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RARE AND REMARKABLE SPIDERS (ARANEAE) FROM VINEYARD TERRACES IN PÁLAVA REGION (SOUTH MORAVIA, CZECH REPUBLIC)

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Abstract

KOŠULIČ ONDŘEJ, HULA VLADIMÍR: *Rare and remarkable spiders (Araneae) from vineyard terraces in Pálava region (South Moravia, Czech Republic).* Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 2013, LXI, No. 3, pp. 663–676

Faunistic data of rare and remarkable spider species found in vineyard terraces around Mikulov and Popice are presented. Vineyard terraces are artificial – man made – habitats that were established in the eighties of the 20th century with intention of growing grapevine. Spiders were collected by pitfall traping during 30 April – 28 October 2011 and by day and night sweeping of herb vegetation in different dates of 2011. Twenty two species listed in the Red List of threatened species in the Czech Republic were recorded. In vineyard terraces at the vicinity of Popice, 12 threatened species (CR – 2 species, EN – 3 species, VU – 7 species) were found altogether. In the vineyard terraces at Mikulov, we found 18 threatened spider species (CR – 3 species, EN – 7 species, VU – 8 species). Very rare and critically endangered *Tibellus macellus* Simon, 1875, *Dysdera hungarica* Kulczyński, 1897 and *Cheiracanthium pennyi* O. P.-Cambridge, 1873 belongs to the most significant findings. Besides of these threatened species, we discovered rich spectra of rare xerothermophilous spiders which created dominant and eudominant component of araneofauna – *Alopecosa solitaria* (Herman, 1879), *Gnaphosa lucifuga* (Walckenaer, 1802), *Thanatus arenarius* Thorell, 1872, and *Ozyptila pullata* (Thorell, 1875). We found that artificial habitats such as vineyard terraces are important as suitable habitats for a wide spectrum of xerothermophilous spiders of the Czech Republic.

spiders, faunistics, vineyard terraces, rare species, Pálava region, Czech Republic

In 2011, a research on selected vineyard terraces of southern Moravia was launched. These are secondary habitats created in the 70s to 80s of the 20th century for cultivation of grapevine and fruit trees. Their steepness, thermal potential, and limestone loessial substrate resulted in initiation of the succession on the terraces and creating microclimatic conditions suitable for rare steppe species. Historically, the most of the steppe species disappeared from our territory due to the negative impact of human activity, such as intensified agriculture, forestation, limited coppice management, and inappropriately conducted management of protected steppe locations (Konvička *et al*., 2005, 2006), but also because of the absence of traditional management of these currently abandoned locations – burning, grazing etc. It is therefore more than desirable to explore and promote the management of habitats that can replace the natural habitats of rare xerothermophilic species and their suitable ecological conditions by creating suitable habitats in an otherwise unified and intensively cultivated landscape of the Czech Republic (Tropek *et al*., 2010; Košulič & Hula, 2012). Moreover, though araneofauna in the Czech Republic is well explored (Buchar & Růžička, 2002; Růžička & Buchar, 2008), agriculture habitats, including vineyard terraces, were generally rather neglected by arachnologists. From South Moravia, just few works from sugar beet fields (Miller, 1974), sunflower fields (Pekár, 2005), and apple orchards exist (Pekár *et al*., 1997; Pekár & Kocourek, 2004). Further, habitats of sinkholes situated in different agrocenoses of Moravian Karst were also

investigated (Horáková, 2005; Hula *et al*., 2012). From the Slovak Republic, arachnofauna research from the vineyards located in the vicinity of Svätý Jur near Bratislava is known (Gajdoš & Dankaninová, 2010). Spiders of vineyard terraces in the Czech Republic have not been studied so far, there is only one paper including faunistic data from vineyards around Pálava (Bryja *et al*., 2005). This publication summarized knowledge of arachnofauna occurring in the Lower Morava Biosphere Reserve, Pálava PLA, and adjacent localities. This includes the investigated areas of our research, therefore, a significant part of faunistic findings was compared with this work.

The present publication thus shows faunistic data of rare species of xerothermophilic spiders found on the vineyard terraces around Mikulov and Popice, an area that is geographically strongly influenced by Pavlov Hills massif belonging to the Pálava Protected Landscape Area.

MATERIAL AND METHODS

Description of studied sites

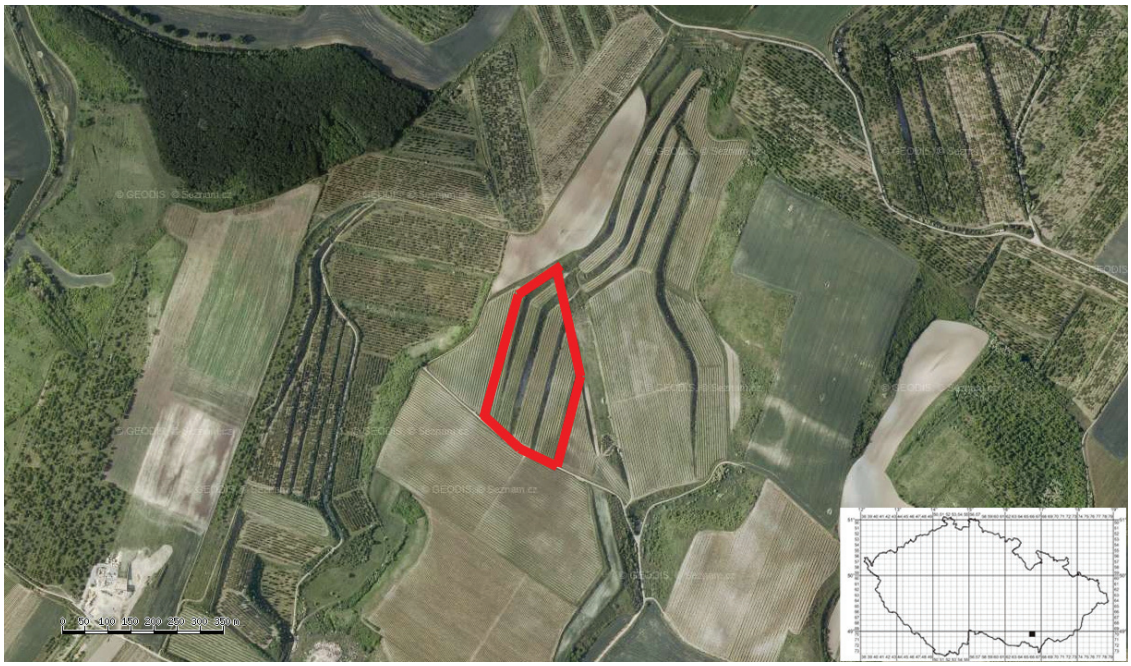
We have studied spider fauna of two localities situated in the Pannonian region of southern Moravia (Czech Republic) – vineyard terraces near following settlements (faunistic squares according to Pruner & Míka, 1996): Popice (7066, 48°56'11"N, 16°40'58"E) and Mikulov (7165, GPS 48°49'91"N, 16°37'35"E). The examined vineyard at Mikulov (Fig. 1) is under integrated pest management (total area of 10,92 ha) and is located in the vicinity of the Růžový kopec NM. Area of the vineyards is situated in Pálava PLA, in essence, it creates a border of the protected area. Vineyard terraces around Popice are under organic-ecological farming (total area of 10 ha). It means that in the vineyards, it is forbidden to use synthetic pesticides and fertilizers, except selective herbicides (Nascimbene *et al*., 2012). Alleyways are greened up by grasses with a mixture of flowering plants. In the vicinity of vineyard terraces, there are orchards and agrocenoses (Fig. 2). The Pouzdřanská step – Kolby NNR is located 2000 m to the west.

Collecting and determination of material

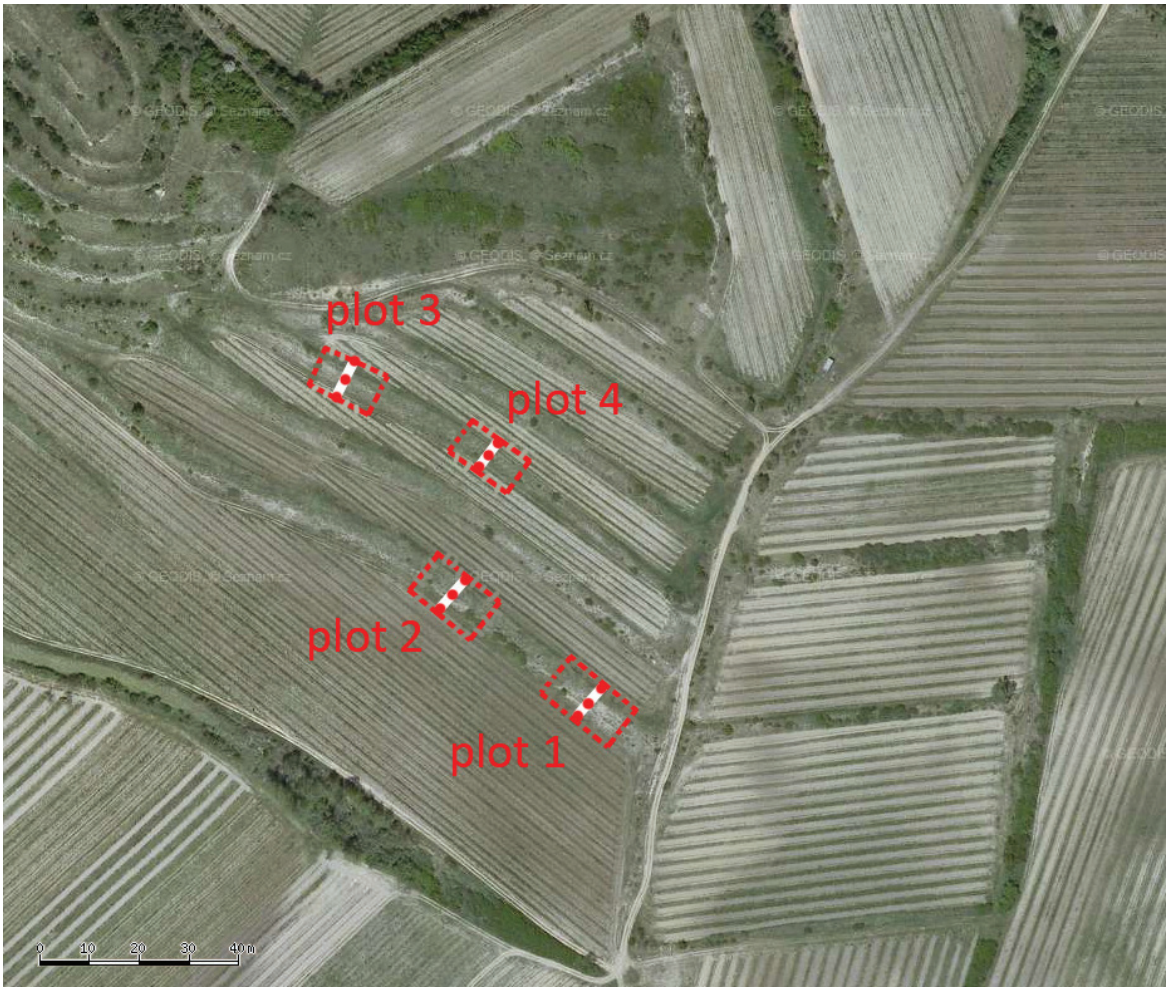
We used pitfall traps as a primary collecting method supplemented by sweeping of herb vegetation. We have chosen four lines of three pitfall traps in each of the examined locality. Two lines were placed on the slopes with a disturbed grass turf and sparse vegetation (Plot 1 and Plot 3). The other two lines were placed on the relatively overgrown slopes with continuous vegetation cover (dense grass turf) (Plot 2 and Plot 4). Pitfall traps were situated on each plot in the centre of slope and in the lower and upper bottom of the slope (Figs 3–4). Traps were installed on 30 April 2011 and emptied at regular monthly intervals from May to October 2011 (29 May, 30 June, 29 July, 26 August, 25 September, and 25 October). We used 4% formaldehyde solution as fixative fluid.

On every collecting plot, we used day and night sweeping of herb vegetation alongside of the each of the pitfall traps line (Figs. 3–4). We used this method in 2011 in the following dates: day sweeping – 30 April, 25 May, 30 June, 30 July, 26 August, 25 September, 28 October; night sweeping – 20 May, 10

1: *Marked border of the vineyard terraces at Mikulov with a location on the grid map of the Czech Republic (www.mapy.cz)*



2: *Marked border of the vineyard terraces at Popice with a location on the grid map of the Czech Republic (www.mapy.cz)*



3: *Locality Mikulov. Position of collecting transects (white line – transect of three pitfall traps, red dashed line – area used for sweeping method) (www.mapy.cz)*

4: *Locality Popice. Position of collecting transects (white line – transect of three pitfall traps, red dashed line – area used for sweeping method) (www.mapy.cz)*

July and 23 August. After collection, the obtained material was preserved in 70% ethanol.

All spider material was determined to species level by means of literature: Miller (1971), Heimer & Nentwig (1991), Roberts (1995), Nentwig *et al.* (2011). Nomenclature and arrangement of families, genera and species follow the most recent version of the World Spider Catalog 13.5 (Platnick, 2013). Majority of the species were determined by Ondřej Košulič and Vladimír Hula. Morphologically complicated taxa were revised and determined by Jan Dolanský (JD) – family Miturgidae and Milan Řezáč (MŘ) – family Dysderidae. Specimens of *Tibellus macellus* were revised and confirmed by Vítězslav Bryja (VB). All of the examined material is deposited in collection of Ondřej Košulič. Comments and ecological preferences of are based mainly on Buchar & Růžička (2002) and Bryja *et al.*, (2005). For each of the discovered species the following characteristics (according to Buchar & Růžička, 2002; Růžička & Buchar, 2008; Růžička, 2005) are mentioned:

Originality of habitat: C (Climax preferences), SN (Seminatural habitats)

Thermopreferences: T (Thermophyticum), M (Mesophyticum)

Occurrence level: S (Scarce), R (Rare species), VR (Very rare species)

Conservation status: CR (Critically endangered), EN (Endangered), VU (Vulnerable)

Vulnerability: LR (Lower risk)

The abbreviations of protected locations and collecting methods are as follows:

PLA (Protected Landscape Area), NNR (National Nature Reserve), NNM (National Nature Monument), NR (Nature Reserve), NM (National Monument)

Pitfall trapping (pt), Day sweeping (ds), Night sweeping (ns).

RESULTS AND DISCUSSION

Concerning the Red List of threatened species in the Czech Republic (Růžička, 2005), 22 species belonging to the categories CR, EN and VU were found altogether (Tab. I). We found 18 species of Red List of threatened species in the vineyard terraces around Mikulov (CR – 3 species, EN – 7 species, VU – 8 species). In vineyard terraces at the vicinity of Popice, 12 threatened species were found altogether (CR – 2 species, EN – 3 species, VU – 7 species).

The most significant findings include the discovery of *Tibellus macellus* Simon, 1875. This species is known only from the Pouzdřanská step – Kolby NNR, where it was discovered by Prof. Miller in the 60s of the 20th century (Kůrka, 1997). Recently, it was found again in 2004 (Bryja *et al.*, 2005). Its findings on the vineyard terraces near Mikulov and Popice are the third and fourth records of this species in the Czech Republic.

Regarding the assessment of rare species abundance, a very great occurrence of several significant bioindicative species was reported for each studied site (Tab. II). Among dominant and eudominant representatives belong following species: rare *Thanatus arenarius* Thorell, 1872 and

I: *Summary of species registrated in Red List of threatened species in the Czech Republic with conservation status (Růžička, 2005) and occurrence level (Buchar & Růžička, 2002). Explanations: CR (Critically endangered), EN (Endangered), VU (Vulnerable); VR (Very rare species), R (Rare species); numbers (collected specimens)*

Category	Rareness	Species	Popice	Mikulov
CR	VR	*Dysdera hungarica*	12	3
CR	VR	*Cheiracanthium pennyi*		3
CR	VR	*Tibellus macelus*	7	4
EN	VR	*Alopecosa solitaria*		55
EN	R	*Euryopis laeta*		4
EN	VR	*Euryopis saukea*		1
EN	R	*Heriaeus oblongus*		12
EN	VR	*Cheiracanthium elegans*		1
EN	VR	*Cheiracanthium punctorium*	1	5
EN	VR	*Micaria dives*	3	
EN	VR	*Synaleges hilarulus*	1	
EN	VR	*Styloctetor romanus*		1
VU	R	*Agroeca lusatica*	2	
VU	R	*Entelecara flavipes*	1	
VU	R	*Haplodrassus dalmatensis*	18	7
VU	R	*Leptyphantes insignis*	1	1
VU	R	*Marpisa nivoyi*		1
VU	R	*Ozyptilla pullata*	47	65
VU	R	*Pellenes nigrociliatus*		1
VU	R	*Scotina celans*		1
VU	R	*Sitticus pennicilatus*	6	3
VU	R	*Titanoeca schineri*	5	6

II: *Summary of rare and significant species with occurrence level and the degree of vulnerability (Buchar & Růžička, 2002). Explanations: LR (Lower risk); x (without vulnerability status); (Very rare species), R (Rare species), S (Scarce species); numbers (collected specimens)*

Vulnerability	Rareness	Species	Popice	Mikulov
x	VR	*Cheiracanthium campestre*	2	
LR	R	*Drassyllus pumilus*	39	23
x	S	*Evarcha laetabunda*	1	1
x	S	*Gnaphosa lucifuga*	109	35
x	S	*Haplodrassus kulczynskii*	3	9
x	R	*Ipa keserlingi*	2	3
LR	R	*Leptyphantes geniculatus*		1
LR	R	*Micaria formicaria*	3	7
LR	R	*Nematogmus sanguinolentus*	5	2
LR	R	*Neottiura suovalens*		2
x	R	*Ozyptilla scabricula*	8	16
x	S	*Pardosa bifasciata*		23
LR	R	*Phrurolithus pullatus*	11	2
LR	R	*Steatoda albomaculata*	39	16
LR	R	*Thanatus arenarius*	104	157
x	S	*Walckenaeria capito*	2	1
LR	R	*Xysticus acerbus*	6	3
x	R	*Xysticus robustus*		10
LR	R	*Xysticus sabulosus*	1	2
x	R	*Xysticus striatipes*	1	58
x	R	*Zelotes longipes*	82	40
LR	R	*Zelotes pygmaeus*	29	15

Ozyptila pullata (Thorell, 1875) (the most abundant species at both studied localities), very rare *Alopecosa solitaria* (Herman, 1879) (eudominant species in terraces at Mikulov), *Xysticus striatipes* L. Koch, 1870 (dominant species in terraces at Mikulov), *Gnaphosa lucifuga* (Walckenaer, 1802) (very abundant in terraces at Popice), *Steatoda albomaculata* (Degeer, 1778) (abundant in terraces at Popice), *Drassyllus pumilus* (C. L. Koch, 1839) and *Zelotes longipes* (L. Koch, 1866) (very abundant species in both localities). Overall, we can say that in the surveyed habitats of vineyard terraces, we found a large number of rare and very rare species whose occurrence is typical by their dependence to less than twenty fields of grid mapping squares. Furthermore, all mentioned species belong to the major bioindication elements of well-preserved xerothermal habitats which are in the constantly intensified landscape of southern Moravia diminishing due to poorly-led interventions into the landscape and unsuitable management of protected grassland habitats.

Generally, majority of the discovered species are characteristic for short-grass steppe habitats at loess loam and sandy soils that are present in several isolated protected reserves in southern Moravia (e.g. Dunajovické kopce NNR, Kamenný vrch NR, Milovické stráň NR, Pouzdřanská step – Kolby NNR, Růžový kopec NM etc.). Among these typical representatives belong very rare and endangered species such as *Euryopis laeta* (Westring, 1861), *Euryopis saukea* Levi, 1951, *Cheiracanthium pennyi* O.P.-Cambridge, 1873, *Haplodrassus dalmatensis* (L. Koch, 1866), *Heriaeus oblongus* Simon, 1886, *Tibellus macellus* Simon, 1875 and *Synageles hilarulus* (C. L. Koch, 1846). Similar composition of rare species is not found in Bohemian steppes habitats, because many typical and often dominant species in the Pálava region occurs only up to the Pannonia and do not spread further to the north, i.e. to Bohemia (e.g. *Alopecosa solitaria, Ozyptila pullata*, *Phrurolithus pullatus*, etc.).

Based on our results, the vineyard terraces can act as an important refuge for rare steppe species of spiders in the unified intensive agricultural landscape of South Moravia. Suitable conditions of vineyard terraces (steep slopes with exposed substrate, low vegetation structure, sparse vegetation coverage) enable many rare endangered species to occur. In harmony with current knowledge, these species are largely depend to the steppe formed on loessial soils only in Moravia (Buchar & Růžička, 2002; Růžička & Buchar, 2008; Bryja *et al.*, 2005).

Annotated list of remarkable species

Dysderidae

Dysdera hungarica Kulczyński, 1897 C, T, VR, CR

A very rare species of the genus *Dysdera* that is distributed exclusively in the warmest parts of southern Moravia (Řezáč & Bryja, 2002). The area of this thermophilic species lies within the area between the Pannonia region and Azerbaijan (Deeleman-Reinhold & Deeleman-Reinhold, 1988). In the Czech Republic, the species was found at 13 locations (7 grid mapping squares). Its findings are reported from warm habitats in rugged areas of Podyjí, Pálava, Pouzdřany Forest-Steppe, Dunajovice Hills and from around Brno (Obřanská stráň NM, Kavky NM). From Bohemia, only one finding of an isolated population in extensive apple orchard at Prague-Ruzyně has been reported. The spider was probably brought here by man (Řezáč, *in press*). *Dysdera hungarica* reproduces parthenogenetically – that is not known in any other spider species occurring in the Czech Republic (Řezáč & Bryja, 2002). Individual specimens of this species were captured in all areas of both surveyed locations. Finding on the vineyard terraces at Popice belongs among the first record of this species in the faunistic square 7066 (Fig. 5).

Data: Mikulov, 30. 4.–29. 5. 2011: plot 2, pt, 1♀, det. MŘ; plot 3, pt, 1♀, det. MŘ; plot 4, pt, 1♀, det. MŘ; Popice, 30. 4.–29. 5. 2011: plot 1, pt, 1♀, det. MŘ; plot 3, pt, 2♀, det. MŘ; plot 4, pt, 3♀, det. MŘ; 29. 5.–30. 6. 2011: plot 3, pt, 1♀, det. MŘ; plot 4, pt, 2♀, det. MŘ; 26. 8.–25. 9. 2011: plot 2, pt, 1♀; plot 3, pt, 1♀; 25. 9.–28. 10. 2011: plot 1, pt, 1♀.

Theridiidae

Euryopis laeta (Westring, 1861) C, T (M), R, EN

A rare species living among grass turf and heather on rock steppes. *E. laeta* was found in Pouzdřanská step – Kolby NNR and in Pavlovské vrchy by F. Miller (Miller, 1963; Kůrka, 2003) and confirmed recently in Dunajovické kopce (NNR) by S. Vinkler (Bryja *et al.*, 2005). We found several specimens only in the terraces at Mikulov. It's very likely that this species can spread from nearby steppe habitats in the vicinity of the vineyards and is able to generate population and survive on the artificial habitats of vineyard terraces.

Data: Mikulov, 30. 4.–29. 5. 2011: plot 1, pt, 1♂; plot 4, pt, 1♂; 29. 5.–30. 6. 2011: plot 2, pt, 2♂.

Euryopis saukea Levi, 1951 C, T, VR, EN

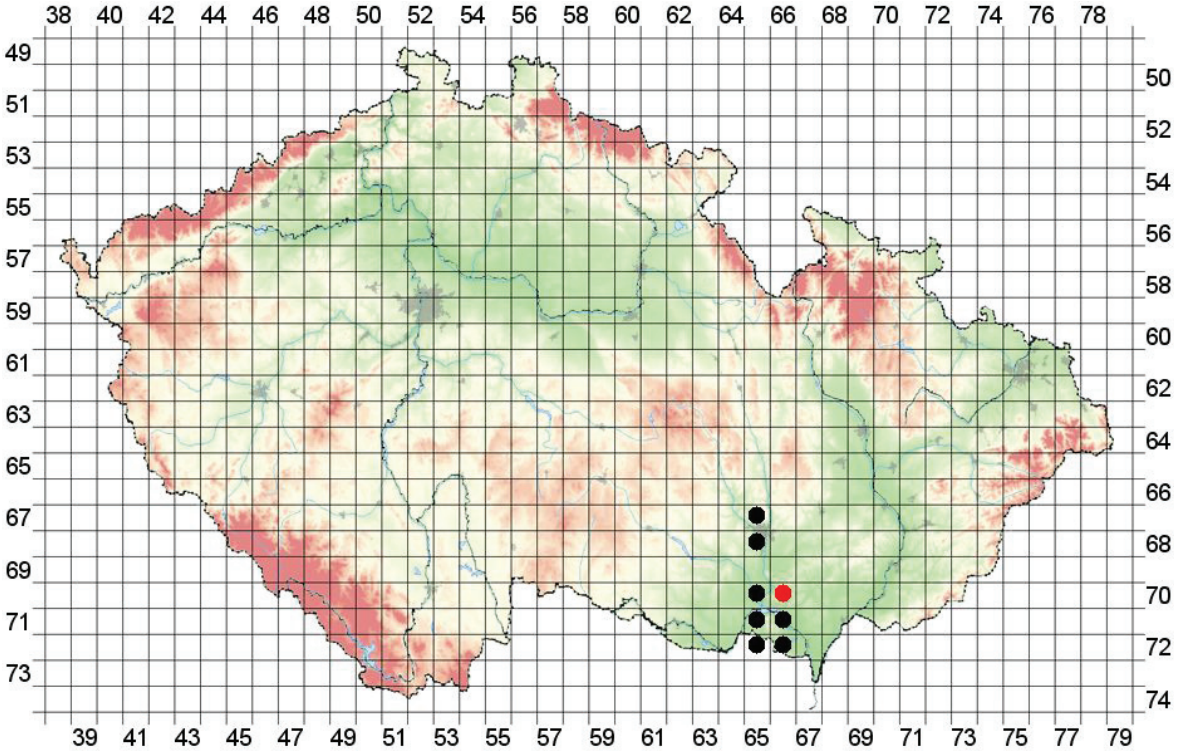
A very rare species which was recently found only on low vegetation of abandoned vineyard close to Moravská Nová Ves (Bryja *et al.*, 2005). From the surrounding area, historical records are known from Pouzdřanská step – Kolby NNR (Miller, 1963). Among the other records belong findings on Hádecká planinka in the vicinity of Brno (Kůrka, 2003) and from sandy habitats around Vlkoš (Buchar & Růžička, 2002). We found only one adult specimen in the terraces at Mikulov. The fifth record of this remarkable species for the Czech Republic and the first record for the faunistic square 7165 (see Fig. 6).

Data: Mikulov, 30. 4.–29. 5. 2011: plot 2, pt, 1♂.

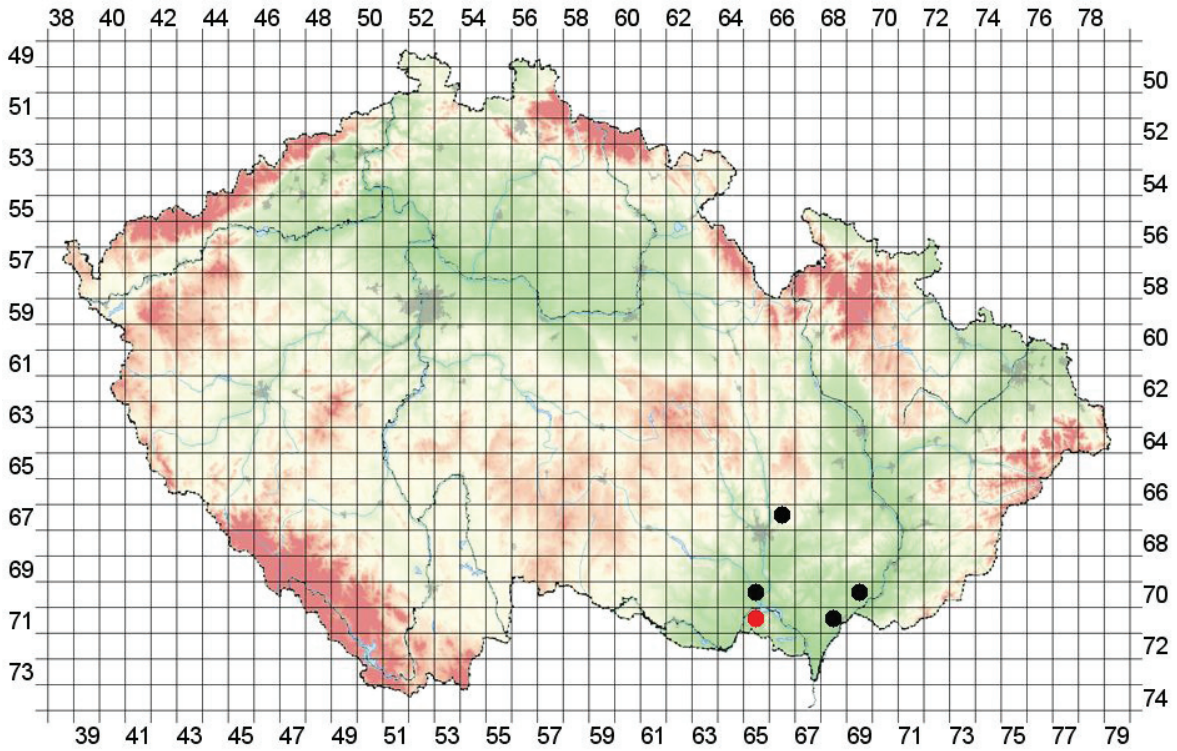
Linyphiidae

Styloctetor romanus (O. P.-Cambridge, 1872) C, T, M, VR, EN

A very rare thermophilic species with original distribution in Mediterranean from where it has



5: *Distribution of Dysdera hungarica in the Czech Republic (red dot – locality Popice)*



6: *Distribution of Euryopis saukea in the Czech Republic (red dot – locality Mikulov)*

spread to a larger part of central Europe. In the Czech Republic, findings from three locations of Bohemia have been reported (České středohoří), in Moravia only two historical (before 1950) findings are known (Buchar & Růžička, 2002). Recently, the species was found in grassy steppes of Pálava PLA – Kočičí skála and Skalky in Lednice-Valtice Area (Bryja *et al.*, 2005). In the examined material, one

adult specimen only was found in the terraces near Mikulov. The finding belongs to the third record of this species in Moravia.

Data: Mikulov, 29. 5.–30. 6. 2011: plot 4, pt, 1♂.

Lycosidae

Alopecosa solitaria (Herman, 1879) C, T, VR, EN

A very rare thermophilic species occurring in rocky steppes and edges of thin forests, and is mapped only at a few locations in Moravia. More frequent findings are reported by Bryja *et al*. (2005) from Pálava PLA and Dunajovické kopce NNR. Individual findings are published from rather small Nature Reserves in the district of Břeclav (Košulič & Hula, 2011a, 2011b). Other localities of its occurrence include Krumlov-Rokytná Conglomerates (Bryja, 2002). This location represents the northern limit of the distribution area of this large wolf spider. It is therefore a significant element of the Pannonian arachnofauna in the Czech Republic. An important condition for the occurrence of these large wolf spiders of the *Alopecosa* genus is not continuous vegetation cover in which they dig their burrows. (Košulič & Hula, 2011a). The vineyard terraces offer them these necessary conditions in form of loessial substrate on the steep slopes of the terraces that are characterized by sparse vegetation. An interesting fact is that this species was found only on the terraces near Mikulov, where it formed a dominant component of local araneofauna. Observations revealed that it penetrated into the vineyard alleyways, where it was found particularly at night.

Data: Mikulov, 30. 4.–29. 5. 2011: plot 3, pt, 1♀; 29. 5.–30. 6. 2011: plot 3, pt, 1♀; 29. 7.–26. 8. 2011: plot 2, pt, 2♂; 26. 8.–25. 9. 2011: plot 1, pt, 5♂2♀; plot 2, pt, 3♂; plot 3, pt, 3♂2♀; plot 4, pt, 3♀; 25. 9.–28. 10. 2011: plot 1, pt, 9♂4♀; plot 2, pt, 4♂; plot 3, pt, 14♂1♀; plot 4, pt, 3♂.

Miturgidae

Cheiracanthium elegans Thorell, 1875 C, VR, T, EN

In the Czech Republic, this species is known only from Moravia. It lives in sunny forest edges, forest-steppes, in old orchards, and bushes. The center of its distribution is situated in the Pannonian part of southern Moravia, where it is reported a bit more frequently, whereas it is always found in steppe habitats, their bushy edges or rather spase thermophilic oak forests. (Dolanský, 2011). At these places, the spiders are found on the branches of trees and shrubs, or in the understory. The first discoveries in the Czech Republic include specimens from Pouzdřanská step – Kolby by F. Miller (Kůrka, 1996) and from NM Čubernice in the Prostějov region (Špičáková, 1985). In our material, an adult male was captured in a pitfall trap on terraces near Mikulov.

Data: Mikulov, 30. 6.–29. 7. 2011: plot 3, pt, 1♂, det. JD.

Cheiracanthium pennyi O. P.-Cambridge, 1873 C, VR, T, CR

A very rare thermophilic species. Within the Czech Republic, it is reported only from southern Moravia. It is found in soil slopes separating terraces of fields and vineyards and in the vicinity of field tracks. It lives here in the sparse, mostly partially ruderal grassland vegetation with presence of exposed places of light loamy soil (Dolanský, 2011). It can thus be concluded that the species is not directly bound to its natural habitats, but it can also colonize disturbed habitats. However, the first findings are specimens from steppe grasslands of Pouzdřanská step – Kolby NNR in 1982 by F. Miller (Kůrka, 1997). Hula *et al*. (2009) and Košulič *et al*. (2011) points out the link to the empty shells of land snails of the genus *Xerolenta* used by subadult specimens for hibernation during the winter months. The finding in the area of vineyard terraces near Mikulov belongs among the first information for 7165 faunistic square (see Fig. 7).

Data: Mikulov, 20. 5. 2011: plot 1, ns, 1♂, det. JD; 25. 5. 2011: plot 3, ds, 1♀, det. JD; plot 4 ds, 1♂, det. JD.

Gnaphosidae

Haplodrassus dalmatensis (L. Koch, 1866) C, R, T, VU

An epigeic rare species living under stones on rocky steppes, also temporarily at depleted stockpiles and a spoil heap at some stage of spontaneous succession (Kůrka *et al.,* 2010). The presence of sufficient number of loose stones which are used by these spiders as their shelter is an important factor. According Bryja *et al*. (2005), quite common around Pálava region, on dry and sunny stands where prefer localities on sandy or loess soils.

Data: Mikulov, 30. 4.–29. 5. 2011: plot 1, pt, 2♀; plot 2, pt, 1♀; plot 3, pt, 2♂2♀; Popice, 30. 4.–29. 5. 2011: plot 1, pt, 3♂1♀; plot 2, pt, 1♂; plot 3, pt, 3♂♀; plot 4, 1♂1♀; 29. 5.–30. 6. 2011: plot 1, 2♀; plot 3, pt, 1♂2♀; 30. 6.–29. 7. 2011: plot 1, pt, 1♂2♀.

Micaria dives (Lucas, 1846) C, VR, T,M, EN

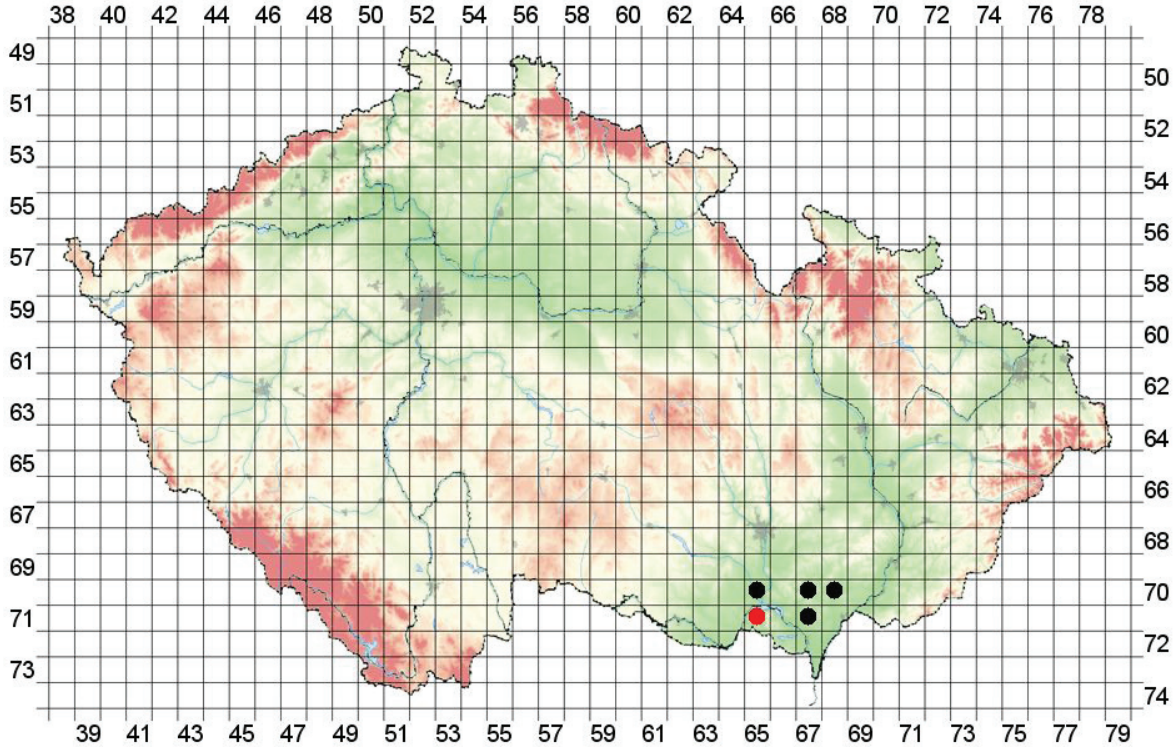
A very rare species of gnaphosid spider that imitates ants. This species occurs mainly on dry and sunny habitats with calcareous geological substrate. From a historical point of view, only a few records from southern Moravia are known from the Czech Republic (Miller, 1947; Kůrka, 1994; Buchar, 1997). Recent findings were confirmed by Bryja *et al*. (2005). We found several specimens by pitfall trapping in vineyard terraces at Popice. The first record of this species for grid mapping square 7066 (Fig. 8).

Data: Popice, 30. 4.–29. 5. 2011: plot 2, pt, 2♂; plot 3, pt, 1♀.

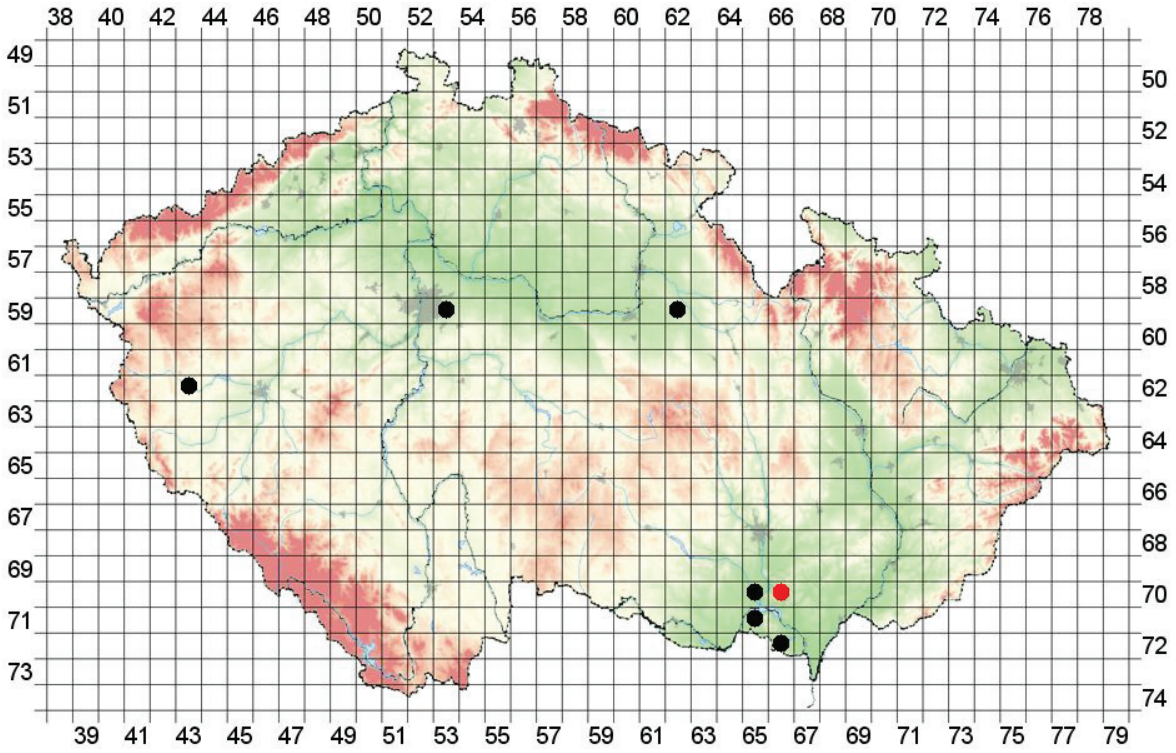
Philodromidae

Tibellus macellus Simon, 1875 C, VR, T, CR

A very rare species known only from Pouzdřanská step – Kolby NNR (Kůrka, 1997; Bryja *et al*., 2005). Unlike the other rare species from Pouzdřany hills, it appears that *T. macellus* has not so locally-

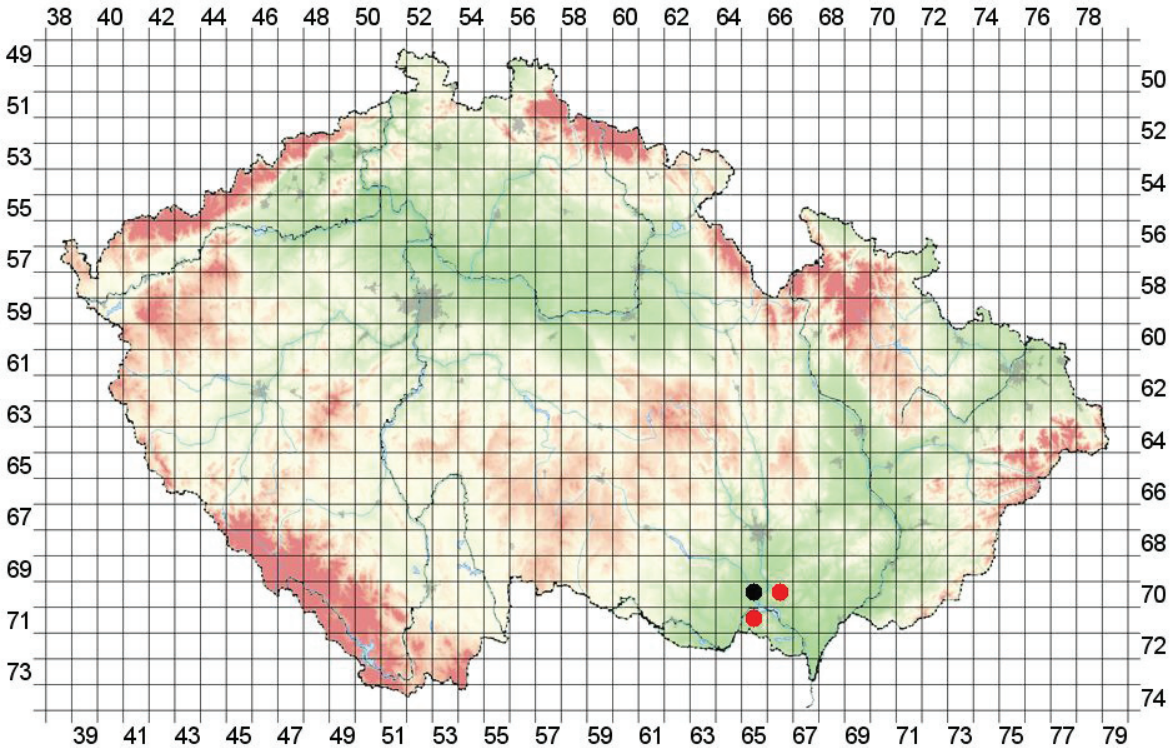


7: *Distribution of Cheiracanthium pennyi in the Czech Republic (red dot – locality Mikulov)*

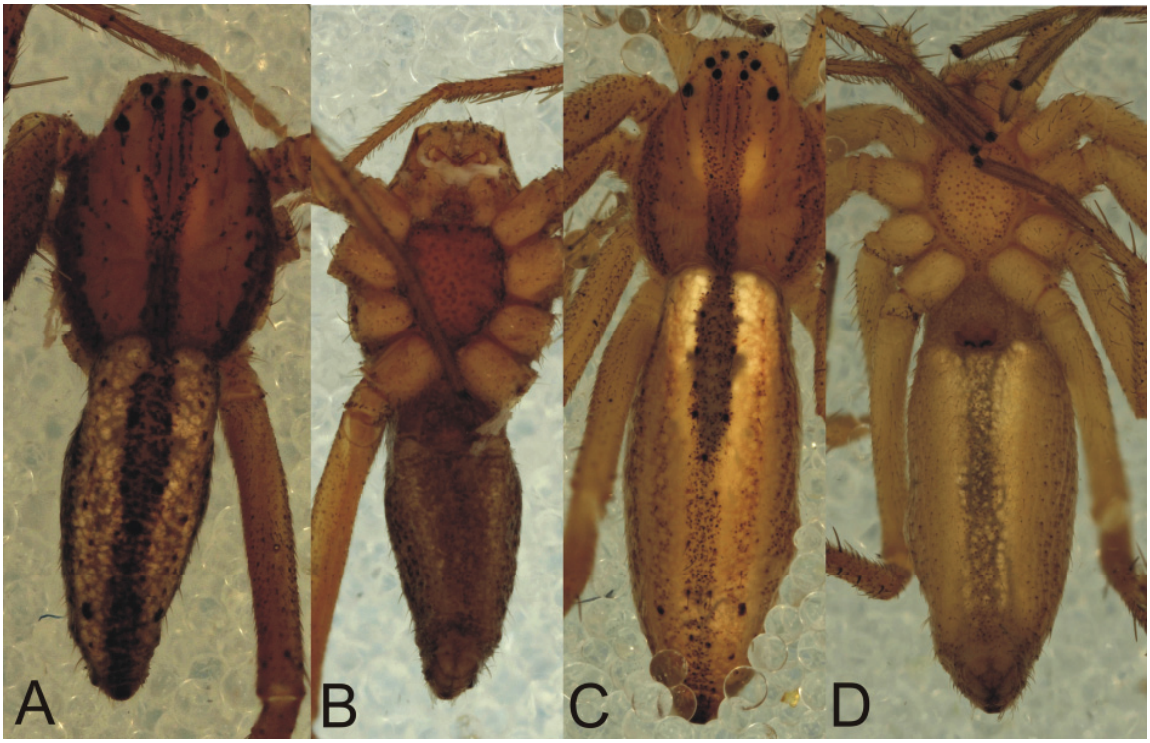


8: *Distribution of Micaria dives in the Czech Republic (red dot – locality Popice)*

dependent population and, at the time of sexual maturity, it was being captured in more numerous amounts. Despite these characteristics, however, it has not spread and has never been detected in the favorable surrounding habitats (Růžička & Buchar, 2008). Within our research, several specimens were collected both at Popice and Mikulov. It occurred in the undergrowth along with a more abundant

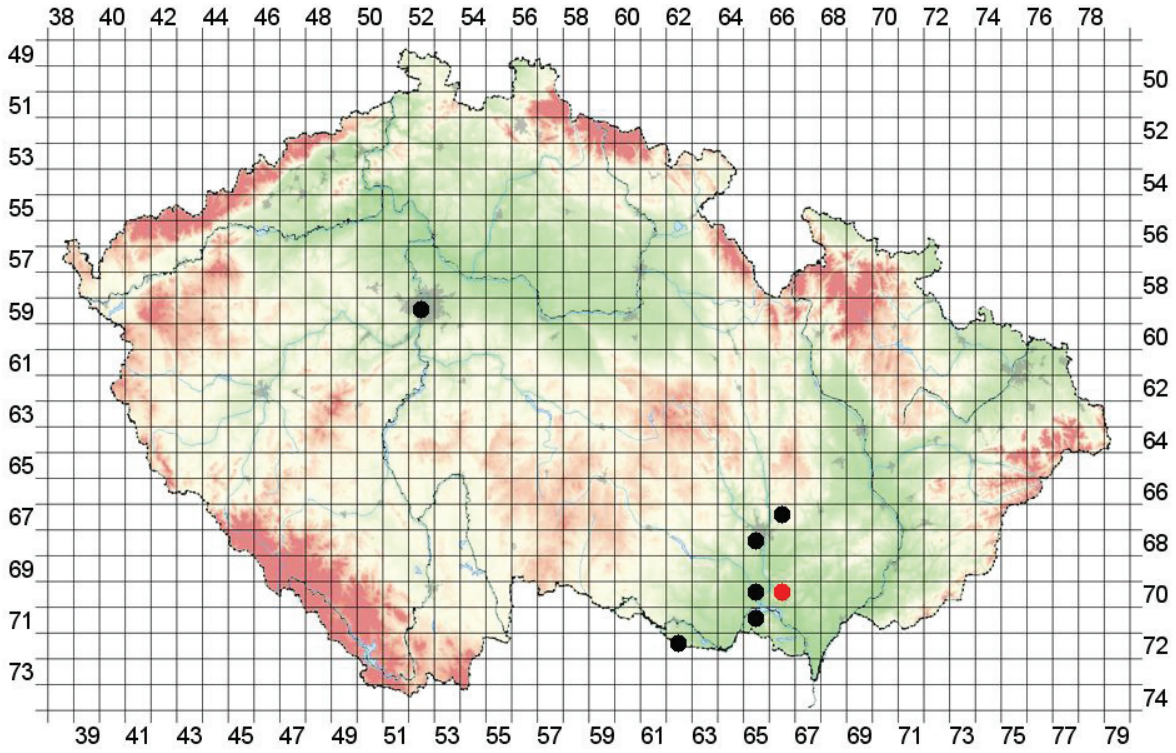


9: *Distribution of Tibellus macellus in the Czech Republic (red dots – locations Popice and Mikulov)*



10: *Habitus of adult specimens of Tibellus macellus (A, B – male, ventral and dorsal view; C, D – female, ventral and dorsal view)*

related species of *Tibellus oblongus* (Walckenaer, 1802). The finding of *T. macellus* on the vineyard terraces at Popice and Mikulov is the third and the fourth finding in the Czech Republic and greatly enriches faunistic information on the distribution (Fig. 9) of this very rare thermophilic species. From neighboring countries, this species is known only from Slovakia (Gajdoš *et al.*, 1999) and then through the Pannonian lowlands where, across the area of Black Sea, it reaches up to the Caucasus (Nentwig



11: *Distribution of Synaleges hilarulus in the Czech Republic (red dot – locality Popice)*

et al., 2011). The species is typical by its streaked body color with a distinct drawing on the abdomen and on the margin of the carapace (Fig. 10).

Data: Mikulov, 25. 5. 2011: plot 2, ds, 1♂1♀, det. VB; 30. 6. 2011: plot 1, ds, 1♂1♀, det. VB; Popice, 30. 4. 2011: plot 1, ds, 1♀, det. VB; 25. 5. 2011: plot 1, ds, 2♀, det. VB; plot 3, ds, 1♀, det. VB; 30. 6. 2011: plot 3, ds, 1♂, det. VB; plot 4, ds, 2♂, det. VB.

Thomisidae

Heriaeus oblongus Simon, 1886 C, T, R, EN

A species typical for grass steppes, rock steppes and adjacent oak forests all around Pálava region (Bryja *et al.*, 2005). This species is rare in the Czech Republic with only two findings in Bohemia (Kůrka *et al.*, 2010), however quite common in south Moravia in suitable habitats (Buchar & Růžička, 2002). Probably a Pannonian element occurring mainly in the warmest parts in the Czech Republic. Alltogether, we found 12 adult specimens in every study plot of vineyard terraces at Mikulov. This species was found mainly by night sweeping method (presumably possesses a night activity).

Data: Mikulov, 20. 5. 2011: plot 2, ns, 1♀; plot 3, ns, 1♂; plot 4, ns, 1♀; 30. 4.–29. 5. 2011: plot 3, pt, 1♂1♀; 29. 5.–30. 6. 2011: plot 2, pt, 1♂1♀; 24. 8. 2011: plot 1, ns, 1♀; plot 4, ns, 1♀; 26. 8. 2011: plot 3, 1♂1♀; 29. 7.–26. 8. 2011: plot 2, pt, 1♀.

Salticidae

Sitticus penicillatus (Simon, 1875) C, SN, T, R, VU

A rare species of jumping spider living in rocky steppe vegetation. However, it is very common in stony debris and quarry habitats which substitute natural rocky steppe habitats (Kůrka *et al.*, 2010; Hula & Šťastná, 2010). From the area of Pálava, there are several historical findings (Kůrka, 2001). Bryja *et al.* (2005) confirmed them and recorded new findings from suitable habitats in Pálava PLA. This species is known for its connection to empty shells of land snails (genera *Xerolenta* and *Cepaea*) which it uses for hibernation and even as shelters during the growing season (Bellman, 1999; Szinetár *et al.*, 1998; Hula *et al.*, 2009). It was found at both studied sites. This is the first record for the grid square No. 7066 (Popice terraces).

Data: Mikulov, 30. 4.–29. 5. 2011: plot 1, pt, 1♀; 30. 6.–29. 7. 2011: plot 3, pt, 1♀; 25. 9. 2011: plot 2, ds, 1♀; Popice, 30. 4.–29. 5. 2011: plot 2, pt, 1♂; 29. 5.–30. 6. 2011: plot 3, pt, 1♀; 30. 6.–29. 7. 2011: plot 1, pt, 2♀; plot 3, pt, 2♀.

Synageles hilarulus (C. L. Koch, 1846) C, T, R, EN

A rare endangered species, collected by F. Miller in Pouzdřanská step – Kolby (Miller, 1966), in Hádecká planinka, and from Špilberk in Brno (Kůrka, 2001). Recently confirmed only by Bryja *et al.* (2005) in Dunajovické kopce NNR in the region of Pálava. The fifth record of this species is from Vrbovec-Hnízdo in the vicinity of Podyjí PLA (Buchar & Růžička, 2002). There is one record from Bohemia only – Prokopské údolí valley in Prague (Kůrka *et al.*, 2007) (Fig. 11). Our finding is the first record for the area of the faunistic square 7066 (terraces Popice) and significant information of the extension of this rare thermophilic spider.

Data: Popice, 30. 4. 2011: plot 1, ds, 1♂.

SUMMARY

The contribution deals with the rare and remarkable spiders of vineyard terraces near Mikulov and Popice. Spiders were collected by pitfall trapping and by sweeping of the herb vegetation in 2011. Twenty two species listed in the Red List of threatened species in the Czech Republic were discovered. In vineyard terraces at the vicinity of Popice, 12 threatened species (CR – 2 species, EN – 3 species, VU – 7 species) were found. In the vineyard terraces at Mikulov, we found 18 threatened spider species (CR – 3 species, EN – 7 species, VU – 8 species). The most important findings were those of critically endangered *Tibellus macellus*, *Dysdera hungarica*, and *Cheiracanthium pennyi* known from the warmest locations of the South Moravia. The discovery of *Tibellus macellus* represents the third record of this species in the Czech Republic. A significant and numerous findings of rare bioindicators of well preserved steppe habitats were found: *Thanatus arenarius, Ozyptilla pullata*, and *Alopecosa solitaria*. These species created dominant component of araneoufauna of both examinted vineyard terraces in Mikulov and Popice. To the other important faunistic findings belong *Euryopis laeta*, *Euryopis saukea*, *Heriaeus oblongus*, *Cheiracanthium elegans*, *Micaria dives*, *Styloctetor romanus*, *Synageles hilarulus*, *Titanoeca schineri*, and further rare xerothermophilous species. All these species are known from no more than ten grid mapping squares in the Czech Republic. All these species are very rare, centres for their presence are the most valuable steppe localities of the Pannonian region. An important element for the presence of xerothermophilous rare species is sparse vegetation coverage that is created and maintained by the pasture in the steppe habitats normaly. In the explored vineyard terraces, these important patches rise from high slope and powdery loess geological substrate. These valuable findings of rare and threatened species of spiders support hypothesis that vineyard terraces are important refuge for xerothermophilous spiders in intensively exploited landscape of south Moravia in the Czech Republic.

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