EPIGEIC SPIDERS FROM LOWLAND OAK WOODLANDS IN THE SOUTH MORAVIA REGION (CZECH REPUBLIC)

Kamila Surovcová¹, Ondřej Košulič¹, Vladimír Hula²

¹Department of Forest Protection and Wildlife Management, Faculty of Forestry and Wood Technology, Mendel University, Zemědělská 1, 613 00 Brno, Czech Republic
²Department of Zoology, Fisheries, Hydrobiology and Apiculture, Faculty of AgriSciences, Zemědělská 1, 613 00 Brno, Czech Republic

Abstract


This paper presents spider faunistics from abandoned coppice oak forest stands located along the South Moravia region. Spiders were collected from May to July 2012 by pitfall trapping at eight different localities. We collected 1945 adult spiders representing 20 families, 53 genera, and 90 species. More than one-third of all the species are known to be xerothermophilous with ecological restrictions to open and partly shaded habitats such as forest-steppe and sparse forests which belong to endangered habitats along central Europe. The most abundant species were Pardosa alacris, P. lugubris and Arctosa lutetiana from the family Lycosidae. In the surveyed area, 24 species were found listed in the Red List of Threatened Species in the Czech Republic (CR – 1 species, EN – 2 species, VU – 15 species, LC – 6 species). In general, we discovered a substantially diversified spider community with a large presence of rare and endangered species characteristic for open and xeric habitats.

Keywords: araneae, biodiversity, faunistics, coppice forests, woodlands

INTRODUCTION

Spiders are a group of animals widely used for bioindication in studies assessing impact of agricultural, forestry or conservation interventions on the quality of ecosystems (Marc et al., 1999; Košulič et al., 2016). They are used due to their species and ecological diversity in various terrestrial habitats (Wise, 1993; Cardoso et al., 2011). For biomonitoring research, spiders occurring on the soil surface (so called epigeic spiders) are widely used. They are well studied and they are easily monitorable using simple techniques such as pitfall trapping (Růžička, 1987). Another reason for their use for bioindicative research is their position in the trophic chain – they are predators without a food specialization in most cases (Wise, 1993). Many species of epigeic spiders are common over a wide area, but remain closely associated with their environment and are relatively easily monitorable by pitfall traps and individual collecting methods (Wise, 1993; Pearce and Venier, 2006). Because of these attributes, they constitute a good indicator group among organisms that may be surveyed to help in the assessment of the natural situation and changes occurring in the locations (Buchar, 1983; Buchar and Růžička, 2002; Kůrka et al., 2015). From these reasons, they are very suitable group for faunistic and biodiversity studies in various ecosystems.

The research of araneofauna in the Czech Republic is extensively and well studied, however, forest habitats (especially thermophilic oak woodlands) in South Moravia region have not been studied very well in last decades (cf. Buchar and Růžička, 2002; Bryja et al., 2005). On the other hand, other forest ecosystems such as mountain forests and forest habitats at higher altitudes with beech and spruce forest stands have been studied more intensively around Czech Republic (e.g. Buchar and Růžička, 2002; Kůrka, 1997; Kůrka, 1999;
There are only two studies which mentioned faunistic record of spiders from lowland oak woodlands in southern Moravia (Bryja et al., 2005; Spitzer et al., 2008). These authors provided extensive faunistic contribution which mentioned many rare and bioindicatively important species of spiders from lowland oak forest stands. They made first awareness that sparse and formerly coppice oak forests may be important habitats for many xeric species which usually live in steppe habitats.

This research began for the purpose to extend knowledge of spiders occurring in lowland oak forests which were formerly coppiced and used for other extensive management efforts. Previous authors point out that this type of forest habitats may be species rich with presence of various araneocenosis (Bryja et al., 2005; Košulič et al., 2016). Therefore, we suggest that faunistic discoveries in this paper will provide important contribution to the knowledge of araneofauna of lowland oak woodlands and may be also used as practical information for conservation management of mentioned habitats.

**MATERIAL AND METHODS**

**Study area and locations**

The research was performed in vicinity of Hodonín, Břeclav and Brno (Fig. 1). This study area is a crossroads between the Hercynian highlands, the Carpathians, and the Pannonian biogeographic region, and it hosts a great biodiversity of thermophilic fauna and flora (Mackovčin, 2007). It encompasses around 670 km² in a lowland type of landscape (150–350 m a.s.l.) that consists of a mosaic of intensified arable land, settlements, deciduous forests, orchards, and small patches of open grasslands (Mackovčin, 2007). All study locations in selected area were formerly managed by traditional forest management such as coppice, but at the recent time, they are abandoned or non-intervened. Only in certain areas, occasional disturbances are present as a conservation thinning and selected tree logging.

We selected eight main and largest formerly coppiced forests in the municipalities of Moravský Krumlov, Němčičky, Boleradice, Kurdějov, Vranovice, Milovice, Dubňany, and Mutěnice (Fig. 1, Tab. I). All study locations were afostered with various species of oaks (*Quercus robur, Q. pubescens, Q. petraea*) and hornbeam (*Carpinus betulus*) as the main tree species. Accompanying tree species included ash (*Fraxinus excelsior*), linden (*Tilia cordata*), and field maple (*Acer campestre*). All study sites had similar altitudes and comparable forest growth ages (formerly coppiced forests >80 years) and are now not actively managed or disturbed by humans.

**Samples collection and methods**

We established transects 60 m long reflecting the canopy openness gradient in each of the eight studied forest stands. This transects consisted of five pitfall traps placed at regular intervals (15 m). Each trap location differed in light density from the most open and sparse canopy (forest steppe clearings) to the most closed and dense canopy (dense forest habitat). This transects were selected from that reason that we needed to collected all spider species from different ecological groups (from heliophilous to psychrophilous). Each pitfall trap consisted of a plastic cup (9 cm in diameter, 15 cm long) sunk so as to be flush with the soil surface and filled with 4% formaldehyde solution as a killing and preserving agent. Traps were placed in 1 May 2012 and deactivated at the 20 July 2012. Traps were emptied two times (10 June and 20 July 2012). This sampling period was chosen because most central European spiders reach adulthood during this time of the season and can therefore be determined to species level and used for further evaluations (Roberts, 1995). Individual sites used for collecting spiders were identified by GPS coordinates (Table I). Maps with the occurrence of particular species were created by online application of BioLib (2017) website. Following publications were used for actual distribution data: Buchar and Řužička (2002); Bryja et al. (2005); Košulič (2014, 2015); Košulič and Hula (2012, 2013, 2014); Hula and Štastná (2010); Hula et al. (2012, 2014); ČAS (2017) and Macek (2017).

**Species identification**

All spider material was determined to species level by means of Heimer & Nentwig (1991), Roberts (1995) and Nentwig et al. (2017). Nomenclature and arrangement of families, genera and species follow the most recent version of the World Spider Catalog (2017). Occurrence level in the Czech Republic (number and distribution of grid squares, in which the species occur in the Czech Republic; Buchar and Řužička, 2002; Řužička and Buchar, 2008) and conservation status (Režák et al., 2015) were used for faunistic evaluation of collected material. Occurrence level was categorized as follow: VA (very abundant), A (abundant), S (scarce), R (rare) and VR (very rare). Conservation status was categorized as follow: CR (critically endangered), EN (endangered), VU (vulnerable), LC (least concern).

All examined material was deposited in the collection of the Mendel University, Faculty of Forestry and Wood Technology in Brno. The numbers of collected species and specimens in each studied locality are shown in Tab. I.

**RESULTS AND DISCUSSION**

During the arachnological research of selected oak woodland, 1945 adult spiders were collected. They were identified to 90 species, 22 families and 53 genera (Tab. II). The most abundant species were *Pardosa alarcis* (C. L. Koch, 1833), *Pardosa lugubris* (Walckenaer, 1802) and *Arctosa lutetiana* (Simon, 1876) which belonged to the family Lycosidae. The dominant representation of *A. lutetiana* is
interesting as this species is relatively rare in the Czech Republic (Buchar and Růžička, 2002). However, according to Dolejš (2014), this species is very typical for sparse and warm oak forest habitats where can reach high abundances. The highest species diversity was found in families Gnaphosidae (19 species), Lycosidae (15 species) and Linyphiidae (11 species) (Tab. III). The most abundant families were Lycosidae (1366 individuals), Gnaphosidae (189 individuals) and Thomisidae (120 individuals).

In comparing of ecological affinity of spider species according to Buchar and Růžička (2002) and Bryja et al. (2005), we discovered 31 species which are classified as having a preference for forest habitats and 54 species which are classified as having a preference for open habitats with a higher level of canopy openness. More than one-third of all the species are known to be xerothermophilous with ecological restrictions to open and partly shaded habitats such as forest-steppe and sparse forests (N = 38). The recorded araneocenosis contained a total of 24 species (26%) listed in the Red List of Threatened Species in the Czech Republic (Rézáč et al., 2015). Species from the Red List of Threatened Species include to the categories: critically endangered – Ge. modestior; endangered – D. pumilus and W. monoceros; vulnerable – A. piceus, C. schuzteri, D. villicus, M. formicaria, Z. erebeus, S. celans, A. sulzeri, A. lutetiana, P. bifaciata, P. hortensis, Z. manicata, T. arenarius, E. lactabunda, C. blackwalli and X. lactator; least concern – D. moravica, Z. apricorum, Z. aurantiacus, Z. electus, A. cuprea and E. truncatus. We found many spider species typical for forest steppe and steppe habitats which are categorized in very rare to scarce categories of occurrence level in the Czech Republic (Buchar and Růžička, 2002; Růžička and Buchar, 2008), namely: very rare: G. modestior; rare: A. sulzeri, A. lutetiana, C. schuzteri, C. blackwalli, D. pumilus, D. villicus, D. moravica, E. truncata, M. formicaria, S. celans, T. arenarius, W. monoceros, Z. manicata; scarce: A. cuprea, A. proxima, A. trabalis, A. piceus, A. albimana, C. prominens, E. lactabunda, H. nata, O. praticola, P. alaceris, P. bifaciata, P. hortensis, T. campestris, T. pedestris, W. furcellata, X. miniata, X. lanio, X. lactator, Z. apricorum, Z. aurantiacus, Z. electus, Z. erebeus and Z. germanicum.

Most of these thermophilous species are strictly dependent to the xeric and semixeric habitats with low vegetation structure and open canopy and presence of barren surfaces (Bryja et al., 2005; Košulič and Hula, 2014). Košulič et al. (2016) point out that the main driver of spider distribution in oak woodlands is canopy opening. Respectively, open habitats in forests with a lot of canopy gaps are very important for forest biodiversity. Unfortunately, such habitats are diminishing in the constantly intensified landscape of southern Moravia due to overgrowing of such suitable places and intensified agriculture and forestry (Spitzner et al., 2008; Šebek et al., 2015). All significant species of spiders found in this study are described below.

Annotated list of significant species
Nomenclature is according World Spider Catalogue (2017), Red List Category according Rézáč et al. (2015).

**Atypidae**
*Atpus piceus* (Sulzer, 1776)
This species occurs on warm hillsides, sunny edges of forests, arid pasture land and forest steppes (Rézáč et al., 2015). All species of *Atpus* genus make typical burrows with a dense web, which protrudes above the surface as a purse-web about 10 cm long (Bristowe, 1958). The horizontal position of purse-boxes, characteristic of European species, is considered to be an adaptation for capturing prey under snow cover (Schwendinger, 1989). It is difficult to find *Atpus* purse-web as the spiders camouflage their outer surface with soil particles (Rézáč et al., 2007). Vulnerable species.
Location: Morkůvky, Němčičky, Mutěnice, Dubňany and Miliove (Fig. 2).

**Dysderidae**
*Dasera moranica* Rézáč, 2014
This species was previously named as *D. ninii* Canestrini 1868, but taxonomic revision showed, however, that it is in fact a complex of several species (Rézáč et al., 2014). Now, it was described as a separate species *D. moranica* belonging to the Pannonian region (Rézáč et al., 2014). This is a therophilic species whose occurrence in the Czech Republic represents the most northern location in the whole Europe. In the Czech Republic, it lives only in 21 locations in xeric habitats such as southern slopes in the lowland oak forests, vineyard terraces, forest steppes etc. (Rézáč, 2012). Nearly threatened species. Location: Dubňany (Fig. 3).

**Gnaphosidae**
*Callilepis schuzteri* (Herman, 1879)
A rare Palaearctic species of Czech araneofauna. This species is bounded to the steppes, xeric edges of forests and scree slopes (Buchar and Růžička, 2002; Bryja et al., 2005). This species belong to the food specialists, which prey predominantly ants (Kůrka et al., 2015). Vulnerable species. Location: Morkůvky, Němečky, Mutěnice and Miliove (Fig. 4).

A European species, rare in the Czech Republic (Kůrka et al., 2015). Species characteristic for rock and forest steppes or sun-exposed scree slopes (Hula and Šťastná, 2010), where it often hides under rocks (Buchar and Růžička, 2002). Vulnerable species. Location: Miliove, Mutěnice, Němečky and Morkůvky (Fig. 5).

**Gnaphosa modestior** Kulczyński, 1897
A species with uncertain taxonomy. If we follow present literature (Kůrka et al., 2015) all record of this morphotype belongs to *G. modestior*. But it is
in contrary to global revision of genus Gnaphosa (Ovtsharenko et al., 1992). It is highly probable that it is species complex and taxonomical revision is needed. Gnaphosa modestior is distributed in eastern Europe to Azerbaijan (Platnick, 1997). According to arachnological research, this species prefers bright ecotones between xerotherminal-grass habitats and dry oak and hornbeams (Gajdoš and Majzlan, 2001). In the Czech Republic, it has very rare distribution in South Moravia (Košulič and Hula, 2012). Critically endangered. Location: Dubňany, Milovice and Mutěnice (Fig. 6).

*Micaria formicaria* (Sundevall, 1831)

A rare and endangered Palaeartic species that is bounded to the steppes, xeric forest edges, where lives under rocks and grass (Buchar and Růžička, 2002). In the Czech Republic, it occurs rarely throughout in the lower elevations (Niedobová et al., 2011). This species overwinter often in shells of land-snails (Hula et al., 2009). Vulnerable species. Location: Morkůvky, Němčičky, Milovice and Vranovice (Fig. 7).

*Zeolotes aurantiacus* Miller, 1967

A thermophilic species in the lowlands where it lives on rocky steppes, light forests, dry slopes, dry-lit forest edges; under stones and grass (Kůrka et al., 2015). This species often inhabit steppes in oak and pine forests in southern Moravia (Bryja et al., 2005).

Nearly threatened species. Location: Dubňany (Fig. 8).

**Linyphiidae**

*Walckenaeria monoceros* (Wider, 1834)

A rare Palaeartic species inhabiting xeric habitats, e.g. rocky steppe or forest steppe, where it prefer places with denser canopy (Buchar and Růžička, 2002). This spider often occurs in detritus on the rocky steppes (Kůrka et al., 2015). In the Czech Republic, it is recorded in the warmest places of Bohemia (Kňovklátsko, Český kras, Dolní Povltaví, Kokořínsko) (Kůrka et al., 2015). Categorized as an endangered species. Location: Kurdějov, Němčičky (Fig. 9).

**Liocranidae**

*Scotina celans* (Blackwall, 1841)

A species occurring from lowlands to middle altitude on the sunlit slopes of scree and detritus in dry forests between rocks, under stones and bark of trees (Buchar and Růžička, 2002). Common species of light forests of Pálava PLA (Bryja et al., 2005). Vulnerable species. Location: Němčičky (Fig. 10).

**Lycosidae**

*Alopeosa sulzeri* (Pavesi, 1873)

This species is bounded to steppe habitats, it is also dominant species on calcareous habitats and open sandy pasture lands (Szenténár et al., 2005).

This is a rare thermophilic species occurring from lowlands to middle altitudes (Kůrka et al., 2015). Adult individuals appear from April to July (Machač, 2008). Vulnerable species.

Location: Mutěnice, Němčičky and Milovice (Fig. 11).

*Arotosa lutetiana* (Simon, 1876)

A rare species inhabiting rocky steppe, forest steppe, sandbanks, warm bushy slopes and sunlit forest edges of lower altitudes. At Moravia region, this species is more common only on sand soils (Hula et al., 2014). This wolf spider was the most abundant species at study locations. Vulnerable species. Location: Dubňany, Mutěnice (Fig. 12).

*Pardosa bifasciata* (C. L. Koch, 1834)

A locally common species of different sand areas where is sometimes very common (Hula et al., 2014). Characterised as a vulnerable species. Location: Morkůvky, Mutěnice, Dubňany, Němčičky (Fig. 13).

*Pardosa hortensis* (Thorell, 1872)

Scarce species of epigeic spider preferring sunny and warm habitats such as steppe and forest-steppe. Good bioindicator of well preserved open habitats (Hula and Šťastná, 2010). Location: Mutěnice (Fig. 14).

**Miturgidae**

*Zora manicata* Simon, 1878

This species inhabits rocky steppes and forest steppes. In the Czech Republic, it is recorded only in warm regions from Bohemia (Kůrka et al., 2010) and southern Moravia (Bryja et al., 2005). Vulnerable species. Location: Mutěnice (Fig. 15).

**Philodromidae**

*Thanatus arenarius* Thorell, 1872

A rare Palaeartic species which is recorded only in warmer areas of Central Bohemia and South Moravia (Bryja et al., 2005). It inhabits sandy areas, rocky steppes and heath (Buchar and Růžička, 2002). Locally common on loess and sandy soils (Košulič and Hula, 2014; Hula et al., 2014). Vulnerable species. Location: Mutěnice, Dubňany (Fig. 16).

**Salticidae**

*Evarcha laetabunda* (C. L. Koch, 1846)

A locally common species of different xeric habitats, but known also from peatbogs. In Moravia, recorded from different places, but mainly from the Moravian Karst PLA (Niedobová et al., 2011). Vulnerable species. Location: Milovice (Fig. 17).

**Thomisidae**

*Cozyptila blackwalli* (Simon, 1875)

A rare species known from the scree forests under stones (Buchar and Růžička, 2002). European species extending to western Siberia. Vulnerable species. Location: Vranovice (Fig. 18).
I: Characteristics of study sites located across South Moravia in the Czech Republic with number of species and specimens.

<table>
<thead>
<tr>
<th>Location</th>
<th>District</th>
<th>Coordinates</th>
<th>Altitude (m a.s.l.)</th>
<th>Species number</th>
<th>Specimen number</th>
<th>Faunistic square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morkůvky</td>
<td>Břeclav</td>
<td>48°57′12″N, 16°50′11″E</td>
<td>280</td>
<td>36</td>
<td>287</td>
<td>7067</td>
</tr>
<tr>
<td>Němčičky</td>
<td>Břeclav</td>
<td>48°56′35″N, 16°50′19″E</td>
<td>245</td>
<td>42</td>
<td>289</td>
<td>7076</td>
</tr>
<tr>
<td>Kurdějov</td>
<td>Břeclav</td>
<td>48°58′58″N, 16°46′41″E</td>
<td>298</td>
<td>26</td>
<td>91</td>
<td>7066</td>
</tr>
<tr>
<td>Boleradice</td>
<td>Břeclav</td>
<td>48°56′43″N, 16°50′55″E</td>
<td>315</td>
<td>29</td>
<td>225</td>
<td>7067</td>
</tr>
<tr>
<td>Milovice</td>
<td>Břeclav</td>
<td>48°50′55″N, 16°41′34″E</td>
<td>225</td>
<td>32</td>
<td>256</td>
<td>7166</td>
</tr>
<tr>
<td>Vranovice</td>
<td>Brno</td>
<td>48°57′25″N, 16°35′46″E</td>
<td>202</td>
<td>30</td>
<td>184</td>
<td>7065</td>
</tr>
<tr>
<td>Mutěnice</td>
<td>Hodonín</td>
<td>48°52′51″N, 17°42′49″E</td>
<td>180</td>
<td>40</td>
<td>289</td>
<td>7068</td>
</tr>
<tr>
<td>Dubňany</td>
<td>Hodonín</td>
<td>48°53′30″N, 17°7′10″E</td>
<td>204</td>
<td>31</td>
<td>324</td>
<td>7168</td>
</tr>
</tbody>
</table>

II: List of recorded species with ecological indicators, in alphabetical order and the total numbers of specimens of spiders at individual collecting sites.

<table>
<thead>
<tr>
<th>Species</th>
<th>Conservation status</th>
<th>Degree of Rarity</th>
<th>Study locations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agelenidae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agelenida labyrinthica (Clerck, 1757)</td>
<td>A</td>
<td>1</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td>Coelotes terrestris (Wider, 1834)</td>
<td>VA</td>
<td>3</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td>Histoponop torpida (C. L. Koch, 1834)</td>
<td>VA</td>
<td>2</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td>Tegenaria campestris (C. L. Koch, 1834)</td>
<td>S</td>
<td>2</td>
<td>Mutěnice, Dubňany</td>
</tr>
<tr>
<td><strong>Atypidae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atypus picens (Sulzer, 1776)</td>
<td>VU</td>
<td>S</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td><strong>Clubionidae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clubiona pallidula (Clerck, 1757)</td>
<td>A</td>
<td>1</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td>Clubiona terrestris Westring, 1851</td>
<td>A</td>
<td>2</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td><strong>Dictynidae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cicurina cicur (Fabricius, 1793)</td>
<td>A</td>
<td>1</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td><strong>Dysderidae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysdera moravica Řezáč, 2014</td>
<td>LC</td>
<td>R</td>
<td>Mutěnice, Dubňany</td>
</tr>
<tr>
<td>Harpactea lepida (C. L. Koch, 1838)</td>
<td>VA</td>
<td>3</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td>Harpactea rubicunda (C. L. Koch, 1838)</td>
<td>VA</td>
<td>4</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td><strong>Gnaphosidae</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Callilepis schusseri (Herman, 1879)</td>
<td>VU</td>
<td>R</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td>Drassodes lapidosa (Walckenaer, 1802)</td>
<td>VA</td>
<td>2</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td>Drassodes pubescens (Thorell, 1856)</td>
<td>VA</td>
<td>1</td>
<td>Morkůvky, Němčičky</td>
</tr>
<tr>
<td>Species</td>
<td>Conservation Status</td>
<td>Degree of Rarity</td>
<td>Study locations</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------</td>
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<td>-----------------</td>
</tr>
<tr>
<td><strong>Drassylus praeficus</strong> (L. Koch, 1866)</td>
<td>A</td>
<td>2 4 1 3 5</td>
<td></td>
</tr>
<tr>
<td><strong>Drassylus pusillus</strong> (C. L. Koch, 1839)</td>
<td>EN</td>
<td>R 2 1</td>
<td></td>
</tr>
<tr>
<td><strong>Drassylus pumilus</strong> (C. L. Koch, 1833)</td>
<td>A</td>
<td>2 3</td>
<td></td>
</tr>
<tr>
<td><strong>Drassylus villicus</strong> (Thorell, 1875)</td>
<td>VU</td>
<td>R 7 2</td>
<td></td>
</tr>
<tr>
<td><strong>Gnaphosa modestior</strong> Kuleżyński, 1897</td>
<td>CR</td>
<td>VR 2 5 3 5</td>
<td></td>
</tr>
<tr>
<td><strong>Haplodrassus signifer</strong> (C. L. Koch, 1839)</td>
<td>VA</td>
<td>1 6 2 6 4</td>
<td></td>
</tr>
<tr>
<td><strong>Haplodrassus silvestris</strong> (Blackwall, 1833)</td>
<td>A</td>
<td>3 2 2</td>
<td></td>
</tr>
<tr>
<td><strong>Micaria formicaria</strong> (Sundevall, 1831)</td>
<td>VU</td>
<td>R 1 1</td>
<td></td>
</tr>
<tr>
<td><strong>Micaria pulicaria</strong> (Sundevall, 1831)</td>
<td>VA</td>
<td>2 1</td>
<td></td>
</tr>
<tr>
<td><strong>Tachyzerotes pedestris</strong> (C. L. Koch, 1837)</td>
<td>S</td>
<td>7 1</td>
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<td>Conservation status</td>
<td>Degree of Rarity</td>
<td>Study locations</td>
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<td><em>Pisaura mirabilis</em> (Clerck, 1757)</td>
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<tr>
<td><em>Evarcha laetabunda</em> (C. L. Koch, 1846)</td>
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<td><strong>Sparassidae</strong></td>
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<td><em>Robertus lividus</em> (Blackwall, 1836)</td>
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<td><strong>Thomisidae</strong></td>
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<tr>
<td><em>Cozyptila blackwalli</em> (Simon, 1875)</td>
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<tr>
<td><em>Cozyptila praticola</em> (C. L. Koch, 1837)</td>
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<td><em>Xysticus cristatus</em> (Clerck, 1757)</td>
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<tr>
<td><em>Xysticus kochi</em> Thorell, 1872</td>
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<td><em>Xysticus lanio</em> C. L. Koch, 1835</td>
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<td><em>Xysticus luctator</em> L. Koch, 1870</td>
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</table>
## Zodariidae

**Zodarion germanicum** (C. L. Koch, 1837)

<table>
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<tr>
<th>Study locations</th>
<th>Morkůvky</th>
<th>Němčičky</th>
<th>Kurdějov</th>
<th>Boleradice</th>
<th>Milovice</th>
<th>Vranovice</th>
<th>Mutěnice</th>
<th>Dubňany</th>
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<td>Degree of Rareness</td>
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<td>4</td>
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<td>3</td>
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### Total number of species

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<th>Milovice</th>
<th>Vranovice</th>
<th>Mutěnice</th>
<th>Dubňany</th>
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<tbody>
<tr>
<td>Total number of species</td>
<td>36</td>
<td>41</td>
<td>23</td>
<td>28</td>
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### Total abundance

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<th>Kurdějov</th>
<th>Boleradice</th>
<th>Milovice</th>
<th>Vranovice</th>
<th>Mutěnice</th>
<th>Dubňany</th>
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<td>Total abundance</td>
<td>287</td>
<td>289</td>
<td>91</td>
<td>225</td>
<td>256</td>
<td>184</td>
<td>289</td>
<td>324</td>
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Explanations: Degree of Rareness (based on Buchar and Růžička, 2002): VA (very abundant), A (abundant), S (scarce), R (rare), VR (very rare); Conservation status (according to Řezáč et al., 2015): CR (critically endangered), EN (endangered), LC (least concern), VU (vulnerable).

### III: Family count with recorded species

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<td><strong>SUM</strong></td>
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1: Map of the study area in the southern Moravia in the Czech Republic with a local map localization of study site (grey area – forest complex).
1 – Němčičky, 2 – Morkůvky, 3 – Boleradice, 4 – Kurdějov, 5 – Vranovice, 6 – Milovice, 8 – Dubňany, 7 – Mutěnice.

2: Distribution of Atypus piceus (Sulzer, 1776) in the Czech Republic (red dots – studied locality).

3: Distribution of Dysdera moravica Řezáč, 2014 in the Czech Republic (red dots – studied locality).
4: Distribution of *Callilepis schusseri* (Herman, 1879) in the Czech Republic (red dots – studied locality).

5: Distribution of *Drassyllus villicus* (Thorell, 1875) in the Czech Republic (red dots – studied locality).

6: Distribution of *Gnaphosa modestior* Kaluzynski, 1897 in the Czech Republic (red dots – studied locality).
7: Distribution of *Micaria formicaria* (Sundevall, 1831) in the Czech Republic (red dots – studied locality).

8: Distribution of *Zelotes aurantiacus* Miller, 1967 in the Czech Republic (red dots – studied locality).

9: Distribution of *Walckenaeria monoceros* (Wider, 1834) in the Czech Republic (red dots – studied locality).
Distribution of Scotina celans (Blackwall, 1841) in the Czech Republic (red dots – studied locality).

Distribution of Alopecosa sulzeri (Pavesi, 1873) in the Czech Republic (red dots – studied locality).

Distribution of Arctosa lutetiana (Simon, 1876) in the Czech Republic (red dots – studied locality).
13: Distribution of *Pardosa bifasciata* (C. L. Koch, 1834) in the Czech Republic (red dots – studied locality).

14: Distribution of *Pardosa hortensis* (Thorell, 1872) in the Czech Republic (red dots – studied locality).

15: Distribution of *Zora manicata* Simon, 1878 in the Czech Republic (red dots – studied locality).
16: Distribution of Thanatus arenarius Thorell, 1872 in the Czech Republic (red dots – studied locality).

17: Distribution of Evarga lactabunda (C. L. Koch, 1846) in the Czech Republic (red dots – studied locality).

18: Distribution of Cozyptila blackwalli (Simon, 1875) in the Czech Republic (red dots – studied locality).
CONCLUSION

During arachnological research of eight selected lowland oak woodlands, 1,945 adult spiders were collected, belonging to 22 families, 53 genera and 90 species. The most abundant species were representatives of the family Lycosidae – Arctosa lutetiana, Pardosa alpina and P. lugubris. A total of 31 species have the strong affinity to forest habitats, while 54 species preferring sunny xeric habitats. Of the entire araneocenosis, 23% species belonged to the Red List of Endangered Species of the Czech Republic and 40% of species belonged to the regionally significant xerothermic spiders. Among these rare and endangered species, e.g. Alopex cola sulzerii, Atyphus piceus, Callilepis schusteri, Drassyllus punimos, Drassyllus villicus, Gnaphosa modesteet, Thanatus arenarius, Walekena rena monceos and Zora manicata were included. To conclude, we discovered a substantially diversified spider assemblage with a large occurrence of rare and thermophilous species of spider's typical for open and xeric habitats. Our results confirm high biotic value of open and sparse oak woodlands in intensified agriculture land of southern Moravia. In this contribution, we also improve our knowledge of faunistic distribution of spiders typical for oak woodlands located in the Czech Republic, which were not well studied in previous researches.

Acknowledgment

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REFERENCES


