of Polanská niva NNR has never been separately published. Spider fauna in Polanská niva NNR was investigated by Baniová (1987), her results are summarized in Bryja and Majkus (1999). The area, which was investigated by Baniová (1987) overlapped territory of recent Polanská niva NNR partially (the Blücherův floodplain forest only), so, we have information about three common spider species from this area only. In the surroundings of Polanská niva NNR, banks of the Odra river were also investidated. There were 26 spider species found by Majkus (1985) and Bryja and Majkus (1999). The aim of this study was to investigate spider fauna of this area, meanders included, for AOPK ČR to improve our knowledge of spiders within this remarkable territory.

MATERIALS AND METHODS

Study site

Polanská niva NNR is a part of the Poodří PLA, it was established in 1985. The territory lies in the land register of Polanka nad Odrou and it takes 122.3 ha. The subjects of the protection are floodplain forests in the alluvium of the Odra river and Odra river meanders and abandoned meanders. The altitude of the protected area is 219–221 m a.s.l. (AOPK ČR, 2013). Locality belongs to the faunistic square 6475.

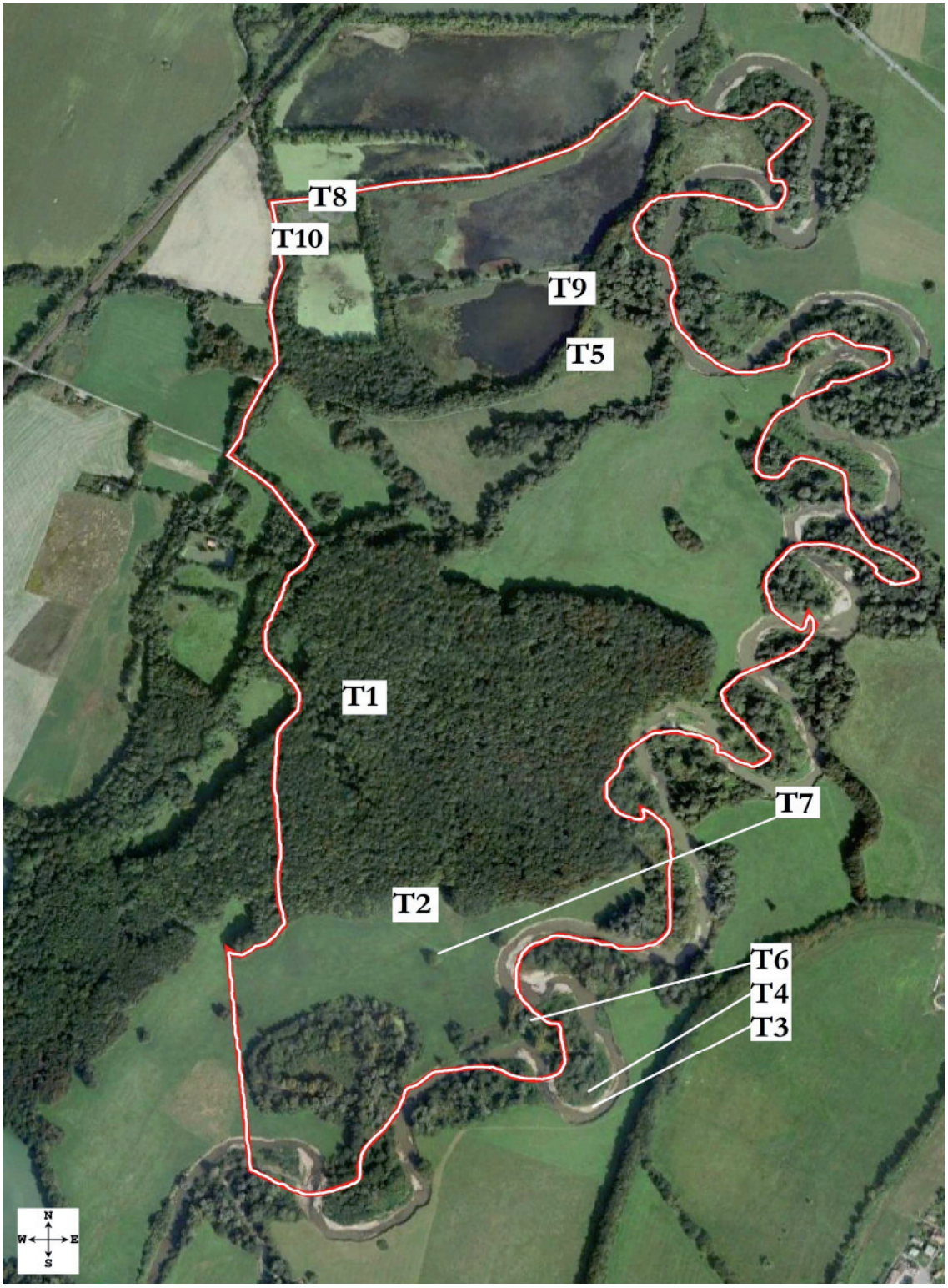
The territory was divided into ten parts for the purpose of investigation (Fig. 1):

T1 – floodplain forest, GPS coordinates: 49°45'36"N, 18°10'36"E, light part of floodplain forest, where alder-trees are dying. Dead wood is left on the ground at different stages of decompositon,

T2 – ecoton of floodplain forest and mesophilic meadow, GPS coordinates: 49°45'26"N, 18°10'57"E, mesophylic meadow is regularly mowed,

T3 – gravel and sand bank of the Odra river meander, GPS coordinates: 49°46'0"N, 18°11'17"E,

T4 – owergrown aluvium of the Odra river meander, GPS coordinates: 49°45’15”N, 18°11’17”E,
T5 – hornbeams on a dam of the Kačírek pond, GPS coordinates: 49°46’0”N, 18°11’17”E,
T6 – brushwood inside the Odra river meander, GPS coordinates: 49°45’18”N, 18°11’16”E, brushwood include poplar trees, there are alluvium of tree trunks, branches and other organic material,



1: *General view of the whole Polanská niva NNR (source: AOPK ČR): T1–T10 are particular transects. For details see Material and Methods: Study site.*

T7 – solitary oak trees on mesophilic meadows, GPS coordinates: 49°45'24"N, 18°11'4"E,
T8 – a dam of the Malý Budní pond, GPS coordinates: 49°46'9"N, 18°10'53"E, this is dam between the Malý Budní pond and the Zimní pond,
T9 – littoral zone of the Kačírek pond, GPS coordinates: 49°46'2"N, 18°11'15"E, littoral zone is owergrown with reeds,
T10 – a dam of the Malý Váček pond, GPS coordinates: 49°46'6"N, 18°10'53"E, the dam is owergrown by trees and shrubs and borders on adjacent road.

Collecting methods, determination and evaluation

We used the AOPK methodology for spiders collecting (Řezáč, 2009) including pitfall traps, detritus sifting, sweeping from vegetation and hand-collecting. Pitfall traps were placed on localities: T1, T2, T3, T4 and T5. There were three pitfall traps arranged in line at about five-metre intervals on each locality. We used 0.5l plastic cups as pitfall traps (diameter 9 cm) and 4% formaldehyde solution as a fixative fluid.

Placement and emptying of traps took place on 28th March, 7th April, 14th May, 14th July, 24th August and 20th September 2013. Pitfall traps were inspected and the trapped material was replaced into 70% alcohol.

The rest of collecting methods, mentioned above, were employed each month at all localities. Collected spiders were immediately preserved in 70% alcohol. Spider species were evaluated according to Buchar & Růžička (2002). The term "climax" according to Buchar & Růžička (2002) does not have the same meaning as in ecological point of view but it means a category of conservations status of habitats – the most threatened and valuable habitats (even all types of meadows which are mostly artificial). The commented species were selected according to their geographical distribution and rarity (see Buchar & Růžička, 2002).

The majority of spiders were determined by the authors, mainly with the following literature: Miller (1971), Heimer & Nentwig (1991), Roberts (1987, 1995) and Nentwig *et al.* (2013). Nomenclature follows Platnick (2013) except of the family Agelenidae where we follow the work of Bolzern *et al.* (2013). The maps of selected species were created by the map application of BioLib.cz (BioLib, 2013). All material is deposited in Jana Niedobová's collection at the Mendel University in Brno.

RESULTS

There were 2064 adult specimens of spiders collected in the Polanská niva NNR. The spiders belonged to 85 species and 14 families (Tab. I). Spider community included species which prefer especially humid and semi-humid habitats (*Donacochara speciosa*, *Kaestneria pullata*, *Centromerita bicolor*, *Arctosa maculata*, *Micaria nivosa*, *Piratula hygrophila*, *Trochosa spinipalpis* etc.). Evaluation of particular species according to originality of habitat shows, that collected spiders belong to all categories. We can find here species of climax habitats (C), semi-natural habitats (SN), disturbed habitats (D) and artificial habitats (A) (Buchar & Růžička, 2002). Evaluation of spider community shows, that 8.2% spider species prefer naturally like habitats (originally published as climax habitats) (Buchar & Růžička, 2002).

The most remarkable species were *Arctosa maculata* and *Micaria nivosa*. They are both very rare and listed under Red List of threatened species in the Czech Republic as vulnerable species (Růžička, 2005). Both species were found in the gravel and sand banks of the meander of the Odra river.

The other remarkable species were: *Kaestneria pullata*, *Donacochara speciosa*, *Hylyphantes graminicola*, *Singa nitidula* and *Trochosa spinipalpis*.

I: *List of all collected spiders from Polanská niva 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; Abbreviations of Red List (RL) are according to Růžička (2005): VU – Vulnerable, T1 – T10 are particular transects, numbers means numbers of specimens.*

Species	Orig.	RL	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Theridiidae												
Robertus arundineti (P. O.-Cambridge, 1871)	C, SN, D		1									
Robertus lividus (Blackwall, 1836)	C, SN		7	1								
Robertus neglectus (O. P.-Cambridge, 1871)	C, SN			1								
Linyphiidae												
Bathyphantes nigrinus (Westring, 1851)	C, SN		2		2		2	3		2	1	
Centromerita bicolor (Blackwall, 1833)	C, SN, D			2								
Centromerus sylvaticus (Blackwall, 1841)	C, SN, D		3				3					
Ceratinella brevis (Wider, 1834)	C, SN						1					
Diplocephalus cristatus (Blackwall, 1833)	C, SN, (D)					2						

Species	Orig.	RL	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Diplocephalus latifrons (O.P.-Cambridge, 1863)	**C**, SN			1						1		
Diplocephalus picinus (Blackwall, 1841)	C, SN						8					
Diplostyla concolor (Wider, 1834)	C, SN		9				1					
Donacochara speciosa (Thorell, 1875)	**C**, SN										3	
Entelecara congenera (O. P.-Cambridge, 1879)	C, SN										1	
Erigone atra Blackwall, 1833	C, SN, D		1	1	3	5			1			
Erigone dentipalpis (Wider, 1834)	C, SN, D				1	17						
Gnathonarium dentatus (Wider, 1834)	C, SN				1							
Gongylidiellum vivum (O. P.-Cambridge, 1875)	C, SN										1	
Hylyphantes graminicola (Sundevall, 1830)	C, SN										1	
Kaestneria pullata (O. P.-Cambridge, 1863)	C										1	
Lepthyphantes minutus (Blackwall, 1833)	C, SN										2	3
Leptorhoptrum robustum (Westring, 1851)	C, SN					1						
Linyphia triangularis (Clerck, 1757)	C, SN, D						6				1	1
Megalepthyphantes nebulosus (Sundevall, 1830)	(C, SN), **A**											1
Mermessus trilobatus (Emerton, 1882)				3								
Micrargus subaequalis (Westring, 1851)	C, SN, (D)					1						
Microlinyphia pusilla (Sundevall, 1830)	C, SN, D				1							
Microneta viaria (Blackwall, 1841)	C, SN						3					
Neriene clathrata (Sundevall, 1830)	C, SN						2					
Neriene montana (Clerck, 1757)	C, SN, D								1			
Oedothorax agrestis (Blackwall, 1853)	**C**, SN					3						
Oedothorax apicatus (Blackwall, 1850)	C, SN, D				1	5		3		1		
Oedothorax fuscus (Blackwall, 1834)	C, SN, D					7	1					
Oedothorax retusus (Westring, 1851)	C, SN, D				19	32						
Tenuiphantes alacris (Blackwall, 1853)	C, SN		1									
Tenuiphantes flavipes (Blackwall, 1854)	C, SN						3					
Troxochrus scabriculus (Westring, 1851)	C, SN, D				1							
Walckenaeria dysderoides (Wider, 1834)	C, SN						2					
Walckenaeria nudipalpis (Westring, 1851)	**C**, SN						1					
Walckenaeria obtusa Blackwall, 1836	C, SN			1								
Tetragnathidae												
Metellina mengei (Blackwall, 1870)	C, SN											3
Pachygnatha clercki Sundevall, 1823	C, SN, D				5			4				
Pachygnatha degeeri Sundevall, 1830	C, SN, D		2	14			4					
Pachygnatha listeri Sundevall, 1830	C, SN		6	16	13		3					
Tetragnatha montana Simon, 1874	C, SN		5		1							
Tetragnatha obtusa C. L. Koch, 1837	C, SN			1							2	
Araneidae												
Araneus diadematus Clerck, 1757	C, SN, A										1	1
Mangora acalypha (Walckenaer, 1802)	C, SN, D			3								
Nuctenea umbratica (Clerck, 1757)	C, SN, A							1				
Singa nitidula C. L. Koch, 1844	C, SN				2							
Lycosidae												
Alopecosa pulverulenta (Clerck, 1757	C, SN, D			2								
Arctosa maculata (Hahn, 1822)	C	VU			1							
Pardosa agrestis (Clerck, 1757)	SN, D				6	1						
Pardosa amentata (Clerck, 1757)	C, SN, D			1174	150	18	71	2		1		
Pardosa lugubris (Walckenaer, 1802)	C, SN, D		1	59		2	64					

Species	Orig.	RL	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Pardosa palustris (Linnaeus, 1758)	C, SN, D			19		3						
Pardosa prativaga (L. Koch, 1870)	C, SN, D					3						
Pardosa pullata (Clerck, 1757)	C, SN, D			2		9						
Piratula hygrophila (Thorell, 1872)	C, SN		54									
Trochosa ruricola (De Geer, 1778)	C, SN, D		2	13	20		2					
Trochosa spinipalpis (F. O. P.-Cambridge, 1895)	C, SN		1			1						
Pisauridae												
Pisaura mirabilis (Clerck, 1757)	C, SN, D			2								
Agelenidae												
Agelena gracilens (C. L. Koch, 1841)	C, SN, (A)						1					1
Coelotes terrestris (Wider, 1834)	C, SN		2									
Histopona torpida (C. L. Koch, 1834)	C, SN						9					
Inermocoelotes inermis (L. Koch, 1855)	C, SN		1	1			11					
Malthonica campestris (C. L. Koch, 1834)	C, SN						8					
Dictynidae												
Cicurina cicur (Fabricius, 1793)	C, SN, D		2	1			2					
Dictyna arundinacea (Linnaeus, 1758)	C, SN, D											1
Dictyna uncinata Thorell, 1856	C, SN, D										7	
Clubionidae												
Clubiona lutescens Westring, 1851	C, SN, (D)		1					2	2			
Clubiona pallidula (Clerck, 1757)	C, SN								2			
Clubiona reclusa O. P.-Cambridge, 1863	C, SN				1							
Corinnidae												
Phrurolithus festivus (C. L. Koch, 1835)	C, SN									6		
Gnaphosidae												
Drassyllus pusillus (C. L. Koch, 1833)	C, SN, (D)			2								
Haplodrassus silvestris (Blackwall, 1833)	C, SN						1					
Micaria nivosa L. Koch, 1866	C, SN	VU			3							
Micaria pulicaria Sundevall, 1831	C, SN					1						
Trachyzelotes pedestris (C. L. Koch, 1837)	**C**, SN			1			1					
Zelotes apricorum (L. Koch, 1876)	C, SN						1					
Philodromidae												
Philodromus albidus Kulczyński, 1911	C, SN, D			2								
Philodromus collinus C. L. Koch, 1835	C, SN			2								
Thomisidae												
Ozyptila praticola (C. L. Koch, 1837)	C, SN						9					
Xysticus cristatus (Clerck, 1757)	C, SN, D			1								
Xysticus lanio C. L. Koch, 1835	C, SN				1							
Salticidae												
Salticus zebraneus (C. L. Koch, 1837)	C, SN		1						2			

Commented list of remarkable and interesting species

Abbreviations of collecting methods: PtT1 – pitfall traps in T1 (floodplain forest), PtT2 – pitfall traps in T2 (ecoton of floodplain forest and mesophilic meadow), PtT3 – pitfall traps in T3 (gravel and sand bank of the Odra river meander), PtT4 – pitfall traps in T4 (owergrown aluvium of the Odra river meander), PtT5 – pitfall traps in T5 (hornbeams on the dike of the Kačírek pond), Sf T1–T10 – sifting detritus on marked locality, Sw T1–T10 – sweeping on vegetation on marked locality, Hc T1–T10 – hand collecting on marked locality.

Linyphiidae

Donacochara speciosa (Thorell, 1875)

A species of climax and semi-natural habitats. Scarce, on herb vegetation (reed, reedmace, sedge) in littorals of ponds (Buchar & Růžička, 2002). For

distribution of this species in the Czech Republic see Fig. 2. 1♂, 2♀, 28. 3. 2013, HcT9.

Hylyphantes graminicola (Sundevall, 1830)

A species of climax and semi-natural habitats. Scarce, on bushes of forests and on forest edges (Buchar & Růžička, 2002). 1 ♂, 14. 5. 2013, SfT9.

Kaestneria pullata (O. P.-Cambridge, 1863)

A rare species of climax habitats, occuring among vegetation on marshy pond margins (Buchar & Růžička, 2002). For distribution of this species in the Czech Republic see Fig. 3. 1 ♂, 14. 5. 2013, SfT9.

Mermesus trilobatus (Emerton, 1882)

An invasive American species spreading across Europe (Blick *et al*., 2005). The first record of this species in the Czech Republic comes from 2007 (Dolanský *et al*., 2009), other records are reported by Holec *et al*. (2012), Hula *et al*. (in press). 3 ♂, 7. 4.–14. 5. 2013, PtT2.

Araneidae

Singa nitidula C. L. Koch, 1844

A scarce species of climax and semi-natural habitats. It occurs on river bank vegetation and cut-off meanders, in fens (Buchar & Růžička, 2002). 1 ♂, 1♀, 14. 5. 2013, HcT3.

Lycosidae

Arctosa maculata (Hahn, 1822)

A rare species of climax habitats, which occurs on gravel and sand river banks in Moravia. Species is recently reported also from Bohemia (Křivokládsko PLA, Berounka river) (Buchar & Růžička, 2002). Bryja (2002) recorded this species near the town of Moravský Krumlov (Rokytná river). Odra river and its gravel and sand banks are habitats, where the spider was also found and recorded by Bryja & Majkus (1999). This spider is endangered due to river belt transformation. The species is listed in the Red List of threatened species in the Czech Republic as vulnerable (Růžička, 2005). 1♀, 14. 5. 2013, HcT3.

Gnaphosidae

Micaria nivosa L. Koch, 1866

A species of climax and semi-natural habitats. A rare species in peat bogs, on forest edges and on a spoil heaps (Buchar & Růžička, 2002). The species is listed in the Red List of threatened species in the Czech Republic as vulnerable (Růžička, 2005). According to Buchar & Růžička (2002), the species is known from this faunistic square, but was recorded only from fully artificial habitats, mainly from spoil heaps. 2 ♂, 7. 4.–14. 5. 2013, PtT3.

DISCUSSION

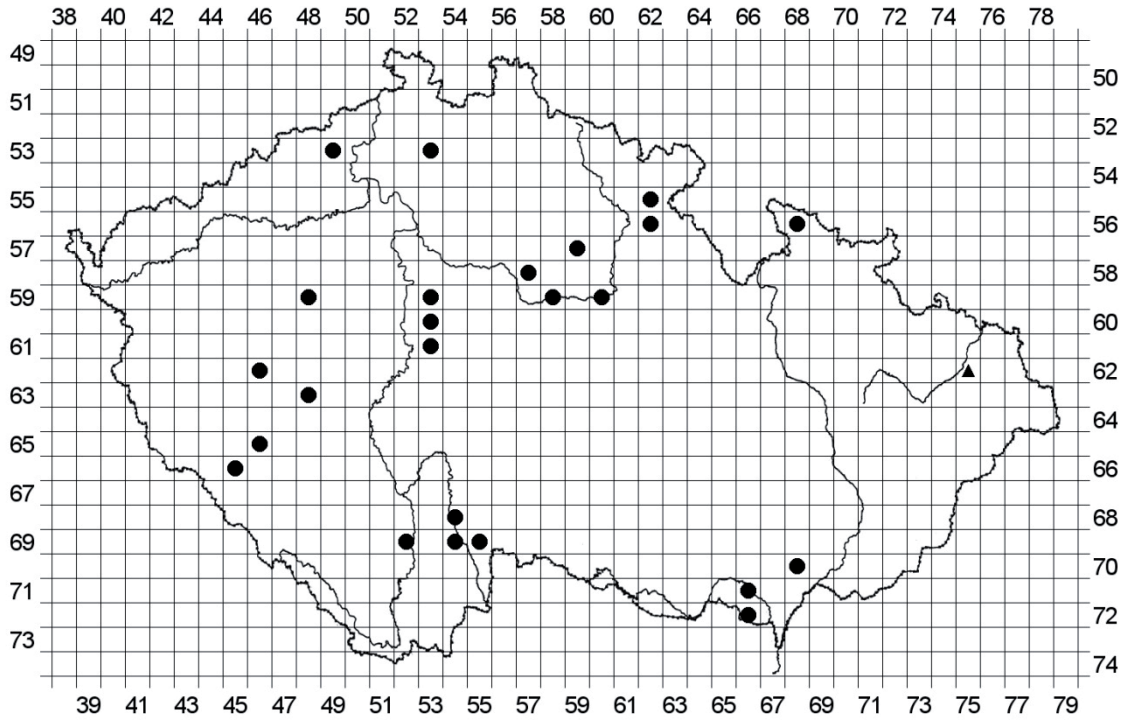
The territory of Polanská niva NNR has never been sufficiently explored. The only studies, which include a part of this territory, are those from Baniová (1987) and Bryja & Majkus (1999). They collected data of spiders from only one locality which is situated in Polanská niva PLA: the Blücherův les floodplain forest. They found there only three common spider species: *Inermocoelotes inermis* (L. Koch, 1855), *Diplostyla concolor* (Wider, 1834) and *Pachygnatha listeri* Sundevall, 1830. They also installed pitfall traps on the banks of the Odra river north-eastwards from the Polanská niva NNR. They found 27 spider species from six families there. They also found *Arctosa maculata* in the gravel and sand bank of the Odra river. We recorded this species from the same habitat, only 5 km southwards and is highly probably that whole natural river banks of the Odra river are inhabited by this species in the region. The gravel river banks are very rare in the Czech Republic and the presented place is one of the best representatives of this habitat in the country.

Two remarkable species were already recorded from the faunistic square 6275: *Arctosa maculata* and *Micaria nivosa*. The latter species is known from the region, but mainly from spoil heaps, here is only one record from natural habitat (river bank) (Buchar & Růžička, 2002). *Donacochara speciosa* is newly recorded for the territory of northern Moravia (Fig. 2), *Kaestneria pullata* was known only from surroundings of the town of Žulová (Buchar & Růžička, 2002) (Fig. 3). Other interesting finding is record of *Micaria nivosa*. The species is known from region, but mainly from spoil heaps, here is only one record from natural habitat (river bank) (Buchar & Růžička, 2002).

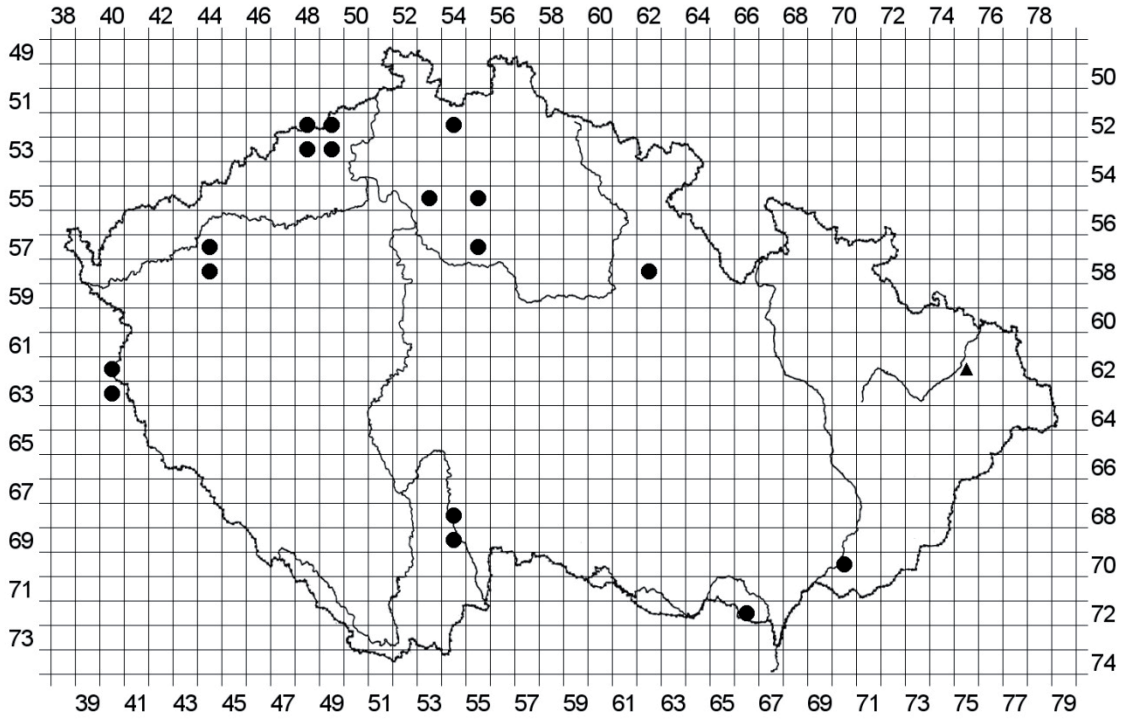
Some data were published from southern Moravian floodplain forest only (Křístek, 1985; Fojtová, 1999; Bryja *et al*., 2005). In comparison, all previously mentioned authors recorded a common occurrence of several *Porrhomma* species, namely *Porrhomma montanum* Jackson, 1913. According to some authors (Bryja *et al*., 2005) this species seems to be characteristic for central European floodplain forests and its absence in Polanská niva NNR is unusual. General evaluation of spider community shows, that 8.2% spider species is associated with naturally like habitats, also C species (according to Buchar & Růžička, 2002). Previous evaluation of spider communities in reserves were done on the base of quantitative collecting methods (pitfall traps), but recently some studies shows, that remarkable species are often collected by nonstandard methods (Hula *et al*., 2009; Niedobová & Fric, in press) and that's why comparison is complicated with former studies.

CONCLUSION

There were 2064 adult specimens of spiders collected in the Polanská niva NNR, belonging to 85 species and 14 families. Spider community include 8.2% spider species, which prefer naturally like habitats. The most remarkable species were *Arctosa maculata* and *Micaria nivosa*. These two species are both very rare and listed in the Red List of threatened species in the Czech Republic (Růžička, 2005) as



2: *Map of all published records of Donacochara speciosa in the Czech Republic: full circles are data published by Buchar & Růžička (2002) and by Macek (2013); triangle is position of the Polanská niva NNR*



3: *Map of all published records of Kaestneria pullata in the Czech Republic: full circles are data published by Buchar & Růžička (2002); triangle is position of the Polanská niva NNR*

vulnerable. Both species were found in the gravel and sand banks of the meander of the Odra river. The other remarkable species were: *Kaestneria pullata*, *Donacochara speciosa*, *Hylyphantes graminicola*, *Singa nitidula* and *Trochosa spinipalpis*. As the only existing studies from the Polanská niva NNR (Baniová, 1987; Bryja & Majkus, 1999) reports only three common spider species: *Inermocoelotes inermis*,

Diplostyla concolor and *Pachygnatha listeri*. Our work highly improved knowledge of spiders inhabiting the locality. It seems that the most valuable habitats in Polanská niva NNR are the gravel river banks of the Odra river and pond littorals.

SUMMARY

Spiders of Polanská niva National Nature Reserve were investigated during the year 2013. The traps were placed and emptied on 28th March, 7th April, 14th May, 14th July, 24th August and 20th September 2013. Several capture methods were used (pitfall traps, detritus sifting, sweeping from vegetation and hand-collecting). Altogether, 85 species from 14 families were recorded. Spider community contain 8.2% of species, which prefer naturally like habitats, originally published as climax habitats.
Several remarkable species were found. Some of them are included in the Red List of threatened species in the Czech Republic (Růžička, 2005): Vulnerable – *Arctosa maculata* (Hahn, 1822) and *Micaria nivosa* L. Koch, 1866. The other remarkable species belonging to climax and semi-natural habitats are: *Kaestneria pullata* (O. P.- Cambridge, 1863), *Donacochara speciosa* (Thorell, 1875), *Hylyphantes graminilola* (Sundevall, 1830), *Singa nitidula* C. L. Koch, 1844 and *Trochosa spinipalpis* (F. O. P.- Cambridge, 1895). The most remarkable species are *Arctosa maculata* and *Micaria nivosa*. Both species were found in the gravel and sand banks of the meander of the Odra river that seems to be one of the most valuable habitats in the investigated area.

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